Resource control and social dominance in early childhood – behavioural, cognitive and affective factors in the first year at school

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DECLARATION

"I certify that the work contained in this thesis, or any part of it, has not been accepted in substance for any previous degree awarded to me, and is not concurrently being submitted for any degree other than that of Doctor of Philosophy being studied at the University of Greenwich. I also declare that this work is the result of my own investigations, except where otherwise identified by references and that the contents are not the outcome of any form of research misconduct."

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ABSTRACT

Social dominance in early childhood has traditionally been viewed as a social status based on aggression. However, through the lens of resource control theory, social dominance is attained via acquisition of resources (e.g. toys, friendship), which can be achieved via any behavioural means – prosocial or coercive. This research used this theoretical approach as a basis to investigate the associations between resource control strategy use, resource control success and social dominance, along with associated cognitive and affective factors – theory of mind, empathy, emotion comprehension and contextual moral application. Ninety-two children aged between 4 and 5 years old were recruited, along with their class teachers from 3 schools in the south east of England. At three time points across their first year at school, the children were assessed using a battery of verbal, theory of mind, empathy, emotion comprehension and selective moral disengagement assessments, as well as being asked to respond to vignettes in which their avatar was required to acquire a resource from an opponent. At each timepoint, class teachers reported on the children's general behaviour, resource control strategy use, resource control success and social dominance. Results found children's resource control strategy use explained near half the variance in resource control success near the beginning of the school year. However, this reduced by the end of the school year, with affective empathy associated with more frequent coercive and prosocial strategy use. Resource control success predicted social dominance at all timepoints. Social dominance was also directly predicted by both prosocial and coercive strategy use at T1, but only coercive strategy use at T2 and T3. Regardless of social preference, ToM, empathy, emotion comprehension and selective moral disengagement, as well as overall changes in class prosocial and coercive resource control strategy over the year, both social dominance and resource control success at the start of the year predicted themselves at the end of the year. Whilst resource control success was found to be directly predictive of social dominance in the immediate-short term, it did not predict social dominance across the year, suggesting that teacher-ratings of social

dominance may be influenced by the social prominence of the child when rating their social dominance. The lack of significant associations between resource control strategy and theory of mind suggest future measures should attempt to capture instances of theory of mind usage within real-world resource contest situations, via direct observation. Overall this work highlights the need for direct observational data to more accurately ascertain the interplay between cognition and strategy selection in early childhood, allowing greater elucidation of the establishment of social dominance in young children's peer groups.

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Introduction

Behaviours in early childhood relating specifically to the control of material or social resources begun to be empirically studied by developmental researchers during the 20th Century and clear links have since been drawn between successful resource control and a child's dominance status within a peer social group. Yet there remains a significant amount of work to be done before a paradigm of such resource control behaviour development and establishment of a child's social dominance status is properly formed.

The central aim of this thesis is to elucidate potential key factors involved in the use of resource control behaviour by 4-5-year-old children during their first year of formal school (in the United Kingdom this equates to Reception class) and investigate how the stability of these factors over the course of the school year influence resource control success and social dominance. Studying this age group specifically allows insight into a developmental epoch during which a variety of cognitive, affective and social factors are undergoing important changes and developments. At this age, an expanded and complex social interaction network – as a result of starting school (many classmates, older children from other classes and staff at school) – requires children to quickly adapt to new group interactions (Fabes, Martin, & Hanish, 2003; Martin & Fabes, 2001). How quickly and how well they adapt may depend on antecedent cognitive and affective processes. Interaction of these cognitive, affective and novel social factors make this age group of particular investigative interest.

The theoretical framework for the questions posed by this thesis stems from Resource Control Theory. Resource control theory (Hawley, 1999) is a developmental evolutionary theory of how power is established in human social groups. Specifically, it places central focus on the importance of attaining and maintaining control over resources (social or material) as the mechanism for increasing social dominance status within the group, with social dominance relationships emerging from the asymmetry in competitive prowess between individuals (Bernstein, 1981; Hawley, 1999).

Through the lens of resource control theory, prosocial and coercive behaviour aimed at achieving resource control are often referred to as 'strategies'. Whilst extensive use of either strategy type may well be effective at specific times in a child's social development, employment of both strategies at high frequency has been shown as the most effective method of resource control regardless of developmental stage (e.g. Hawley, 2003a, 2003b), with strategies potentially being selected based on context-specific environmental cues rather than an arbitrary choice (Pellegrini et al., 2011; Roseth et al., 2011). It is plausible to suggest that these strategies will have varied implications for an individual's social interactions depending on the extent of their use and the context in which they are deployed.

Children of this age (4-5-year-olds) pass important developmental milestones including key developments in theory of mind and empathy (e.g. Eisenberg, 1988; Eisenberg & Morris, 2001; Perner & Wimmer, 1985; Pons, Harris, & de Rosnay, 2004; Wimmer & Perner, 1983). Empathy and theory of mind (ToM) are widely studied in the child development literature but have yet to be investigated in the context of resource control theory; justification for their investigation under the lens of resource control theory will be provided and these two factors will comprise the core cognitive and affective factors investigated by the work presented here. Empathy and ToM may also be related to the contextual application of morals and moral judgement (Hoffman, 2000; Miller, Eisenberg, Fabes, & Shell, 1996), and one's comprehension of another person's ability to defeat one in a resource contest (resource holding potential), though this remains to be empirically tested. Resource-oriented behaviour specifically is poorly studied in this age group, with Hawley's theory shifting the focus to resource control behaviour in particular since the turn of the millennium (Hawley, 1999). In order to gain more accurate insight into such developmental phenomena, this study has collected longitudinal data at three timepoints at the beginning, middle and end of the participants' first year at school. This thesis' novelty lies in three broad areas: first, the investigation into the relationships between social and cognitive factors, resource control behaviour and social dominance in young children; second, the study of the development of these behaviours and their interactions with social cognition and affect over the first year of school utilising a longitudinal design in the final study. The third novel area is based on the design. This thesis investigates the impact that data handling has on analytical outcome; viz. how does treating the same resource-control behavioural data gathered from participants as two different variable types, categorical or continuous-type resource control variables affect the results of the studies? Whilst Hawley's work (Hawley, 2003a, 2003b; Hawley & Geldhof, 2012) has categorised participants as specific resource control 'subtype' groups, according to specific resource control behaviour-based parameters, Pellegrini, Roseth and colleagues (Pellegrini et al., 2011; Pellegrini, Roseth, et al., 2007; Roseth et al., 2011) have analysed resource control behaviour data as *continuous* variables. This study therefore aims to compare such categorical and continuous methods of data treatment.

Thesis overview

This brief section will outline the structure of this thesis.

Chapter 1 will review the pertinent background literature. It will discuss the theory relating to the key concepts of resource control and social dominance, defining these concepts as well as others, specifically Theory of mind (ToM), empathy and emotion comprehension, resource holding potential and selective moral disengagement. Relevant empirical findings relating to these concepts, particularly concerning early childhood will be reviewed, given this is the focal age group for this thesis. These discussions will lead to the formulation and statement of the overall thesis research questions.

Chapter 2 is the main methodology section and provides detailed descriptions of the sample, measures and procedures used to collect the data for the studies reported.

Chapters 3, 4, 5 and 6 report studies 1, 2, 3 and 4, respectively. Studies 1-3 were cross-sectional and focussed on the first timepoint (T1) data, collected at the beginning of the school year. Study 4 was longitudinal and examined how multiple factors influenced resource control strategy use across three timepoints over the school year – start (T1), middle (T2) and end (T3) – and how this affected resource control success and social dominance across this time frame.

Specifically, study 1 (chapter 3) examined the relationship between frequency of resource control strategy use, resource control success and social dominance in the 4-5-year-old participants. Study 2 (chapter 4) continues the examination from study 1 (chapter 3) but introduces cognitive and affective factors – ToM, empathy, emotion comprehension and moral reasoning – that may be important factors in resource control strategy use in early childhood. Study 3 (chapter 5) further expands the examination by examining whether children's responses to hypothetical resource contests with varied opponent characteristics is associated with the cognitive/affective attributes measured (study 2) and/or the teacher-reported resource control strategy, resource control success and social dominance data. Study 4 (chapter 6) longitudinally investigates how the factors predicting strategy use, resource control success and social dominance vary between T1, T2 and T3. Moreover study 4 investigates the influence of establishing social dominance early on in the school year has an effect on dominance at the end of the year.

Chapter 7 is the general discussion. It summarises the findings from the four studies and discusses these findings in terms of how they addressed the core research questions, implications the findings have theoretically and methodologically. Limitations of the present studies are discussed, as well as how future investigations can build upon the studies presented in this thesis.

Chapter 1 – Literature Review

1.2. Social Dominance and resource control in humans – an ethological basis

Resource control theory (Hawley, 1999) is an evolutionary-based theory of social dominance. The concept of social dominance has its roots in ethological study and, ultimately, in Darwinian Theory (Darwin, 1859). Throughout the literature there is the seeming synonymy between the terms 'social dominance' and 'dominance' which can be traced back to at least Gage and Lieberman (1978), with 'dominance' essentially acting as a short hand form of 'social dominance'. This author is yet to find any literature which explicitly defines 'dominance' and 'social dominance' as separate conceptual entities; indeed, Hawley uses the terms interchangeably at times throughout her published work. It is possible that 'social' was a qualifying term added at some point to the dominance concept that appears in primatological or anthropological study, to highlight the increased complexity of the respective societies compared to other animal groups. Regardless, as per Hawley, this thesis will use both the terms 'social dominance' and 'dominance' and will consider these as having identical meanings.

1.2.1. Social dominance and dyadic agonism

Whilst social dominance has been a widely utilised concept in the developmental psychology literature it was, until the turn of the millennium (Hawley, 1999, 2014), an ill-defined concept. The lack of a commonly agreed upon definition has resulted in conflicting findings and has obstructed progression towards a deeper understanding of human social development.

Following an influential study on the pecking order of hens (Schjelderup-Ebbe, 1922) the concept of dominance transitioned to human research. Whilst there was at least one alternative approach to conceptualising dominance in children (Hanfmann, 1935), a leaning towards the study of *agonistic* dominance developed and this definition resultantly dominated the 20th century literature (e.g. McGrew, 1969; Sluckin & Smith, 1977; Strayer & Strayer, 1976; for more comprehensive list see Hawley 2002). The concept of agonism can be defined as aggressive behaviour in animal social groups, based around physical confrontations between individuals, which may result in physical contact, physical threat/intimidation displays and resultant submission. The term was taken from ethological works (e.g. Schjelderup-Ebbe, 1922) and primatological dominance studies (e.g. DeVore, 1965) and was similarly adopted by developmental psychologists with much of the developmental research on social dominance in humans focussing on the agonistic behaviour of young children.

McGrew (1969) produced a seminal work which established a 'dominance rank' (i.e. a dominance hierarchy) for a group of 30 children (3-5 years old), based on the relative dominance of each child to their peers. Here, a child was classified as dominant if they won a resource contest against a peer. Such dyadic interactions (resource contests) accounted for a large proportion (86%) of the observed encounters in the study and it was found that dominance, i.e. higher positioning in the dominance hierarchy, positively correlated with the display of aggressive behaviour. Strayer and Strayer (1976) continued this rationale in their study, defining young children's social dominance in terms of 'dyadic agonism', rather than individual aggression – that dominance relationships and thus group dominance hierarchies were determined through aggressive conflicts between *pairs* of individuals, rather than solo acts of aggression. They found that dominance status was not determined by the frequency of initiated aggression, noting that the most dominant child in the study exhibited a relatively low aggression frequency. This may be for several reasons, for example, aggression was may not have resulted in successful resource contests, or that another behaviour type was more effective in resource control. Strayer and Strayer, though not providing specific examples, suggested that other behavioural modes affect dominance in young children when they mention 'other individual "trait" concepts' (Strayer & Strayer, 1976, p. 988).

Social dominance remained a phenomenon defined by dyadic agonism (e.g. Abramovitch & Grusec, 1978; Freniere & Charlesworth, 1983; Strayer & Trudel, 1984), until the theory of cooperation (Charlesworth, 1988, 1996) posited alternatives to agonism-driven competition (also see Chapais, 1992; Crook, 1971; Strum, 1994). Charlesworth (1996) stated that individuals can compete for resources through cooperation and can both attain a resource otherwise unobtainable for the individual, and unequally distribute the benefits, likely according to dominance. The theory was an important milestone in developmental research and was instrumental in the development of Hawley's resource control theory (1999). A study by Russon and Waite (1991) demonstrated the broadening theoretical scope of dominance research. Their study of infant dominance relationships defined a dominant individual as one who emerges from a dyadic contest with the contested resource, one who instigates aggression, disturbs the behaviour of another individual, or 'provides contact' to another individual. It is not explicitly stated whether disturbing the behaviour of another individual or providing contact would be in relation to obtaining something from them; it may be that a social resource is being competed for in these situations, but this is not explicitly stated. The inclusion of these latter two items in the definition opens the dominance concept to non-aggressive methods of resource attainment. Their results support the position of Charlesworth (1988) in finding that there is no significant relationship between dominance and agonistic success, suggesting that there may be non-agonistic behaviours which contribute to dominance, at least in infant peer groups. Moreover, they state that defining dominance based on *outcome* rather than the *process* with which it is achieved may be a more useful definition and is a crucial observation which later forms a core tenet of resource control theory.

A second branch of developmental research, contemporary to the above created a potential paradox surrounding agonism and social dominance, proposing that aggressive behaviour in young children was a *maladaptive* behaviour, indicative of poor social and cognitive development (Crick & Dodge, 1994; Levy-Shiff & Hoffman, 1989). A paradox is thus created: that aggression is *both* the behavioural path to social dominance *and* a sign of social ineptitude and maladaptation. The paradox exists if theory states that social dominance results from the dominant individual specifically choosing aggressive behaviour based on at least a degree of social awareness and analysis of the environmental context; if this is so, then one cannot be socially dominant if one is concurrently socially inept, as social dominance from this perspective is *contingent on* social adeptness. However, the paradox does *not* exist if theory views social dominance as something which can be achieved through means that are not exclusively dependent on the deliberate, socially perceptive actions of the individual, i.e. arbitrary, non-context-specific aggression. This approach then allows socially unsophisticated individuals to achieve a high social dominance status. It is therefore impossible to ascertain if this paradox exists until a clear definition of social dominance is presented[1] (see section 1.2.).

By the turn of the millennium, research suggested that aggressive behaviour *became* maladaptive i.e. less socially acceptable, as children aged, with aggressive children being rejected by peers as a function of time and social development (Dodge, Coie, Pettit, & Price, 1990; Pettit, Bakshi, Dodge, & Coie, 1990; Wright, Zakriski, & Fisher, 1996), with the trend continuing into adolescence (Cairns, Cairns, Neckerman, Gest, & Gariépy, 1988). Such research began to implicitly (or in one case explicitly, see Wright et al., 1996) challenge the agonistic assumptions surrounding social dominance, joining the contention of Russon and Waite (1991) and others (e.g. Chapais, 1992; Charlesworth, 1988, 1996; Strum, 1994). In one of their two observational studies from 1990, Dodge and colleagues (Dodge et al., 1990) found that more reactively and instrumentally aggressive boys (instrumental aggression was defined as "a nonsocial outcome, such as object acquisition"; p. 1291) in the first- and third- grades (US system; ~6-9-years old) were both socially rejected at higher rates compared to their peers. Moreover, whilst popular first graders bullied more, similar behaviour in third graders was associated with a decrease in popularity/social preference.

[1] One could imagine this as the 'Schrödinger's Cat' of social dominance research.

In their other study (Pettit et al., 1990) they evidenced that higher social preference was associated with higher dominance rank more strongly in first grade boys than in third grade boys and that the first-grade groups exhibited greater aggression than the third-grade groups. The definition of dominance consisted of four component 'dominance behaviours': persuasion, bullying, angry-reactive aggression and instrumental aggression, thus this definition of dominance includes both outcome-based (instrumental aggression) and process-based (angry-reactive aggression) behavioural modes. Therefore, dominance as defined in this context is not solely associated with whether goals are achieved through certain behaviours, or whether children simply behave in certain ways; it is a composite of the two. Roughly fifty percent of dominance behaviours in both age groups were aggression-based. Pettit et al. suggest that due to the aggressive behaviour in the younger groups being more normative, and normative behaviour is socially valued (Wright, Giammarino & Parad, 1986), aggressive behaviour could be seen as a social positive, therefore the aggression-based dominance confers a social benefit. Conversely, they contended that such overt aggression was less desirable in the older children, thus *their* dominance construct was not found to be associated with social preference. In both age groups, higher rates of aggression predicted higher dominance rank, despite around fifty percent of the dominance interactions being rated as non-aggressive ('persuasion'). Taken as such, this data somewhat supports previous notions that dominance is aggression-based. A second possibility from these studies is that aggression becomes less socially desirable over time.

Pellegrini and colleagues tackled these possibilities in a series of longitudinal studies. A consistent finding was that the effectiveness of aggression in terms of achieving dominance *reduced* as a function of time, specifically in 2-5 year olds over the course of a school year (Pellegrini et al., 2011; Pellegrini, Roseth, et al., 2007; Roseth et al., 2011). Their research contested notions of an agonism-based dominance, evidencing that socially dominant preschool children display increasing prosocial/affiliative behaviour over time and increase in sociometric ratings over time (Pellegrini et al., 2011; Roseth et al., 2011). A possible reason for discrepancies between the research of Dodge, Pettit and colleagues (Dodge et al., 1990; Pettit et al., 1990) and Pellegrini, Roseth and colleagues (Pellegrini et al., 2011; Pellegrini, Roseth, et al., 2007; Roseth et al., 2011) is their measure of social dominance. Whilst Dodge and Pettit did include a broad 'prosocial' dimension into their dominance construct, they included any 'dominance behaviour' that was initiated (see above description), regardless of whether that action achieved the desired outcome. Conversely, Pellegrini and colleagues used the Dodge and Coie (1987) Likert measure of social dominance (completed by teachers), which comprises four items – *leader, competitive, frequently centre of group, gets what wants*. Here, an obstruction to empirical clarity is stark – the definition of dominance.

1.2.2. Defining social dominance

In the research discussed above, either implicitly or explicitly, there was a functional definition of social dominance given. In most cases it can be paraphrased as 'dominance according to coercive dyadic *conflict* in resource contests' ***or*** 'dominance according to coercive dyadic *victories* in resource contests' (section 1.2.1 for details). Crucially, there was an explicit or implicit theoretical view of dominance in young children as being agonism-based, and this focus on the agonistic *process* of achieving the social dominance *functionality/outcome*, restricted the methodological approaches, effectively narrowing the functional definition of social dominance to one of *agonistic* dyadic interaction/victories in resource contests. Moreover, the semantic conflation of 'dominance' with similar words – specifically, the possible conflation of 'dominance' with the word 'domineering'[2] (Hawley, 2014b) – are plausible contributing factors to the decades of conceptually and methodologically restricted research.

[2] Domineering is defined as: 'Ruling arbitrarily or imperiously; tyrannical, despotic; overbearing, insolent' (Oxford English Dictionary, 2013).

It was not until 2014 that a clear functional definition of social dominance was stated in the developmental literature (Hawley, 2014b), though this was heavily implied in her earlier research (Hawley, 1999, 2002, 2003a, 2003b; Hawley, Johnson, Mize, & McNamara, 2007). Hawley used the established Oxford English Dictionary definition of 'dominant', defined as:

"T*he exercise of chief authority or rule – or occupying a commanding position.*"

This definition does not state *how* social dominance is achieved but provides only an explicit functional definition of the concept itself, allowing a more complete picture of social dominance and its relationships with behaviour to be drawn.

1.2.3. Social dominance and the hierarchy construct – explaining wider social organisation

Primatological research has defined dominance as a 'general descriptive concept' (Strayer & Strayer, 1976, p. 980) which summarises stable social relationships within a group evidenced by internal conflict resolution (Alexander & Bowers, 1969; Bernstein, 1970; Hinde, 1974; Strayer & Bovenkerk, 1975; see Strayer & Strayer, 1976). Specifically, dominance hierarchies in non-human primate societies have been used to explain social learning (Hall, 1968), social innovation (Tsumori, 1967), social play (Dolhinow & Bishop, 1972), group defence (Jolly, 1972), reaction to strangers (Ripley, 1967), and reorganisation of the social unit (Furuya, 1960; Sugiyama, 1965 - see Strayer & Strayer, 1976). In recent decades, the study of dominance hierarchies has transitioned into human psychological research.

The study of dominance has been mainly examined within the group rather than between dyads and thus has often been investigated in relation to the formation of dominance hierarchies. Key research theorised that peer groups of young children would take a similar hierarchical developmental form and produced linearly ranked social dominance hierarchies based on agonist dyadic behaviours between individuals (McGrew, 1969, 1972; Sluckin & Smith, 1977; Strayer &

Strayer, 1976). The focus on a solely agonistic view of social dominance is highlighted by the use of methodologies exclusively recording data concerning aggressive displays. Prominent examples can be seen in work by Strayer and Strayer (1976) and Sluckin and Smith (1977). In both studies, children were observed in aggressive dyadic conflict situations and a dominance hierarchy was identified by the researchers, with each child ranking linearly depending on their wins and losses, as well as transitive assumptions of dominance (i.e. A > B; B > C; therefore A > C). The children were said to be socially dominant if they ranked highly on the social dominance hierarchy, which is determined by the success of their aggressive behaviour in dyadic confrontations. Though such study showed that dyadic agonism was a key factor in establishing some form of group social structure in young children, some data nevertheless did not entirely fit patterns predicted by the agonism-driven model of social dominance (e.g. Strayer & Strayer, 1976; Russon & Waite, 1991) and this lack of fit increased with the age group studied (Hawley, 1999), exemplified by the studies by conducted by Dodge and Pettit and colleagues (Pettit et al., 1990), and Pellegrini and colleagues (Pellegrini et al., 2011; Roseth et al., 2011), discussed above (section 1.1.).

Further investigations found that from around the age of around 6-years-old aggressive children are increasingly socially isolated and shunned by peers (Dodge et al., 1990; Pettit et al., 1990; Wright et al., 1996). Conversely, the agonism-based dominance hierarchies of infants, toddlers and younger children could reliably predict wider group social interaction and organisation outside of resource competition situations, with more dominant children being looked at, imitated and liked more by peers (Abramovitch & Grusec, 1978; Jones, 1984; La Freniere & Charlesworth, 1983; Russon & Waite, 1991; F. Strayer & Trudel, 1984). However, the more recent studies by Pellegrini, Roseth and colleagues suggest that this trend towards reduced social standing of aggressive individuals emerges even earlier, even in preschool groupings (Pellegrini et al., 2011; Pellegrini, Roseth, et al., 2007; Roseth et al., 2011). If one holds to the ‘agonist-based dyadic resource contest’ model of social dominance, this pattern of agonist isolation, therefore, contravenes the intended utility of the social dominance hierarchy – predicting wider group social organisation, external to resource contests. Viz. if one adheres to this model of social dominance, then hypothetically an individual who wins the most contests through aggressive behaviour would therefore be placed at the top of the social dominance hierarchy. Yet data shows that these individuals would be increasingly socially isolated from as young as 3 years old (Pellegrini et al., 2011; Pellegrini, Roseth, et al., 2007; Roseth et al., 2011) – in contrast to the previous findings of Dodge and colleagues (Dodge et al., 1990; Pettit et al., 1990; Wright et al., 1996) – reducing their ability to affect group organisation and dynamics beyond dyadic contests. Invoking the concept of a social dominance hierarchy or social dominance relationships to explain wider group organisation and dynamics is redundant if it fails to increase understanding of the organisation and dynamics of the group (Bernstein, 1981). If one still adheres to the agonism-based definition of social dominance, one is required to invoke another concept/s which must gradually increase in relevance and replace social dominance as a predictor of social organisation over time.

Alternatively, one can remove the inclusion of behavioural *processes* (i.e. agonism) entirely from the definition of social dominance, resulting in a purely functional definition, which is not limited by its adherence to specific behavioural inputs and allows an unspecified number – and variation of – behavioural processes with which dominance can be achieved (Hawley, 1999, 2014). This allows dominance hierarchies to provide useful predictions of wider group organisation across developmental time, without the need to invoke other concepts as replacements at developmental stages that are difficult to reliably identify and that are characterised by different prominent social behaviour modes.

A crucial part of the utility of hierarchical dominance structures is the individual's ability to comprehend – in order to adhere to – that structure in terms of the relative dominance statuses of the members of the group. Recent research has identified that even preverbal infants are capable of distinguishing between the subordinate and dominant individual in a contest scenario. One such study evidenced that 10-13-month-old preverbal infants were able to predict the outcome of a contest scenario in which two novel individuals have conflicting goals, based on physical size differences, whilst 8-month-old infants could not (Thomsen, Frankenhuis, Ingold-Smith, & Carey, 2011). Yet a further study has shown that infants as young as 6 months were able to predict a similar scenario outcome based on another social dominance status cue: number of allies/individuals in a group (Pun, Birch, & Baron, 2016); 6-12 month-old infants were able to infer the dominance relationship between two competing individuals based on the numerical size of their respective social groups. Findings such as these, combined with similar data gathered from non-human primate dominance research (Wilson, Hauser, & Wrangham, 2001), has led researchers to theorise that over evolutionary time an innate cognitive capacity for social dominance perception has been conserved (Pun et al., 2016; Pun, Birch, & Baron, 2017).

Previously in this chapter, dominance has been discussed in terms of behavioural adaptations such as aggressive or prosocial behaviour. However, evidence shows that physical characteristics such as physical size are also likely to be a factor in a child's perception of social dominance (Pellegrini, Roseth, et al., 2007). However, in terms of increasing social dominance status, the importance of physical size may diminish with time and cognitive development; whilst 10-13-month-old infants have been shown to perceive social dominance by physical size differences, by 4-years-old, social dominance behavioural adaptations and cognitive development surpass physical size in terms of social dominance prediction (Hawley & Little, 1999; Pellegrini, Roseth, et al., 2007). Rather than entirely replacing factors (such as physical size) that predict social dominance or affect dominance perception, later cognitive, behavioural and social developments may add to the complexity and number of factors that children may consider when assessing social dominance relationships, with physical size not necessarily having the greatest impact. Social dominance relationships and perception of them may relate to an individual's decision to proceed with, or back down from, a contest over a resource against another individual.

In other words, assessing another's 'resource holding power/potential' (Parker, 1974) – their ability to attain/maintain resource control – may well be contingent on considering traditional dominance cues such as physical size and number of allies, as well as more complex social and behavioural factors mentioned above that develop over the course of childhood. However, as discussed in more depth below (section 1.7), the extent to which children in their first year of school (4-5 years old) take aspects related to the RHP of others into account when deciding on how to deal with a resource contest remains to be directly investigated.

More recently research has endeavoured to identify the neural underpinnings of social dominance comprehension in humans. A recent review (Qu, Ligneul, Van der Henst, & Dreher, 2017) compiled the neuropsychological data surrounding social dominance comprehension and showed that multiple regions of the brain were associated with social dominance relationship comprehension, but were dependent on the way in which the individual learned about that relationship – either through observational learning, dyadic interactions or dominance cues, e.g. physical size (Qu et al., 2017). A recent study has shown in adults that the ability to learn the relative social dominance ranks in a hierarchy coincides with increased activity in sub-regions of the medial prefrontal cortex (mPFC; Kumaran, Banino, Blundell, Hassabis, & Dayan, 2016) as well as the superior temporal sulcus (STS; Binder et al., 2017). Whilst interest in the neurobiology underlying these processes is beyond this current project, it is pertinent to note that there is an overlap in functionality of the mPFC; specifically, that sub-regions of the mPFC have been identified as important to ToM (e.g. Schaafsma, Pfaff, Spunt, & Adolphs, 2015; Schurz, Radua, Aichhorn, Richlan, & Perner, 2014; Shamay-Tsoory, Aharon-Peretz, & Perry, 2009), a key variable of interest in this project (sections 1.4 and 1.5).

1.2.4. Section 2 summary

Theory and research regarding social dominance, (viz. dominance), has undergone a transition from an almost exclusively agonist-based concept, to a more holistic framework that considers a wider range of behaviour. As behavioural data which violated the former model accumulated, new theories and supporting data emerged (Chapais, 1992; Charlesworth, 1988, 1996; Russon & Waite, 1991; Strum, 1994) emphasising, or at least suggesting, the importance of prosocial behaviour in social interaction. Hawley explicitly redefined social dominance to reflect the varied ways in which social dominance can be achieved (Hawley, 2014b).

Recent developmental research has built upon the ethological concept of dominance hierarchies and has shown that young children and even infants are capable of appreciating dominance relationships between individuals via a variety of cues, including but beyond physical size differentials (Pun et al., 2017; Thomsen et al., 2011) whilst neuroscientific evidence has identified regions of the brain that may be involved in hierarchical identification, with those regions also being involved in higher cognitive functions such as ToM.

1.3. Resource Control Theory – a strategy-based approach to social dominance

Resource control theory contends that whilst aggression and agonistic contest can be important factors in determining an individual's social dominance status, they are not necessarily the sole or most influential behavioural factors. Resource control theory provides the most robust explanatory framework for the development of social dominance to date, through its fundamental grounding in Darwinian Theory and its inclusion of the wider behavioural spectrum. Resource control is the ability of an organism to successfully access – and maintain continued access to – environmental (either material or social) resources. The concept of resource control is firmly rooted in Darwin's theory of Natural Selection (Darwin, 1859). In nurturing human societies and groupings, where basic resources are in surplus, children naturally utilise their developing resource-acquiring skills to procure desired (rather than required) resources, such as toys, social relationships and attention, and information (Hawley, 2014).

Resource control theory posits that there is a significant relationship between resource control and social dominance – an individual will be unlikely to attain a dominant status in a group if they are unable to successfully compete for resources (e.g. Hawley 1999, 2002, 2014, 2015; McGrew, 1969, 1972; Pellegrini, 2008; Roseth et al., 2011; Sluckin & Smith, 1977; Strayer & Strayer, 1976). Hawley defines the two as highly associated (Hawley, 2014)**,** whereby social dominance is achieved through successful resource competition; indeed her research as well as Pellegrini, Roseth and colleagues have shown there to be a strong association between the two (Hawley, 2002, 2003b, 2003a; Hawley & Geldhof, 2012; Pellegrini et al., 2011; Pellegrini, Roseth, et al., 2007; Roseth et al., 2011).

Prosocial behaviours such as cooperation and sharing as well as coercive behaviours such as physical, verbal and relational aggression are employed (Charlesworth, 1988, 1996; Strum, 1994) as behavioural strategies for attaining resource control. Resource control theory divides this strategy spectrum into two broad groups: coercive strategies and prosocial strategies (Hawley, 1999, 2003a), and states that individuals can choose strategies from either or both group when faced with a resource control contest, or not choose a strategy at all. Such ‘behaviour as strategy’ credits the different behaviours that children exhibit with an equal evolutionary and strategic validity by acknowledging that environmental and social context was critical to the success of any strategy chosen by a child, be it prosocial or coercive (Hawley, 1999, 2002, 2014b, 2015). In essence, for optimal resource control, children must learn to adapt their strategic selection to the social environment.

1.3.1. The strategy subtypes

Resource control theory's framework places individuals into one of five strategic subtypes, according to Hawley (Hawley, 2003b). *Coercive controllers* use aggressive strategies in high frequency (above the 66th percentile) relative to their peers to gain and maintain resource control and would fit the traditional agonism-specific description of 'dominant' (Sluckin & Smith, 1977; Strayer & Strayer, 1976). The previous decades of research into human social dominance have provided a great deal of information on various coercive strategies utilised by children and adolescents. For example, Strayer and Strayer catalogued some of the various coercive strategies employed by children – physical attacks, object struggles, threat gestures – as well as responses to those strategies by the other children involved in the resource control contests (Strayer & Strayer, 1976). *Prosocial controllers* employ prosocial strategies – such as sharing, co-operating, offering friendship or advice – at high frequency (above the 66th percentile) relative to their peers to attain and maintain resource control. *Bistrategic controllers* employ both coercive and prosocial strategies of resource control at high frequency (above the 66th percentile) relative to their peers. *Typical controllers* use both prosocial and coercive strategies at a relatively average rate (below the 66th percentile for both, below the 33rd percentile for none or one), whilst *non-controllers* score relatively low (below the 33rd percentile) on both prosocial and coercive behaviour and tend to stay withdrawn from situations of resource competition (Hawley, 1999; Hawley, 2014). In broader terms, the subtypes – regardless of the specific controller type – can be viewed as non-altruistic behavioural mechanisms for resource attainment. Resource control theory-based research with young children between 2 and 6 years suggests that the coercive, prosocial and bistrategic controllers are more competitively successful and socially dominant, compared to the typical controllers and non-controllers. Coercive controllers are less effective in older children within this age group, whilst and prosocial and bistrategic controllers tend to be more successful in terms of resource acquisition and maintenance as well as increasing in peer regard in the older child groupings; specifically, resource control theory-specific research to date evidences bistrategic controllers being the most successful in terms of resource acquisition and maintenance over all, including in adolescents (Bjorklund & Pellegrini, 2000; Hawley, 2002, 2003b, 2003a, 2014b, 2015; Hawley & Geldhof, 2012; Hawley et al., 2007; Hawley & Little, 1999; Massey-Abernathy & Byrd-Craven, 2016; Massey, Byrd-Craven, & Swearingen, 2014; Pellegrini, Roseth, et al., 2007; Pellegrini, 2008; Pellegrini et al., 2011; Pellegrini & Long, 2002; Roseth et al., 2011).

1.3.2. Reconciling agonism with resource control theory

1.3.2.1. Aggression, prosocial behaviour and their use by subtype

As discussed above (section 1.2.2.) there is increasing evidence in the developmental literature that aggressive behaviour is increasingly socially stigmatised with age within social groups; however, the relationship is complex. For example, Nelson, Robinson, and Hart (2005) found that pre-schoolers (4-5-years-old) were less likely to socially reject a peer if they behaved both prosocially and exhibited *relational* aggression – acts involving manipulation or damage (actual or threatened) to a victim's social relationships through means such as social exclusion or rumour spreading (Crick, Casas, & Ku, 1999; Crick & Grotpeter, 1995), compared to when peers behaved prosocially and exhibited *physical* aggression, particularly for female peers. Though Nelson, Robinson and Hart (2005) did not approach their research from a resource control theory perspective, they did highlight distinct behavioural similarities between their 'controversial peers' – those children who were both highly liked and disliked amongst their peers - and Hawley's bistrategic controller subtype (Hawley, 2003b; Nelson et al., 2005) in that both groups employ both prosocial and coercive behaviour. However, a difference is that bistrategic children tend to suffer little rejection, unlike Nelson et al.'s 'controversial peers'. Hawley and others (e.g. Hawley, 2003a; Pellegrini, 2008; Pellegrini et al., 2007) have argued that ostracism of aggressive individuals is moderated by the aggressor's use of prosocial behaviour. Why Nelson, Hart and Robinson (2005) did not find such a moderation effect in regards to the controversial peers is unclear, with confounding factors, such specific classroom environmental differences in the context of their study compared to Hawley's that were not mentioned, potentially accounting for the differing rejection rates. Studies suggest that bistrategic controllers are both popular with peers and are amongst the most aggressive children in these samples. However, the coercive controllers in these studies, who exhibit significantly less prosocial behaviour but similar levels of aggression compared to the bistrategic controllers, are less popular and are more likely to suffer the repercussions associated with aggressive behaviour (Hawley, 2002; Hawley & Geldhof, 2012; Massey & Byrd-Craven, 2014; Pellegrini et al., 2007), with this effect becoming more pronounced over time (Pellegrini et al., 2011; Roseth et al., 2011).

Of note, in a large study of 1,723 adolescents (*M* = 14.0 years) peers rated bistrategic controllers as using prosocial strategies at the same rate as prosocial controllers, but as using coercive strategies (items tapping both physical and verbal resource-specific aggression) at a higher rate than coercive controllers (and every other controller type). However, bistrategic controllers were rated as more central to the social group in addition to being the most successful resource controllers with the highest social dominance status overall. Additionally, bistrategics were *perceived* by peers to be the most popular, as well as rated as *actually* most liked alongside prosocial controllers. Notably coercive controllers were significantly less liked than the bistrategic and prosocial controllers, but more liked than either typical- or non-controllers (Hawley, 2003a). Coercive controllers were still more socially dominant than typical- and non-controllers despite low popularity, suggesting that there is some form of social value to successful resource control, at least in adolescence, regardless of popularity.

In a study of 163 preschool children (M = 4.29 years), bistrategic controllers were rated by teachers as being equally the most effective resource controllers along with coercive controllers, with both subtypes being more effective than prosocial-, typical- and non-controllers (Hawley, 2003b). Bistrategic controllers were rated highest on *relational* aggression specifically. Bistrategic controllers were also rated as equal highest in likability among peers with prosocial controllers. In a further preschool study with 153 children (*M* = 4.85 years) teachers rated bistrategic and coercive controllers to be the highest in non-resource-specific aggression whilst bistrategics were rated as the most socially dominant group out of the five resource control subtypes and joint highest socially preferred with prosocial controllers – coercive controllers received the most negative nominations for social preference and scored similarly to non-controllers (Hawley & Geldhof, 2012; Hawley et al., 2007).

The above studies by Hawley and colleagues highlight some interesting patterns, particularly when comparing the preschool studies (Hawley, 2003a; Hawley & Geldhof, 2012; Hawley et al., 2007) with the adolescent study (Hawley, 2003a). Across all studies, typical controllers and non-controllers consistently scored lowest in social dominance, resource control and sociometric/likability measures. Moreover, a consistent result in the preschool studies was the finding that the two highest scoring groups for effective resource control (Hawley, 2003b) and social dominance (Hawley & Geldhof, 2012; Hawley et al., 2007), were bistrategic and coercive controllers, with prosocial controllers consistently scoring below these two subtypes. In contrast, research with adolescents indicates that, in this age group, coercive controllers are significantly less effective than both bistrategic and prosocial controllers (Hawley, 2003a) .

These data suggest that, whilst bistrategic controllers remain highly effective resource controllers in both preschool and adolescent age groups, coercive and prosocial controllers may switch places, with prosocial controllers superseding coercive controllers by adolescence. Given that social relationships can be highly desired resources themselves, adolescent coercive controllers, who have shown a lack of flexibility in terms of employing prosocial strategies (Hawley, 2003a), may be socially ostracised, potentially resulting in further negative ramifications beyond the scope of this present study, yet an important investigative topic for other projects and society as a whole. Additional comparison of the above with the research by Pellegrini, Roseth and colleagues serves to further elucidate the relationship between control strategy and social dominance and resource control. Their work (Pellegrini, 2008; Pellegrini et al., 2011; Pellegrini, Roseth, et al., 2007; Roseth et al., 2011), particularly a longitudinal study (Roseth et al., 2011) corroborates Hawley and colleagues' suggestions regarding the decreased aggression over time (Hawley, 2003a, 2003b).

Specifically, Roseth et al. (2011) did not analyse their data in terms of the five strategy subtypes, therefore direct comparison to Hawley's work is not possible in this regard. However, they evidenced longitudinally over the course of one school year that preschool children's relative social dominance status was associated with the change in rate of coercive and prosocial control strategies employed. Frequency of coercive and prosocial control strategies were then investigated in terms of dominance status. Roseth et al. found an overall decline in the rate of coercive resource control behaviour over the year, but children with higher dominance status exhibited higher rates of coercion at the start of the year with a significant decrease in rate shortly after, ending in low rates of coercion similar to those children rated as having low dominance status, whose rates of coercive behaviour started significantly lower and gradually reduced over time. Interestingly, Roseth et al. noted a slight and temporary increase in coercive behaviour starting at around half way through the study in only the higher social dominance status children, which coincided with a return to school after the end of term break. As they noted in their discussion, this corroborates the notion expressed by McGrew (1972) that disruption to normal classroom dynamics can result in a short-term elevation of aggression; viz. the socially dominant children may be using aggression to re-establish the social dominance relationship differentials that may have partially degraded over the time spent apart from their peers (Roseth et al., 2011). Conversely to coercive control behaviour rates, prosocial control behaviour rates steadily increased over time for all children, with the more dominant children exhibiting significantly greater prosocial control behaviour across the year. The overall result showed that prosocial and coercive resource control behaviour began at fairly similar rates across the sample (though less socially dominance children scored lower for both behaviour types); however, prosocial and coercive behaviour patterns diverged rapidly. By the end of the year, this pattern of divergence had resulted in a significantly higher rate of prosocial control behaviour than coercive, for *both* highly dominant and less dominant children overall. Of significant interest is their finding that there was no association between social dominance and prosocial control, contrary to a previous finding (Pellegrini & Bartini, 2001). They suggest that rather than 'replacing' coercive strategies with prosocial ones, dominant children may tend to increase their prosocial strategy use, with the effect being to offset the social repercussions caused by their prior aggression (Roseth et al., 2011); viz. the general rate of prosocial behaviour is not associated with social dominance, but that contextual application of prosocial behaviour might be. Indeed, they found that the use of prosocial behaviour towards a recent opponent was significantly related to social dominance; this prosocial/dominance finding, they argue, can be explained as *reconciliation*.

1.3.2.2. Bistrategic control – Reconciliation

de Waal (1986) observed reconciliation behaviour in non-human primate groups and this concept was invoked by Pellegrini and Bartini (2001) as a possible explanation for the tandem reduction in the explanatory power of aggression and the increase in the explanatory power of affiliation in terms of dominance status in adolescent boys. Reconciliation in the context of resource control theory is a bistrategic strategy comprising initial coercive resource acquisition, followed by specific reconciliatory prosocial behaviour aimed to reduce the potential negative social impact and/or maintain positive relations with the defeated opponent. As described above, Roseth et al. (2011) posit and empirically corroborate the notion that in the initial period of social interaction in a new social group, children who are successful at establishing a stable high social dominance status within their peer group across time, will employ coercive behaviour at high frequency relative to their peers. As time progresses, those individuals who maintain a stable high dominance status are those who significantly increase the frequency of prosocial behaviour (Roseth et al., 2011). Specifically, they have theorised (Pellegrini, 2008; Pellegrini & Bartini, 2001) that socially dominant children who maintain their social dominance over time use prosocial reconciliatory behaviour towards their defeated resource contest opponent shortly after the conflict to either reduce social reprimand caused by the teacher being informed by the opponent, or to maintain the opponent as an affiliate/ally for the future. Their longitudinal data show that whilst coercive resource control behaviour, affiliation and reconciliation behaviour predict social dominance at the start of a school year in preschool children, by the latter stages of the year, only affiliation and reconciliation remain significant predictors (Pellegrini et al., 2011). Roseth's preschool longitudinal study indicates that, in addition to corroborating the results from the other longitudinal study, reconciliatory behaviour was associated with 'don't like' peer nominations at the beginning of the school year, but was associated with 'special friend' nominations by the end of the year (Roseth et al., 2011), concluding that a combination of decreasing coercive control behaviour, increasing prosocial control behaviour and the accumulative effect of reconciliatory behaviour may account for this shift in peer regard.

The concept of reconciliation raises important considerations for how the resource control types are currently constructed. The only guidance on how the subtypes should be defined, indeed if there should be 'subtypes' at all, comes from work conducted by Hawley and colleagues (e.g. Hawley, 2003b) – a determination based on the individual's relative frequency of coercive and prosocial resource control behaviours. Whilst the above research suggests that dominant children reduce coercive control behaviour over time, there is no evidence as to whether the control subtypes differ in this regard. If all socially dominant children reduce coercive control over time, then by definition this includes bistrategic controllers; if then, bistrategic controllers drop their rate of coercive control behaviour and increase their prosocial control behaviour rates (Roseth et al., 2011) more than the other subtypes, then by resource control theory's rules of subtype classification, they may reclassify as *prosocial* controllers, in that they could ultimately employ low rates of coercive behaviour and high rates of prosocial behaviour, relative to their peers. A key question raised here is: do the same children remain under the same subtype classification over time? It has been shown that bistrategic control does not become defunct as a highly efficient resource control subtype over time as it is still present in adolescent groupings where bistrategic controllers are valued by peers and are socially dominant. This suggests there is a behavioural flexibility possessed by bistrategic controllers that allows continued social dominance and resource control across age groups, without causing social isolation.

Evidently, research looking at how children's behaviour changes over time and specifically whether they change subtypes, is needed. Perhaps, rather than bistrategic controllers stopping being bistrategic per se, that the bistrategic control subtype (indeed the other subtypes too) should be defined with more specific parameters than just broad relative differences in prosocial and coercive control behaviour frequencies – viz. context-specific behaviours. Perhaps a core differentiating factor is bistrategic *flexibility*, not evident in prosocial and coercive controllers, but is evidenced in bistrategic controllers in the form of reconciliation. In this regard, an empirical differentiating factor between bistrategic controllers and the other subtypes could be that, if a disruption to the established social dynamic occurs e.g. introduction of a new child to the class (McGrew, 1972), or a break for school holidays (Roseth et al., 2011), then the bistrategic controllers would be expected to temporarily increase their coercive behaviour to re-establish stable social dominance differentials, crucially followed by reconciliatory behaviour. This could potentially provide a predictive utility to the subtype classifications, which would be lacking if children continually switched across subtype boundaries.

Yet this argument fails to acknowledge that children may not so easily be behaviourally subtyped. Of note is the method employed by Roseth et al. (2011), where they investigated rates of prosocial and coercive control behaviour without the subtype classifications. Therefore, reconciliation could be a bistrategic method of control adopted by children regardless of Hawley's subtype classification, with differences occurring in the rate of successful application of that strategy (and indeed perhaps other specific strategies). Moreover, if Hawley's resource control subtypes do change subtype classification over time, what are the predictors (behavioural, cognitive, affective etc.) that can determine, for example, which bistrategic controllers remain classified as bistrategic over their childhood and adolescence, and which convert into prosocial controllers or other subtypes? Similar to dominance hierarchies (Bernstein, 1981), controller subtypes only serve an empirical purpose if they have some reliable predictive utility. The resource control theory research discussed above, suggests that Hawley's classification system may well be useful in providing a broad predictive utility in that bistrategics are most socially dominant, but may be limited in its ability to capture the complexities of human behaviour, particularly over time; indeed, the stability of the subtype classifications has yet to be studied.

Longitudinal research should investigate whether, across the course of childhood, the subtype classifications are stable and if not, what within-subtype classification predictors may account for the change in subtype classification. Additionally, are there more subtle within-subtype classification behaviours that distinguish, for example, certain bistrategic controllers from others? These and other questions need answering; this current thesis will endeavour to investigate the stability of subtype group membership over the course of children's first year at school, as well as investigating the behavioural differences between each group to assess whether *statistically* there are differences, and if so, how different they are.

One can further highlight potential issues with the current determining of subtype classification by looking at other studies investigating similar variables. Renouf et al. (2010) in a study of ToM and behaviour in young children determined the relative rates of coercive and prosocial behaviour (though not resource-specific behaviour) by standard deviations from the mean scores, rather than percentile divisions as per Hawley's controller parameters. Clearly, this methodology could significantly affect the analysis and interpretation of the data.

1.3.2.3. Strategy effectiveness over time

As to why a shift in effective resource control strategy has been found to occur over time (i.e. coercive control efficiency reduces, prosocial increases) is not clear, however an informed opinion can be offered based on two key points: The first states that, in most studies of resource control contests in children to date, the imposition of social norms by external regulators, e.g. teachers, is a consistent factor. Teacher attitudes to classroom behaviour and their emotional support towards students have been associated with like and dislike peer nominations of US 1st grade children (~5-7 years old; Gest & Rodkin, 2011), with teacher support also associated with prosocial student behaviour and teacher-student conflict associated with anti-social behaviour (Gest & Rodkin, 2011; Hendrickx, Mainhard, Boor-Klip, Cillessen, & Brekelmans, 2016). It is therefore reasonable to hypothesise that there may be a similar effect in classes of younger children. Therefore, with sufficient positive support and encouragement from teaching staff, coercive control strategies may reduce over time in favour of prosocial control strategies. With bistrategic controllers specifically, the child may become increasingly adept at concealing the coercive behaviour from teaching staff (Hawley, 2003a) and concurrently reduce said behaviour's perceived impact through reconciliatory prosocial behaviour (Pellegrini et al., 2011; Pellegrini, Roseth, et al., 2007; Roseth et al., 2011).

In fact it may be that being liked or disliked by peers is, in part, the result of prior behavioural choices, and in turn may affect future behavioural choices. Roseth et al. (2011) collected sociometric nominations (Coie, Dodge, & Coppotelli, 1982), collecting most liked and least liked peer nominations, with the addition of a 'special friend' nomination category. The results showed that, across the school year, social dominance and reconciliation behaviour was consistently positively associated with positive peer social regard (popularity, and like most and 'special friend' nominations), corroborating prior cross-sectional suggestions (Hawley, 2003a; Pellegrini, Long, Roseth, Bohn, & Van Ryzin, 2007; Roseth, Pellegrini, Bohn, Van Ryzin, & Vance, 2007) that dominance is viewed by peers as socially attractive, as well as suggesting that the relationship between peer social regard and dominance is stable over time.

Caputi, Lecce, Pagnin, and Banerjee (2012) also collected longitudinal behavioural and sociometric data from children aged 5-, 6- and 7-years-old, and found that prosocial behaviour at age 5 predicted prosocial behaviour and negatively predicted peer 'like least' nominations at age 6. This same pattern was found for the children aged 6 and 7. Similarly, for both these age groups, prosocial behaviour positively predicted 'liked most' nominations. Liked most and liked least nominations at age 6 predicted themselves at age 7 (nominations were not collected at age 5). Not only are there positive time-lagged associations between prosocial behaviour and social preference/likability, these sociometric showed strong stability over time. Whilst Caputi et al. (2012) did not directly measure social dominance or resource control, as mentioned above (Roseth et al., 2011), positive peer regard and social dominance has been found to have a relatively stable relationship over time, yet how earlier social dominance and resource control impacts on later peer sociometric ratings and vice versa, remains to be investigated in detail.

The second point relates to the development of cognitive and affective characteristics. To date there has been very little study of the associations between any cognitive process and resource control strategy. Only two studies by the same research group (Massey-Abernathy & Byrd-Craven, 2016; Massey et al., 2014) have attempted to assess relationships between cognitive processes and resource control/social dominance within the resource control theory framework. In these studies, children between 3 and 5 years old (Massey et al., 2014) and late adolescents and young adults (Massey-Abernathy & Byrd-Craven, 2016) exhibiting high rates of bistrategic behaviour in combination with high rates of effortful control (the ability to inhibit one's own behaviour) attained a high social status and were healthier than their peers, possibly due to reduced social stress, leading to the suggestion that these individuals may become more effective leaders. However, this research perspective is in its infancy and direct conclusions cannot be drawn. Prior to the introduction of resource control theory, Hawley and Little (1999) found that greater cognitive development in a small sample of toddlers (N = 16; M = 2.5 years) was associated with higher social dominance rank than physical size. However, in addition to the sample being very small, this study reported a broad measure they referred to as 'mental age' (using the Bayley Scales of Infant and Toddler Development, Second Edition) and made no assertions as to the effect of specific cognitive processes or concepts being integral to social dominance ranking, a key interest of this present study.

When considering the potential relationships between *specific* cognitive and affective processes and resource control behaviour, Theory of Mind (ToM) – the imputation of the mental states of others and oneself (Premack & Woodruff, 1978) – and empathy – the comprehension and feeling of another's emotions (see section 3 for the debate surrounding empathy in more detail) – may play an important role in resource control (Hawley, 1999). The empirical basis for connections between resource control and ToM and empathy have not yet been established, yet Hawley theorised that prosocial resource control behaviours may well require developed empathy and ToM as well as other cognitive developments (Hawley, 1999).

1.3.2.4. Section 3 summary

Resource control theory (Hawley, 1999) reconciled previous dominance literature and allowed social dominance to be viewed as a social state that could be achieved using various evolutionary conserved behaviours that evolved primarily to attain and maintain resources. In young children, more primal overt resource control behaviours can be observed, yet it is plausible that in the first year of school more sophisticated social behaviours develop which allow children to compete in ever more complex ways, for ever more varied resources (e.g. social relationships, not just toys). Resource control theory divides the population in to five strategy subtypes, depending on their relative rates of coercive and prosocial behaviour. Research suggests that whilst coercive, prosocial and bistrategic controllers are all effective resource controllers towards the start of the first school year, by the end of the year, coercive controllers have become the least effective of the three, with bistrategics generally being the superior controller subtype; typical controllers and non-controllers are consistently ranked as the least effective resource controllers (Hawley, 2002; Hawley & Geldhof, 2012; Pellegrini et al., 2011; Roseth et al., 2011). Moreover, subtype classification may produce results from the data that other methodologies do not (Renouf et al., 2010; Roseth et al., 2011) and may fail to capture the more subtle behavioural realities at play in young children's social interactions.

1.4. Theory of Mind and empathy – clarifying the concepts

The study of ToM and empathy is complicated by the varied *conceptual* and *practical* (measurement) approaches when studying these concepts. Though the definition of ToM has remained essentially the same since its mainstream incarnation (Premack & Woodruff, 1978), empathy has been defined in myriad ways since Adam Smith discussed its conceptual precursor in 1759 (Smith, 1759), including definitions which significantly overlap with ToM.

1.4.1. Theory of Mind - definitions

The phrase 'Theory of Mind' was originally coined by Premack and Woodruff (1978) defining the concept as when an individual "imputes mental states to himself and to others" (Premack & Woodruff, 1978, p. 515). In modern developmental psychology, Theory of Mind (ToM) research still explores the concept within this original umbrella definition (i.e. the study of mental state perception), however extensive work has been conducted which investigates ToM at greater levels of specificity. ToM research is now extensive and incorporates a broad range of human cognitive and affective processes (Wellman, 2014a).

Contention regarding the definition of ToM arises when emotional/affective factors are included. Across the developmental psychology and social neuroscientific fields, some studies define, or adopt measures that treat ToM as a purely ‘cold’ (logical, non-affect-based) cognitive process and define any ‘hot’ cognitive process, i.e. those that also include a degree of *affective* processing, as cognitive empathy (see section 1.4.2). Other studies within the field include affective processing as just described as part of the ToM construct, more in keeping with the umbrella definition of Premack and Woodruff (1978; e.g. Imuta, Henry, Slaughter, Selcuk, & Ruffman, 2016). Such discrepancy is compounded with some papers splitting ToM into *cognitive ToM* and *affective ToM* subdomains, with empathy referring to purely affective response mechanisms (e.g. Kalbe et al., 2010; Sebastian et al., 2012; Shamay-Tsoory & Aharon-Peretz, 2007; Shamay-Tsoory, Harari, Aharon-Peretz, & Levkovitz, 2010), with Dvash and Shamay-Tsoory (2014) stating in their review of the empathy and ToM constructs “*cognitive ToM involves thinking about thoughts, intentions, or beliefs whereas affective ToM involves thinking about feelings*” (p. 284).

Numerous measures have been developed to measure increasingly specific and diverse ToM functionality, functionality that reflects the expanded retinue of sub-processes within the ToM umbrella. For example, false-belief tasks require the individual to impute that someone has an incorrect belief about an empirical fact (e.g.Wimmer & Perner, 1983); ‘mind in the eyes’ tasks require the individual to impute what mood the person in the picture is in, but only by being shown their eyes and eyebrows; (e.g. Baron-Cohen et al., 1999); lie/joke scenarios assess the capability to distinguish between deliberate falsehoods that are designed to either deceive or amuse (Sullivan, Winner, & Hopfield, 1995).

1.4.2. Empathy - definitions

In the developmental psychology literature, the consensus is that empathy also comprises both a cognitive dimension and an affective dimension broadly defined as the *comprehension* (cognitive empathy), and *subjective experience* (affective empathy) of another's emotions. Both dimensions have been described in a wide range of literature with variations even within these definitions (Batson, 2009). The Oxford English Dictionary (2004) reflects these two components in the official non-specialist definition also: "The ability to *understand and share* the feelings of another" (emphases added). Eisenberg, Fabes and Spinrad (2006) have defined empathy as "an affective response that stems from the apprehension or comprehension of another's emotional state or condition, and which is identical or very similar to what the other person is feeling or would be expected to feel" (Eisenberg et al., 2006 p. 647), suggesting that empathy fundamentally requires an affective response that is at least similar to the perceived emotion of the other person, but which can be affected or augmented by additional cognitive processing. Hoffman's definition of the general concept of empathy as "an affective response more appropriate to another's situation than one's own" (Hoffman, 2000, p. 4), and Feshbach and Roe's (1968) 'vicarious response' definition of empathy as a whole are synonymous with the definition taken by many to refer to *affective* empathy specifically (e.g. Bensalah, Caillies, & Anduze, 2015; Eisenberg & Morris, 2001).

1.4.2.1. Affective empathy

Affective empathy, or 'emotional' empathy, refers to the production of an appropriate emotional reaction in response to others' emotions (Feshbach, 1978, 1987; Wai & Tiliopoulos, 2012). It has broadly been defined by paraphrasing Hoffman (2000)'s definition of empathy: 'feelings that are more congruent with another's situation than with [one's] own situation' (p. 30), which specifies the affective, rather than cognitive aspects of the empathy construct. Emotional contagion, defined as "the tendency to automatically mimic and synchronize facial expressions, vocalizations, postures, and movements with those of another person's and, consequently, to converge emotionally" (Hatfield, Bensman, Thornton, & Rapson, 2014; Hatfield, Cacioppo, & Rapson, 1992, p. 153-154) is another concept which appears frequently in the empathy-related developmental literature, overlapping conceptually with Feshbach and Roe's 'vicarious response' definition of empathy and is considered the automatic mechanism through which one's experience of affective empathy functions (Hatfield, Rapson, & Le, 2009). In essence, the physical mechanisms of mimicry described by Hatfield and colleagues (2014) can be seen as the emotional contagion itself, whilst the 'convergence of emotions' can be defined as *affective empathy*.

1.4.2.2. Cognitive empathy

Cognitive empathy has a more mutable definition across the literature. Common definitions range from variations of Ickes' 'empathic accuracy', meaning the inference or detection of emotions in others (Ickes, 1993), as well as basic emotion recognition in others, and taking the perspective of others (Smith, 2006; for a review, see Batson, 2009). Others (Howe, Pit-Ten Cate, Brown, & Hadwin, 2008; Lemerise & Arsenio, 2000; Reid et al., 2013), define it as the inference of a protagonist's emotion from a scenario (Reid et al., 2013) to a more basic recognition of a protagonist's exhibited emotion in a scenario (Howe et al., 2008).

Despite some differences, a commonality of these different definitions is that cognitive empathy is dependent on some degree of mental state imputation, albeit an *affective* mental state. This has been noted by academics and has fuelled discussion concerning a functional overlap between ToM and empathy, specifically cognitive empathy (e.g. Bensalah, Caillies, & Anduze, 2015; Völlm et al., 2006). For example, the 'mind in the eyes' task, though designed by Baron-Cohen et al. (1999) to measure what they defined as ToM, may measure what others define as cognitive empathy or simply empathy, given that determining someone's emotional state of mind from their facial expressions at least in part requires an affective understanding as described by

Eisenberg et al. (2006). Indeed more recent research has empirically found the mind in the eyes task to test more basic emotion recognition, rather than the more ‘cold’ logic/knowledge-based ToM abilities as tested by other ToM measures (Oakley, Brewer, Bird, & Catmur, 2016). Specifically, they found that alexithymics – who show poor emotion recognition capabilities – performed poorly on the mind in the eyes task, whilst performing as well as controls on another ToM task (the Movie for Assessment of Social Cognition, MASC) which tested mainly non-emotional, cognitive aspects of ToM. Conversely, those with ASD, which often is comorbid with alexithymia, performed worse than controls on the mid in the eyes task only if they were comorbid for alexithymia. Furthermore, unlike alexithymics, those with ASD performed significantly worse than controls for the MASC task. Oakley et al. therefore argue that the results suggest that the mind in the eyes task is a measure of emotion recognition and not ToM; however, the accuracy of such a conclusion depends on one’s definition of ToM. In this example, Oakley et al. define ToM as ‘the ability to represent mental states’, which in the paper includes more complex emotive situations – as represented by some the MASC task scenarios – as well as more non-emotive logic or ‘cold’ mental states. Thus in Oakley et al.’s definition, the mind in the eyes task does not represent ToM at all (Oakley et al., 2016).

Two broad yet important points emerge from the discussion above: 1) that much further work across many fields is required to determine and agree upon more universally accepted definitions of ToM and empathy; 2) whilst such agreement is lacking, studies must be explicit as to which conceptual ToM/empathy framework they are adopting. As such for clarity at least within the developmental psychology field, this present work will adopt the theoretical framework of separating empathy into cognitive and affective dimensions as discussed above, with ToM accounting for the imputation of non-affective ‘cold’ mental states, such as another’s knowledge and beliefs, given its common adoption at least in the developmental psychology literature (e.g.

Bensalah et al., 2015; Dadds et al., 2008; Howe et al., 2008; Reid et al., 2013; Reniers, Corcoran, Drake, Shryane, & Völlm, 2011).

1.4.2.3. Interaction between affective and cognitive empathy

Bensalah et al. (2015) have stated that cognitive empathy should be measured directly from 'affective empathic responses', that the participant should be asked, for example 'why do you share this emotion with the character?' They suggest that cognitive empathy can only be reliably determined if the participant is asked to justify *why* they think a person/protagonist of a story feels that way (when utilising storybook methodologies). From this, the participant's rationale can be compared to how they said they felt after listening to/looking at the story, as "*it is the shared feeling that constitutes the critical indicator of a child's empathic process*" (Bensalah et al., 2015, p. 19). The authors innately tie cognitive empathy to affective empathy and argue that both sub-processes are required for empathy to function as a process. However, Bensalah et al. (2015)'s rationale for this strict requirement is contingent on their view/definition of empathy. This perspective directly rejects the perspective of a large swathe of research. For example, much psychopathy research, which omits Bensalah's critical connection between the cognitive and affective domains of empathy, allows empathy to function utilising either domain, or both. Thus psychopathy literature characterises psychopaths as empathetic beings, with normally functioning cognitive empathy but a deficit/absence of affective empathy (Blair, 2005; Dadds et al., 2009; Wai & Tiliopoulos, 2012). By Bensalah's definition of empathy above, psychopaths would be deemed to not experience empathy at all due to the absence of affective empathy.

Interestingly, psychopathy and callous unemotional traits (low or absence of emotional reactions/feelings towards others) in 3 – 13-year-olds has been shown to associate with severe deficits in cognitive empathy in both females and males, and also affective empathy in males.

males with high psychopathic traits seem to overcome the cognitive empathy deficits across puberty, becoming, whilst this was not found for females (Dadds et al., 2009).

1.4.3. Section 4 summary

Throughout the literature, ToM and empathy are defined in a variety of ways, making the extent to which they overlap and relate to each other unclear. Whilst there is a great need for universal agreement on, and clarification of, the conceptual and practical approaches to elucidating ToM and empathy, this is beyond the scope of the current thesis. Rather, this thesis has chosen, in the absence of such universal agreement or established paradigm, to adopt what seems the most broadly agreed upon definitions in the developmental field. This broad consensus describes empathy as a cognitive-affective bi-dimensional construct, which is the conceptual framework adopted by this current project, whilst ToM, though perhaps less broadly agreed upon, shall refer to the non-affective understanding of another’s non-affective mental state, e.g. appreciation of another’s knowledge and beliefs, or lack thereof.

1.5. Theory of Mind and resource control

1.5.1. The theory behind Theory of Mind

How ToM functions *conceptually* has been long debated and there are various theories attempting to explain its cognitive mechanisms. Three broad and prominent theories are ‘theory theory’ (e.g. Gopnik & Wellman, 2012; Wellman, Kushnir, Xu, & Brink, 2016), ‘simulation theory' (e.g. Gallese & Goldman, 1998; Goldman, 1992, 2009) and ‘modular theory’ (Baron-Cohen, 1995; Leslie, 1991), reviewed in detail by Wellman (2014a) and Hughes and Devine (2015) and are discussed briefly below.

Piaget posited that children attempt to comprehend new evidence about how something works within a base theory/conceptual framework (assimilation), modify that framework based on their ongoing assimilation of new evidence (accommodation), until a threshold of non-compatible evidence is reached at which point a new theoretical framework is created that accommodates all the data and allows for more accurate predictions in the future (Piaget, 1951). A common critique of Piaget's position was that the theory was too vague, thus recent ToM theory theorists have adapted it to incorporate machine learning-like Bayesian reasoning – where hypotheses are formed from probability-based models that are constantly reviewed and updated according to new evidence (Gopnik & Wellman, 2012). Such Bayesian statistical reasoning-based learning has been shown in 3-4 year olds (Kushnir, Xu, & Wellman, 2010), 20-month old and 8-month old infants (Kushnir et al., 2010; Xu & Garcia, 2008). More specific evidence for a ToM theory theory approach was published in Wellman, Kushnir, Xu, and Brink (2016) where they evidenced that 10-month old preverbal infants inferred (or at least shown a precursor to such inference) the experimenter's desire for a specifically coloured ball based on violations of statistical likelihood. This suggests that a Bayesian reasoning-based learning model may be key in explaining how ToM develops in humans.

Conversely, a simulation theory-based ToM model proposes that no conceptual frameworks or abstract representations of reality occur; rather it is direct subjective experience that guide one's perceptions of others' mental states (Gallese & Goldman, 1998), e.g. that someone would think or do that thing because 'I' would have, or have done previously. Whilst the recent evidence suggests that the theory theory approach is an accurate framework for ToM development, there is not yet sufficient evidence that the simulation theory approach does not at least act as a complimentary developmental framework (Wellman, 2014b).

There has also been extensive work investigating ToM development from a modular theoretical perspective, notably Leslie (e.g. Leslie, 1991) and Baron-Cohen (e.g. Baron-Cohen, 1995). They, and other proponents of 'modularity' contend that ToM is an innate, genetically-predisposed characteristic of human cognition and that a ToM module (ToMM) becomes functional in early development. Whilst twin study research has provided data in support of such a genetics-based view (Hughes & Cutting, 1999) a more recent study in a more representative sample was shown to be in direct contrast to that prior evidence, finding that the large majority of variance in ToM was explained by environmental factors, with only 15% of the variance explained by genetic factors (Hughes et al., 2005; Wellman, 2014b). Clearly further study is required to elucidate the developmental frameworks behind ToM.

1.5.2. ToM development in young children

To date, the earliest form of ToM has been observed in 5-month (Woodward, 1998) and 8-12-month-old infants, and has been interpreted as *intentional understanding* (Brandone & Wellman, 2009; Phillips & Wellman, 2005). Based on the notion that infants attend to a stimulus for longer if it is unexpected, Phillips and Wellman (2005) showed that infants accustomed to witnessing a researcher reach over a barrier to pick up a ball, looked longer when the same ‘up and over’ reaching movement was reproduced after the barrier was removed, compared to a *direct* movement after the removal. It was therefore concluded that the infants had formed an understanding of the intention of the researcher to get the ball and this was contradicted when the researcher did not take the obvious direct path when the barrier was removed.

Intentional understanding ToM increases in complexity as the child ages, with the next developmental ToM milestone, *desire understanding* being exhibited in children as young as 18 months. Repacholi and Gopnik (1997) found that 18-month-old children offered food to an experimenter that they themselves did not like, but to which the experimenter had previously shown positive affect. Conversely, they found that 13-month-old children offered the experimenter whichever food they themselves preferred, regardless of the experimenters previously displayed preference. This study provides evidence that by 18 months, at least some children have cognitively developed beyond an exclusively egocentric state of mind, showing an awareness of different desire mental states in other individuals.

As ToM becomes more complex, its imputations – and the cognitive processes behind them – become more abstracted and distanced from the data/stimuli presented to the individual (Wellman, 2014a). Though it is important not to underestimate the complexity of ToM development and functioning, ToM has generally be broadly split into three developmental stages – First order, second order and higher order (Perner & Wimmer, 1985). First order ToM capabilities are those which allow an individual to impute what other people think about real events; second order ToM capabilities are those which allow an individual to impute what other people think about other people's thoughts; higher order ToM are those capabilities which allow people to think about what other people think about their thoughts (Perner & Wimmer, 1985). First-order false-belief understanding – comprehension that someone holds a false *belief* regarding a real event (Wimmer & Perner, 1983) – seems to develop at some point between preschool and early school years, regardless of the cultural or national background studied thus far (Astington, 2003; Astington & Jenkins, 1995; Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003; Devine & Hughes, 2016; Diesendruck & Ben-Eliyahu, 2006; LaBounty, 2008; Moore, Barresi, & Thompson, 2001; A. C. Watson, Nixon, Wilson, & Capage, 1999). However, of note is research suggesting that implicit first-order belief understanding is present in children as young as 7 months (Kovács, Téglás, & Endress, 2010), in which infants imputed non-verbally suggested false beliefs of another person, which then affected the infant's own responses, even if they themselves had a true belief regarding the same situation. The authors suggest that ToM may be an innate human feature, but in younger children its behavioural manifestations may be suppressed by the absence of other cognitive characteristics such as inhibition; specifically they comment that infants may well be capable of holding their own belief and representing another's belief in tandem, yet struggle to/are incapable of inhibiting the belief less applicable to the situation in order to arrive at a correct response in the typical ToM tests (Kovács et al., 2010).

ToM research involving young children has largely focussed on first-order components as these are considered more basic ToM competencies than second-order components. Perner and Wimmer's pioneering measure of second-order ToM originally suggested that children of 6 years were capable of second-order reasoning (Perner & Wimmer, 1985), however since then a catalogue of research (e.g. Sullivan, Winner, & Hopfield, 1995; Sullivan, Zaitchik, & Tager-Flusberg, 1994) has evidenced younger children, as young as 3 years, are able to correctly attribute mental states via second-order reasoning (Miller, 2009).

Second-order reasoning is not limited to the false-belief concept. Like first-order reasoning, second-order ToM processes are many and include second-order ignorance understanding (an individual's appreciation that a second individual doesn't know that a third individual knows something) which is currently understood as developing prior to second-order false-belief understanding by 6 months – 1 year (Sullivan et al., 1994), and lie/joke understanding. Whilst Sullivan et al. (1995) demonstrated that some 5 year olds can successfully distinguish between the two types of false statement, no research to date has investigated this ToM process in younger children.

1.5.3. ToM and resource control behaviour

ToM and its associations with social behaviour has been extensively researched in recent decades in a wide variety of contexts in developmental psychology (Hughes & Leekam, 2004). Children who behave aggressively have been viewed by some research as cognitively deficient in some respect (e.g. Crick & Dodge, 1994; Levy-Shiff & Hoffman, 1989) yet more recent ToM research counters these contentions. Sutton, Smith and Swettenham (1999) found that ring-leader bullies in a sample of 7-10-year-old children had greater ToM, as well as cognitive empathy compared to their 'followers', the victims of the bullying or those children who attempted to defend the victims. However, when ToM data was collected from younger children (4-6 year olds) in a similar study, no significant difference in ToM capability was found between the aggressors, victims or those who tried to defend the victims (Monks, Smith & Swettenham, 2005). Conversely, Walker (2005) found that ToM predicted aggressive or disruptive behaviour, but only in boys (aged 3-5 year old). Differences here could be explained by differing tasks: Monks et al. used both first- and second-order ToM tasks whilst Walker used only first-order tasks. Clearly further work is required to elucidate this relationship. Monks, Smith and Swettenham (2005) suggest that the non-significant relationship between aggression and ToM functioning found in their study, when compared to the significant result found by Sutton et al. (1999), may be a function of age and social environment complexity. They posit that whilst older children (e.g. Sutton et al., 1999) who are ring-leader bullies utilise more indirect, often less overt aggression which would require knowledge of the victim's thoughts and feelings, younger children (Monks, Smith, & Swettenham, 2005) tend toward more direct methods of aggression (Björkqvist, Lagerspetz, & Kaukiainen, 1992; Rivers & Smith, 1994), the implication being that – in terms of resource control – one does not need to know what another person is thinking or feeling to just rip a toy out of that person's hands.[3] Yet to cause emotional damage through insults, one must understand what sort of insults will hurt their victim the most, whilst simultaneously understanding what behaviour will best impress their followers. Working in tandem with such enhanced ToM (thought and belief perception), the utilisation of this developed cognitive empathy (emotion perception) for this specific form of aggression could also be seen as an affective resource control strategy (though not framed in a resource control context by Sutton et al., 1999), as bullying potentially allows for acquisition of material resources from victims as well as social resources in the form of attention and praise from the friends or 'followers' of the ringleader. The study focuses on older children yet it is plausible that some aggressive children at the age of 4 or 5 years old, whilst perhaps lacking the social sophistication to bully in groups or consistently bully one individual for long term gain, may possess greater ToM (and

[3] Though it should be noted that ToM would enhance effectiveness of physical coercion to gain resource control as the aggressor may better predict the likelihood of the opponent to tell the teacher following the conflict.

cognitive empathic capability) relative to their peers, thus be able to customise threats or physical confrontations depending on the context of the resource contest situation. Additionally, aggression would generally be actively discouraged by teaching staff, thus over time children would either have to reduce their aggression to avoid reprimand, use ameliorating follow-up behaviours, or find more subtle aggressive behaviours to avoid reprimand (e.g. Hawley, 2003b; Roseth et al., 2011). This therefore means that they would need, for example, to be aware of victim's intentions to 'tattle', and the beliefs and knowledge of the teachers in regard to their behaviour (Hawley, 2003a; Pellegrini et al., 2011; Roseth et al., 2011). Alternatively they may use tattling on their rivals as a form of aggression in itself (Hawley & Geldhof, 2012). ToM has also been found to be positively associated with indirect/relational aggression in 6-year-olds, but specifically only in those who were rated as average of low in prosocial behaviour (Renouf et al., 2010), which may reflect developed ToM within the coercive resource control subtype.

Conversely, Walker (2005) found that in young girls (3-5 years) cognitive ToM predicted prosocial, rather than aggressive, behaviour; conversely ToM predicted aggressive and disruptive behaviour in boys of the same age. However, more recent research found no gender difference, but did find a positive relationship between sponteniety of sharing behaviour and ToM in 2-4 year olds (Wu & Su, 2014). A more recent significant contribution to the prosocial behaviour/ToM debate, is a meta-analysis of 76 studies comprising 6,432 children between the ages of 2 and 12 years (Imuta et al., 2016). It was found that there is low-moderate correlation (r = .17) between first-order ToM and prosocial behaviour in 2-5 year olds, with this association increasing to a moderate correlation (r = .24) in children aged 6-12 years, with no significant gender difference, with a particularly strong (relative to their other findings) relationship between ToM and specifically cooperative behaviour. Moreover, they found that higher ratings of spontaneous prosocial behaviour (sharing) was significantly more associated with higher ratings of ToM than was compliant prosocial behaviour (i.e. *instructed* to comfort, help etc). Imuta et al. (2016) suggest that, specifically in the case of cooperation, one must be capable of continually assessing the socioemotional cues from others and adjust one's own desires and behaviour in order to maintain a cooperative relationship. Moreover, they suggest that the difference in ToM association between spontaneous and compliant prosocial behaviour may be explained by compliant prosocial behaviour simply reflecting one's ability to follow rules, as opposed to appreciating another's mental states. As suggested both in their own discussion as well as extensively posited in other works in both the developmental and neuroscientific fields (e.g. Hawley, 1999; Morelli, Rameson, & Lieberman, 2014; Spinrad & Eisenberg, 2017), empathy (in addition to other factors) may be of equal or greater importance to the manifestation of prosocial behaviour.

Of importance to this current study however, is that the ToM literature reviewed earlier, relating to either aggressive or prosocial behaviour considers only general behaviour and makes no explicit statement on resource-oriented behaviour. It should also be noted that ToM does not necessarily directly associate with behavioural modes per se; other confounders or moderating behaviours may well be crucial in the exhibition of the specific behaviours. Renouf et al. (2010) found that the relation between ToM and aggression was moderated by the child's level of prosocial behaviour. They found that those who scored high on indirect/relational aggression, but low or average on prosocial behaviour, scored highly on ToM tasks.

To date, there is a dearth of resource-specific behavioural research which focusses on resource control behaviour's associations with ToM in young children. One study to date (Pellegrini et al., 2011) does investigate the link between ToM and social dominance in young children (*M* = 3.7 years), in which basic ToM (first-order false belief) capability was positively associated with both social dominance and reconciliation behaviour at the end of the school year; ToM not being measured previously in the longitudinal study. This result corroborates Hawley's contention, however, they did not measure ToM prior to the last time point, which raises questions as to whether dominant children develop heightened ToM as a result of successes in resource control contests, or that it is ToM that provides them with a competitive edge, or indeed that it is an experience-driven mutual cyclic reinforcing of the two. The data, when taken with the research of Pellegrini and colleagues into bistrategic reconciliation behaviour, perhaps suggest that bistrategic children in particular may have a more developed ToM which provides them with some form of competitive and/or social advantage. Yet evidently, more research is required to elucidate such relationships.

Whilst Pellegrini (2011) is, to this author's knowledge, the only resource control theory-based study to explicitly examine ToM's association with resource control and social dominance, there are other studies not directly associated with resource control theory that provide insight into the potential longitudinal relationships between behaviour, sociometric status and theory of mind in children. Caputi et al. (2012) found that greater theory of mind in 5-years-old children predicted greater prosocial behaviour when they were 6-years-old, which in turn negatively predicted peer 'like least' nominations and positively predicted peer 'like most' nominations at age 7. It was suggested that from the age of around 5, the effect of theory of mind on peer regard at age 7 is mediated by greater prosocial control at age 6. A further longitudinal study (Banerjee, Watling, & Caputi, 2011) found that greater peer rejection at age 7 was predictive of poorer faux pas understanding – whether the child appreciates that a social blunder committed by another was inadvertent – at age 8. Moreover, greater faux pas understanding at age 9 was also associated with greater peer acceptance at age 10 and that greater faux pas understanding at age 10 was negatively predictive of peer rejection at age 11. From these studies, there is a clear pattern of association between ToM and greater peer regard and acceptance. However, sociometrics are at best a proxy for social dominance, and could plausibly not be causally linked at all. Therefore, such time-lagged relationships between sociometric ratings and resource control and social dominance require investigation. Many other studies have found first-order false-belief to be positively associated with peer acceptance and popularity (e.g. Astington, 2003; Astington & Jenkins, 1995; Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003; Diesendruck & Ben-Eliyahu, 2006; LaBounty, 2008; Moore, Barresi, & Thompson, 1998). Whilst it would be erroneous to unquestioningly use these peer acceptance and popularity findings as proxies for social dominance, one can plausibly hypothesise that the likelihood of an individual increasing their dominance status would itself increase if they possessed necessary social skills to enhance peers' judgement of their positive characteristics. These studies suggest a potential link between social skill and first-order ToM and thus, by inference, between first-order ToM and social dominance in young children. This is not a baseless hypothesis as previous research has shown a positive relationship between dominance status and social approval in both adolescents (Hawley, 2003a) and in young children (La Freniere & Charlesworth, 1983; Pellegrini, 2008). In turn, it would be plausible to hypothesise that there is a positive link between ToM and resource control, given the close association between social dominance and resource control, as discussed above, and evidence from studies where these two concepts (social dominance and resource control) are essentially conflated (e.g. Hawley, 2002, 2003b; Hawley & Geldhof, 2012; Pellegrini, 2008).

Yet using visual peer regard or popularity as a proxy for social dominance and resource control is tenuous; validity of such a proxy requires a great deal further investigation, though due to the lack of direct empirical evidence, others have hypothesised in similar fashion. Some research, expanding on Hawley and Little's (1999) finding that greater cognitive development in a small sample of toddlers was more closely associated with higher social dominance rank than physical size, has hypothesised that ToM is a key factor in successful resource control over time (Pellegrini, 2008), as ToM processing becomes increasingly more sophisticated (Wellman & Liu, 2004) which may well benefit increasingly sophisticated modes of resource control over time.

Pellegrini hypothesised that bistrategic children would require ToM in order to use prosocial reconciliation tactics (Pellegrini, 2008). The hypothesis is that victors would need to appreciate the mental state of their defeated opponent, in order to gauge what their intentions are (e.g. social retribution, telling teacher, trying to make friends), therefore allowing them to select the optimal behaviour to limit reputational damage – with the most successful resource controllers opting for reconciliation/amelioration. Pellegrini (2008) suggests that both experience of contests and developing ToM cyclically develop each other, in essence they may act as a mutual reinforcement mechanism. Previous research has shown that in children aged 4-11 years those with superior ToM are also more popular among their peers (Badenes, Estevan, & Bacete, 2000; Deković & Gerris, 1994; Slaughter, Dennis, & Pritchard, 2002), with these differences in both variables becoming more pronounced with time. It may be that poorer ToM (and cognitive empathy) development would reduce the specificity and sensitivity with which the child interacts with their peers, increasing the likelihood of social isolation; social isolation would in turn result in less opportunities to socially interact and revise their ToM conceptual framework (Slaughter et al., 2002). As to whether ToM is an antecedent to initiating contests and reconciliations is beyond the scope of the work presented in this thesis, as children will have been embedded in their class' social network for several weeks prior to the start of the first data collection point, thus exposure to resource contests will have almost certainly occurred. However, it may be possible to elucidate the association between ToM and resource contests as the school year progresses.

Notably, to date, these data and predictions have focused on first-order ToM reasoning with little focus on the relationship between second-order ToM and social dominance or resource control. Observational research studying resource control and dominance behaviour in young children has largely focussed on dyadic interactions (e.g. Pellegrini, 2008; Pellegrini et al., 2007, 2011), given the proclivity of young children, particularly those under 4 years old to interact mainly in pairs (Ladd, 1990; McGrew, 1969; Parten, 1933). Therefore, it can be construed that first-order reasoning may be sufficient to attain a high dominance status; that is to say, that a child need only impute the mental state of one other individual in the majority of social interactions at this age. However with the introduction of school to the child's life, social interactions will increase in complexity as group work and play is a part of their school day, with same sex group interaction becoming increasingly prominent (Fabes, Martin, & Hanish, 2003; Martin & Fabes, 2001). Therefore, it may well be the case that prior to attending school and in the early stages of school life, children require only first-order reasoning to greatly enhance dominance status and resource control capability. Yet as the first school year progresses, and group interaction increases in turn, the ability to accurately predict what another child – or indeed a staff member – is thinking about another child would plausibly allow more efficient manipulation of the group dynamic and thus resource control (though it may well require more than this first year for such a result to be measured). Certainly first-order and second order ToM have been investigated as separate variables (e.g. Perner & Wimmer, 1985; Sullivan et al., 1994; Wimmer & Perner, 1983), yet never in a resource control study.

1.5.3.1. Emotion comprehension

Emotion comprehension can be defined as the "understanding of the nature of emotions, their causes and the possibility of control", (Pons, Harris, & de Rosnay 2004, p. 127). Pons, Harris, and de Rosnay (2004) developed the Test of Emotion Comprehension (TEC) as a tool for assessing the development of emotion understanding in children 3 years and over, from their developmental model on which the TEC is based (Harris, 2000; Pons et al., 2004; Saarni, Mumme, & Campos, 1998). The model consists of 9 different emotion comprehension capabilities, which increase in cognitive complexity (from 1 to 9), with estimates as to the age range at which the capabilities develop. The first four capabilities are deemed to develop before or by the end of early childhood:

> *Component I (Recognition).* By approximately 3 – 4 years of age, children start to be able to recognize and name emotions on the basis of expressive cues. For example, most children of this age can recognize and name facial expressions of the basic emotions (happiness, sadness, fear, and anger) when presented as pictures.
>
> *Component II (External cause*). By approximately 3 – 4 years, children begin to understand how external causes affect the emotions of other children. For example, they can anticipate the sadness another feels at the loss of a favourite toy or the happiness another experiences when receiving a gift.

> *Component III (Desire).* By approximately 3 – 5 years children begin to appreciate that people's emotional reactions depend on their desires. They can therefore understand that two people may feel a different emotion about the same situation because they have different desires.
>
> *Component IV (Belief).* Between 4 and 6 years, children start to understand that a person's beliefs, whether false or true, will determine his or her emotional reaction to a situation.
>
> Component V (Reminder). Between 3 and 6 years: Children start to understand the relation between memory and emotion. For example, they increasingly understand that the intensity of an emotion decreases with time and that some elements of a present situation can serve as reminders that reactivate past emotions.
>
> Component VI (Regulation). Children invoke different strategies for emotional control as they get older. Children aged 6 – 7 years refer mostly to behavioural strategies, whereas older children aged 8 years and older start to acknowledge that psychological strategies (denial, distraction, etc.) can be more effective.
>
> Component VII (Hiding). Potentially, there can be a discrepancy between the outward expression of emotion and the actual, felt emotion. Between approximately 4 and 6 years, children begin to understand this possible discrepancy.
>
> Component VIII (Mixed). From approximately 8 years, children start to understand that a person may have multiple or even contradictory (ambivalent) emotional responses to a given situation.
>
> Component IX (Morality). From approximately 8 years, children begin to understand that negative feelings ensue from a morally reprehensible action (e.g., lying, stealing, concealing a misdemeanour) and that positive feelings ensue from a morally praiseworthy action (e.g., making a sacrifice, resisting a temptation, confessing a misdemeanour).
>
> (Pons, Harris, & de Rosnay, 2004; p. 128-9).

There seems a distinct shared principle between the descriptions of the components of emotion comprehension presented above and the definition of cognitive empathy (along with ToM) – both require the ability to impute emotional mental state of another individual is at a given time, therefore *conceptually* emotion comprehension is a cognitive domain very similar to, if not synonymous with, cognitive empathy. However, from the current *practical*, *measurement* perspective, there are differences. Wellman views the TEC as a battery of tasks that assesses areas of ToM not assessed by the Theory of Mind Scale (Wellman & Liu, 2004), which encompasses aspects of cognitive empathy as defined by this thesis, with the TEC including measures for early ToM that may emerge in preschool children, and a measure with specific emphasis on the emotion understanding (affective) aspects of ToM (Wellman, 2014). Clearly there are similarities between these two constructs. It is evident also, that components III and IV of the TEC are similar to the 'diverse desires' and 'false-belief' stages of ToM development proposed by Wellman and Liu (Wellman & Liu, 2004).

Whilst clarifying the *degree* of conceptual overlap between emotion comprehension, ToM and cognitive empathy remains an important research goal, it is beyond the aims of this current project. What is apparent from the above discussion is that there is at least *some* conceptual overlap between these concepts, specifically cognitive empathy and emotion comprehension, in that they both require forms of emotional understanding. In the absence of empirical research or broad consensus regarding their relationship, this project will treat cognitive empathy and emotion comprehension as separate cognitive-affective variables, measured via separate methods, with statistical analysis determining their association.

1.5.4. Section 5 summary

Whilst ToM is a concept extensively researched in the developmental and social neuroscientific fields, there is little research providing insight into the associations that may exist between ToM and resource control and social dominance. Clearly there is a need for research to fill this knowledge gap. Moreover, it is important to note that the contribution of ToM to resource control and dominance should not be exaggerated. To date, research has found little solid, corroborated evidence to link aggressive behaviour and ToM in young children and only a low-moderate association between prosocial behaviour and ToM in this age group. This may well be due to the more direct (as opposed to indirect/relational) nature of aggression seen in young children compared to older children and adolescents (Monks et al., 2005) and importance of other factors such as empathy in the manifestation of prosocial behaviour (Hawley, 1999; Imuta et al., 2016; Spinrad & Eisenberg, 2017). Furthermore, cognitive ToM has only been found to have moderate associations with social competence. Given that children adept in resource control strategy use, specifically bistrategic methods such as reconciliation, score highly in aggression, prosocial behaviour and peer regard measures, it is therefore reasonable to hypothesise that there are indeed other factors at play here, such as cognitive and affective empathy.

Emotion comprehension is a closely related concept to cognitive empathy and, in some opinions, ToM. Further discussion among academics is required to clarify the degree to which these concepts reflect one another. Regardless, both will be investigated for this project using differing methods of measurement.

1.6. Empathy and resource control

1.6.1. Empathy development in young children

Hoffman's influential theory of empathy recognises that both affective and, later in development, cognitive processes are integral to a more complete picture of the empathy construct. Hoffman's model promotes a broader conceptual five stage model of empathetic development (Hoffman, 1984, 2000; Imuta et al., 2016). Stage 1 (reactive new-born cry) and stage 2 (egocentric empathic distress) are characterised by an infant's emotional response to another's display of distress with their own distress (also known as personal distress; Eisenberg, Fabes, & Spinrad (2006)) – a self-oriented negative reaction to emotional contagion. At these stages, according to Hoffman (2000) the infant shows no awareness of the distinction between its own emotional state and the other individual's. Stage 3 (quasi-egocentric empathic distress) similarly is characterised by such distress, however Hoffman (2000) argues that the individual can cognitively discriminate between its own emotional state and the other individual's. Typically, the individual reacts to the emotional experience by behaving in ways that would comfort themselves but not necessarily the other individual. Stage 4 (veridical empathic distress) comprises the child experiencing much more closely the distress of another as they have a greater appreciation of the other's emotional state. Stage 5 is the ability to empathise with another's experience beyond the emotional situation.

Hoffman's theory and work regarding empathy (e.g. Hoffman, 2000; Sagi & Hoffman, 1976) traditionally held that prior to the second year of life humans were generally incapable of experiencing other-orientated empathy. Such a view has generally been corroborated by other literature (e.g. Dondi, Simion, & Caltran, 1999; Martin & Clark, 1982; Sagi & Hoffman, 1976; Simner, 1971) with some data suggesting empathic/personal distress is the dominant empathic expression in infants for the majority of the first year of life (Geangu, Benga, Stahl, & Striano, 2010). Contrary to the timeframe posited by Hoffman's theory however, there is some data to suggest that children are capable of showing other-oriented empathic responses to peers at 6 months old. Hay and colleagues showed that around half of the 6 month old infants, in 12 pairs, exhibited no empathic distress when their paired peer showed distress, rather they gestured, leant toward or reached out to touch the partner (Hay, Nash, & Pedersen, 1981). However, whilst this can be interpreted as indirect evidence for 'other-oriented' empathy, or concern for others, one should do so with caution as Hay and colleagues did not take any more direct measures for concern, such as facial expressions or vocalisations. Moreover, as discussed, empathy as a whole construct comprises both cognitive and affective processes; whilst it seems unlikely that such young infants are capable of cognitively processing affective stimuli – emotional contagion – and then behaviourally reacting based on such thought processes, further research needs to be conducted to elucidate whether such complex processing is present, rather than an autonomic behavioural response or simple learned mimicry of older individuals.

From the second year of development onwards, children show increasingly sophisticated emotional and behavioural reactions to the affective displays of others and emotional distress decreases with age (Hoffman, 1984, 2000). At developmental stages 3 and 4 of Hoffman's model, he posits that cognitive understanding – cognitive empathy – has developed and therefore augments the more basic emotional contagion-based reactions of stages 1 and 2 – affective empathy. Moreover, a more recent study found that whilst age, gender and IQ affected cognitive empathy function in 7-17 year olds, none of these factors affected emotional contagion, which the authors suggest indicates that the latter is a process that is developed prior to age of 7 years (Schwenck et al., 2014). Cognitive empathy has been recorded in children as young as 4 years old. Bensalah et al. (2015) found that 4 year old preschool children could correctly attribute an appropriate emotion to a story's protagonist and describe why they chose that emotion. More specifically, they were able to verbally rationalise their own affective response to emotive stories (e.g. I'm sad because he lost his balloon).

More pertinent to this thesis however, is how such development and interplay of affective and cognitive empathy can affect social dominance and resource control strategy selection in children just starting school.

1.6.2. Affective empathy resource control behaviour

Studies that have investigated relationships between young children's behaviour and affective empathy provide increasing evidence that increased empathy is associated with increased prosocial behaviour. Miller and colleagues (1996) showed that 4- and 5-year-old boys and girls who displayed facial expression emotionally congruent with the emotional video scenarios that they watched, had significantly higher levels of moral reasoning and prosocial behaviour responses, with the converse found in those displayed less congruent facial expressions. Moreover, emotional expressiveness and empathy have been found to positively associate with prosocial behaviour in 5-, 9- and 13-year-olds (Roberts & Strayer, 1996; Roberts, Strayer, & Denham, 2014; Strayer & Roberts, 2004). Younger children (30-month-olds) have also been shown to be capable of assisting adults in emotional distress via empathic reasoning (Svetlova, Nichols, & Brownell, 2010).

There is no research (that this author is aware of) examining affective empathy in young children in the context of resource control theory. Yet affective empathy may be a critical factor in resource control behaviour and social dominance, specifically in young children just starting school. For example, affective empathy may provide children with the subjective insight into how another person feels, which may then augment or expedite the development of their cognitive empathy, therefore allowing them to improve at forming friendships or using prosocial control strategies, or conversely to better identify coercive strategies that will defeat rivals in resource contests. There is no empirical evidence that supports this contention, however Hawley offers an informed yet still hypothetical view on empathy's relation to resource control behaviour. Hawley proposes that the idea of 'psychological altruism' – that people's prosocial behaviour towards others is motivated by a selflessness – is broadly misplaced when describing prosocial behaviour as a whole (Hawley, 2014a). Hawley subscribes to the 'selfish gene' approach to understanding prosocial behaviour (Dawkins, 1976) – that animals are genetically programmed behave in ultimately selfish ways, e.g. to pass on their genes/reproduce, despite the regular appearance of 'proximal' altruism, e.g. someone offering to help someone else out with their homework. From such a perspective, one can argue that the offer of assistance originates from the drive to acquire allies, or to attain a resource at a later date as a returned favour for the help. Some specific corroboration of such a contention has been provided by Svetlova et al. (2010), where 30-month-year olds were monitored in a variety of 'assistance conditions' – in which an adult required help/support from the toddler. Results showed that voluntary assistance was provided by the child at a significantly higher rate in the 'empathic condition' than in the 'altruism condition'. The key difference between these two conditions was that, whilst in the empathy condition the assisting child provided the distressed adult with objects that *were not the child's*, the altruism condition required the child to give the adult their own object, thus requiring the toddler to sacrifice their possession. This study therefore provides support for the contention that empathy-driven behaviour is a separate phenomenon from true 'psychological' altruistic behaviour.

Importantly, Hawley (2012) does recognise that resource control strategies may contain an 'empathic component' reflecting internalised norms of the society such as 'moral codes'. In the only study to date that touches upon empathy in the context of resource control theory, Hawley found that bistrategic controllers in a sample of 153 preschool children (M = 4.85 years), whilst able to cite whether a morally-charged occurrence in various vignettes was 'right' or 'wrong' – viz. were aware of moral rules – were rated as having emotional deficits in moral functioning according to teachers (Hawley & Geldhof, 2012). The teacher questionnaire assessed the children's emotion-related moral understanding and was not exclusively an empathy questionnaire; three questions were related to empathy, with two relating to behavioural empathic responses and one relating to emotional contagion/affective empathy ("is not likely to become upset if a playmate cries (reversed)."). Exploratory factor analysis revealed only a small loading of this affective question to 'moral emotion attribution' variable as a whole, which in turn did not have any significant association with resource control or social dominance across all strategy sub-types. Though this result suggests that affective empathy has little or no effect on resource control or social dominance, stress must be placed on this conclusion only comes from the results based on one single question. Further research would be needed utilising a more complete empathy questionnaire to provide a more reliable data set.

1.6.3. Cognitive empathy and resource control behaviour

Of significant importance regarding some of the literature discussed in the previous section (section 1.6.2.), is that empathy is not investigated in terms of: 1) resource-oriented behaviour specifically; and 2) both affective and cognitive empathy. Regarding cognitive empathy specifically, there have been important findings in relation to resource control. Though cognitive empathy's relationship with resource control behaviour specifically has not been directly studied through the lens of resource control theory per se, there have been some insightful studies regarding the association between cognitive empathy and behaviour in children. As discussed above (section

1.5.3.), enhanced cognitive empathy has been associated with ring-leader bullies compared to their peers (Sutton et al., 1999). Such cognitive advantages may well be used through the bully's aggressive behaviour to more precisely and affectively hurt the victim and impress their followers. However, association patterns between behaviour and cognitive empathy are not necessarily restricted to aggression. Imuta et al. (2016) conducted a meta-analysis on 76 studies totalling 6,432 children aged 2-12. They included studies that used measures which assessed 'children's identification of… emotions' (p. 1193; i.e. cognitive empathy) but did not include any studies that included affective empathy measures. Cognitive empathy was found to be significantly associated with prosocial behaviour in children ranging from 2-12 years old. However, this was only a low-moderate association, and an analysis of cognitive empathy in the 5 years and below subgroup was not conducted. Moreover, other research has resulted in mixed findings, with some finding no significant association between early cognitive empathy and later prosocial behaviour (Ruffman, Slade, Devitt, & Crowe, 2006) and others finding there is a significant connection between these two variables (Caputi et al., 2012; Eggum et al., 2011; Muris et al., 2003). Moreover, as stated by Imuta et al. (2016), these studies do not measure both variables at each time point in their longitudinal studies, therefore associations, particularly causal relations, cannot be drawn with any significant certainty.

1.6.4. Section 6 summary

Affective empathy has been positively associated with prosocial behaviour (Feshbach & Feshbach, 1969) as well as greater moral reasoning (Miller et al., 1996), with more recent yet tenuous evidence suggesting a more direct connection between empathy, moral cognition and resource control and social dominance (Hawley & Geldhof, 2012).

Whilst there is no direct data regarding cognitive empathy's relationship with social dominance or resource control, the research discussed above at least provides a stable platform from which this study can hypothesise. Research focussing on 7-10 year olds (Sutton et al., 1999) found that greater cognitive empathy is associated with ring-leader bullies whilst it has also been linked to greater prosocial behaviour in both young and older children (Caputi et al., 2012; Eggum et al., 2011; Imuta et al., 2016; Muris et al., 2003).

1.7. Resource holding potential comprehension

1.7.1. The concepts applied to human resource control

An additional concept that holds relevance to resource control behaviour is resource holding potential/power (RHP) comprehension. The concept of RHP originates from ethological theory (Parker, 1974) and can be summarised as the ability of an organism to defend a resource, essentially it's 'fighting ability'. In his original paper, Parker describes RHP as being based on a combatant's 'fitness budget', which will be expended over the course of a contest that has escalated to physical battle against an opponent. The loser of that contest will be the individual who exhausts their fitness budget first (Parker, 1974). RHP *comprehension* therefore, is the ability of an individual to ascertain/estimate the fitness budget, or RHP, of a potential resource contest opponent. Parker states that, in essence, animals in contest over a resource will resort – 'escalate' – to violence and physical fighting if previous strategies of resource control have been unsuccessful. He suggests that an animal's strategy selection ability is determined by natural selection, as is their judgement of when to withdraw from a contest. More specifically, he describes that, through an animal's instinct, they determine how their 'fitness budget' – how much fitness or 'survivability' they can afford to lose in order to attain/maintain the contested resource – measures against the budget of their opponent. The animals who were more effective at correctly judging when to engage in a resource fight, when to withdraw from that fight if losing, or withdrawing prior to escalation, would best increase their chance of survival to reproductive age. Those animals whose strategy 'assessments' were poor, would miscalculate the 'risk-cost-benefit' of the resource contests and be more likely to, for example, be mortally wounded in a fight against a much more powerful opponent or withdraw from a fight too early when they could have attained a precious resource. This in other words, would be evidence of the animal's poor RHP comprehension.

RHP theory can be applied to humans (Archer & Benson, 2008). Certainly, humans are capable of – and do – make such judgements as 'can I win this fight against him to get the boxing trophy'. Certainly, a boxing trainer would not pit his 12-year-old protégé against a 25-year-old Mike Tyson – clearly their fitness budgets are far too unbalanced. However, RHP comprehension in humans requires the capability to potentially make highly complex considerations in a resource contest situation. Whilst there is possibly a genetically-based, instinct that drives our decisions to back down, run or fight (e.g. fight or flight) – there is at least some evidence that the male response to stressful situations is modulated by the SRY gene's activity (Lee & Harley, 2012) our complex social conditioning and environments may well play a significant part in shaping our RHP comprehension capabilities over the course of life, though this is yet to be specifically investigated (to this authors knowledge). Such is the complexity of human society and cognition, that RHP alone (in its strict physical meaning of the term) may not be sufficient for successful resource control. An additional mechanism – social attention holding power (SAHP) – has been suggested as a means through which individuals are able to attain resources without the need to resort to violence, or even direct confrontation with another individual at all (Gilbert, 1989, 1992; Gilbert, Price, & Allan, 1995). The contention here is that humans attain resources (e.g. social status or physical things) through indirect mechanisms such as socially desirable 'fashion sense', promotion at work etc., in addition to, or instead of, the more ethological, RHP-related methods; that too overt a display of RHP may actually be counter-productive in terms of resource control attainment. This contention certainly is corroborated by the agonism-related literature discussed earlier (sections 1.3. and 2.) in that children who continue to use aggressive resource control strategies that may have been highly successful after the preschool years (~3-4 years) without utilising ameliorating/reconciliation behaviour, i.e. 'coercive controllers', are increasingly stigmatised and socially isolated as they progress through childhood, compared to those children who use prosocial or bistrategic methods (Pellegrini et al., 2011; Roseth et al., 2011).

The bullying and victimisation literature have also adopted these concepts and applied them within Social Rank theory, a framework used to investigate the origin of depression and internalisation problems, along with other negative experiences within social relationships (Gilbert, 1992). Specifically, RHP and SAHP have been used in separating the type of bullying behaviour often seen in school age children. Hawker and Boulton (2001; p. 384) contend that the threat of, or actual physical attack involves the depletion of the victim's RHP, whilst verbal attack depletes their SAHP. Whilst bullying behaviour may be less established in children who have just started school (Monks et al., 2003), it may be useful to consider their application to the resource control theory framework; that physically coercive resource control strategies involve the attempted depletion of the opponent's RHP – their 'physical fitness budget' – in order to gain the social or physical resource, e.g. hitting, grabbing, pushing etc., whilst verbally coercive resource control strategies involve the attempted depletion of the opponent's SAHP – their 'social fitness budget' – in order to gain the social or physical resource. While RHP is essentially physical fighting ability, SAHP is what can be viewed as 'social fighting ability'. Both can be utilised to get social and/or physical resources. In essence the two concepts relate to the *approach* to a contest, rather than the type of resource the individual is contesting. In the context of the resource control theory framework, relationally coercive strategies do not fit neatly into either a RHP- or SAHP-related contest. Whilst one can associate relational coercion with SAHP-based resource contests, there is a more complex resource-related social agonism at play here compared to verbal coercion, which requires a more detailed exploration.

In RHP-related resource contests, prior to physical engagement there may be (though not always) posturing in the form of physical or relational threats that will be enacted if the aggressor does not get what they want (Parker, 1974). Unlike in other animals, where threats are manifested through innate physiological adaptations (e.g. horns) or behavioural displays (e.g. rearing onto hind legs, beating chest), in young children (~4 years old) threats can be verbal, e.g. "if you don't give me the toy, I will kick you". Additionally, they can be relational threats, e.g. "if you don't give me that toy, I won't be your friend anymore" (Ostrov & Crick, 2007). Hawker and Boulton (2001) identify relational aggression as an assault on the "sense of belonging", yet a relational threat based on the destruction of a friendship can be interpreted through the lens of resource control theory as the child using the friendship between themselves and their opponent as a resource in itself. Akin to the risk-cost-benefit assessments associated with RHP comprehension, the child must assess whether it is 'worth it' to ignore the threat and keep control of the toy or withdraw from the contest. Similarly, the resource challenger must make similar assessments prior to and following issuing the threat. For example, if the challenger is a very popular child in the class and the current resource controller is not, the challenger may well be likely to make the threat and be fully prepared to go through with it, as this particular friendship is a low value social resource that the challenger deems less valuable that the toy (material resource). However, the opposite may be the case of the social statuses of the two children were reversed. Moreover, as a person ages and develops cognitively, more indirect and convoluted factors will likely enter into their assessment in such situations, yet the core RHP-style risk-cost-benefit assessments will remain. Such relational threat-based contests can be associated with SAHP-based contest as by losing a friend, a child's social influence and standing would (likely) decrease, thus this would reduce their SAHP budget for future resource contests. No study yet exists that investigates how a child's RHP or SAHP comprehension affects either aggression or prosocial behaviour, either within or outside of the context of resource control theory.

Of note is the is the lack of human studies directly investigating RHP or its comprehension. Whilst Parker concentrates RHP theory on the physical, overt confrontations seen in other animals, as RHP theory begins to expand into the human scientific literature, it is logical that the theory develops to reflect the more complex and social ways in which more socially complex animals (humans) compete. SAHP evidently is such an expansion. Whilst it has been positioned as a related but separate concept (Hawker & Boulton, 2001), it can be comfortably positioned as a concept within the overarching RHP theory when relating to human competitive behaviour. This subsumption of SAHP theory within RHP theory is particularly justified when viewing RHP/SAHP through the lens of resource control theory, which considers social attention itself as a potential desired resource. Therefore, throughout this thesis, SAHP is taken to be part of the overall concept of RHP.

To date, there has been only one study (that this author is aware of) in adults which investigated the relation between RHP comprehension and social behaviour. Archer and Benson (2008) used a questionnaire to record young men's responses as to how they would react in a hypothetical confrontation scenario in a bar, with the adversary varying in size and strength, number of allies present, and his reputation for fighting. Results showed that young men would be more likely to choose more direct physical confrontation when the provocation from the adversary increased (e.g. insult to girlfriend) and the adversary's RHP decreased (e.g. smaller, less/no friends, known for being weak). This indicated that participants take into consideration the resource holding potential of others in a confrontation situation. However, whether or not similar responses are found in younger age groups remains to be examined.

1.7.2. ToM, empathy and RHP comprehension

At the age of 4-5 years egocentrism and less developed ToM may play an important role in an individual's RHP comprehension; egocentrism – the inability to take anyone's perspective but your own (Piaget, 1951) – is conceptually linked to ToM, moreover in a recent study this link has been empirically corroborated (White & Carlson, 2016). To this author's knowledge, there is to date no research investigating either cognitive empathy or ToM and their association with RHP comprehension, yet it is plausible to hypothesise that being able to accurately judge what chance one has to defeat a resource competitor may involve both cognitive empathy and ToM. For example, a developed ToM would allow an individual to appreciate the advantage of concealing, rather than displaying, a weapon from the opponent prior to the contest, i.e. depriving the opponent of important knowledge that alters the relative RHPs. Developed cognitive empathy would allow the individual to perceive how enraged or scared the opponent is, allowing the individual to more accurately predict the likelihood of the opponent capitulating.

1.7.3. Section 7 summary

RHP comprehension are likely important factors regarding young children's resource control behaviour and social dominance, yet RHP-based behavioural research in humans has only been conducted in adults, for a single study (that this author is aware of; Archer & Benson, 2008). How RHP comprehension associates with ToM and cognitive empathy is another area requiring direct investigation. Conceptually, ToM may give young children a decisive advantage in resource contests, as would developed empathy. Over the course of the first school year, whether developing RHP comprehension relate to altering resource control strategy as well as successful resource control and social dominance status, is an intriguing research question that has yet to be answered.

1.8. Morality – the development and application of moral codes

1.8.1. Theories of Moral Development

Whilst the association between RHP/SAHP and empathy is yet to be explicitly investigated, the association between moral development and empathy has been significantly studied and documented. Moral development has been a subject of extensive focus and theoretical debate over many decades, yet, as with empathy, two main underlying facets of morality emerge from the literature, those being cognitive and affective processes. These domains have been argued to underpin the complex moral behaviour and rationales seen in human society. From a cognitive perspective it has been argued that moral knowledge motivates moral action (Arsenio & Lemerise, 2004; Crick & Dodge, 1994). From this perspective an individual's immoral behaviour could be explained by deficits in their moral knowledge (Crick & Dodge, 1994).

Yet research also emphasises the importance of 'moral emotions' – empathy, sympathy, guilt, shame, embarrassment and compassion – as important in relating cognition to behaviour and is a central component of Hoffman's theory of moral development (Batson, 1990; Eisenberg, 2000; Hoffman, 2000). The emergence of a moral conscience has been suggested from study of 3-4 year olds in which greater expression of guilt was related to decreased violation of rules of conduct later in development (Kochanska, Gross, Lin, & Nichols, 2002). Moral emotions may also be key in the development of prosocial principles and behaviour (Eisenberg et al., 2006) and moral norm internalisation (Kochanska & Aksan, 2006). Among 4-5-year-old children, Miller et al. (1996) found a significant association between empathic responses and developed moral reasoning. Those children who recorded facial expressions more emotionally congruent to the scenario they were witnessing, were significantly more likely to respond more altruistically than egocentrically in the moral dilemma situations, e.g. choosing to help a peer who has fallen over rather than going a party.

The connection between empathy and morality has been found across the developmental epochs. In young adults, perspective-taking, empathic concern/sympathy and personal distress were associated with 'care-based moral reasoning' – a five stage hierarchical developmental construct ranging from exclusive self-concern to primarily other-concern to a balance of self- and other-concern (Skoe, 2010). Specifically, perspective-taking was found to be positively associated with higher levels of care-based moral reasoning, whilst personal distress was negatively associated with care-based moral reasoning.

Damage to the ventromedial prefrontal cortex (vmPFC) – which has been associated with cognitive empathy and affective ToM (Sebastian et al., 2012; Shamay-Tsoory et al., 2009) – has also been associated with heightened utilitarian moral reasoning – moral decisions based on what is the optimum outcome for the greatest number of people - in adult brain injury patients (Koenigs et al., 2007). Specifically, in one of the study's tasks, participants were asked to answer whether or not they would push a person off a bridge to block a boxcar (freight/cargo train carriage) and prevent it killing five other people. However, they would be killing the person they pushed. Compared to the neurologically normal control group as well as a sub-sample of patients with alternative types of brain damage, the vmPFC damage patients exhibited reduced physiological response to emotive pictures and were rated lower in empathy by family members. Moreover, they were significantly more likely to endorse the pushing of the person in the scenario compared to the other groups. Though neurological data will not be collected for this project, the evidence of a neurophysiological overlap between a domain associated with ToM, empathy and moral reasoning provides at least a suggestion of *functional* overlap between these phenomena.

1.8.2. Morality and resource control

Morality has also been associated directly with resource control behaviour; Hawley and Geldhof (2012) found that young children classified as bistrategic controllers (M = 4.85 years) showed significantly enhanced moral cognition compared to their peers, despite high levels of aggressive behaviour. Interestingly bistrategic children scored lower on moral internalisation/conscience in comparison to their peers to the extent that moral internalisation negatively predicted social dominance, with the exception of prosocial controllers who were above the sample average for social dominance and had high moral internalisation scores. Notably, the prosocial controllers were the least dominant out of the three most dominant sub-types (the other two being coercive and bistrategic controllers). This corroborates the notion that at this age, aggression is an effective resource control strategy, with specific strategic use of aggression and prosocial behaviour being most effective (e.g. Roseth et al., 2011). Additionally, this study suggests that at such a young age, a developed conscience may play an inhibitory role in resource control and social dominance – the prosocial controllers were a minority of the sample who showed above average moral internalisation; in other words, they did not conform to the overall group's moral norm (Roseth et al., 2011). However, over time, prosocial controllers increase in popularity whilst coercive controllers decrease (Pellegrini et al., 2011; Roseth et al., 2011) which hypothetically could reflect the development of a moral norm in the wider peer group that 'catches up' with the moral values of the prosocial controllers. Further research is required to investigate such a contention as well as other possible explanations for this effect.

Hawley and Geldhof (2012) coined the term 'selective moral engagement' to refer to their reported finding that all three controller groups (prosocial, coercive and bistrategic) used moral behaviour selectively in order to either limit repercussions against themselves, or to cause detrimental effects to a peer. In essence, selective moral engagement was measured through various items on the teacher questionnaire used, such as frequency of 'telling the teacher' (tattling) or frequency of scolding a peer for doing wrong.

Though selective moral engagement is an intriguing research avenue worthy of future investigation, selective moral *disengagement* – the original concept upon which selective moral engagement is based – is yet to be investigated in young children. Bandura (2002) defined this concept as the process whereby individuals or groups justify normally considered amoral behaviour as in fact moral behaviour. Bandura theorised that reduced moral behaviour and action in society at large can be explained by a four-factor model of moral disengagement. The *cognitive restructuring* factor frames the behaviour as positive, by either: justifying the act as moral (moral justification); comparing the behaviour to a worse act (advantageous comparison); by describing the behaviour in a way that ameliorates it to diminish its severity (euphemistic labelling). The *displacement and diffusion of responsibility* factor obscures or minimises the role of the perpetrator in the harmful outcome. The *minimising/misconstruing of consequences* factor denotes the agent disregarding or distorting the behaviours consequences, allowing them to emphasise positive outcomes or distance themselves from the resultant damage. The *dehumanising/blaming of the victim* factor sees the agent strip the victim of human characteristics or blame them for provoking the behaviour (Bandura, 2002; Pozzoli, Gini, & Vieno, 2012).

Whilst there is an increasing amount of research into moral disengagement in adults (e.g. Weiss et al., 2006) adolescents (see Gini, Pozzoli, & Hymel, 2014 for meta-analysis of both adolescent and child research; Wang, Lei, Yang, Gao, & Zhao, 2016) and older children (e.g. Pozzoli et al., 2012) there is little focused on selective moral disengagement in younger children below the age of 8-years-old. Furthermore, there is a most pertinent finding in the adolescent literature. Wang and colleagues (2016) found that in 357 male juvenile offenders (aged 14-26 years) empathy was negatively associated with offender aggression. However, this effect was moderated by moral disengagement; specifically, when low levels of moral disengagement were present, there was a significant negative relationship between empathy and aggression, but this relationship became non-significant when levels of moral disengagement were high. It is unclear whether this would be similar among young children. Importantly, the study did not discriminate between affective or cognitive empathy (they used the Interpersonal Reactivity Index (IRI); see Davis, 1983b) therefore an attempt to elucidate more specific associations with empathy made in future research, particularly regarding resource control and social dominance variables, a comparison that is yet to be made.

1.8.3. Section 8 summary

The development of morality has been heavily researched and more recent theories denote the importance of both a grounding in moral knowledge – learned moral rules (Arsenio & Lemerise, 2004; Crick & Dodge, 1994) – and the development of moral emotions such as empathy, sympathy, guilt, shame, compassion and embarrassment (Batson, 1990; Eisenberg, 2000; Hoffman, 2000). Such moral cognitions and moral affect have rarely been investigated in the context of resource control behaviour, only one study has done so, finding that moral internalisation/conscience development was low in bistrategics and coercive controllers, yet high in prosocial controllers (Hawley & Geldhof, 2012). Ecological application of moral codes may play an important role in young children's social dominance structures, and whilst conscience may be a somewhat inhibitory force in terms of social dominance (Hawley & Geldhof, 2012), over time such characteristics may have significant negative effects (X. Wang et al., 2016).

1.9. Literature review – summary

Research into young children's resource control behaviour has only been influenced by resource control theory's holistic behavioural model since the turn of the millennium, thus there is scant research directly framed by the theory. However, interpreting previous data from the developmental psychology literature through this theoretical lens, along with the recent work of Hawley and colleagues (Hawley, 1999, 2002, 2003b, 2003a, 2014b, 2015; Hawley & Geldhof, 2012; Hawley et al., 2007; Hawley & Little, 1999) among others (Bjorklund & Pellegrini, 2000; Massey-Abernathy & Byrd-Craven, 2016; Massey et al., 2014; Pellegrini, Roseth, et al., 2007; Pellegrini, 2008; Pellegrini et al., 2011; Pellegrini & Long, 2002; Roseth et al., 2011), provides this present thesis with a fairly substantial amount of work on which to base hypotheses, identify gaps in knowledge and form pertinent research questions. Resource control theory has reframed earlier agonist-based dominance research as just a part of the strategic spectrum from which young children (and humans in general) select strategies, in order to 'win out' in resource contests. Current resource control theory-based research suggests that by the age of 5 or 6 years, children classed as bistrategic are more competitively successful than those classed as coercive strategists. What research is yet to elucidate in any way is resource control and social dominance's relationship to empathy and ToM. Additionally, developed resource/social attention holding potential and selective moral disengagement may be advantageous in resource contests; these too have yet to be investigated within the context of resource control theory.

This thesis will report studies of both cross-sectional and longitudinal design that analyse data collected from 4-5-year-olds – who are at a key developmental life stage cognitively and socially - and their class teachers over the course of the children's first year at school year in order to investigate the aims, questions and hypotheses laid out in the section below. The value of a longitudinal study, particularly in the context of such an understudied theoretical framework as resource control theory, is great. The longitudinal studies thus far carried out by Roseth, Pellegrini and colleagues (Pellegrini et al., 2011; Roseth et al., 2011) have provided unique insights, compared with other resource control theory-based cross-sectional studies, into the developmental pathways of the young children's resource control behaviour over the course their first year at school, particularly regarding the reconciliation behaviour employed by the most dominant children – this specifically has elucidated a specific behavioural mechanism behind why bistrategic children – those children employing coercive and prosocial strategies at high rates – are not stigmatised over time as their coercive controller peers appear to be, suggesting a more complex function of social behaviour that was suggested by the earlier studies into social dominance in young children.

1.10. Aims, questions and hypotheses

1.10.1. Overarching research questions

Whilst there is a range of research focused on young children's development, only a limited amount of research has investigated children's behaviour in terms of resource control. Moreover, the potential factors that influence such behavioural outcomes are many and varied, both cognitive and affective, with both types combining to influence more complex social and environmental awareness. There is yet to be any study that investigates both these variables under the theoretical lens of resource control theory. This thesis therefore presents four studies, each investigating aspects of early childhood resource control, social dominance and the factors that may be related to them, with each study adding to the two overarching questions of this thesis, which are:

1) ***What are the relationships between frequency of resource control strategy use, resource control success and social dominance over the first year at school?***

2) ***What are the potential influences of social, cognitive and affective factors on the relationships examined in response to question 1 over the first year at school?***

Each of the four studies in will address aspects of these questions via addressing their own study aims, outlined below.

1.10.2. Study aims

Study 1: Associations between resource control behaviour, resource control success and social dominance - the effect of data treatment on analytical outcome

Aim 1 *– Examine the relationship between frequency of resource control strategy use, resource control success and social dominance, and the effect of resource control behaviour variable construction on these relationships.*

The first aim of this study was to examine the empirical validity of the social dominance achievement mechanism proposed by resource control theory, whereby successful resource competitors will increase in social dominance status. Linked to this aim was the comparison of how the relationship between the resource control variables and social dominance vary according to how the resource control data is treated in terms of variable type – categorical or continuous. Whilst Hawley and others (Hawley, 2003a; Massey-Abernathy & Byrd-Craven, 2016) have opted for a percentile-based categorisation of participants according to relative resource control behaviour frequencies, Roseth (Roseth et al., 2011) investigated resource control behaviour and social dominance using continuous-type ratings of coercive and prosocial resource control behaviour. However, no study to date (to the knowledge of this author) has compared the two systems of analysing resource control data. This study will therefore be the first to do so.

Aim 2 *– Examine the relationship between resource control behaviour and controller subtype*

The second aim of this study was to investigate whether there are statistical differences in teacher-rated resource control behaviour – the continuous-type data from which the subtypes were formed – between the controller subtypes. If not, then this raises an important question regarding the validity of the subtype groups and how they are currently formed. Related to this was the examination of the absolute behavioural frequency differences exhibited for each subtype group and discussion of whether the subtypes, or future resource control groups should be solely based on relative behaviour without considering absolute behavioural data which could provide additional information that relative data cannot.

Study 2. Thinking and feeling your way to dominance – are theory of mind, empathy and selective moral disengagement associated with social dominance, resource control early in a child's first year at school?

Aim 1 – *Examine the relationship of social dominance, resource control behaviour and resource control success with theory of mind in early childhood.*

Both theory (Hawley, 1999, 2008) and some empirical data (Pellegrini et al., 2011) have suggested the association between ToM and social dominance and resource control. However, the data is scarce and incomplete. What data are present suggest a significant role of first-order ToM reasoning in increasing social dominance at the end of the first school year. However, whether such and effect is present at the start of a child's first school year remains to be seen. Given that Pellegrini et al. (2011) found that at 4-years-old – the age of the vast majority of the children in this present study at phase 1 – ToM had some significant effect on teacher-rated dominance status, this study's hypothesis is that ToM will have had some positive relation to resource control success and social dominance.

This author also makes a tentative hypothesis extrapolating from the theory (Hawley, 1999, 2008) that those with greater ToM capability, particularly regarding second-order ToM reasoning, utilise pro-social control strategies more frequently than others as this theoretically would require greater thought perception skills and would lower the risk of getting into trouble with the class teacher.

Aim 2 *– Examine the relationship of social dominance, resource control behaviour and resource control success with empathy and emotion comprehension in early childhood.*

There is no direct empirical evidence to associate emotion comprehension with resource control and social dominance. Reasoning similar to that in hypothesis 1 applies here, therefore: that resource control theory (Hawley, 1999) and related work (Pellegrini et al., 2011) suggests that aggression and less sophisticated strategies for resource control are used in the early stage of school life, however over that first school year young children develop more complex strategies requiring higher cognitive functioning. This reasoning should also extend to emotion comprehension and cognitive empathy. Therefore, similar to aim 1 above, this author hypothesises that emotion comprehension and cognitive empathy may have some relationship with resource control success and social dominance. However, relationships with resource control behaviour is less clear.

Whilst the few resource control-based papers that include or mention cognitive/affective factors focus on ToM and cognitive empathy, there is a total absence (to this authors knowledge) of literature regarding resource control/social dominance and *affective* empathy specifically. With that caveat in mind, it remains an open question as to whether affective empathy has any impact on resource control and social dominance in the first year at school. However, Hoffman's theory of empathy does lend credence to the hypothesis that cognitive empathy may enhance one's affective empathic experience; therefore a tenuous hypothesis that affective empathy's effect on social dominance or resource control will dependent on cognitive empathy, though data is too scarce to specify exactly which specific strategy (prosocial or coercive) this effect will be mediated by.

Aim 3 *– Examine the relationship of resource control behaviour, resource control success and social dominance with selective moral disengagement in early childhood.*

Evidence is scarce on which to base a hypothesis, however there is sufficient literature to justify a tentative one (Hawley & Geldhof, 2012; Renouf et al., 2010; Svetlova et al., 2010). Hawley and Geldhof (2012) found bistrategic controllers to be the most socially dominant subtype, scoring highest for moral rule comprehension but joint lowest (with coercive controllers) on emotional reasoning-based moral understanding, however the scale used in this current study does not discriminate between these factors behind moral functioning. Therefore, this study leaves the question as to how the subtype types may differ in selective moral disengagement and how that may relate to resource control behaviour, resource control success and social dominance as an open question. Wang et al. (2016) found selective moral disengagement to have a moderating effect on empathy's relationship to aggression – adolescents scoring low for moral disengagement and higher for empathy were less aggressive, yet this relationship became non-significant when levels of moral disengagement were high. Given that 1) the sample was much older than the one presented in this thesis, and 2) the aggression measured in that study was not specifically resource control behaviour; this result may not be corroborated here, however a cautious hypothesis that a similar moderation effect will be found in this present study is put forward.

Study 3: What are the chances? Investigating resource holding potential comprehension in early childhood and its association with resource control and social dominance

Aim 1 *– Examine child RHP comprehension vignette responses and their associations with ToM, empathy and emotion comprehension, and teacher-rated resource control behaviour and social dominance*

The first aim was to investigate the relationships between the categorical controller subtypes and the continuous prosocial and coercive resource control strategy variables, and the child responses to 12 RHP comprehension scenarios – stick figure vignettes depicting varying resource contest situations against an opponent. There is little data within the field on which to base solid hypotheses, however, it is plausible to suggest that those children tending toward prosocial or coercive strategy selection may respond prosocially or coercively, respectively, more frequently in a resource contest scenario and that ToM, empathy or emotion comprehension may play a important role in determining responses in these situations.

Aim 2 *– Examine the effect of opponent characteristic variation on child participant response*

The second aim was to establish how varying specific characteristics – toughness, presence of friends/allies, and physical size – of the scenario's resource contest opponent can impact the scenario responses. Whilst there is limited data regarding RHP comprehension in adult males (Archer & Benson, 2008) there is none to date (that this author is aware of) regarding such capability in early childhood. This prior adult data could guide a hypothesis that young children would provide a similar pattern of responses, however, given the significant difference in development in this study's participant age group, an open question regarding their response patterns in relation to a resource contest opponent's characteristics, rather than a hypothesis, is presented here.

Study 4: Longitudinal analysis of the cognitive and affective factors involved in establishment of social dominance and resource control in young children

Aim 1 *– Examine the changes on prosocial and coercive resource control strategies over time.*

Longitudinal research (Pellegrini et al., 2011; Pellegrini, Long, et al., 2007; Roseth et al., 2011, 2007) to date suggests that over the course of the first year at school, early childhood prosocial control strategies increase over time, whilst coercive strategies decrease. However, this data is only from one sample and any solid conclusions as to wider population trends in this age group will require further data from other samples. Therefore, this study intends to examine these behavioural changes in this present sample and add to currently scarce data in this area. Based on previous research, it is hypothesized that the present study will find that prosocial strategy use will increase across the school year, whilst coercive strategy use will decrease over this time.

Aim 2 - *Examine how prosocial and coercive strategy use frequency earlier in the school year relate to resource control success and social dominance at the end of the year, and whether sociometric status or cognitive/affective factors affect these relationships*

Pellegrini, Roseth and colleagues (Pellegrini et al., 2011; Roseth et al., 2011) have provided the only longitudinal data to date that investigates how resource control strategy relates to social dominance over the course of the first year at school. However, it is yet to be investigated whether initial strategy selection and indeed initial establishment of dominance has any bearing on resource control and social dominance status at the end of that year. It is therefore hypothesized, based on the theoretical works of Bernstein (Bernstein, 1981) and Hawley (Hawley, 1999), that initial dominance and/or resource control success, but not resource control strategy, at the start of the year will be a significant predictor of social dominance/resource control success at the end of the year.

Roseth et al. (2011) showed that over the course of the first school year, positive peer regard was consistently associated with social dominance. Furthermore, theory (Hawley, 1999) and empirical findings (Pellegrini et al., 2011) suggest that cognitive and affective factors have some relation to resource control and social dominance, affecting the behaviours chosen in contest situations. Findings from study 3 (chapter 5) of this present thesis suggest this may not be the case. However, study three was cross-sectional and did not consider the possibility that factors such as theory of mind and empathy may require time to affect social relationships and behaviour. Based on this possibility, and empirical findings that evidence the time-lagged effect of theory of mind on other factors such as peer acceptance and general prosocial behaviour (Banerjee et al., 2011;

Caputi et al., 2012), the current study therefore aims to examine whether initial peer social regard and cognitive/affective factors (e.g. ToM and empathy) will have longitudinal on the relationships between resource control strategy use and resource control and/or social dominance at the end of the year, with the hypothesis being that some cognitive factor (either ToM or empathy, or both) earlier in the year will significantly effect social dominance and/or resource control later in the year.

1.10.3. Section 10 summary

Overall, this project aims to investigate how resource control and social dominance relate to each other across time, via analysing the same resource control data in both categorical and continuous forms. Moreover, the relationship between resource control and social dominance – with a range of cognitive and affective factors – will be invested both across three timepoints. This project provides a novel investigation into the effect of variable formation on analytical output in terms of resource control data and provides novel investigation into a unique combination of cognitive and affective variables in terms of resource control and social dominance in young children across their first year of school.

Chapter 2 – Methodology

2.1. Design

The empirical component of the present thesis comprised four studies; the first three studies utilised a cross-sectional design and the fourth study a longitudinal design. Each of the four studies used varying aspects of the same data gathered over the course of a school year at three different schools in four different reception classes, with children aged 4-5 years old and their teachers. The data were collected at three points across a school year. Phase 1 data were collected between September and November 2016, phase 2 between February and April 2017 and phase 3 between May and July 2017. Schools were visited for data collection in the same order at each phase. Upon completion of the data collection at the first school, collection at the second school was initiated as soon as it was practically possible (allowing for school holidays and the school's other commitments). Participating schools were all situated in South-East England (for detail regarding participating schools, see section 2.2.1.).

Overall the research presented in this thesis investigates how the variables social dominance status and resource control strategy/behaviour associate with the following factors: theory of mind (ToM), emotion comprehension and empathy (cognitive and affective), resource holding potential (RHP) and strategy selection, and selective moral disengagement; associations with age, gender, verbal ability and non-resource oriented behaviour as were also investigated.

The first three studies investigated child resource control and its relationship to other variables during the first phase (start of the school year) via two alternative resource control variable constructs formed for the same resource control data (taken from teacher reports of child behaviour). The formation of these variables is discussed in more detail below. Briefly, one construct was a continuous-type measure of prosocial and coercive resource control (Roseth et al., 2011); the other used that same resource control data to form categorical 'controller subtype' groupings of the child participants that sit within specifically defined resource control parameters

(Hawley, 2003b) – those groupings being bistrategic controllers, prosocial controllers, coercive controllers, typical controllers and non-controllers.

Study 1 (chapter 3) examined the relationships between resource control behaviour, resource control success and social dominance and the compared the two methods of coding the resource control strategy use as described above. Specifically, did the resource control variable *type* – i.e. categorical- or continuous-type – affect the subsequent findings regarding resource control's association with the variables of interest? Whilst there were similarities in the results found by Hawley (Hawley, 2003b) and Roseth et al. (Roseth et al., 2011), who used categorical 'subtype' groupings and continuous resource control behavioural ratings, respectively, there were also differences. By analysing the same resource control data using *both* these methods, the first study aimed to investigate whether such differences could be accounted for by genuine differences in the sample or are accounted for by data handling artefacts, specifically variable structure.

Study 2 (chapter 4) examined the socio-affective/cognitive correlates of social dominance and resource control behaviour via analyses of the data gathered regarding the ToM and empathy variables in terms of social dominance status and resource control (both variable types as above), in addition to investigating the relationship between ToM and empathy themselves. This study also investigated the associations between moral reasoning and social dominance and resource control (both variable types). Furthermore, given the theoretical connection between morality and empathy (Batson, 1990; Eisenberg, 2000; Hoffman, 2000), the association between empathy and moral reasoning was also investigated. Research into ToM and empathy's relationship to social dominance and resource control is scant, with theory-based hypotheses (Hawley, 1999; Pellegrini, 2008; Roseth et al., 2011) forming the majority of the literature base in this area. No resource control study to date (that this author is aware of) has combined empathy and ToM within one single study and compared their relationship with resource control and social dominance.

Study 3 (chapter 5) examined the potential effects of a resource opponent's RHP on the strategy selection of children in relation to their teacher ratings of social dominance and resource control success and behaviour. Specifically, this study investigated whether social dominance status and resource control strategy use and success accounted for variance in responses (prosocial or coercive) to the RHP vignette measure, consisting of 12 stick figure vignettes.

Study 4 longitudinally examined the relationship between dominance status and resource control success, resource control strategy use and the above cognitive and affective variables of interest across three phases over the course of the child participant's first school year. One of the only longitudinal studies to date (that this author is aware of) which utilises specific ideas put forward by resource control theory (specifically bistrategic behaviour) was conducted by Roseth et al. (2011), however neither measures of ToM nor empathy were included in the design, whilst another longitudinal study by the same research group (Pellegrini et al, 2011) included a ToM variable only for the last phase of data collection; therefore, this novel study aims to provide longitudinal data that empirically examined the previous hypotheses put forward regarding these phenomena and their association with resource control and social dominance. Longitudinal designs, unlike cross-sectional designs, allow for the tracking of developmental pathways and changes in variable associations over time, both at the individual and group levels (Fitzmaurice, Laird, & Ware, 2012). Study 5 of this thesis aims to utilise a longitudinal design to elucidate the relationships between resource control and social dominance, and affective and cognitive development over time, and any causal relationships that may exist.

2.2. Participants

Ninety-three children aged between 4 and 5 years old were recruited from 4 reception year classes from 3 state primary schools in the south east of England, one class each from 2 of the schools and 2 classes from the remaining school. Participation rates for the four classes were 73%, 73%, 76% and 80%. Parents/caregivers gave written consent (Appendix A) for their child to participate and all children assented to the study prior to data collection. All children participating in the study had no recorded mental health diagnosis or specific learning disabilities at the time of this study. One child was diagnosed with sight impairment and one child was registered deaf and was equipped with a hearing aid. In both cases each child did not seem to struggle with any of the tasks because of these potential impediments.

Six children spoke English as a second language (English as an Alternative Language; EAL). The sex of the participants was roughly equal overall and within class samples (see table 2.1). Teachers from each class (N = 4) also participated in the study by completing the teacher questionnaires described below.

Initially 93 children were recruited to take part in the study. However, during initial stages of phase 1, one child refused to take part in the study. Another child was not present for phase 3 and thus that data is missing for the analyses. One other child was absent for phase two but present for phases 1 and 3 of the study (attempts were made to collect the phase 2 data for this child but chronic absence from school over this phase prevented this). Therefore, attrition rates were low and 97.85% of the child participants remained at the end of phase 3.

Table 2.1. Descriptive statistics for child participants at beginning of T1 of data collection

Variable	**Child participants**
Sample size	92[4]
Sex	
Male (n)	47
Female (n)	45
Age (years)	
M (SD)	4.64 (0.29)
Range	4.08 – 5.17
BPVS (standardised)	
M (SD)	105.52
Range	71-122

[4] This does not include the child who dropped out in the very early stages of phase 1. See main text above.

2.2.1. Participating schools

All three schools received a 'Good' rating for their most recent Ofsted report. Socioeconomic data for the child participants specifically were not obtained for this project, though all schools were situated in suburban, lower to middle class areas of Greater London. The proportion of children attending the schools whose first language was not English ranged between roughly 16-23%, with the national average at 20.8%; pupils eligible for free school meals at any time in the previous 6 years ranged between roughly 5-18%, with the national average at 24.9% (this data is for the academic year 2016/17; Department for Education, 2017).

2.3. ToM measures

ToM is a widely studied concept and cognitive phenomenon and as such there are a number of measures designed to assess it. This present study employed the widely used unexpected transfer task (Wimmer & Perner, 1983) and a version of the classic Perner and Wimmer (1985) second-order false-belief task, the story for which has been simplified to remove other cognitive confounders and therefore more appropriate for use with 4-5-year-old children (Sullivan et al., 1995). These tasks assessed first-order false-belief and second-order false-belief, respectively. To investigate ToM development in greater depth, 'lie/joke' differentiation ability was assessed using two lie/joke scenarios (Sullivan et al., 1995), given the lack of study into this specific area of ToM research. Moreover, as a second-order ability, it provides this project with a broader scope as well as a more detailed examination in terms of second-order ToM in early childhood, when coupled with the second-order false-belief task also being used.

2.3.1. First-order false-belief (Wimmer & Perner, 1983)

The Sally-Anne unexpected transfer task (Wimmer & Perner, 1983) was used to assess first-order false-belief and has been widely used, including with the age group of interest here (e.g. Bensalah et al., 2015). In this scenario, both dolls, Anne and Sally, have containers. In Anne's container is an object, e.g. a ball. Anne goes outside to play and thus does not see that Sally moves her ball from Anne's container to Sally's container. Sally ensures that the containers are covered how they were at the start of the scenario so that when Anne comes back in at the end, things look unmoved. Before Anne returns, the check question was asked: "did Anne see Sally move the ball?" The scenario ended with the first-order false belief question "where does Anne think the [object] is?" followed by a confirmation question "why does she think the [object] is there?"

The set-up consisted of a cardboard doll house with open access to the front for easy access to the dolls and props. Each child was sat directly in front of the doll's house, with the researcher sat to the side, with a clear view and access to the scenario and the recording equipment (laptop, paper). Space was left round the back of the house so that Anne could 'go out and play' which was integral to the scenario. Across the three data collection phases, the scenario remained essentially the same, with variations in the object that was being moved (a marble, a bouncy ball and a miniature toy teddy bear) and the storage units for the object (cardboard boxes, toy handbags and toy baskets), to reduce memory bias confounding. The scenario script was set up in the software SuperLab on a laptop to the side in such a way that only the researcher could see the screen (for full scenario see Appendix B). Included as part of the script was the check question ("did Anne see Sally move the ball?") and the first-order false-belief question. Hotkeys were assigned to the different categories of answer the child could give: correct, incorrect or don't know/not sure. Due to only one researcher being present for the data collection, this allowed quick and discrete recording of answers. If a child changed their answer following entry into SuperLab, a brief note was made on paper (hidden behind a 'wall' of the doll house) and this was noted manually in the data output after the session had concluded.

Throughout the scenario, the researcher manipulated the dolls manually, according to the scripted actions. The dolls were introduced as Sally and Anne to the child, who was then asked to identify each doll by name. This was repeated as necessary until the child correctly identified Sally and Anne. The researcher then followed the scenario script, showing the child that both dolls owned a container each and that Sally's was empty, and Anne's contained the object, each time ensuring that the lids/coverings were replaced. When Sally 'moved' the object, the researcher allowed the child to help if they wanted, e.g. opening the container, closing the container. When the test questions were asked, the researcher discretely used one hand to hit the appropriate hotkey (depending on the child's answer) whilst moving the doll with the other hand to keep the child's attention on the scenario. Scores were created based on absolute 'correct' or 'incorrect' responses, with 1 point for a correct answer for each of the questions (first-order false-belief and justification questions), as per Bensalah et al. (2015). However, unlike Bensalah and colleagues, this project adopted the method used by Sullivan et al. (1994; see second-order false-belief below), in that if the check question was incorrectly answered, the child could still attain a score for the test questions after. Rather than disqualifying the child after giving an incorrect answer to the check question, the researcher gave them correcting feedback as to what was right.

Justification. The decision to not disqualify participants following incorrect check question responses is based on the inclusion of a 'justification' question following the false-belief test question, which asks the participant to justify their response to the false-belief question as per the methodology used by Sullivan et al. (1994). By this methodology (for both first- and second-order false-belief measures), participants only counted as passing if they gave the correct response followed by a valid justification for that response. This method therefore deemed correct responses *not* accompanied by a valid justification to be a fail, as they may have been simply guessed. By correcting a participant's incorrect check question response, the measure accounted for potential confounding due to attentiveness or linguistic restrictions; young children may well possess first-order ToM capabilities, but in other methods of delivery, their poor ability to attend to story detail or less developed linguistic comprehension may confound such abilities. Sullivan et al.'s (1994) method of delivery reduces such confounding and increases the likelihood that the child has stored the information to be able to fairly answer the false-belief question.

According to Sullivan et al. (1994), justifications were classed as either appropriate or inappropriate. Whilst there were sub-categories of justifications within the appropriate and inappropriate groups (for details on sub-categories of justification see Sullivan et al., 1994), for analytical purposes justifications were classed as simply *appropriate* or *inappropriate*. This is due to appropriate responses consisting of mainly ‘explicit first-order reasoning’ and ‘implicit second-order reasoning’ for the first- and second-order false belief questions respectively thus *n* for the other justification sub-categories was too small to reliably analyse the significance separately.

Justifications given by children were noted down discretely by the researcher during the testing and logged into a laptop by pressing hotkeys assigned for each justification category. These logged responses were then later checked against the written note.

2.3.2. Second-order false belief (Sullivan et al., 1994)

The adapted Perner and Wimmer (1985) scenario created by Sullivan et al. (1994) was used for this study, but with the characters changed from those in Sullivan’s study, to Sally and Anne, for both practical reasons (dolls were already introduced to children) and to further the emersion of the children in the scenario by utilising familiar characters. Throughout the scenario, a series of check questions and memory prompts were used to ensure the child was following the scenario, prior to the ignorance and false-belief questions. In this scenario Anne intentionally deceived Sally regarding what she got Sally for her birthday present, by saying that she got her something else, because she wanted to surprise her. This was followed by three check questions: 1) "Did Anne really get Sally a [toy] for her birthday?"; 2) "Did Anne tell Sally she got her a [toy] for her birthday?"; 3) "Why did Anne tell Sally that she got her a [toy] for her birthday?" Sally then found the actual birthday present, without Anne knowing she had and the researcher asked the check questions 4) "Does Sally know that Anne got her a [toy] for her birthday?" and 5) "Does Anne know that Sally saw the [toy] in the basement?". Then Anne spoke to Sally’s grandma on the phone and Grandma asked Anne if Sally knows what her birthday present is; the researcher then asked: "What does Anne say to Grandma?" (second-order ignorance). A memory aid was then given to the child by the researcher: “Now remember, Anne does not know that Sally saw what she got her for her birthday”. Grandma then asked Anne what Sally thought she is getting; the researcher then asked the child: “What does Anne say to Grandma?” (second-order false-belief). Finally, the researcher asked the justification question: “Why does Anne say that?” to follow the second-order false-belief question (for the full scenario, see Appendix C).

Set-up regarding laptop/script, house, positioning of child and researcher was identical to the first-order measure. As per the first-order false-belief scenario, this scenario was kept the same through all phases, with the alteration of the present being hidden (toy puppy, toy dinosaur, teddy bear).

This scenario immediately followed the first-order scenario. During the scenario, the child was told that Anne hides the present in the basement, at which point the researcher placed the relevant object under the desk below the house. The procedure for recording responses was as per the first-order measure.

Scores were created similarly to the first order method above, whereby 1 point each was given for a correct response to the second-order false-belief question and the justification question.

2.3.3. Deception intent comprehension (Sullivan et al., 1995)

This measure was adapted from the lie/joke measure (Sullivan et al., 1995) to make it possible to conduct using only one researcher (original used two researchers). As with the second-order first-belief scenario, this measure was adapted to use the Sally and Anne dolls as the protagonists in the stories. There were two scenarios comprising this measure, the first being the ‘lie’ (deception intended) scenario and the second the ‘joke’ (deception not intended) scenario.

Set up regarding laptop/script, house, positioning of child and researcher was identical to the first-order measure. As per the first-order false-belief scenario, this scenario was kept the same through all phases, with the alteration of the food (broccoli, carrots, cauliflower).

Positioning of props, participant and researcher, and recording equipment were the same as above. The food was presented to the Anne doll in an open container, so that it was clearly visible to the child and the dolls (the scenario script clarifies that the dolls can see the food). As previously prior to the lie/joke and comprehension check test questions, there were questions designed to ensure the child is comprehending the scenario (see Appendix C).

Training

According to Sullivan et al. (1995), each child received training on the measure prior to commencing the scenarios, to familiarise them with the logical difference between the two different forms of falsehoods, in case they were not already familiar. Testing was then conducted following the training as per Sullivan et al. (1995), ensuring that any knowledge gained from the training was not diminished over time. Sally and Anne were used for the training scenarios, with the appropriate props mentioned below, including the Sally and Anne dolls and the doll’s house used in the previously described ToM tasks.

Deception intent (‘lie’) training scenario. In the training scenario, the researcher started: “Anne has a box and she knows what’s in there. Guess what’s in there? A coin [hushed voice, shows the child the coin in the box away from Sally]. But Sally ***doesn’t*** know what is in Anne’s box. Does Sally know what’s in the box? Then Sally asks Anne ‘what’s in your box Anne?’ And Anne says to Sally, ‘Oh nothing, it’s just an empty box’. Now do you think Anne was telling a lie or a joke?”. Following a correct response (lie), the child was told “that’s right. Anne was lying to

Sally. Anne knew that Sally couldn't see that something was in the box, so Anne told Sally it was empty." Following an incorrect response (joke), the researcher said "No" with the same explanation.

Deception not intended ('joke') training scenario. Following the 'lie' training scenario, the researcher immediately carried out the 'joke' training, saying: "The next day, Anne's box really is empty and Anne shows Sally that the box is empty, so Sally can see its empty too. Does Sally know the box is empty? Then Anne says to Sally 'look at this big frog in my box Sally'. Now, do you think Anne was telling a lie or a joke?" Following a correct response (joke), the child was told "that's right. Anne was joking. Anne knew that Sally could see that was box empty." Following an incorrect response (lie), the researcher said "No" with the same explanation.

Scenarios

Lie scenario – Messy Room. The 'lie' scenario consisted of Anne and Sally in the doll house, this time with 'Anne's room' (the house only has one room) being very messy. Anne wanted to go out and play in the garden but Sally says she can only after she has tidied her room. Then, whilst Sally is called away to talk to her grandma on the phone Anne snuck out to play without tidying the room. Grandma then asked Sally to check and see if Anne tidied the room so she does, with Anne unaware that Sally had checked. Then Sally meets Anne in the garden and Anne exclaims to Sally "I did a really good job at tidying my room!" (deception intended statement). The scenario ended with the researcher asking, "was Anne lying when she said that to Sally?" This study has also added a final 'justification' question following the lie/joke question, not present in the Sullivan and colleagues iteration. Given that if the child simply guesses the answer – Anne was either joking or lying – there is a fifty percent chance that the correct answer will be given by guessing. Therefore, following the lie/joke question, the researcher asked, "and why was what Anne said a lie and not a joke?" To be deemed to have passed test scenario, the child must give a valid justification as well as the initial correct response to the lie/joke scenario, such as: ***lie**/joke response* = “lying”; *justification response* = “because Anne was trying to trick her”.

Joke Scenario – Vegetables. The second scenario consisted of Sally presenting Anne with some food that Anne did not like, with Sally stating she had to eat the food before she could have dessert. Sally was called out of the room and when she returned Anne had obviously not eaten the food, which both protagonists and the participant can clearly see. Then Anne exclaimed “I did a really good job at eating my vegetables”. The test questions as in the lie scenario then concluded the scenario.

Lie/joke scoring. The task overall was scored as either a pass or fail, based on a correct answer *and* a valid justification *for both scenarios*. If a correct answer was given without a valid justification for either scenario, then the child did not receive a pass, due to the 50% chance of guessing the correct answer.

2.3.4. Emotion comprehension

The Test of Emotion Comprehension (Pons et al., 2004) was used to measure emotion comprehension. Based on the age ranges deemed appropriate for each of the measures in the test booklets by Pons et al. (2004), this study used only the first 4 components: recognition (component 1), external cause (component 2), desire (component 3) and belief (component 4). Component 1 consisted simply of a series of cartoon faces with varying facial expressions, with the other components consisting of a series of short scenarios comprised of cartoon vignettes.

The components were presented to the participant in a booklet, either the ‘boy’ booklet or the ‘girl’ booklet, with the only difference between the two booklets being the sex of the characters; male participants worked with the boy booklet containing male characters and female participants worked with the girl booklet containing female characters. The researcher and participant worked through the booklet in ascending numerical order, finishing with component 4, belief. The procedure for conducting the measure suggested by Pons et al. (2004) was followed. Scoring was conducted according to the same procedure given by Pons et al. (2004), so that a summed general level of emotion understanding was given via assigning 1 point for each correctly answered component. For the *Recognition* and *External cause* tasks, children were given 1 point for correctly identifying at least four of the five items. For the *Desire* task, children scored one point if both items were answered correctly. For the *Belief* task, children scored 1 point if they answered the question correctly. Correct answers were counted as only those which precisely matched the model answer supplied by the test. Incorrect answers were given 0 points. The only difference in scoring compared to Pons et al., (2004) is the maximum points available, as here, only the first four components were used therefore the maximum score was 4 points, with the minimum at 0 points.

2.4. Empathy assessment (Sezov, 2002)

The Empathy Test for Preschoolers (EMP; Sezov, 2002) was used for empathy assessment of the child participants. Child participants were presented with a series of short illustrated stories from the EMP storybook ending in a focal character expressing happiness, sadness, fear or anger. The child was then asked, "how does this make *you* feel [child's name]?" (the 'affective empathy' question in the EMP), followed by "how do you think [story's focal character] feels?" (the 'cognitive empathy' question in the EMP). The storybook was split into two halves, differentiated by the protagonist, one half has a human child protagonist, the other half a dog protagonist., thereby allowing assessment of the generalisability of the measure (Poresky, 1990). In both halves, there is one short, three-page story resulting in the overt representation for an emotion, with one story relaying one of the emotions mentioned above. Therefore, in total the booklet exhibits two stories assessing each emotion type (happiness, sadness, fear and anger). The characters in the stories were illustrated and named in a way that kept them gender neutral.

The cognitive and affective components of empathy were scored according to the EMP instruction manual. Additionally, an overall empathy score was created by summing the two cognitive and affective component scores, given empathy being comprised of these two domains (See Chapter 1). Scoring was performed according to the guidance from the instruction manual shown in Table 2.2. Further instructions were given in detail in the EMP manual regarding exact words and phrases that would correspond to the scores (Table 2.2). For example, in the Sad condition, other words/phrases scoring 4 include ‘unhappy’, ‘gloomy’, ‘miserable’; words/phrases scoring 3 include ‘hopeless’ and ‘sorry for’; words/phrases scoring 2 include ‘bad’, ‘grumpy’ and ‘afraid’; words/phrases scoring 1 include ‘I don’t know’ or any verbal response relating to the story that isn’t an emotion. Non-verbal responses, responses unrelated to the story and responses that were the opposite emotion to the correct one (e.g. happy), were scored 0.

Table 2.2. Instructions for scoring participants’ EMP responses

Response	Score
Exact Match to Correct Emotion	4 (max score)
Similar Emotion	3
Related Emotion	2
Relevant Verbal Response	1
Opposite Emotion/ No Response	0 (min score)

2.5. Resource Holding Potential (RHP) vignettes (adapted from Archer & Benson, 2008)

To investigate the potential effects of opponent RHP on a child’s resource control strategy selection, an adapted version of the Archer and Benson (2008) method was used. To date their method is the only RHP-based assessment of behavioural response applied to human psychology (that this author is aware of) that can be easily adapted and applied to the similar assessment in young children, given their clear identification of three factors argued to be pertinent to RHP: the core tenet of their measure altered the 1) physical size, 2) reputation (for fighting), and 3) presence of allies of an antagonist in hypothetical scenarios and was designed to investigate how these different factors altered the responses of young men in regards to how they would respond to the assailant. These core variations (physical size, reputation for fighting and presence of allies/friends) also formed the variables within the child adaptation presented here, with the slight alteration of 'reputation' being delivered to the child as 'this boy/girl is tough', due to the linguistic limitations of such young children.

Given that the participants in this research were young children, the measure was adapted to be age-appropriate. Rather than the original setting of a pub/bar, the setting was switched to a school playground. Moreover, the adaptation also intended to assess the participants' responses when asked what they would do in a hypothetical resource control contest situation. Therefore, the original dynamic of the Archer and Benson (2008) measure was adapted so that the participant was faced with a vignette of another child varying in size, toughness and number of friends with them, who currently possessed a desirable toy. The participant was asked to suggest what they would do to get the toy.

Vignette creation

The RHP scenarios were created as simple stick figure vignettes in SuperLab and presented to the participants using a laptop and a separate screen for the children to view. The laptop and screen were set up in such a way that the researcher could discretely enter the participant's response without disturbing their focus. The vignettes were designed as a series of slides that were moved through by the researcher on the laptop following a required response from the participant. Multiple hotkeys were set up, which related to various categories of the response that the child might give, informed by the pilot (see pilot section below). For example, if the child said they would *"just take it [the resource] off them [the opponent]",* that would require the researcher to enter the hotkey for 'aggressive grab'. As a check mechanism, the researcher made a brief manual note (discretely on paper to the side of the laptop), regarding the response of the participant. This was then later checked against the hot-key entry that the researcher logged via SuperLab during the delivery to ensure the entry was accurate to the participant's response.

In total, there were 12 different scenarios, allowing for all possible combinations of opponent characteristics. Viz. the opponent size was either smaller than the participant, the same size, or bigger than the participant; toughness was classified as either not tough or tough; presence of friends was either yes or no.

Procedure

The 12 scenarios' presentation order were initially randomised prior to data collection and then that order was kept constant across each phase for all assessments (see Appendix D). The child was first shown a stick figure and told by the researcher to *"imagine this is **you**"* (figure 2.1., slide 1) with the researcher pointing at the stick figure and the child where appropriate. To ensure they understood, the researcher then showed a slide with the same stick figure in a very basic environment and ask the participant *"who is that?"* (figure 2.1., slide 2). In each scenario, the stick figure representing the participant was placed on the left side of the screen (figure 2.1., slide 2) and then their 'resource opponent' was introduced on the right, along with the desired resource, in this case a scooter (figure 2.1., slide 3), which was determined to be the most sought-after resource for children this age following consultation with children and the teaching staff in the pilot and at phase 1 of the main data collection. At this point the researcher would, along with physically pointing at the pertinent parts of the vignette, say *"imagine you really want to play with this [resource], but it's the only one there is to play with and this boy/girl has it to play with"* (figure 2.1., slide 3) Each participant was presented with a same-sex opponent (as described by the researcher) as same sex play interactions are far more common in this age group (Maccoby & Jacklin, 1987; Ruble & Martin, 1998). The researcher then highlighted (by pointing) the opponent's characteristics, which were pictorially represented in the slide, specifically their size relative to the participant, if they were tough and if they had friends with them or not. For example, the researcher would say *"s/he isn't as big as you, s/he is tough and s/he hasn't got any friends"* (figure 2.1., slide 3 or 4, depending on whether the opponent has friends present). The researcher would then ask the assessment question: *"What would you do to get the [resource]?"* No further questions were asked. Alternative methods of enquiry were tried in the pilot, however these proved counter-productive (see pilot section below).

Following each scenario, the researcher refrained from offering words of praise that could be easily associated with the participant's response, as this could bias the following responses. Therefore, after each participant's response at the end of each scenario, the researcher would say "*I see. Well, this time…"* and then would start the next scenario.

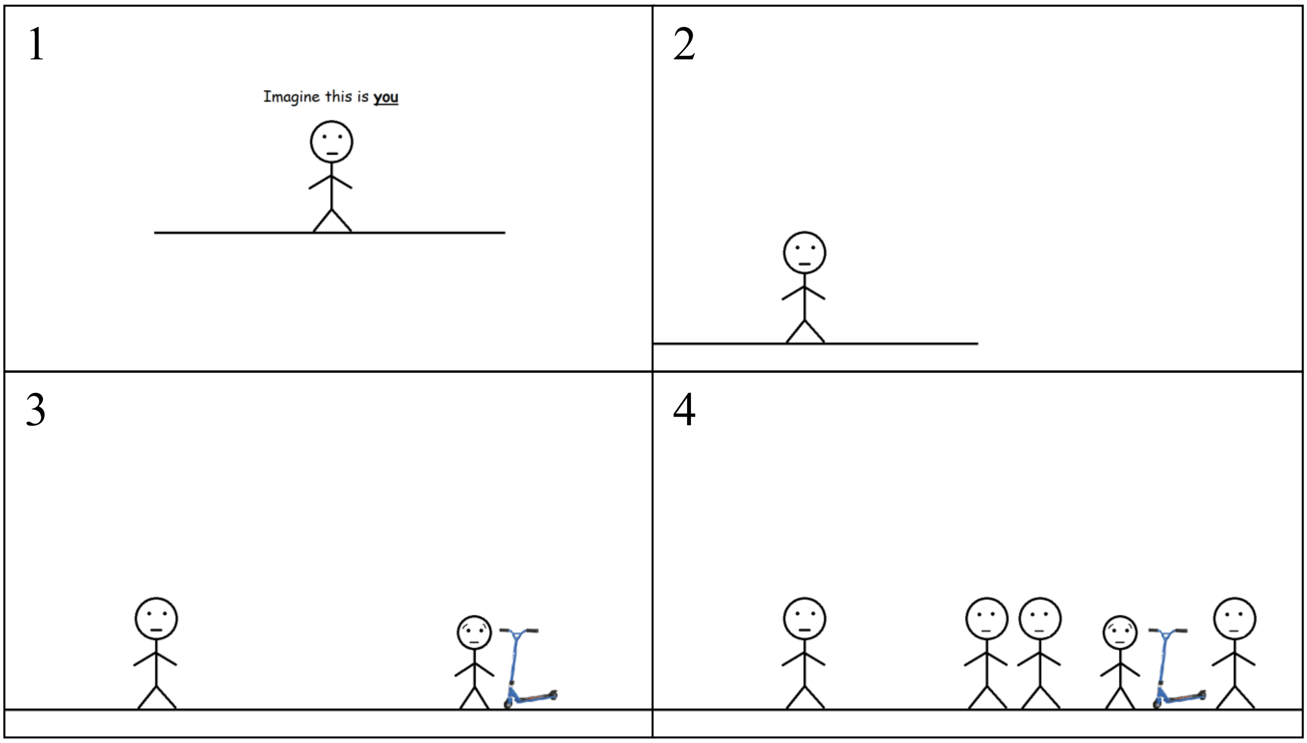

Figure 2.1. One of the twelve scenarios used in the RHP vignette measure (numbers added for display purposes in this report only). Slides were presented to each child in the numerical order shown (for the final screens, i.e. screen 4, for each of the 12

Categorisation of response variables

Assigning numerical scores or categorical labels to the responses was a complex issue. Assigning scores denoting 'greater or 'lesser' prosocial or coercive behaviour was deemed inappropriate for the prosocial responses, given both an unclear/lack of (that this author is aware of) theoretical and empirical basis for deeming one prosocial response ‘more prosocial’ than the other. Therefore, prosocial responses were deemed categorical.

For coercive responses, there is theoretical (Parker, 1974) and empirical (Archer & Benson, 2008) justification for numerical scoring for differing aggression levels; however, several key obstacles prevent such classification here. Firstly, the ‘coercive – sneak/grab’ response’ – where the child says they would grab or steal the toy from the opponent covertly – is very difficult to appropriately score in terms of aggressiveness relative to threats and overtly grabbing the toy from the opponent; further research is needed to investigate whether such scoring would be appropriate. Secondly, the responses classified as ‘verbal abuse’, ‘verbal threat’ and physical threat, when used by participants in the main data collection phases, were generally combined into the same response, providing no statistically meaningful separation between the response types, thus invalidating efforts to score them differently and reducing the range of scoring available for coercive responses. Thirdly, given that prosocial responses were deemed appropriate for categorical analysis, it was deemed more practical to analyse the coercive responses as categorical variables. Finally, ‘coercive – attack/grab’ responses, constituted 71-100% of the coercive responses across the phases and classes. Furthermore, the other coercive responses constituting the remaining percentage of coercive responses were too infrequent to provide meaningful power when conducting analyses, frequently with only 1-2 or no individuals in some or all of the categories (except ‘coercive – attack/grab’). Therefore, for practicality and clarity of analysis, responses were split into either general ‘prosocial’ or ‘coercive’ response categories.

2.6. Moral disengagement (Pozzoli, Gini, & Vieno, 2012 - Selective Moral Disengagement scale)

Set up – scale adaptation

This thesis used an adapted version of the selective moral disengagement scale used by Pozzoli et al. (2012) who based the scale on the theory of selective moral disengagement proposed by Bandura (2002). The Pozzoli scale consists of a 14 item, 5-point likert scale, ranging from strongly disagree to strongly agree and was designed for use with children aged around 8-10 years old, thus some questions on the scale were linguistically too complex for the age group investigated here. Therefore, such questions as "it is alright to beat someone who bad mouths your family" was edited to read "is it OK to hit someone if they are mean about your family?" For this present investigation, each of the 14 items were reworded for suitability for 4-5-year olds, according to findings from the pilot study. Items were also reworded as a question rather than a statement to avoid child responses being biased by the positive assertion of the statement format, e.g. "it is OK…"; moreover, a statement followed by a question asking the child if they agree increases the complexity of the phrasing and may confound the response of a young child.

The 5-point scale used by Pozzoli et al. (2012) was deemed too complicated for the age group investigated here, so the scale was reduced to 3-points ('always OK', 'sometimes OK' and 'never OK'); empirical evidence supports this choice, with Chambers (2002) finding that the use of a 5-point scale resulted in answers no more differentiated than a 3-point scale in 5-6-year-old children, moreover 3-point scales have been used with children as young as 4 years old (Muris et al., 2003).

Scoring. Rather than a 1-3 point continuous-type score for each response (e.g. never OK = 1, sometimes OK = 2; always OK = 3), children's answers were first taken as categorical answers; the number of 'always/sometimes/never OK' answers were then added to give a response frequency for each response category. These frequencies could then be analysed against other variable data to examine possible association between those variables and the frequency of response type.

The continuous-style points score mentioned above was deemed inappropriate as the questions were based on contextual moral decisions. The questions often pose morally complex questions/statements, for example, ‘it's alright to fight when someone is mean to your friend’; therefore to score someone higher in selective moral disengagement (i.e. 3 points) for saying its ‘always OK’ to do that) than someone who responds with ‘sometimes OK’ is not appropriate. This is due to the selective moral disengagement concept being fundamentally based in environmental/social context. Therefore, a child who answers ‘always OK’ would – according to a standard points score as above – would score highest for selective moral disengagement whilst in fact showing no contextual sensitivity an no selectivity when ‘disengaging’ their moral norms. Conversely, a child who scores lower for answering with a variety of responses may in fact be much more selective with their moral disengagement. As a focal aid for the children, cartoon representations of a ‘thumbs up’, ‘thumbs to the side’ and ‘thumbs down’ were printed on a laminated piece of A4 card with the words ‘always OK’, ‘sometimes OK’ and ‘never OK’ printed above each picture respectively. Pictorial anchors are often used in both educational and clinical research with young or cognitively impaired children and it has been shown that, whilst pictorial anchors do improve focus on cognitive tasks compared to no pictorial aids at all, there is no significant difference in the effects that different types of pictures have on the participant’s response (Reynolds-Keefer, Johnson, & Mcfadden, 2009). Therefore, thumbs were chosen as a focal anchoring aid for the participants in this present investigation based on this data.

The selective moral disengagement scale is designed to ask questions which reflect each of the four factors Bandura (2002) theorised comprised selective moral disengagement. These factors were validated by the confirmatory factor analyses conducted by Pozzoli et al. (2012), for use with 8-10-year-old children. However, in the current study, despite rewording items to maintain the four-factor structure (Appendix F), only one dimension, the cognitive restructuring dimension, maintained a reasonable internal consistency over the three phases (phase 1, $\alpha = .68$; phase 2, $\alpha = .73$; phase 3, $\alpha = .66$); the other three dimensions scored inconsistently, but all had $\alpha < .50$, across all time points, with just one dimension at phase 2, the distorting consequences dimension, scoring $\alpha = .579$. Cronbach's alpha scores for all items together were consistently $\alpha >$ .75 across all time-points (phase 1, $\alpha = .81$; phase 2, $\alpha = .75$; phase 3, $\alpha = .78$). This shows for use in this age group that the scale may be a useful tool for investigating the contextual application of moral reasoning more generally. It is possible that children at this young age do not contextualise immoral behaviour in the subtle ways suggested by Bandura's theory. No study (that this author is aware of) has yet evidenced such complex moral reasoning in 4-5-year-olds, thus further work is required to investigate the extent to which such young children contextually apply morals, and how this compares to older children and adolescents (Pozzoli et al., 2012; Wang et al., 2016).

The responses were recorded into SuperLab software using hotkeys assigned to each of the three possible responses, with the specific hotkeys coded to the three responses.

Procedure

To carry out the moral disengagement scale, the researcher first ensured the participant was associating the correct anchors with the verbal responses (as above). To do this, the researcher would show the child the card with the thumb responses on and say "now look at this. This one [points to thumb] means never OK/sometimes OK/always OK [as appropriate]". The researcher did this for each thumb image and would then check to ensure the participant remembered what each one meant before continuing then say "now, I'm going to say some things, and then you can tell me if you think that thing is always OK to do, sometimes OK to do or never OK to do [whilst pointing at the relevant thumb picture]. There are no right or wrong answers, so you can just say whichever one you think OK?" The researcher would then proceed through each item on the scale. If the child did not offer an answer after a reasonable period, the researcher would gently prompt them by saying “so do you think that’s always OK to do, sometimes OK to do, or never OK to do?” Following each response, the researcher would give a neutral but engaged-sounding response such as “so let’s hear what the next thing is…”.

2.7. Peer sociometric nominations

Set up – scale design

An aim of this current investigation was to elucidate the relationship between peer social standing and social dominance. Therefore, a questionnaire was used to ascertain both who each child liked and disliked in their class. Specifically, the child participants were asked to nominate up to three peers whom they liked the most in their class and up to three they liked the least (Coie et al., 1982), with cross-sex nominations allowed for both behavioural and like/dislike nominations. If the child nominated teaching staff (this happened on occasion), the researcher replied, “Oh, I mean which other boy or girl in your class…”.

Scoring. Like most (LM) and like least (LL) nomination were tallied. Following standardisation across classes, a social preference (SP) score was derived by subtracting the standardised LL score from the standardised LM score, SP = LM – LL as per the method of Slaughter et al. (2002).

Procedure

The researcher read out the questionnaire to each child participant item by item. For the final two questions (like most and like least), the researcher followed up the participant’s initial response for each question with “who else do/don’t you like playing with?”; this was done again until the child has nominated at least 3 children or was unable to nominate anymore people.

2.7.1. Participation rates and peer nomination data

Participation rates can affect the reliability and validity of peer nomination data (Bukowski, Cillessen, & Velasquez, 2012). Research has indicated that participation above 60% can produce reliable sociometric peer nomination data (Cillessen & Marks, 2011; Crick & Ladd, 1989), notably class participation rates in the present study were between 73 and 80%. Moreover, Marks and colleagues (2013) found that nominations for overt aggression and prosocial behaviour were reliable at participation rates as low as 40%, far lower than this present study's participation rate per class.

2.8. Verbal Ability

Children's verbal ability was measured with the British Picture Vocabulary Scale (BPVS; (Dunn & Dunn, 2009) version 3. This measure assessed the English receptive vocabulary of the child participants based on their identification of pictures. Detailed instructions accompanied the measure and are standard as part of the BPVS pack; in brief, the researcher showed the participant sets of 12 picture pages (4 pictures on each picture page) and asked them to identify the picture that matches the word verbalised by the researcher. The researcher begins at the picture set identified by the measure as age appropriate and continues up the age grouped sets until the child incorrectly identifies 8 or more pictures. The researcher worked through sets below the recommended age group if the child incorrectly identified 2-7 pictures. The researcher stopped moving down the sets when the child got only one or none of the identifications wrong. Scoring was also conducted as per instructions; a raw score was attained for the each test the participant completed, whilst a standardised score was also produced, which was used for the purposes of analysis.

2.9. Teacher-r*ated* child behaviour *report and social dominance*

The class teachers were also recruited for this investigation and for each data collection phase completed the task via Qualtrics online survey software, completing a child behaviour questionnaire for each child individually (Appendix G). This questionnaire contained 4 items relating to dominance on a seven-point scale (Dodge & Coie, 1987, adapted in Pellegrini et al.

2011), aggression on a four-point scale (Hawley, 2003b) and prosocial behaviour on a five-point scale (PSBS; Crick, Casas, & Mosher, 1997; Poland, Monks, & Tsermentseli, 2015).

In addition, 18 resource control-related items, on a seven-point Likert scale were taken from the questionnaire used by Hawley (2003) and Hawley and Geldhof (2012) and added to the questionnaire in order to provide specific data regarding prosocial (6 items; $\alpha = .74$) and coercive (6 items; $\alpha = .87$) resource control behaviours as well as items regarding resource control success (6 items; $\alpha = .85$). Therefore, in total the questionnaire was composed of 32 items. Items included "this child… *gets what s/he wants by 'helping' others (even if they don't really need it)* (prosocial resource control question); … *makes others follow his/her plans to gets what s/he wants* (coercive resource control question); … *usually gets what s/he wants when with peers* (general resource control success); … *is a leader* (social dominance); … *is kind to peers* (non-resource-specific prosocial behaviour); … *fights with others* (non-resource-specific aggressive behaviour).

Social dominance. In addition to the dominance items on the questionnaire, the teachers were asked to provide a linear dominance ranking (with higher values representing higher social dominance). They were provided with the Hawley (2014) definition of social dominance – 'exercising chief authority or rule; occupying a commanding position' – as guidance. Akin to the methodology Hawley and Geldhof (2012) and Hawley et al., (2007), a composite of the standardised linear ranks and teacher scores for the dominance scale items was created, with one key difference: Hawley created a composite from the linear dominance ranks and the *resource control success*/*effectiveness* items from the teacher questionnaire; in this thesis however, the dominance items from the questionnaire were used rather than the resource control success items. This was due to one of this thesis' aims being to investigate potential differences in the variance of resource control success and social dominance, thus one cannot test that if they are combined into a composite. Teaching dominance rating scale and rank ordering measures were strongly correlated, $r = .73$, with $\alpha = .85$.

2.10. Formation of the controller subtype groups

The strategist type variables were formed using the method used by Hawley and colleagues in their empirical work on resource control (Hawley, 2003b, 2003a; Hawley & Geldhof, 2012; Hawley et al., 2007). This approach considers strategy type as a categorical variable relative to the position in percentile grouping. The types were constructed using the coercive and prosocial resource control behaviour scores for each child on the teacher questionnaire. Bistrategic controllers scored in the top 66th percentile for both behavioural dimensions (i.e. prosocial and coercive resource control); prosocial controllers score in the top 66th percentile for prosocial resource control behaviour but outside of this percentile (i.e. average or low) for coercive resource control behaviour; coercive controllers conversely scored in the top 66th percentile for coercive resource control and outside for prosocial resource control; typical controllers scored less than the top 66th percentile on *both* prosocial and coercive resource control and may have scored in the lowest 33rd percentile for either one or none of the dimensions; non-controllers scored in the lowest 33rd percentile for both dimensions (table 2.3).

Table 2.3. Controller subtype categorisation according to percentile membership of teacher-rated prosocial and coercive resource control scores.

Strategy subtype	**Prosocial resource control**	**Coercive resource control**
Bistrategic controller	Top 66th percentile	Top 66th percentile
Prosocial controller	Top 66th percentile	Below top 66th percentile
Coercive controller	Below top 66th percentile	Top 66th percentile
Typical controller	Outside top 66th percentile on both behavioural dimension scores; one of the dimension scores may be in lowest 33rd percentile, but not both.	
Non-controller	Lowest 33rd percentile	Lowest 33rd percentile

Note: *Whilst the subtypes are a useful categorical approach for some analyses, such categorisation may mean that subtle patterns of behaviour may be less clear within the analyses (see Chapter 1, section 2.3.1.), therefore this project will also analyse the continuous scores for prosocial and coercive resource control scores.*

2.11. General procedure

2.11.1. Recruitment

Initial participation requests (Appendix H) were sent to over a hundred schools in the London, greater London and Kent regions of the UK, with three resulting schools agreeing to participate, resulting in a total of four participating classes. Consent forms were signed by the head teacher, the class teacher and the parents/caregivers of each of the child participants prior to beginning phase 1 data collection or the pilot study. All schools received a 'good' rating in the latest published Office for Standards in Education (OFSTED) reports. As of writing, these reports were for 2017 for two of the schools, and 2014 for the other school. All children received free school meals as default due to national policy for those children in infant classes.

Parent/caregiver consent forms were sent home from school with the children with cover letters that were also written by the researcher and signed by the head teacher to clarify the authenticity of the research (Appendix I). These letters and consent forms were distributed to the children by the class teachers. Contact details for the researcher were given to all head teachers, class teachers and parents/caregivers and a more detailed information page was included in the consent 'pack'. Additionally, as advised by prior research (Rodgers, 2006) the researcher requested the schools send out the consent packs with a cover sheet, ideally brightly coloured with large font reading "**IMPORTANT INFORMATION, PLEASE READ**" (Appendix I). However, this request was only partially adhered to, with one school following the entirety of the request, one school including the cover sheet but only on plain white paper, and one school not including a cover sheet at all. However, the discrepancy did not result in a marked difference in returns between the schools. Those children who had not returned a consent form after fifteen days were given a second consent pack as a 'reminder' to the parents. A third follow-up was handed out a week after this for the same reason. These follow-ups proved highly effective with approaching half of the consent forms being returned after the second or third distribution, in all three schools.

2.11.2. Data collection procedure

This investigation was approved by the Ethics Committee of University of Greenwich and data collection was carried out over a school year from September 2016 to July 2017. Data collection was carried out in the three phases outlined in section 1 above evenly spaced across the school year. At each phase with each class, teachers were asked to complete their two tasks by the end of the collection with their class. Data collection at each phase with each class lasted up to two school weeks, with the occasional small extension to account for student absences or exceptional events occurring in the school calendar. Each child was worked with individually in a quiet area away from the classroom and their data collected over two sessions over two days, to reduce fatigue and limit absence from the classroom for extended periods of time. Each session lasted around 30 minutes. The researcher was introduced to the children prior to beginning the data collection and talked to each child participant in a friendly and engaged way for a short period of time to increase their comfort in taking part in the research. The child was told at the beginning of every session that they could stop at any time and verbal assent was given by each child at the start of each session, in addition to parental consent. All measures and tasks (table 2.4) were carried out in the same order with each child, at each phase of the data collection (table 2.5).

Teacher responses were gathered via the ‘anonymous link’ function of Qualtrics and the data was only accessible to the researcher via a password protected account. All child and teacher responses were collected and transferred onto a university supplied computer, anonymised using ID codes and password protected by the researcher.

Table 2.4. Summary of measures used at all time points in the present investigation.

Measure	Participant	Variable
Sally and Anne unexpected transfer	Child	ToM - First-order false-belief
Sally and Anne birthday present	Child	ToM - Second-order ignorance; second-order false-belief
Sally and Anne lie/joke	Child	ToM – deceit intent
TEC test	Child	Emotion comprehension
EMP story book	Child	Empathy
BPVS III	Child	Verbal ability
SMD scale	Child	Selective moral disengagement
RHP comprehension task	Child	Resource control comprehension
Peer-rated behaviour survey	Child	Peer behaviour; peer regard (like most/least)
Child behaviour scale	Teacher	Non-resource-directed prosocial behaviour; non-resource-directed coercive behaviour; general resource control success; prosocial resource control behaviour; coercive resource control behaviour; social dominance

Table 2.5. Task performance order for each day of the session with each child participant

Order	Day 1 tasks	Day 2 tasks
1	Sally and Anne unexpected transfer	Sally and Anne lie/joke
2	Sally and Anne birthday present	BPVS III (part 2)
3	BPVS III (part 1)	RHP comprehension task (part 2)
4	RHP comprehension task (part 1)	Peer-rated behaviour survey
5	SMD scale	EMP story book
6	TEC test	

2.12. Pilot

The pilot study was carried out in the summer term of 2016 at one of the schools participating in the main studies. Consent was gained for eight children in the 2015-16 reception class to participate, thus they were too old to participate in the main study the following school year and their data is not included in the main analysis. All tasks were used except the EMP as this was unavailable to the researcher at the time, which was trialled as part of phase 1 data collection, and which was deemed appropriate for continued use in the project.

Pilot outcomes

The tasks mentioned below were altered/adapted as a result of testing in the pilot. All other tasks were performed and deemed suitable without alteration following the pilot.

BPVS. Children in the pilot were found to become increasingly disengaged with latter parts of the BPVS when conducting the assessment. Given that the BPVS should assess verbal ability and not attentiveness, it was deemed pertinent to split the task across two sessions for each of the main data collection phases.

RHP vignette response categories. The pilot informed the researcher regarding what response categories to short-key code for in SuperLab. The pilot allowed the resulting measure to have multiple short-keyed response sub-categories belonging to two broad categories, prosocial responses and coercive responses (table 2.6).

During the pilot, the teaching staff at the school were asked to identify the most popular toys for the children play with. The teachers suggested that the children particularly liked the scooters and trikes. The picture of the toy used in the RHP vignette task was therefore one of a scooter, to which the children reacted positively. The scooter was consistently used throughout each phase and each school during the main investigation, as varying it may have introduced confounding, such as varied motivation to get the toy.

Table 2.6. The prosocial and coercive resource control potential child RHP vignette responses.

Behavioural categories for RHP comprehension	Examples of possible responses
Prosocial – Ask	"I'd say can I have the scooter" "please may I have that"
Prosocial – Help/instruct	"I can show you how to go fast"
Prosocial – Share	"let's take turns" "let's play together"
Prosocial – Be friend	"I'd be their friend" "make friends"
Coercive – Tell teacher	"I'd tell Miss [name of teaching staff]"
Coercive – Demand	"I'd say, 'give me the scooter!'
Coercive – Verbal abuse	"I'd say you're smelly and stupid"
Coercive – Relational threat	"I'd say, give me the scooter or I'll not be your friend"
Coercive – Physical threat	"give it to me or I'll kick you in the leg"
Coercive – Physically attack/snatch/grab	"I'd just take it off him" "I'd punch her in the nose"

Children were also initially asked follow-up prompting questions following their initial response to the '*what would you do to get the scooter*' question, i.e. *'what else would you do?'*. However, this was abandoned for the main data collection phase as it appeared that the children thought that this meant that the researcher was asking them for the same answers for each scenario regardless of their initial response, to the extent where the children would pre-empt the prompt and list identical secondary, tertiary etc. responses for each vignette immediately following their initial answer. This therefore resulted in the responses very quickly becoming identical. Therefore, the children were only asked once what they would do in order to get to resource (scooter) in order to obtain the most salient response to them for each vignette.

2.13. Chapter summary

This chapter detailed the methods used to carry out the investigation presented in this thesis. Ninety-two children aged 4-5 years old and their class teachers were recruited for data collection across a school year, consisting of three phases of data collection at the start, middle and end of that school year. Analyses utilised both cross-sectional and longitudinal approaches. Children were assessed individually, and the measures conducted with each child for each phase were split across two sessions. Measures assessing ToM, empathy, RHP comprehension, selective moral disengagement, verbal ability and peer behaviour perception were conducted with the child participants, whilst Qualtrics surveys were completed by the class teachers providing data regarding teachers' perceptions of dominance hierarchies in the classroom and individual child behaviour for each child. All measures were previously established in the literature, with some adaptations made for age suitability reasons. This investigation was approved by the ethics committee of the University of Greenwich.

Chapter 3 – Study 1: Associations between resource control strategy use, resource control success and social dominance - the effect of data treatment on analytical outcome

Abstract

Aims. The present study had two related aims: 1) Investigate the associations between frequency of resource control strategy use, resource control success and social dominance of children near the start of their first school year. Both categorical ('controller subtype groups') and continuous (separate prosocial and coercive strategy dimensions) versions of the resource control strategy variable were investigated and their associations with the other variables compared. 2) Examine the statistical differences in resource control strategy use between each of the subtype groups. **Methods.** Children (*N* = 92; 4-5 years old) completed the BPVS III (verbal ability; (Dunn & Dunn, 2009). Teachers completed an online behavioural survey assessing social dominance, resource control strategy and resource control success for each participating child in their class. **Results.** Resource control success was found to be a positive predictor of social dominance. Analysis found no significant difference in resource control success between any of the subtype groups (i.e. bistrategic, coercive, prosocial, typical or non-controller). However, the continuous strategy dimensions showed a negative moderated mediation in which higher prosocial strategy use was associated with higher resource control success, with this positive effect *increasing* with decreasing coercive strategy use. Analysis found no significant difference in social dominance between bistrategic, coercive and prosocial controllers, with all three significantly higher rated in social dominance than typical and non-controllers. The continuous strategy dimension analysis showed both prosocial and coercive control behaviour to be equally important significant positive predictors of social dominance. Analysis also found that prosocial controllers did not statistically differ in prosocial control compared to coercive controllers, whilst all subtype groups, including coercive controllers exhibited prosocial control behaviour significantly more frequently than coercive control behaviour.

Conclusion. This study suggests that resource control, at least at the start of the first school year, is in line with resource control theory, is a mechanism for achieving social dominance, yet competition for social dominance directly as a resource itself may also occur in early childhood. The moderated mediation model may suggest the prominent use of reconciliation tactics, as empirically evidenced in prior studies, in securing resource control in the first year of school. Yet this study's lack of direct reconciliation data prevents any solid conclusions in this regard. The study highlights flaws in the current formation methodology of resource controller subtypes, which may affect the predictive utility of the current subtype groups.

3.1. Chapter overview

This chapter presents the first study of four in this thesis and is focused on data collected in phase 1 of the project (during the 1st term of the school year). Specifically, this study investigated the relationships between social dominance, resource control strategy and resource control success, examining how resource control success relates to social dominance and how resource strategy use relates to them both.

This study's first aim (to examine the relationship between frequency of resource control strategy use, resource control success and social dominance, and the effect of resource control strategy variable construction on these relationships) is addressed via two analysis sections; it first examined the relationships between the categorical controller subtype groups and the teacher-rated resource control success and social dominance data. It then examined the relationships between the continuous resource control strategy dimensions (prosocial and coercive) and resource control success and social dominance. The second aim (to examine the relationship between resource control strategy and controller subtype) was then addressed by examining the differences in the frequencies of prosocial and coercive resource control strategy use (the continuous data) between the controller subtypes, followed by analysis of each subtype group's absolute resource control strategy frequencies to further examine whether the current subtype formation methodology is adequate.

3.2. Introduction

3.2.1. Resource control and social dominance

Hawley's resource control theory (Hawley, 1999) defines social dominance as "the exercise of chief authority or rule – or occupying a commanding position" akin to a leader (Hawley, 2014, p. 327), with the theory's central contention that an individual's social dominance status in a group is established, not by solely aggressive means, but by the implementation of successful resource control strategies, all of which are characterised by their utilisation of a two-dimensional prosocial/coercive resource-directed behavioural spectrum.

Of note however, is that resource control theory's definition of social dominance is similar to the more traditional definitions (McGrew, 1972; Schjelderup-Ebbe, 1922; Sluckin & Smith, 1977) in that winning resource contests is key to achieving higher dominance status, yet it says nothing of other mechanisms through which dominance could be achieved. Resource control theory has described resource control and social dominance in almost synonymous terms (Hawley, 1999, 2003a, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007). Hawley (1999) defines 'dominant individuals' as "those who are superior at resource control" (p. 110) and states that "social dominance inevitably results when individuals are unequal in their ability or motivation to acquire and control resources" (p. 122). This perspective has previously been embedded in the measurement of dominance; in earlier resource control theory studies social dominance was not measured as a separate variable, rather that differences in social dominance were said to exist between the controller subtypes based on the differences in their reported *resource control success*, viz. how successfully one competes for resources (Hawley, 2003b, 2003a), with Hawley (2003b) explicitly referring to the controller subtypes (groups according to resource control strategy frequencies, see 4.2.2 below) as 'dominance groupings' (p. 289). Following studies did record social dominance as a separate variable, however in these studies a resource control success/dominance composite was created, combining teacher-rated resource control success and teacher reported linear dominance rankings for the child (Hawley & Geldhof, 2012; Hawley et al., 2007). These two components were combined based on the theoretical position of resource control theory: that controlling resources is the mechanism by which social dominance is achieved.

Whilst both empirically and theoretically resource control has been shown to be a major factor in social dominance, further study may benefit from studying resource control success and social dominance as separate (though likely related) variables, particularly if they are not highly correlated within a dataset as this clearly would suggest they are capturing, at least in part, different phenomena. It should also be noted that in the resource control studies to date, when direct correlations between resource control strategy and resource control success are presented, the correlation is significant but not overly strong: adolescent self-report data found resource control success correlated with both prosocial and coercive resource control strategy use at $r = .55$ (Hawley, 2003a) and teacher-rated data for young children (mean age= 4.29) found resource control success to correlate with coercive control strategy at $r < .50$ and prosocial control behaviour at $r < .40$ for both boys and girls (Hawley, 2003b). In the context of behavioural science, these associations are fairly large; inaccuracy of reporting may also be an issue in these cases, along with confounding factors, however such results do leave room for alternative mechanisms for achievement of social dominance.

3.2.2. The controller subtype categories and resource control strategy

Successive resource control theory-based studies grouped participants into one of five 'controller subtypes', based on the relative frequency (in relation to their social group/school class) of prosocial and coercive resource control exhibited by the participant (Hawley, 2003a, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007).

Research has indicated clear differences in the dominance status between the subtypes themselves. In all studies to date, non-controllers have scored lowest on social dominance/resource control success (Hawley, 2003a, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007), with typical controllers scoring second lowest, though in one instance tying with prosocial controllers as second lowest in early childhood (Hawley & Geldhof, 2012). Bistrategic, prosocial and coercive controllers tend to be more socially dominant and more successful at resource control than both typical and non-controllers. In early childhood, bistrategic controllers have been shown to be the most effective resource controllers overall (Hawley & Geldhof, 2012; Hawley et al., 2007). In adolescence however, whilst bistrategics are rated by their peers to be the joint most effective resource controllers along with prosocial controllers, prosocial controllers are significantly more effective resource controllers than coercive controllers (Hawley, 2003a).

Aside from Hawley and colleagues, few research groups have explored behaviour within the framework of resource control theory, but data is increasing in the literature. Akin to Hawley, Roseth et al. (2011) found bistrategic behaviour to be the most associated with social dominance; however, Roseth et al. (2011) did not categorise strategic tendency according to Hawley's controller subtypes, rather they defined 'reconciliatory' behaviour – prosocial amelioration behaviour immediately following coercive behaviour toward the same individual – as a bistrategic strategy, given the use of both coercive and prosocial behaviour as one coherent behavioural output. They found that reconciliatory behaviour was highly associated with child social dominance by the end of the first school year. Such a behavioural context approach to resource control may prove to be a valuable expansion to future research in this area and requires further investigation. Moreover, Roseth et al. (2011) did not use controller subtypes in the analyses. The study investigated prosocial and coercive resource control strategy of 2-4-year-old children across their first year of school/preschool, but rather than grouping the participants according to strategy subtype, Roseth et al. (2011) compared social dominance to the two behavioural dimensions without subtype classification, opting for a continuous measurement of prosocial and coercive control behaviour rather than the percentile cut-offs described above. Via behavioural observations over a school year, Roseth et al. collected data for the number of observed coercive and prosocial resource-directed interactions and compared their relationship to teacher-rated social dominance.

The subtype grouping methodology of Hawley and colleagues and the non-categorical analyses of Roseth and colleagues discussed above show two different ways that resource control strategy data can be analysed, however these two alternative methodologies have not been directly compared. Importantly, whether data is treated as categorical or continuous can significantly impact the resultant analytical outcomes and therefore the conclusions drawn from those results. Direct investigation into the impact of such treatment in child behaviour is scarce, however some work has touched upon this concern. Goossens, Olthof and Dekker (2006) investigated how categories of behaviour associated with bullying are assigned. Whilst they did not directly report data regarding continuous measures for the behaviour under investigation, they remarked in their discussion that the continuous data they used to form the categories were “consistently reliable and highly stable” (p. 356) over their 2-phase, 2-year study. This suggests a difference in stability when compared to their reported results for categorical classifications which were found to be low-moderate in stability over the same period. Additionally, in the medical sciences it has been recommended that continuous data not be categorised prior to analysis (Naggara et al., 2011; Schellingerhout, Heymans, de Vet, Koes, & Verhagen, 2009). Schellingerhout et al. (2009) ran three separate multivariate logistic regression models, containing data on possible predictors of non-specific neck pain. In one model these predictors were kept as continuous data (the form in which the data were collected); in the other two models these predictors were stratified (multiple categories) and dichotomised (according to median). The results showed that the continuous model had the highest explanatory power in addition to disagreeing with the other two models regarding three of the predictors, highlighting clear clinical ramifications of such data conversion methods.

Whilst resource control data has no immediate clinical application akin to that presented in Schellingerhout et al. (2009), an end goal surely is to use such data for real-world implementation, in whatever form that may take. Therefore, given the affects this could have, resource control data should be subject to similar scientific interrogation. As such, given that resource control research has not undergone similar methodological examination to date it is of key importance that such study is undertaken.

3.2.3. Effects of variable construction on analytical outcome

The controller subtypes are constructed according to relative behavioural frequencies as per Hawley (2003b). There is certainly utility in viewing resource control strategy in relative terms, as, for example, a child who scores higher in coercive control behaviour than their peers but still score low in this dimension in absolute terms, may achieve high social dominance status because that difference in coercive control is *relatively* large and provides a significant advantage in resource contests against their peers. An absolute view of the behavioural scores would not necessarily be sensitive to this difference. However, the current methodology for forming the controller subtypes does not guarantee any statistical difference between the relative behaviours comprising the subtypes; that is, an individual classed as a prosocial controller may have almost identical rates of coercive resource control strategy to an individual who is classed as a coercive controller, however because the latter individual fell just *inside* the top 66th percentile for coercive control behaviour and the former individual fell just *outside* this percentile, they are classified as different behavioural types. The same situation can occur for prosocial resource control strategy. This could result in the situation where individuals of very similar behavioural outputs can be classified into different behavioural categories that are labelled as different behaviour types, e.g. prosocial and coercive controllers. This results in the potentially very misleading differentiation between subtype groups that in fact may contain individuals that do not statistically differ in their behavioural outputs to members of the other controller subtype groups.

How the controller subtypes are formed and labelled causes a further theoretical problem, as evidenced empirically by the following example. Hawley (2003a) provided the *absolute* mean scores for self-reported prosocial and coercive resource control strategy according to controller subtype (p. 286, table 1.). Bistrategic controllers showed higher coercive control behaviour compared to prosocial control behaviour, and prosocial controllers showed higher prosocial control behaviour than coercive control behaviour. Crucially however, coercive controllers show *higher prosocial* control behaviour than *coercive* control behaviour. This highlights a significant issue with the subtype groupings. As discussed above, the controller subtypes are formed based on the frequency of exhibited prosocial and coercive behaviour of a participant *relative* to their class/social group overall. For both resource control strategies, the method of collection is the same (i.e. the same choices and number of points on a Likert scale). Therefore, the situation as shown by Hawley (2003b) can arise; more generally that is, if a class/social group *as a whole* exhibits a significantly higher frequency of, for example, prosocial resource control strategy compared to coercive control behaviour, which happens to be extremely uncommon in this hypothetical class, then a participant who uses prosocial resource control strategy the *vast majority* of the time compared to coercive control behaviour, could still be classified as a 'coercive' controller as only very occasional use of coercive strategies could place them in the top 66th percentile for coercive control behaviour. This raises the question as to whether the 'coercive' label is semantically appropriate.

These issues highlight that the current formation method of the subtype groups and how they are labelled – in terms of transparently reflecting the actual behavioural similarities and differences of the constituent participants – should be examined more closely. Fundamentally, a relative perspective of an individual's social behaviour in relation to their peer group can be valuable. If absolute frequencies of a behaviour are similar across a class/social group but significant differences are detected in certain individual's behaviour *relative* to their peers, then this could explain differences in other variables found in these individuals that would otherwise be unexplainable if only absolute frequencies were considered. This is a fundamental premise of resource control theory (Hawley, 1999) which acknowledges children are sensitive to violations of internalised social norms, which tend towards prosocial behaviour with time (Hawley, 1999; Roseth et al., 2011), and can result in social ostracism of individuals seen to violate those norms. If behaviour is only viewed using an absolute measure, slightly higher frequencies of, say, aggression for an otherwise very prosocial child may not be found to associate with that child's ostracism by their peers.

However, when using relative behavioural frequencies to categorise individuals into behavioural groups, the specific formation methodology must be logically sound. The controller subtypes are formed according to relative behavioural frequencies within each class/peer group, which allow subtypes to be formed based on the relevant intra-class behaviour, yet this allows researchers to analyse that class data as part of a larger multiclass sample, as is the case in this present study. However, the insights that such a relativistic perspective could provide are potentially undermined by the formation methodology as discussed above, as it provides no statistical guarantee that those relative frequencies of prosocial and coercive control behaviour are significantly different both between the groups and within an individual. Whilst the theoretical problems regarding subtype formation and labelling raised here seem logically sound, only one study to date (Hawley, 2003a) has provided the required data to corroborate this hypothesis. Given that these highlighted methodological issues may have significant ramifications for future resource control theory study, the contentions put forward here should be investigated further.

3.2.4. Aims and hypotheses

The aims/hypotheses and corresponding analyses of this study are split into two broad sections. Aim 1 addresses relationships between social dominance, resource control success and the child resource control strategy data organised as categorical controller subtypes, and then as continuous-type data, i.e. when resource control strategy is not categorised and rather analysed as continuous dimensions of prosocial and coercive control behaviour. Aim 2 focuses on investigating the resource control strategy frequencies of the controller subtypes and whether the current classification methodology is justified in terms of statistical significance of behavioural difference between the subtype groups and whether the labelling (e.g. calling a group 'coercive' controllers) is appropriate.

Aim 1 – Examine the relationship between frequency of resource control strategy use, resource control success and social dominance, comparing categorical (controller subtypes and continuous-type (prosocial and coercive dimensions) resource control strategy variables.

Resource control theory has essentially equated social dominance and resource control success and investigated one mechanism for the achievement of social dominance: that resource control strategy leads to resource control success/efficacy which in turn leads to increased social dominance status with in the social group. The hypothesis presented in this chapter is that there would be a strong relationship between these three variables in accordance with resource control theory.

Aim 2 – Examine the relationship between resource control strategy and controller subtype.

This thesis contends that the justification for categorising individuals according to subtype, based on prosocial and coercive resource control strategy use frequencies has not been adequately examined in the literature to date. Whilst labelling individuals as, for example, prosocial controllers *implies* they exhibit significantly more prosocial behaviour than coercive controllers (and vice versa), this does not necessarily mean there is an *actual statistically* significant difference in said behaviour. Secondly, due to these behavioural categories being based on *relative* frequency within a class, children may be placed in a subtype group despite exhibiting very little of the behaviour supposedly prominent in that subtype, leading to misleading labelling, potentially leading to assumptions regarding an individual's behaviour that may not be accurate. Therefore, this study aims to investigate the relationship between controller subtype groups and prosocial and coercive resource control strategy, by 1) investigating the differences in resource control strategy use between the subtypes, and 2) examining the absolute frequencies of resource control strategy use for each subtype category. These analyses are exploratory; whilst previous study using the subtype categorisation methods have provided data to potentially inform hypotheses, this present study is examining the validity of the subtype formation method, thus hypotheses based on such data would be inappropriate.

3.3. Methodology

Note: Participants took part at three phases across the school year and measures outlined below were used at each phase of data collection. However, this study examines only the data collected at phase 1. See study 4 (chapter 6) for longitudinal analyses.

3.3.1. Participants

The participants in this study and the project overall, including demographics and recruitment strategy, are described in detail in the main methodology section (chapter 3). Ninety-two children (following one drop-out) aged between 4 and 5 years (M = 4.64, SD = 0.29) old were recruited from 4 reception year classes from 3 state primary schools in the south east of England (males, n = 47; females, n = 45). Teachers from each class (N = 4; all female) also participated in the study by completing the teacher tasks described in detail in Chapter 3.

3.3.2. Measures

The measures outlined below are described in detail in the main methodology section (chapter 2).

3.3.2.1. Verbal ability

Children's verbal ability was measured with the British Picture Vocabulary Scale III (BPVS III; Dunn & Dunn, 2009) and administered in accordance with the instructions. The standardised scores were used for purposes of analysis.

3.3.2.2. Teacher-rated child behaviour report and social dominance

Teachers completed a child behaviour questionnaire. More comprehensive detail is given in chapter 2, section 2.9. In brief, teachers completed a child behaviour questionnaire for each child individually (appendix G). This questionnaire contained 4 items relating to dominance on a seven-point scale (Dodge & Coie, 1987, adapted for preschool children in Pellegrini et al. 2011), aggression on a four-point scale (Hawley, 2003b) and prosocial behaviour on a five-point scale (PSBS; Crick, Casas, & Mosher, 1997; Poland, Monks, & Tsermentseli, 2015). In addition, 18 resource control-related items, on a seven-point Likert scale from the questionnaire used by Hawley (2003) and Hawley and Geldhof (2012) were used in order to provide specific data regarding prosocial and coercive resource control strategies as well as items regarding resource control success. Therefore, in total the questionnaire was composed of 32 items. As detailed in the general methodology (chapter 2), a social dominance composite was used as a measure of the child participant's social dominance (the composite being an aggregate of the standardised teacher dominance ratings and ranks; see chapter 2, section 2.9).

The resource control data from this questionnaire was used to form the strategy subtype categories using the method of Hawley and colleagues (Hawley, 2003b, 2003a; Hawley & Geldhof, 2012; Hawley et al., 2007). This approach considers strategy type as a categorical variable relative to the position in percentile grouping. The types were constructed using the coercive and prosocial resource control strategy scores for each child on the teacher questionnaire. Bistrategic controllers scored above the 66th percentile for both behavioural dimensions (i.e. prosocial and coercive resource control); prosocial controllers score above the 66th percentile for prosocial resource control strategy but below of this percentile (i.e. average or low) for coercive resource control strategy; coercive controllers conversely scored above the 66th percentile for coercive resource control and outside for prosocial resource control; typical controllers scored less than the 66th percentile on both prosocial and coercive resource control and may have scored below the 33rd percentile for either one or none of the dimensions; non-controllers scored below the 33rd percentile for both dimensions (chapter 2, table 2.3).

3.3.3. Data collection procedure

Data collection was carried out in the phase 1 at the start of the children's first school year. Teachers were asked to complete their tasks by the end of the collection with their class. Data collection with each class lasted up to two school weeks, with the occasional small extension to account for student absences or exceptional events occurring in the school calendar. Each child was worked with individually in a quiet area away from the classroom and their data collected over two sessions over two days, to reduce fatigue and limit absence from the classroom for extended periods of time. Each session lasted around 30 minutes, though only one child task, the BPVS III, is presented in this first study, with the subsequent studies in this thesis examining ToM, empathy and emotion comprehension and selective moral disengagement data (study 2, chapter 4), and RHP comprehension data (study 3, chapter 5). The researcher was introduced to the children prior to beginning the data collection and talked to each child participant in a friendly and engaged way for a short period of time to increase their comfort in taking part in the research. The child was told at the beginning of every session that they could stop at any time and verbal assent was given by each child at the start of each session, in addition to parental consent. All measures and tasks (chapter 2, table 2.4) were carried out in the same order with each child, at each phase of the data collection (chapter 2, table 2.5).

Teacher responses were gathered via the 'anonymous link' function of Qualtrics and the data was only accessible to the researcher via a password protected account. All child and teacher responses were collected and transferred onto a university supplied computer, anonymised using ID codes and password protected by the researcher.

3.3.4. Data analysis

Analyses were conducted using SPSS version 25 (2017). Initial Pearson's correlations were conducted to ascertain general bivariate associations between the variables and to inform use of controls in further analyses. Proceeding these exploratory analyses, the following analyses were conducted to address the aims and hypotheses of this study:

Aim 1 – Examine the relationship between frequency of resource control strategy use, resource control success and social dominance, and the effect of resource control strategy variable construction on these relationships

Section (3.4.2.2.) examined the relationships between social dominance, resource control success and each of the resource controller subtypes, via ANOVA analysis (section 3.4.2.2.1.). This was followed by section 3.4.2.2.2, which examined the relationships between social dominance, resource control success and the continuous-type prosocial and coercive measures, via linear regression and hierarchical multiple regression analyses.

Aim 2 – Examine the relationship between resource control strategy and controller subtype

This aim was addressed in two parts (section 3.4.2.4). First via ANOVA analysis comparing the continuous-type prosocial and coercive resource control strategy data against the controller subtype groupings formed from that continuous data (section 3.4.2.4.1); second via paired *t*-tests/Wilcoxon Signed Rank tests investigating the differences in prosocial and coercive resource control strategy for each controller subtype separately (section 3.4.2.4.2).

3.4. Results

3.4.1. Preliminary analyses

Note on gender coding. Where gender was entered into an analysis, gender was dummy coded: males = 0 and females = 1 for all analyses reported here (both preliminary and main analyses).

Prior to conducting analyses on the variables of interest or preliminary correlations, suitable tests were decided upon. Examination of the normality of the data was conducted via examination of Q-Q plots, histograms, skewness and kurtosis values and Shapiro-Wilk testing. Examination found that all variables, except for teacher-rated social dominance, were non-normally distributed. Parametric statistical testing assumes the variables of interest's sampling distributions to be normally distributed (Cohen, 2008; Little, 2013) with an increased likelihood of type II errors occurring when parametric tests are used when this assumption is violated (Qualls, Pallin, & Schuur, 2010). However, the sampling distribution cannot be examined directly, thus it can be concluded that if the distribution of the data is normal then so is the sampling distribution (Mayers, 2013). Central limit theorem, however, states that population distribution notwithstanding, the distribution of sample means will meet the normality requirement if the size of the study's sample is sufficient – generally taken to be $N > 30$ (Cohen, 2008; Little, 2013). The sample size in this study was $N = 92$, with some slight reductions for some variables due to missing data. Therefore, given the contention of central limit theorem, parametric tests were used in the analyses presented in this chapter unless otherwise stated in the main analyses section (3.4.2).

3.4.1.2. Gender associations with controller subtype

Fisher's exact testing found no significant association between gender and any of the controller subtype categories (table 3.1), therefore the main analyses do not report controller subtype analyses by gender.

Table 3.1. Number of boys and girls categorised by controller subtype.

	Boys[a]	Girls[a]
Bistrategic controllers	9	10
Prosocial controllers	6	6
Coercive controllers	7	6
Typical controllers	19	19
Non-controllers	6	4

Note: [a]p = .985, Fisher's exact test. Superscript denotes significance of association between gender and controller subtype.

3.4.1.3. Correlations and follow-up initial testing

Verbal ability. Initial non-partialled correlation analysis found verbal ability to be correlated with several behavioural variables (table 3.2). Therefore, a further correlation analysis was conducted partialling out verbal ability (table 3.3) and is reported below.

Resource control success. As expected from a resource control theory perspective, resource control success showed a strong and significant positive correlation with both strategy dimensions (prosocial and coercive) and social dominance. Resource control success also showed a significant moderate negative correlation with non-resource-specific prosocial behaviour and a fairly weak yet significant positive correlation with relational aggression (table 3.3).

Social dominance. Also, as expected, social dominance showed a strong significant positive correlation with both prosocial and coercive resource control strategy as well as resource control success. Dominance also showed a fairly weak but still significant positive correlation with relational aggression, and a significant moderate positive correlation with overt aggression (table 3.3). Dominance also showed a fairly weak but significant negative correlation with non-resource-specific prosocial behaviour.

A series of Fisher's Z transformation tests was then carried out to examine whether the differences between the bivariate correlations for *prosocial* control behaviour and 1) resource control success; and 2) social dominance, were significantly different to the bivariate correlations for *coercive* control behaviour and 1) resource control success; and 2) social dominance, respectively. This would allow an examination of whether the linear social dominance model described by resource control theory – that resource control strategy leads to resource control success leads to increased social dominance – was relevant to this sample. Prosocial control behaviour was found to be significantly more correlated to resource control success, $z = 4.14$, $p < .001$, and social dominance, $z = 2.03$, $p = .021$, than coercive control behaviour.

Overall, preliminary examination suggests that both prosocial and coercive resource control are significantly related to resource control success and social dominance, but with prosocial control behaviour significantly more correlated to them than coercive control behaviour This potential relationship differential requires more detailed examination in the main analysis. Neither prosocial nor coercive control behaviours are more strongly associated to social dominance than resource control success.

Table 3.2. Pearson's bivariate correlations between variables.

	1	2	3	4	5	6	7	8	9	10
1. Gender	-	.317**	-.0001	.069	.025	.029	.043	.141	-.218*	-.049
2. Verbal ability		-	.008	.184†	-.070	-.105	.022	.362**	-.341**	-.237*
3. Age			-	.020	-.066	-.114	.018	.133	-.056	-.104
4. Social dominance				-	.739***	.624***	.662***	-.094	.262*	.274**
5. Prosocial strategy					-	.684***	.687***	-.319**	.355***	.432***
6. Coercive strategy						-	.413***	-.454***	.678***	.632***
7. RC success							-	-.208*	.130	.234*
8. Prosocial (non-RCS)								-	-.591**	-.608**
9. Overt aggression (non-RCS)									-	.629***
10. Relational aggression (non-RCS)										-

Note: **p* < .05; ***p* <. 01; ****p* < .001; †*p* = < .065 *RC* = resource control; RCS = resource control strategy

Table 3.3. Pearson's bivariate correlations between variables, with verbal ability partialled out.

	1	2	3	4	5	6	7	8	9
1. Gender	-	-.020	.097	.052	.057	.031	-.004	-.125	.020
2. Age		-	-.069	-.115	.013	.007	.133	-.049	-.104
3. Prosocial strategy			-	.671***	.684***	.763***	-.427***	.346***	.422***
4. Coercive strategy				-	.413***	.657***	-.528***	.684***	.623***
5. RC success					-	.662***	-.321**	.146	.251*
6. Social dominance						-	-.240*	.350***	.329*
7. Prosocial (non-RCS)							-	-.591***	-.638***
8. Overt aggression (non-RCS)								-	.596
9. Relational aggression (non-RCS)									-

Note: **p* < .05; ***p* <. 01; ****p* < .001. *RC* = resource control; RCS = resource control strategy

3.4.1.4. Statistical assumptions

For the main analyses reported below, Analysis of Covariance (ANCOVA) tests were performed to examine the relationships between some of the variables reported in this study (see main analyses below). The ANCOVA test requires that variance in the residuals for each group should be normally distributed (Kirk, 2013). In some cases the variable being tested did not meet this requirement, however Central Limit Theorem (Cohen, 2008; see above) contends this does not mean the ANCOVA cannot be used, therefore ANOVAs were used for all strategy subtype association tests below. ANCOVAs also require homogeneity of variance for each group within the categorical variable, in this case strategy subtype. This assumption was regularly violated, therefore the Welch's test (Welch, 1951) was taken as valid in these instances as this does not pool the variances (as the standard ANCOVA does). It was noted that this did not result in a difference of significance compared to the standard ANCOVA. Tukey post-hoc tests (if assumption of homogeneity of variance was not violated) and Games-Howell post-hoc tests (if this assumption was violated) were carried out to investigate specific subtype grouping differences in social dominance (Games & Howell, 1976).

Linear regressions and hierarchical multiple regressions were performed to examine some of the relationships between the variables described below, with the requisite test assumptions checked prior to performance. One assumption is that the relationship between predictor and outcome variables should be linear with no heteroscedasticity (Cohen, 2008). Via examination of standardised predicted vs standardised residual scatter plots, this assumption was met for all variables. Another assumption of hierarchical regressions is that there should be no multicollinearity (high correlation) between predictor variables (Kelley & Maxwell, 2010). No correlation between these variables exceeded .80, moreover tolerance values were all above .20 and VIF scores were all lower than 10. These examinations thus satisfied the assumption of multicollinearity. Another assumption of hierarchical regression is independence of residuals (Kelley & Maxwell, 2010). The Durbin-Watson value was derived for the regression model run in the main analysis and was found to be 1.798. This was above the upper bound for a model of this structure (Savin & White, 1977) of 1.596 (lower bound being 1.468), however it has more recently been reported that provided the Durbin-Watson value is greater than the lower bound but below a value of 2.5, the assumption of independence holds (G. Wang & Jain, 2003).

Adjusted R^2 ($_{adj}R^2$) are reported, rather than conventional R^2 values as these have been shown to be more relatable to trends in the general population, particularly when conducting regressions on smaller samples (Austin & Steyerberg, 2015).

3.4.2. Main analyses

3.4.2.1. Associations between social dominance and resource control success in controller subtypes.

To partly address aim 1, this section reports the findings from examination of the resource controller subtypes in terms of social dominance and resource control success. It reports the results from ANCOVAs examining the differences between social dominance and resource control success scores for the resource controller subtype categories formed from the continuous teacher-rated resource control strategy data. The covariate entered into the ANCOVA reported below was verbal ability, due to the findings from the preliminary correlations (tables 3.2 and 3.3). ANCOVAs were also conducted for both resource control success and social dominance which also included age and gender as covariates, but there were no differences in findings and so are not reported here.

Resource control success. An initial ANCOVA was performed to investigate the association between strategy subtype and resource control success (table 3.4). No significant results were found for any of the subtype groups, $F(4, 87) = 2.17$, $p = .079$, $\omega^2 = .05$.

Social dominance. An initial ANCOVA found a significant difference in mean social dominance scores (table 3.4) amongst the subtype groups, $F(4, 29.64) = 11.26$, $p < .001$, $\omega^2 = .31$. Post-hoc testing revealed bistrategic controllers ($M = 3.28$, $SD = .69$) to have significantly higher scores compared to typical controllers ($M = 2.29$, $SD = .66$), $p < .001$, and non-controllers ($M = 1.78$, $SD = .65$), $p < .001$. Coercive controllers ($M = 2.98$, $SD = .70$) had significantly higher scores compared to typical controllers, $p = .04$, and non-controllers $p < .001$. Prosocial controllers ($M = 2.96$, $SD = 1.08$) were found to score significantly higher on social dominance rating than non-controllers, $p = .04$, but not typical controllers $p = .30$. No significant difference in mean social dominance score was found between any of the three most dominant groups (bistrategic, coercive and prosocial controllers) or between typical- and non-controllers.

Table 3.4. Summary statistics showing the post-hoc significance between the subtype groups for social dominance and teacher-rated behaviour variable scores.

	Social Dominance	*RC success*	*Prosocial strategy*	*Coercive strategy*	*Non-RC Prosocial behaviour*	*Non-RC Overt aggression*	*Non-RC Relational aggression*
BC$^{(a)}$	**3.28**^{de}	4.07	**4.90**^{cde}	**2.84**^{bde}	**1.58**^{d}	**1.58**^{de}	**1.65**^{d}
	(.69)	(1.42)	(.99)	(.95)	(.67)	(.65)	(.67)
PC$^{(b)}$	**2.96**^{e}	3.64	**4.32**^{de}	**1.85**^{ace}	1.19	1.19	1.25
	(1.08)	(1.68)	(1.21)	(.69)	(.76)	(.39)	(.43)
CC$^{(c)}$	**2.98**^{de}	4.56	**3.81**^{ad}	**2.90**^{bde}	1.62	1.62	1.44
	(.70)	(1.62)	(.82)	(.97)	(.91)	(.69)	(.60)
TC$^{(d)}$	**2.29**^{ac}	3.04	**2.90**^{abc}	**1.59**^{ac}	**1.07**^{a}	**1.07**^{a}	**1.16**^{a}
	(.66)	(1.98)	(1.34)	(.54)	(.77)	(.21)	(.33)
NC$^{(e)}$	**1.78**^{ac}	3.67	**2.88**^{abc}	**1.47**^{abc}	**1.03**	**1.03**^{a}	1.33
	(.65)	(2.15)	(.89)	(.31)	(.81)	(.10)	(.63)

Note: Means are on the top line, SDs below in ( ) for each subtype. RC = resource control; BC = bistrategic controller; PC = prosocial controller; CC = coercive controller; TC = typical controller; NC = non-controller. The superscripts indicate significant differences using Games-Howell correction (p < .05; unless otherwise stated in the main text). E.g. the top row, phase 1, indicates that bistrategic controllers differ from typical controllers (d) and non-controllers (e), but no other subtypes, on social dominance.

3.4.2.2. Associations between resource control success, social dominance and the continuous resource control strategy dimensions

Note: Similar to the ANCOVA subtype analysis reported above. Initial regressions were conducted including gender, age and verbal ability as control variables, however gender and age had negligible effects on the outcome of the model. Therefore, the regression reported below included only verbal ability out of the three.

To further address aim 1, standard linear and hierarchical multiple regressions were conducted to investigate associations between the continuous strategy dimensions and resource control success and social dominance. The initial Fisher's *z* transformations investigating the variable correlations (table 3.3) informed the appropriate structuring of two initial regressions – one examining the variance in resource control success explained by prosocial and coercive resource control strategy and the other a hierarchical regression examining the variance in social dominance explained by the resource control strategies (prosocial and coercive) and resource control success (section 3.4.2.2.2). This allowed examination of the mechanism for social dominance achievement suggested by resource control theory, whereby successful application of resource control strategies result in resource control success which leads to social dominance.

3.4.2.2.1. Resource control success

Model structure. Of the variables that correlated with resource control success (table 3.3), significant correlations were found between prosocial resource control, coercive resource control and social dominance in accordance with resource control theory (Hawley, 1999). Fisher's *z* transformations showed that prosocial resource control strategy was more correlated to resource control success than coercive control behaviour. Other variables that significantly correlated with resource control success were non-resource-directed prosocial behaviour and relational aggression, however these were ultimately removed from both models (table 3.5) due to non-significant effects, ${}_{\Delta adj}R^2$ =.04, ${}_{\Delta}F(2, 89) = 2.92$, $p = .059$.

To investigate the predictive value of prosocial and coercive control behaviour in terms of resource control success, a multiple linear regression containing both the prosocial and coercive resource control strategy variables as predictors was conducted (table 3.5). This model was split into three blocks, with block 1 containing verbal ability, block 2 containing the non-resource-directed behavioural variables (prosocial behaviour, overt and relational aggression), and block 3 containing prosocial and coercive strategy variables. Block 4 contained the interaction term between the two strategy dimensions to investigate potential moderation effects. This structure would allow examination of the relationship strategy use has with resource control success once other factors have been accounted for.

Examination of the regression (table 3.5) showed that prior to the addition of the control strategy variables (prosocial strategy and coercive strategy), verbal ability and the non-resource-specific behaviours (block 2) explained 7% of the variance in resource control success, ${}_{adj}R^2$ =.07, $F(4, 87) = 2.69$, $p < .001$. Following the addition of the control strategy variables (block 3) and their interaction term (block 4), the regression explained a total of 50% of the variance in resource control success, ${}_{adj}R^2$ =.50, $F(7, 84) = 13.40$, $p < .001$. Therefore, prosocial and coercive control strategies and their interaction *alone* accounted for 43% of the variance in resource control success. However, examination of the beta coefficients for each predictor showed only prosocial control behaviour to be a significant predictor (table 3.5). Therefore, a follow-up univariate linear regression was conduction with only prosocial control behaviour as a predictor, which found that prosocial control behaviour alone explained an identical variance in resource control success, ${}_{\Delta adj}R^2$ =.43, ${}_{\Delta}F(2, 89) = 80.45$, $p < .001$. Therefore, results showed that prosocial behaviour was a significantly more important predictor than coercive control behaviour for resource control success.

Table 3.5. Multiple regression results for resource control success.

	F	$_{adj}R^2$	*β*	*SE β*	*β 95% CI*	
					Lower	*Upper*
Block 1	***0.04***	***.00***				
Verbal ability			.022	.100	-.169	.224
Block 2	***2.69****	***.07***				
Verbal ability			.129	.111	-.089	.347
Prosocial (non-strategy)			-.331*	.159	-.677	-.035
Overt aggression			-.109	.144	-.418	.165
Relational aggression			.117	.144	-.190	.378
Block 3	***12.99******	***.45***				
Verbal ability			.058	.099	-.121	.269
Prosocial (non-strategy)			-.152	.098	-.351	.031
Overt aggression			-.161	.126	-.375	.124
Relational aggression			-.043	.106	-.301	.111
Prosocial strategy			.687***	.114	.495	.949
Coercive strategy			.009	.153	-.300	.295
Block 4	***13.40******	***.50***				
Verbal ability			.084	.091	-.093	.264
Prosocial (non-strategy)			-.062	.093	-.253	.109
Overt aggression			-.147	.120	-.336	.135
Relational aggression			.059	.104	-.198	.211
Prosocial strategy			.594***	.107	.395	.818
Coercive strategy			.075	.150	-.240	.350
Prosocial*Coercive			-.260**	.078	-.454	-.125

Note: *p < .05 **p <. 01 ***p < .001;

The regression (table 3.5) produced two key findings, 1) that the addition of prosocial strategy and the interaction term reduced coercive strategy's association with resource control success to non-significance, indicating possible mediation of coercive strategy's effect on resource control success by prosocial strategy; 2) that the significance of the interaction term suggests a moderation of prosocial strategy's effect on resource control success by coercive strategy. Therefore, a further analysis was conducted to investigate the presence of this 'moderated mediation' effect (figure 3.1) – a model in which the mediated variable (coercive strategy) moderates the effect of the mediator (prosocial strategy) on the outcome variable (resource control success).

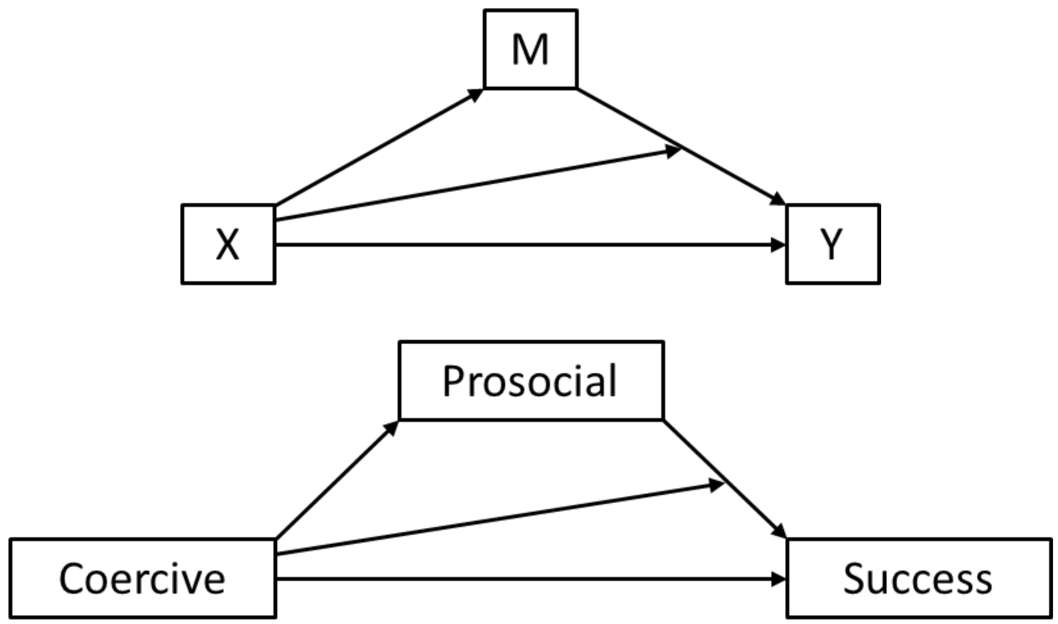

Figure 3.1. Moderated mediation model. Top diagram shows the theoretical moderated mediation model, where X moderates the effect of the mediator on the outcome variable. Lower diagram shows the study variable entered into the model. Prosocial = prosocial strategy use; Coercive = coercive strategy use

It should be noted that mediation is innately a causal model. One could therefore argue that such a model as the one above (figure 3.1) is wrong, as coercive behaviour does not generally cause prosocial behaviour. However, the phenomenon of reconciliation behaviour has been empirically documented in this age group (Roseth et al., 2011); in essence, this features a causal mechanism, whereby initial coercive strategy will lead to detrimental effects, therefore immediate follow-up prosocial strategy is required. For example, a hitting a child and grabbing their scooter (coercive strategy) may lead to the defeated opponent going to tell the teacher. To successfully maintain control (at least majority control) of that scooter, the victor is forced to employ immediate prosocial strategy – reconciliation tactics – and share the scooter with the defeated opponent. In this way the child's initial coercive strategy *causes* their subsequent prosocial behaviour.

Fritz and Mackinnon (2007) have shown that to have sufficient power (.80) to reject a false null hypothesis for a mediation analysis, regression methodology and the size of the path coefficients α (variable X's effect on M, figure 3.1) and β (variable M's effect on Y, figure

3.1) must be taken into account. Mediation analysis using PROCESS (v. 2.16.3) was used to conduct the analysis. Bias-corrected bootstrapped (2000 resamples) regressions were conducted for this analysis (Hayes, 2013), providing the path α (i.e. coercive strategy's effect on prosocial strategy) value, = .68, and the path β (i.e. prosocial strategy's effect on resource control success) value, = .64. Based on these path values and the bias-corrected bootstrap methodology used, a sample size of $N = 34$ is required for a power = .80 (Fritz & MacKinnon, 2007). The sample size used here was $N = 92$, therefore this was deemed sufficient.

The analysis found there to be a significant negative moderated mediation effect in line with the model shown in figure 3.1, with results showing a significant result for the index of moderated mediation, index = -2.07 (*S.E.* = .08) with *CIs* = -.41 – -.10 (Hayes, 2015). Specifically, coercive strategy has an indirect effect on resource control success through prosocial strategy, where prosocial strategy use has an increasingly positive effect on resource control success with decreasing coercive strategy use (table 3.6). This result means that whilst the direct effect of prosocial resource control strategy use was positively associated with resource control success, this positive relationship, whilst remaining positive (rather than changing to negative) decreased with increasing coercive resource control strategy use (figure 3.2).

Table 3.6. Moderated mediation analyses results; the indirect effect

			CI	
	Coercive strategy (SD from mean)	Indirect effect (SE)	Lower	Upper
Prosocial strategy	-1.00	0.69 (0.15)	0.46	1.03
	0.00	0.48 (0.11)	0.32	0.73
	1.00	0.27 (0.11)	0.11	0.6

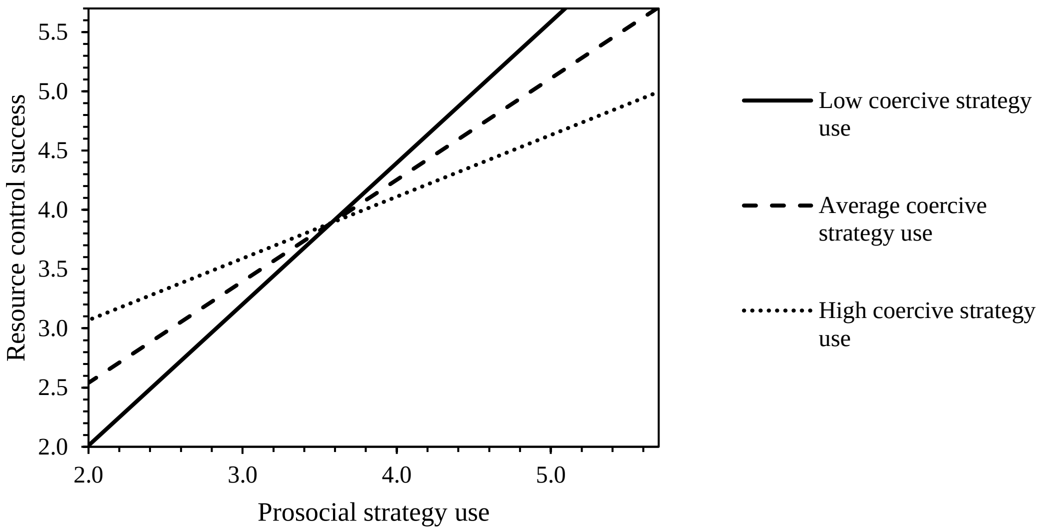

Figure 3.2. The moderation effect of coercive strategy use on prosocial strategy use's relationship with resource control success early in the school year. Low coercive strategy line = -1.00 SD from sample mean; average coercive strategy line = sample mean.

3.4.2.2.2. Social dominance

Model structure. Variables correlated with social dominance (table 3.2 and 3.3), in addition to prosocial and coercive control behaviour and resource control success, were the non-resource-directed behaviours (prosocial behaviour, overt and relational aggression, with verbal ability showing a borderline significant correlation. Therefore, verbal ability was added to the initial block 1 of the regression. Block 2 of the hierarchical regression added the non-resource-specific behaviour variables. Block 3 added both the prosocial and coercive resource control strategy dimensions. This would allow examination of the amount of variance in social dominance that is explained by resource control strategy. Moreover, comparison of their respective beta coefficients would establish the importance of one predictor over the other (i.e. significant difference between the coefficients) in terms of the explanation of variance in social dominance (Cumming, 2009). Their interaction term was added to block 4.

Resource control success was entered as the final block (block 5) of the model (table 3.7). Due to resource control success theoretically subsuming the all variance in social dominance explained by both prosocial and coercive control behaviour, resource control success was added into a separate block *after* block 3 (containing the prosocial and coercive resource control strategy predictors) and block 4 (containing the strategies' interaction term), rather than before it, therefore allowing block 3 to show the idiosyncratic explanatory powers of prosocial and coercive control behaviour, rather than this information being subsumed as part of the variance explained by resource control success.

Examination of the hierarchical regression revealed significant findings (table 3.7). the first two blocks containing verbal ability and the non-resource-oriented behaviour variables (prosocial behaviour, overt and relational aggression accounted for 16% of the variance in social dominance, ${}_{adj}R^2$ =.16, $F(4, 87) = 4.44$, $p = .016$, with verbal ability as the only significant predictor. Prosocial and coercive resource control strategy were added in block 3 and explained an additional 48% of the variance in social dominance, with block 3 explaining a total of 64% of the variance in social dominance, ${}_{adj}R^2$ =.64, $F(7, 82)$ =23.09, $p < .001$. Resource control success also explained an additional 6% of the variance in social dominance, with the overall model explaining 70%, ${}_{adj}R^2$ =.70, $F(8, 80)$ =26.77, $p < .001$.

To investigate the relative importance of prosocial and coercive resource control strategy as a predictor of social dominance analysis, their standardized beta coefficients were analysed. The coefficient 95% confidence intervals were estimated with bias correcting bootstrapping to a thousand re-samples (Cohen, 2008). As Cumming (2009) has evidenced, beta coefficients are statistically significantly different from one another at p <.05 if the higher confidence interval bound of the smaller coefficient overlaps the lower bound of the larger coefficient by less than 50%. Results here showed that there was far greater than 50% overlap between the confidence intervals, as the upper bound for the smaller coefficient (prosocial) surpasses 100% overlap of the larger coefficient (coercive) lower bound (figure 3.3). This means the difference between the coefficients was highly non-significant (Cumming, 2009), thus, no difference in predictor importance was found between prosocial and coercive resource control strategy regarding social dominance.

Table 3.7. Hierarchical multiple regression results for social dominance.

	F	$_{\Delta adj}R^2$	*β*	*SE β*	*β 95% confidence intervals*	
					Lower	*Upper*
Block 1	**3.04.**	**.02**				
Verbal ability			.184	.100	-.003	.401
Block 2	**4.44***	**.16**				
Verbal ability			.307**	.102	.096	.503
Prosocial (non-strategy)			.041	.163	-.300	.354
Overt aggression			.258	.147	-.037	.566
Relational aggression			.205	.144	-.064	.505
Block 3	**27.13*****	**.64**				
Verbal ability			.190**	.068	.057	.325
Prosocial (non-strategy)			.224	.099	.040	.431
Overt aggression			.051	.125	-.151	.332
Relational aggression			-.044	.107	-.282	.129
Prosocial strategy			.627***	.111	.410	.853
Coercive strategy			.336*	.127	.075	.594
Block 4	**23.09*****	**.64**				
Verbal ability			.186**	.070	.052	.329
Prosocial (non-strategy)			.209*	.102	.019	.421
Overt aggression			.048	.128	-.158	.339
Relational aggression			-.060	.117	-.343	.121
Prosocial strategy			.642***	.121	.426	.913
Coercive strategy			.326**	.133	.051	.583
Prosocial*Coercive			.042	.077	-.100	.203
Block 5	**26.77*****	**.70**				
Verbal ability			.154	.058	.043	.267
Prosocial (non-strategy)			.233	.088	.068	.415
Overt aggression			.103	.114	-.087	.357
Relational aggression			-.082	.109	-.339	.097
Prosocial strategy			.419	.133	.197	.733
Coercive strategy			.298	.116	.067	.521
Prosocial*Coercive			.139	.071	.011	.293
RC success			.374	.091	.186	.545

Note: *p < .05 **p <. 01 ***p < .001 †p = .065.

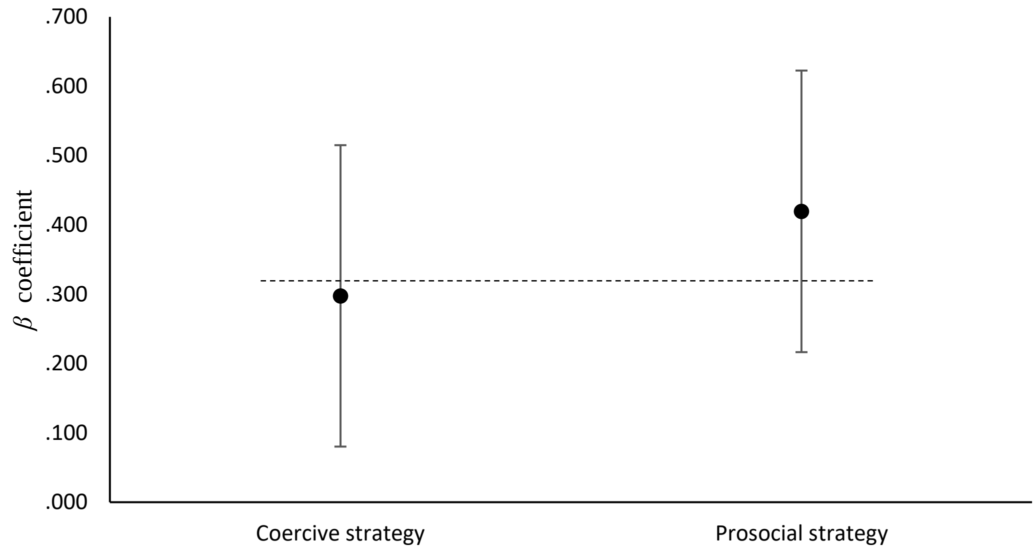

Figure 3.3. Beta coefficients and 95% confidence intervals for prosocial and coercive resource control strategy predictor in level 2 of the hierarchical regression for social dominance. Horizontal dotted line denotes significance threshold, above which the upper CI boundary of coercive strategy denotes a non-significance between coercive and prosocial coefficients.

3.4.2.3. Resource control differences amongst the subtypes

To address aim 2, two sets of analyses were conducted. For the first section, 3.4.2.4.1, an ANOVA with post-hoc testing was conducted to investigate the differences in resource control strategy amongst the controller subtypes. This analysis was conducted to investigate the extent to which the resource control strategies (continuous data) vary between those subtype groups. For the second section, 3.4.2.4.2, paired *t*-tests/Wilcoxon Signed Rank tests were conducted to investigate the differences in prosocial and coercive resource control strategy for each controller subtype separately. For simplicity of presentation, the median values relating to the Wilcoxon Signed-Ranks tests are presented in table 3.8.

3.4.2.3.1. Between Subtype resource control strategy

Prosocial resource control. The initial ANOVA found a significant difference between the mean prosocial resource control strategy scores for the subtypes, $F(4, 32.36) = 12.45$, $p < .001$, $\omega^2 = .33$ (for the *M's* and *SD's*, see table 3.4). Post-hoc analysis revealed that bistrategic controllers scored significantly higher than coercive controllers, $p = .016$, typical controllers, $p < .001$, and non-controllers, $p < .001$, but not prosocial controllers, $p = .64$. Prosocial controllers scored significantly higher than only typical controllers, p = .019, and non-controllers, p = .032, but not bistrategic controllers or coercive controllers. Coercive controllers scored significantly higher than only typical controllers, p = .048.

Coercive resource control. The initial ANOVA found a significant difference between the mean coercive resource control strategy scores for the subtypes, $F(4, 31.38) = 12.78$, $p < .001$, $\omega^2 = .60$. Post-hoc analysis revealed that bistrategic controllers scored significantly higher than prosocial controllers, p = .018, typical controllers, p < .001, and non-controllers, p < .001, but showed no significant difference compare to coercive controllers, p = 1.000. Coercive controllers scored significantly higher than prosocial controllers, p = .037, typical controllers, p = .003, and non-controllers, p = .001. Prosocial controllers did not score significantly differently from either typical controllers, p = .768, or non-controllers, p = .454. Differences between typical controllers and non-controllers were non-significant, p = .870.

3.4.2.3.2. Absolute resource control strategy within subtypes

Some of the controller subtype groupings counting below $n > 30$, therefore central limit theorem does not apply (Cohen, 2008; Little, 2013). Therefore, in order to investigate the absolute frequencies of the resource control strategy with each subtype, the non-parametric Wilcoxon Signed-Rank test was used accordingly in some of the analyses in this section.

Bistrategic controllers. Bistrategic controllers were rated significantly higher for prosocial control behaviour than coercive behaviour. A Wilcoxon Signed-Rank test showed prosocial control behaviour to be more frequently exhibited by bistrategics than coercive control behaviour, $z = -3.83$, $p < .001$.

Prosocial controllers. Prosocial controllers were also rated significantly higher for prosocial resource control strategy than coercive resource control strategy. A Wilcoxon

Signed-Rank test showed prosocial control behaviour to be more frequently exhibited by prosocial controllers than coercive control behaviour, z = -3.07, *p* = .002.

Coercive controllers. *t*-tests showed coercive controllers to exhibit prosocial control behaviour, (*M* = 3.81, *SD* = 0.82) significantly more frequently than coercive control behaviour, (*M* = 2.90, *SD* = 0.97), *t*(12) = 2.82, *p* = .016.

Typical controllers. A Wilcoxon Signed-Rank tests showed that prosocial control behaviour was exhibited significantly more frequently than coercive control behaviour by typical controllers, z = -5.02, *p* < .001.

Non-controllers. A Wilcoxon Signed-Rank tests showed that non-controllers exhibited prosocial control behaviour significantly more frequently than coercive control behaviour, z = -2.67, *p* = .008.

Table 3.8. Median scores for prosocial and coercive resource control strategy for each subtype at T1.

	Prosocial RC behaviour	*Coercive RC behaviour*
Bistrategic controllers	5.17	3.17
Prosocial controllers	5.00	1.84
Coercive controllers	3.83	3.33
Typical controllers	3.17	1.33
Non-controllers	3.08	1.33

3.5. Discussion

Hawley's work involving resource control theory has laid important theoretical and empirical foundations for resource control-oriented developmental research (Hawley, 1999, 2002, 2003b, 2003a, 2014b, 2014a; Hawley & Geldhof, 2012; Hawley et al., 2007), positing that there is a causal relationship between resource control strategy, resource control success and social dominance, in that resource control strategy leads to resource control, which in turn is the critical, if not single, mechanism for achieving greater social dominance in one's social group (Hawley, 1999). This present study investigated whether this critical mechanism for the achievement of dominance was reflected in the child sample studied, specifically through the investigation of associations between teacher-rated social dominance, resource control success and resource control strategy. This investigation was conducted by analysing resource control strategy data as both categorical 'controller subtype' groups and as continuous dimensions of behaviour (prosocial and coercive behaviour). Moreover, by directly investigating associations between controller subtype and the prosocial/coercive control behaviour dimensional variables, the current subtype formation methodology was investigated. The following discussion is structured in relation to addressing the two aims.

Aim 1 – Examine the relationship between frequency of resource control strategy use, resource control success and social dominance, comparing categorical (controller subtypes and continuous-type (prosocial and coercive dimensions) resource control strategy variables.

Analyses addressing aim 1 investigated the relationship between social dominance, resource control success and both the controller subtype categories and the continuous-type prosocial and coercive resource control strategy data from which those subtypes were formed. Addressing aim 1 in part serves to provide further data regarding subtype association to social dominance and resource control as per prior resource control literature. Furthermore, this chapter enabled the comparison of the methodological approaches to investigating social dominance and resource control, highlighting key similarities and differences between the relationships that social dominance and resource control success have with resource control strategy when the latter is analysed as either categorical 'subtypes' or continuous behavioural dimensions.

As per Hawley's specifications (Hawley, 2003b, 2003a; Hawley & Geldhof, 2012; Hawley et al., 2007) scores from teacher-rated resource control via means of prosocial or coercive strategies were used to group the child participants into one of five resource control controller subtypes. These subtypes' teacher-rated social dominance and resource control success scores were then compared. Gender distribution amongst the subtypes were found to match the findings of previous studies (Hawley, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007) finding no significant difference in gender association for any subtype category and no significant difference between coercive controllers and prosocial controllers in terms of dominance or resource control success – a finding also corroborated by Hawley and Geldhof (2012) and Hawley et al. (2007) – though these studies combined dominance and resource control success into a composite measure of dominance, as discussed below, thus precise comparison is impossible. Similarly, no gender differences were found between genders regarding the continuous-type prosocial and coercive resource control strategy variables and social dominance and resource control success. This supports the prior contention that males and females, at least within this age group, are equally effective resource competitors (Hawley, 1999; Hawley & Geldhof, 2012; Hawley et al., 2007). However, other findings were less corroborative.

No significant difference in the association with resource control success was found for any of the subtypes in early childhood. This seems to contrast the finding of previous studies in this age group (Hawley & Geldhof, 2012; Hawley et al., 2007) which found highest dominance/resource success composite scores to associate with bistrategic controllers and the lowest scores to associate with non-controllers, with coercive controllers scoring higher than both non-controllers and typicals, and prosocial controllers scoring higher than non-controllers. Similar results have been reported in an adolescent sample (Hawley, 2003a). Therefore, whilst prior research examining resource control strategy through subtype categorisation fits with resource control theory's contention that resource targeted behaviour leads to successful resource control, this present study indicates this is not the case, at least in the initial stages of the children's first year at school; it may be that longitudinal study (study 4) could reveal significant differences later in the year. Moreover, some of the subtype grouping were small, which may have also affected the findings in this present case.

Analysis of the continuous resource behaviour variables (the same data that was used to form the subtypes) found that prosocial resource control strategy was a significant predictor of resource control success, accounting for 47% of the variance, whilst coercive control behaviour was a non-significant contributor. This evidence clearly matches the theory more closely than the subtype analysis and adheres to its logic that trying to get resources as opposed to not trying to get them will increase your chances of resource control. Evidently, when creating the subtypes from the continuous data, the predictive power of prosocial control behaviour was negated by the formation methodology of the controller subtypes, which combines both resource control strategy dimensions to form each subtype. Resource control theory-based research has documented the use of both prosocial and coercive resource targeted behaviours of children between 2-6-years-old (Hawley, 2002, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007; Hawley & Little, 1999; 2016; Massey & Byrd-Craven, 2014; Pellegrini et al., 2011; Roseth et al., 2011) thus a strength of the subtype grouping method of resource control strategy is that it accounts for the combination of both behavioural dimensions and at least attempts to provide a more complex explanation of behavioural associations with various outcomes. Yet in turn, as discussed above (section 4.2.3) and below (aim 2 discussion), whilst the creation of a more than unidimensional behavioural construct would provide more accurate explanatory power, the current formation methodology of the controller subtypes has some fundamental flaws.

Of note is that 43% of resource control success is explained by resource control strategy use frequency (specifically prosocial), which supports resource control theory in that resource control strategy use is a critical factor in attaining control of a resource. However, this finding does leave space for additional predictors of resource control success that are not captured by these present data, possibly alternative mechanisms for resource control achievement. Furthermore, prior resource control research in adolescent groups has shown that class teachers may not be aware of behaviours that pupils utilise, with teachers rating bistrategic controllers significantly less aggressive compared to the their classmates (Hawley, 2003a). A similar lack of awareness or presence of the teacher could be at play here, whereby they do not see children competing or do not consider/perceive more subtle competition as competition. Additionally, it is plausible that children may gain control of resources without competing for them; for example, a resource controller may attempt to win the friendship of the child by giving them a resource without competition. Furthermore, such resource control could be achieved through the initial resource controller's benevolence, or as Hawley (1999) terms it, the "psychological motivational system characterized by altruism" (p. 109). Specific to this contention, this could be prosocial 'caring' behaviour that confers the gain of a resource upon the recipient, but the loss of one upon the benefactor. Whilst Hawley does recognise the capability of young children to be 'psychologically altruistic' (Hawley, 1999, p. 106, footnote 7), resource control theory does not discuss the possibility of resource controller altruism as a viable means of another's 'passive' resource control success/efficacy. Yet this is a viable expansion of resource control theory and does not confound the fundamental contention that dominance is achieved through resource control, *regardless of how that control is achieved*. This could also explain the small but significant 6% of the variance in social dominance accounted for by resource control success that could not be explained by prosocial and coercive resource control strategy combined. Equally, this could be rater (teacher) error. Therefore, the combination of teacher rating insufficiency and this passive resource control mechanism (among others) may well be contributing factors of resource control success. Further research is evidently needed to confirm such a mechanism.

The resource control success analyses also revealed a moderated mediation mechanism, specifically where coercive strategy use's direct effect on resource control success is completely mediated by prosocial strategy, yet prosocial strategy's positive effect on resource control success is moderated by coercive strategy. Specifically, this study found that, whilst prosocial strategy had some positive relationship with resource control success regardless of coercive strategy use, the relationship was stronger with linearly decreasing coercive strategy use. This study did not obtain any temporal data in terms of whether prosocial behaviour being enacted after coercive behaviour following a resource contest, however, this mediation result could be indicative of reconciliation behaviour (Pellegrini et al., 2011; Roseth et al., 2011, 2007). Specifically, coercive strategy use was found to be correlated to resource control success prior to more in-depth multivariate analyses. Only following the addition of prosocial strategy use to the regression alongside coercive strategy did coercive strategy lose its significance as a predictor of resource control success, with it maintaining a predictive effect on resource control success via prosocial strategy use. Therefore, this result could be reflective of prosocial behaviour being a crucial follow up to an initial successful use of coercive resource control strategy, preventing, for example, teacher intervention, or a counter challenge by the opponent or their ally. Importantly however, due to no direct reconciliation data being collected, it is impossible to determine the extent to which reconciliation behaviour specifically explains this finding, thus future study will need to address this.

An important point to note here, however, is the debate surrounding the utility regarding cross-sectional mediation analysis. Whilst mediation analysis is often performed on cross-sectional data (e.g., Bøe et al., 2013; Talmon & Ginzburg, 2017) others have argued against its use on cross-sectional data (Cole & Maxwell, 2003) given such data's inability to account for temporal effects of factors. Conversely, more recent work argues that cross-sectional data can provide useful insights when sound theory provides a basis for the analysis (Maunder & Monks, 2018; Shrout, 2011). In the present case, resource control theory does provide a solid theory on which the analysis is justified, whilst study 4 (chapter 6) will introduce longitudinal data.

The prominence of prosocial strategy use as a predictor of resource control success, particularly if reconciliation behaviour (which uses coercion as the initial resource acquisition behaviour) is not greatly reflected in these present data, goes against the traditional view and earlier findings that young children's resource control was mainly achieved through coercive, or agonistic, means (McGrew, 1969; F. Strayer & Strayer, 1976). Yet of note is the finding that the teacher-rated scores for prosocial and coercive control behaviour were equally important predictors of social dominance. This raises an important point regarding resource control theory's proposed mechanism for achievement of social dominance and relates to the potential fundamental interrelatedness of resource control and social dominance. Results from the resource control success regression found that only prosocial control behaviour was a significant predictor, yet both dimensions are predictors of dominance. The theory's central dominance achievement mechanism implies that if only prosocial control is a predictor of resource control success, then only it (and not coercive control behaviour) should be a predictor of social dominance, as dominance is achieved through resource control success. However, when considering resource control theory's definition of social dominance – "the exercise of chief authority or rule – or occupying a commanding position" (Hawley, 2014, p. 327), in essence, leadership, it is plausible that dominance *itself* may well be a social resource to be competed for, as having command, or being a leader is itself a social relationship with other people.

Regarding social dominance, this present study found bistrategic controllers to be more dominant than typical- and non-controllers only, which again does not agree with the previous findings (Hawley & Geldhof, 2012; Hawley et al., 2007) as mentioned above. Bistrategic controllers were not rated as significantly more dominant than either prosocial or coercive controllers. It is perhaps worthwhile to note that, although the statistical significance of the findings presented here differ in some ways to those described by Hawley and colleagues, the non-significant patterns do match Hawley's findings, in that bistrategics were consistently scored (though non-significantly) highest for social dominance (table 3.1.). Yet it should again be emphasised that this pattern could well be an artefact of methodological problems regarding the formation of the subtypes themselves.

There are discrepancies between the social dominance variable used in this present study and Hawley et al.'s previous work, which could at least in part explain them. The present study used a composite social dominance measure which was an aggregate of two teacher reports of social dominance (scaled ratings and linear dominance rankings; see chapter 2, section 2.9), whereas Hawley and colleagues (Hawley & Geldhof, 2012; Hawley et al., 2007) created a composite social dominance measure which was an aggregate of teacher-rated *resource control success/effectiveness* and teacher linear dominance rankings for the child. Their composite was based on the theoretical position of resource control theory: that controlling resources is the mechanism by which social dominance is achieved (Hawley, 1999, 2003b), whilst the measure used here separated resource control success and social dominance, in order to examine that theoretical position. Therefore, differences in the controller subtype associations with social dominance between this and previous studies may be, at least in part, due to the differing social dominance variable construction methods.

The results presented here, in combination with previous findings and the hypothesised relationships between resource control strategy, resource control success and social dominance, has produced as many questions as answers. Whilst initial review of this study's findings might suggest that resource control success and social dominance are significantly different phenomena, theoretical discussion has plausibly defined social dominance itself a social resource to be competed for and controlled. Therefore, there is theoretical support for Hawley's creation of a dominance/resource control composite. However, whilst such a composite can be justified, the validity of the current formation methodology of the controller subtypes was investigated for aim 2.

Aim 2 – *Examine the relationship between resource control strategy and controller subtype.*

ANCOVA and paired *t*-test/Wilcoxon signed ranks test analyses provided empirical support for the methodological issues highlighted in section 4.2.1.1 above. Specifically, ANCOVA post-hoc results showed non-significant differences in the scores on prosocial control for prosocial control behaviour for the prosocial controller and coercive controller subtypes. These result show that the rates of prosocial resource control strategy vary minimally between the coercive and prosocial controller subtypes. Furthermore, each controller subtype group was analysed via paired *t*-test or Wilcoxon Signed-Rank test separately and results showed that, regardless of controller subtype, prosocial control behaviour was exhibited significantly more frequently than coercive control behaviour. In many cases these differences were substantial, highlighting the potential inappropriateness of labelling a child who exhibits prosocial behaviour the large majority of the time as a ‘coercive controller’. However, a key note of caution for this interpretation must be given here; this study did not analyse behavioural differences at the class level for the subtype grouping, due to the significant reduction in subtype sample size this would produce. Therefore, this study cannot determine the frequency of coercive controller coercive strategy use compared to their class peers. It may well be that within classes, this subtype label is more appropriate. Further study is required to investigate this.

Specifically, this present study proposes that such relative categorisation of behaviour and labelling should only be employed if 1) the formation methodology provides a statistical guarantee that the different behavioural groups do in fact statistically differ in the relevant behaviour, or combination of behaviours, relative to other groups; 2) that the *absolute* behavioural frequencies should be examined in conjunction with the relative frequencies, either being incorporated into the formation methodology, or prominently noted in research publications. For at least the first stipulation the current subtype formation method does not meet the stated requirement. These stipulations may be particularly relevant for future longitudinal studies, as a purely relative view would not be sensitive to a change (increase/decrease) in *absolute* behaviour frequencies, if all groups undergo a similar change; this would result in, for example, coercive controllers to remain classified as such, but there would be no data showing that their coercive control behaviour has significantly reduced which could be crucial information.

These results have empirically supported the hypothesis made in section 4.2.1.1. above: that the current percentile-based methodology used to form the controller subtype groupings can result in the separation of individuals who are similarly behaved – statistically behaviourally the same – into different behavioural groups, which in turn can thus misrepresent the behavioural realities being studied. The subtype groupings remove the behavioural variances of individuals (found when analysing the continuous behavioural data) in favour of supposed broad differences and similarities, which as this present study shows, should not be assumed. Moreover, the labelling of individuals as certain controller subtypes, if not carefully scrutinised (as it has not been to date) may lead to false heuristic assumptions that the coercive and prosocial controller subtypes are representative of actual coercive and prosocial control behaviour, respectively.

Other research in both developmental and medical sciences have also pointed to the implications of different forms of categorisation, (Goossens et al., 2006; Naggara et al., 2011; Schellingerhout et al., 2009), yet it is important to note that neither those studies, nor this present one, advocate *abandonment* of categorisation; rather, that categorisation should be suitably scrutinised in order to most appropriately represent reality via more accurate and easily interpreted grouped data. A plausible avenue for such resource control strategy category improvement may be found via incorporation of data regarding *contextual* application of resource control strategies. Similar to the non-subtype grouping method employed in the present chapter, work by Pellegrini, Roseth and colleagues has investigated resource control by treating prosocial and coercive control data as a continuous variable (Pellegrini et al., 2011; Roseth et al., 2011). Of specific interest however is their investigation of the effect of *context-specific* prosocial 'reconciliation' behaviour – prosocial behaviour toward a resource contest opponent, immediately/shortly after the contest. They found that reconciliatory behaviour is most associated with the most socially dominant children increasingly over the course of a school year. Whilst the examination of reconciliatory behaviour was not within the scope of this present study, future research should investigate such context-specific behaviour, including investigating the links between resource control and reconciliation. Importantly therefore, reconciliation and other context-specific resource control strategies should be incorporated into future resource control strategy categories.

Conclusions, limitations and future study.

This study provided novel insights into the associations between social dominance and resource control in early childhood, and the effects of data handling/variable formation on resource control data gathered from young children. The study compared how teacher-rated prosocial and coercive resource control strategy in 4-5-year-old-children early in their first school year – when treated as either a categorical 'controller subtype' grouping variable (Hawley, 2003b, 2003a; Hawley & Geldhof, 2012; Hawley et al., 2007) or as continuous-type measures of prosocial and coercive resource control (Pellegrini et al., 2011; Roseth et al., 2011) – can reveal significantly different findings.

In terms of social dominance, this study partially agrees with previous findings concerning the associations of controller subtypes with social dominance, yet some of this agreement is based on non-significant patterns in this study's data; more importantly, the results from the analysis of the continuous resource control strategy variables question the fundamental reliability of the subtype variables to accurately portray behavioural reality, with the former revealing relationships between behaviour and dominance that the latter did not. Yet despite the differences between the subtype groups and the continuous resource control variables, this study has found that resource control success and its associated behaviours seem to have a strong relationship with social dominance at least in the early phases of a child's first year in school; however, the data suggest that other mechanisms for achievement of social dominance may exist. In terms of resource control success, whilst analysis of the resource control subtypes for association with resource control success revealed no significant differences between prosocial and coercive controllers, the continuous-type prosocial and coercive control variables showed distinct patterns of contribution to variance in resource control success. Therefore, a more complex mechanism for resource control and social dominance was proposed based on these findings and the inherent logic within resource control theory, yet this requires empirical corroboration.

A key limitation however, is the lack of observational data, the study being reliant on one member of teaching staff per class. Teacher-ratings of resource control have been previously shown to not fully reflect the behaviours of their students (Hawley, 2003a). If such a result reflects a teacher ignorance regarding pupil resource control strategy, then the results presented here can be called into question. Clearly such discrepancy needs further investigation. Whilst the results presented here may *suggest* that current controller subtype formation may impede accurate reflection of behavioural reality, only observation of that behavioural reality will provide sufficient corroboration of this contention. Therefore, direct observation-based study of children's resource control strategy – and the context in which it is applied – clearly provides a path to a gold standard of behavioural measurement in this field.

The lack of consistency between the categorical and continuous variable analyses' findings appear inextricably tied to how the subtypes are currently formed. When directly comparing the association of the subtype groups to the continuous prosocial and coercive control variables – the actual data with which they are formed – the formation methodology creates the potential for non-significant differences in behaviour between and within subtype groups to be effectively treated as significant (i.e. individuals who statistically exhibit the same behavioural frequencies are placed into different subtype groups), whilst poor semantic clarity between the definition of the subtypes and the relative differences in prosocial and coercive resource control strategy may lead to erroneous heuristic assumptions as to what the subtypes represent. Analyses from this data strongly suggests that these resource control strategy subtypes should be methodologically reformed to include statistical guarantees of behavioural difference between groups and contextual behaviour information in order to more accurately reflect behavioural reality, whilst ensuring that absolute behavioural data is acknowledged appropriately.

Importantly however, this study does not consider the effects on behaviour, and ultimately social dominance, that cognitive and affective development may have. Previous literature has posited other cognitive and affective factors, such as theory of mind and empathy (Hawley, 1999; Pellegrini et al., 2011) may be integral to resource acquisition and social dominance. In essence, the logic contends that having a intuitive insight into a potential resource opponents state of mind – whether that be understanding what they know or believe compred to oneself (ToM), or how they feel or would feel (cognitive empathy) – would provide one with a significant advantage going into a resource contest. In study 2 (chapter 4), these factors, are investigated.

Chapter 4 – Study 2: Thinking and feeling your way to dominance – are theory of mind, empathy and selective moral disengagement associated with social dominance, resource control early in a child's first year at school?

Abstract

Aims. The present study aimed to investigate the relationships between resource control strategy (both controller subtype and continuous-type data), resource control success and social dominance, and 1) theory of mind; 2) emotion comprehension, and affective and cognitive empathy; and 4) selective moral disengagement. ***Methods.*** Children (*N* = 92; 4-5 years old) completed the BPVS III (verbal ability; (Dunn & Dunn, 2009)), EMP (empathy; McInnis, 2014; Sezov, 2002), the TEC (emotion comprehension; Pons, Harris, & de Rosnay, 2004), ToM battery (Sullivan et al., 1994; Wimmer & Perner, 1983) and a selective moral disengagement scale (adapted from Pozzoli, Gini, & Vieno, 2012). Teachers completed an online behavioural survey assessing social dominance, resource control strategy and resource control success for each participating child in their class. The categorical 'controller subtype' groups were constructed from the continuous resource control strategy data, as per Hawley (2003b). ***Results.*** No significant differences were revealed between any of the subtype controller groups for any of the variables examined. In contrast, the continuous-type prosocial resource control strategy data was significantly positively associated with affective empathy, and coercive resource control strategy was significantly associated with affective empathy depending on levels of cognitive empathy. The effect of affective empathy on social dominance was reduced to non-significance when the resource control strategy factors were taken into account as dominance predictors. No significant effects of selective moral disengagement were found for any resource control or social dominance variable. ***Conclusion***. Results do not reject the theoretical contention that empathy may play an important role in resource-directed

behaviour in early childhood, which in turn may leads to increased resource control and social dominance; however, further empirical study is required to examine a causal interpretation of the data presented here.

4.1. Chapter overview

This chapter presents the second study of four in this thesis and is focused on the cognitive and affective data collected in phase 1 (T1) of the project. Specifically, this study investigated how affective and cognitive empathy, emotion comprehension, theory of mind and selective moral disengagement related to frequency of resource control strategy use, resource control success and social dominance in the first few weeks of the child participants' first year at school. Findings are discussed in relation to theory and prior empirical findings.

4.2. Introduction

4.2.1. Theory of mind and resource control

Hawley and Little (1999) found that greater cognitive development in a small sample of toddlers was more closely associated with higher social dominance rank than physical size, however the cognitive measure used (Bayley scale of infant development version II) did not measure ToM specifically. The phrase 'Theory of Mind' was originally coined by Premack and Woodruff (1978) defining the concept as when an individual "imputes mental states to himself and to others" (Premack & Woodruff, 1978, p. 515). The connection between ToM and resource control and social dominance has no concrete empirical corroboration, yet theoretically the connection is most plausible. Pellegrini (2008) hypothesised that children who successfully utilised reconciliation strategies – coercive acquisition of a resource closely followed by ameliorating prosocial behaviour toward the opponent to prevent negative repercussions following the initial coercion – require ToM in order to use these more complex resource control tactics. Pellegrini (2008) suggests that both engagement in resource contests and a generally developing ToM may act as a mutual reinforcement mechanism; a positive feedback loop. Further research has shown that children with more developed ToM between 4 and 11 years old are more popular (Badenes et al., 2000; Deković & Gerris, 1994; Slaughter et al., 2002), with these differences becoming more pronounced over time. It may be that poorer ToM (and cognitive empathy) would reduce the specificity and sensitivity of their peer interaction and therefore increase the potential for social isolation which would therefore reduce their social interaction which could allow them to further hone their ToM capabilities (Slaughter et al., 2002).

Children under 4-years-old prior to school tend to interact in pairs, or 'dyadically' (Ladd, 1990; McGrew, 1969; Parten, 1933). For such social success up to this age therefore, first-order reasoning may be sufficient. However starting school immediately and dramatically increases the scope and complexity of everyday social interaction for the child (Fabes, Martin, & Hanish, 2003; Martin & Fabes, 2001). Those who already have, or quickly develop a more complex ToM, such as the ability to accurately predict what another person – thinks about another child (i.e. second-order reasoning) could allow that individual to more effectively manipulate group dynamics and increase their chances of successful resource control and enhancing their dominance status within that group.

To date, only one study (that this author is aware of) has empirically investigated the association between resource control or social dominance and ToM. Pellegrini et al. (2011) found that first-order false belief in children aged 2-4 years was positively associated with teacher-rated social dominance by at end of their first school year. However, as stated in the paper, ToM was only measured at the end of the year, with no ToM measures taken prior to this time point. Therefore, not only is corroborative data regarding the end of a child's first school year required before more robust conclusions can be drawn, novel data is also required as to ToM's role in social dominance (and resource control) at earlier stages, such as the *start* of the child's first school year. Moreover, Pellegrini and colleagues' sample was on average younger than the sample in this project, therefore their study is not an ideal comparison. Though no empirical data was presented, Hawley's original resource control theory paper heavily implies the use of ToM processes as the human resource competition mechanism develops over time (Hawley, 1999); a later paper (Hawley, 2008) explicitly confirmed this implication: *"the theory* [resource control theory] *suggests that humans employ unrefined coercive strategies like other mammals, but diverge from other species with the development of strategies that necessitate a theory of mind and other higher order cognitive abilities"* (p. 199).

Summary

Overall, there is very little direct empirical evidence to suggest that theory of mind, in any form, has an effect or any relationship with resource control success and social. Whilst theoretical suggestions that ToM is positively associated with these social outcomes (Hawley, 1999, 2008; Pellegrini, 2008), they remain to be examined in this age group, a group which is likely undergoing a dramatic increase in exposure to social and cognitive stimuli, having just started school. However, empirical data does suggest that more 'general cognitive' development (Hawley & Little, 1999) and first-order false-belief specifically (Pellegrini et al., 2011) is associated with higher dominance status in children up to 4 years of age. However, until specific ToM data is gathered in the age group of interest for this study, the contention that there is such a link in young children at the start of school remains largely speculative.

4.2.2. Empathy, emotion comprehension and resource control

Similar to ToM discussed above, to this author's knowledge, there is no research to date that has directly examined the association between affective or cognitive empathy or emotion comprehension and resource control or social dominance However, positive associations between empathy and prosocial behaviour in general are very well documented and have a long history in the literature (for reviews and meta-analysis see Eisenberg & Miller, 1987; Telle & Pfister, 2014). A more recent example being that 5-6-year-olds behave more prosocially in tasks following being shown a video in which the protagonist exhibits sadness (Williams, O'Driscoll, & Moore, 2014) compared to those children who have witnessed a more emotively neutral video. Therefore, one could plausibly expect to find similar results with prosocial resource control strategy and empathy. However, given the stress resource control theory places on the potential 'selfishness' of strategy employment (Hawley, 1999), one could plausibly argue that empathy would not result in increased prosocial strategy given the often Machiavellian nature of resource attainment strategy (Hawley 2003a).

Hawley and Geldhof (2012) suggest that resource control strategies may contain an 'empathic component' that reflects societal 'moral codes'; they found that bistrategic controllers (*M* = 4.85 years) were rated as having emotional deficits in moral functioning according to teachers, yet showed greatest understanding of moral rules – that is, appreciating that something is wrong because a rule is broken, rather than it is wrong because emotional harm has been inflicted on someone, for example. As there is plausibly an overlap between ToM and cognitive empathy (see chapter 1), this seems somewhat contradictory to the theoretical contentions (Hawley, 1999; Pellegrini, 2008) and limited empirical evidence (Pellegrini et al., 2011) that ToM is *positively* associated with resource control and social dominance. It may therefore be the case that developed emotional understanding is not an advantage in terms of resource acquisition, at least not in this age group. Evidently, further research should be conducted before any reasonable conclusions can be drawn. It should also be reiterated that there is likely a strong relationship between affective and cognitive empathy (see chapter 1 for detailed discussion). Hoffman's influential developmental theory of empathy (Hoffman, 2000) states how appreciation of another's emotions may alter or enhance subjective empathic experience of that emotion. However, whether there is such a cognitive moderation effect of affective empathic experience at work within the minds of young children when resource control strategy must be decided on remains to be empirically examined.

Interestingly, enhanced cognitive empathy has been associated with ring-leader bullies compared to their peers (Sutton et al., 1999). It should be noted here that the authors themselves referred to the cognitive variable as ToM rather than cognitive empathy, again highlighting the nebulous nature of ToM/empathy definitions in the literature (see chapter 1); however, the measure was based around the appreciation of affective/emotional mental state perception, thus for the purposes of this present discussion, it is deemed cognitive empathy. Developed cognitive empathy may have allowed these bullies to understand what the most effective means of hurting their victims and impress their followers, with impressing followers being a desired social resource. Moreover, being an effective bully can potentially lead to material resource gain from both victims and followers, thus in this fashion cognitive empathy may plausibly increase the bully's resource control prowess and social dominance. Yet there are leaps of assessment in such reasoning; clearly direct empirical evidence is needed in regarding to associations between cognitive empathy and resource control/social dominance.

4.2.3. Selective moral disengagement and contextual moral judgement

Empathy often been associated with moral development (e.g. Eisenberg & Morris, 2001; Hoffman, 2000), however, there has been only one study to date that has directly associated morality with resource control strategy and social dominance. Hawley and Geldhof (2012) found bistrategic controllers (M = 4.85 years) showed greater moral cognition – appreciation of moral rules – than the other subtypes (composed of their peers), yet scored lower on 'emotion-based' moral internalisation/conscience (as rated by their teachers). Interestingly, moral internalisation *negatively* predicted social dominance, in all subtype groups but prosocial controllers, who scored high in moral internalisation and above the sample average for social dominance. Yet the prosocial controllers were the least dominant out of the three most dominant subtypes (i.e. prosocial, coercive and bistrategic controllers). This supports the contention that in early childhood, aggression is an effective resource control strategy, with specific strategic use of aggression and prosocial behaviour being most effective (e.g. Roseth et al., 2011). Additionally, this study suggests that at such a young age, a developed 'emotion-based' conscience may inhibit effective resource control, whilst more 'cold' understanding of moral rules without an internal affect associated with them, may not.

Hawley and Geldhof (2012) found that the dominant subtypes – prosocial, coercive and bistrategic controllers – used moral behaviour selectively to either limit repercussions against themselves, or to cause detrimental effects to a peer and termed this 'selective moral engagement'. This term was based on the original concept of 'selective moral disengagement' (Bandura, 2002) *whereby individuals or groups justify behaviour normally accepted as amoral as in fact moral behaviour.* Bandura theorised that reduced moral behaviour and action in society at large can be mapped onto four fundamental factors of moral disengagement: 1) *cognitive restructuring* (frames the behaviour as positive); 2) *displacement and diffusion of responsibility* (obscures or minimises the role of the perpetrator in the harmful outcome); 3) *minimising/misconstruing of consequences* (the agent disregards or distorts their behaviour's consequences); 4) *the dehumanising/blaming of the victim* (the agent strips the victim of human characteristics or blame them for provoking the behaviour; Bandura, 2002; Pozzoli, Gini, & Vieno, 2012).

There is a substantial amount of research into moral disengagement in adults (e.g. Weiss et al., 2006), adolescents (see Gini, Pozzoli, & Hymel, 2014 for meta-analysis of both adolescent and child research; Wang, Lei, Yang, Gao, & Zhao, 2016) and older children (e.g. Pozzoli et al., 2012), yet none (to this author's knowledge) that has investigated selective moral disengagement in children under 8 years old. Notably, Wang and colleagues (2016) found that in male young offenders (14-26 years old) empathy was negatively associated with offender aggression. However, this effect was moderated by moral disengagement; those scoring low for moral disengagement and higher for empathy were less aggressive, yet this relationship became non-significant when levels of moral disengagement were high. It is unclear whether this would be similar among young children. Importantly, the study did not discriminate between affective or cognitive empathy (they used the Interpersonal Reactivity Index (IRI); see Davis, 1983b) therefore such discrimination may reveal more specific relationships.

4.2.4. Aims and hypotheses

Aim 1 – Examine the relationship of resource control strategy, resource control success and social dominance with theory of mind in early childhood.

Both theory (Hawley, 1999, 2008) and some empirical data (Pellegrini et al., 2011) have suggested the association between ToM and social dominance and resource control. However, the data is scarce and incomplete. What data are present suggest a significant role of first-order ToM reasoning in increasing social dominance at the end of the first school year. However, whether such and effect is present at the start of a child's first school year remains to be seen. Given that Pellegrini et al. (2011) found that at 4-years-old – the age of the vast majority of the children in this present study at phase 1 – ToM had some significant effect on teacher-rated dominance status, this study's hypothesis is that ToM will have had some positive relation to resource control success and social dominance.

This author also makes a tenuous hypothesis extrapolating from the theory (Hawley, 1999, 2008) that those with greater ToM capability, particularly regarding second-order ToM reasoning, utilise pro-social control strategies more frequently than others as this theoretically would require greater thought perception skills and would lower the risk of getting into trouble with the class teacher.

Aim 2 – Examine the relationship of social dominance, resource control strategy and resource control success with <u>empathy and emotion comprehension</u> in early childhood.

There is also no direct empirical evidence to associate emotion comprehension with resource control and social dominance. Reasoning similar to that in hypothesis 1 applies here, therefore: that resource control theory (Hawley, 1999) and related work (Pellegrini et al., 2011) suggests that aggression and less sophisticated strategies for resource control are used in the early stage of school life, however over that first school year young children develop more complex strategies requiring higher cognitive functioning. This reasoning should also extend to emotion comprehension and cognitive empathy. Therefore, similar to aim 1 above, it is hypothesised that emotion comprehension and cognitive empathy may have some relationship with resource control success and social dominance. However, relationships with resource control strategy is less clear.

Whilst the few resource control-based papers that include or mention cognitive/affective factors focus on ToM and cognitive empathy, there is a dearth (to this author's knowledge) of literature regarding resource control/social dominance and *affective* empathy specifically. With that caveat in mind, it remains an open question as to whether affective empathy has any impact on resource control and social dominance in the first year at school. However, Hoffman's theory of empathy does lend credence to the hypothesis that cognitive empathy may enhance one's affective empathic experience; therefore, a tenuous hypothesis that affective empathy's effect on social dominance or resource control will dependent on cognitive empathy, though data is too scarce to specify exactly which specific strategy (prosocial or coercive) this effect will be mediated by.

Aim 3 – Examine the relationship of social dominance, resource control strategy and resource control success with selective moral disengagement in early childhood.

Hawley and Geldhof (2012) found bistrategic controllers to be the most socially dominant subtype, scoring highest for moral rule comprehension but joint lowest (with coercive controllers) on emotional reasoning-based moral understanding, however the scale used in this current study does not discriminate between these factors behind moral functioning. Therefore, this study leaves the question as to how the subtype types may differ in selective moral disengagement and how that may relate to resource control strategy, resource control success and social dominance as an open question. Wang et al. (2016) found selective moral disengagement to have a moderating effect on empathy's relationship to aggression – adolescents scoring low for moral disengagement and higher for empathy were less aggressive, yet this relationship became non-significant when levels of moral disengagement were high. Given that 1) the sample was much older than the one presented in this thesis, and 2) the aggression measured in that study was not specifically resource control strategy; this result may not be corroborated here, however a cautious hypothesis that a similar moderation effect will be found in this present study is put forward.

4.3. Methodology

4.3.1. Participants

The participants in this study and the project overall, including demographics and recruitment strategy, are described in detail in the main methodology section (Chapter 3). Ninety-two 4-5-year-old children (M = 4.64, SD = 0.29) old were recruited from 4 reception year classes from 3 state primary schools in the south east of England (males, n = 47; females, n = 45). Teachers from each class (N = 4; all female) also participated in the study by completing the teacher task described in detail in chapter 2.

4.3.2. Measures

The measures outlined below are described in detail in the methodology section (chapter 2).

4.3.2.1. Teacher-rated child behaviour report and social dominance

Teachers completed a child behaviour questionnaire. More comprehensive detail is given in chapter 2, section 2.9. A brief description was reported in study 1 (chapter 3). For ease of reference, that brief description is replicated here.

Teachers completed a child behaviour questionnaire for each child individually (appendix G). This questionnaire contained 4 items relating to dominance on a seven-point scale (Dodge & Coie, 1987, adapted for preschool children in Pellegrini et al. 2011), aggression on a four-point scale (Hawley, 2003b) and prosocial behaviour on a five-point scale (PSBS; Crick, Casas, & Mosher, 1997; Poland, Monks, & Tsermentseli, 2015). In addition, 18 resource control-related items, on a seven-point Likert scale from the questionnaire used by Hawley (2003) and Hawley and Geldhof (2012) were used in order to provide specific data regarding prosocial and coercive resource control strategies as well as items regarding resource control success. Therefore, in total the questionnaire was composed of 32 items. As detailed in the general methodology (chapter 2), a social dominance composite was used as a measure of the child participant's social dominance (the composite being an aggregate of the standardised teacher dominance ratings and ranks; see chapter 2, section 2.9).

The resource control data from this questionnaire was used to form the strategy subtype categories using the method of Hawley and colleagues (Hawley, 2003b, 2003a; Hawley & Geldhof, 2012; Hawley et al., 2007). This approach considers strategy type as a categorical variable relative to the position in percentile grouping. The types were constructed using the coercive and prosocial resource control strategy scores for each child on the teacher questionnaire. Bistrategic controllers scored above the top 66th percentile for both behavioural dimensions (i.e. prosocial and coercive resource control); prosocial controllers score above the top 66th percentile for prosocial resource control strategy but below of this percentile (i.e. average or low) for coercive resource control strategy; coercive controllers conversely scored above the top 66th percentile for coercive resource control and below for prosocial resource control; typical controllers scored less than the 66th percentile on both prosocial and coercive resource control and may have scored below the 33rd percentile for either one or none of the dimensions; non-controllers scored below the 33rd percentile for both dimensions (chapter 2, table 2.3).

4.3.2.1. Verbal ability

Children's verbal ability was measured with the British Picture Vocabulary Scale III (BPVS III; Dunn & Dunn, 2009) and administered in accordance with the instructions. The standardised scores were used for purposes of analysis.

4.3.2.2. ToM measures

4.3.2.2.1. First-order false-belief

The Sally-Anne unexpected transfer task (Wimmer & Perner, 1983) was used to assess first-order false-belief and has been widely used, including with the age group of interest here (e.g. Bensalah et al., 2015) using physical Sally and Anne dolls.

Scores were created based on absolute 'correct' or 'incorrect' responses, with 1 point for a correct answer for each of the questions (first-order false-belief and justification questions), as per Bensalah et al. (2015). This project adopted the method used by Sullivan et al. (1994; see second-order false-belief below), in that if the check question was incorrectly answered, the child could still attain a score for the test questions after provided both the false-belief and justification questions were answered correctly.

4.3.2.2.2. Second-order false belief

The adapted Perner and Wimmer (1985) birthday puppy scenario created by Sullivan et al. (1994) was used for this study, but with the characters changed from those in Sullivan's study, to Sally and Anne. Throughout the scenario, check questions and memory prompts were used to ensure the child was following the scenario.

Scores were created similarly to the first order method above, whereby 1 point each was given for a correct response to the second-order false-belief question and the justification question.

Deception intent comprehension. This measure was adapted from the lie/joke measure (Sullivan et al., 1995) to make it possible to conduct using only one researcher (original used two researchers). As with the second-order first-belief scenario, this measure was adapted to use the Sally and Anne dolls as the protagonists in the stories. There were two scenarios comprising this measure, the first being the 'lie' (deception intended) scenario and the second the 'joke' (deception not intended) scenario. See the main methodology section (Chapter 2) for the details of this measure.

4.3.2.4. Emotion comprehension

The Test of Emotion Comprehension (Pons et al., 2004) was used to measure emotion comprehension. Based on the age ranges deemed appropriate for each of the measures in the test booklets by Pons et al. (2004), this study used only the first 4 components: recognition (component 1), external cause (component 2), desire (component 3) and belief (component 4).

The components were presented to the participant in ascending order, either the 'boy' booklet or the 'girl' booklet, with the only difference between the two booklets being the sex of the characters; male participants worked with the boy booklet containing male characters and female participants worked with the girl booklet containing female characters. Scoring was conducted according to the same procedure given by Pons et al. (2004), so that a summed general level of emotion understanding was given via assigning 1 point for each correctly answered component. Correct answers were counted as only those which precisely matched the model answer supplied by the test. Incorrect answers were given 0 points.

4.3.2.5. Selective moral disengagement

This investigation used an adapted version of the selective moral disengagement scale used by Pozzoli et al. (2012) who based the scale on the theory of selective moral disengagement proposed by Bandura (2002). For a full description of this measure, see chapter 2, section 2.6 of this thesis.

The selective moral disengagement scale is designed to ask questions which reflect each of the four factors Bandura (2002) theorised comprised selective moral disengagement. However, in the present study, only the cognitive restructuring dimension maintained a reasonable internal consistency ($\alpha = .68$); the other three dimensions scored $\alpha < .50$, Cronbach's alpha scores for all items together were consistently $\alpha = .81$. This shows for use in this age group that the scale may be a useful tool for investigating the contextual application of more general moral judgement, or a selective moral disengagement that may not adhere to the more complex dimensions originally outlined by Bandura.

4.3.2.5. Empathy assessment

The Empathy Test for Preschoolers (EMP; Sezov, 2002) was used for empathy assessment of the child participants. Child participants were presented with a series of short illustrated stories from the EMP storybook ending in a focal character expressing happiness, sadness, fear or anger. The child was then asked, "how does this make *you* feel [child's name]?" (the 'affective empathy' question in the EMP), followed by "how do you think [story's focal character] feels?" (the 'cognitive empathy' question in the EMP).

Scoring was performed according to the guidance from the instruction manual, a summary is shown in the general methodology section (Chapter 2, table 2.2).

4.3.3. Data collection procedure

A brief description for the data collection procedure is given below. For a full description please see chapter 2 of this thesis.

Data collection was carried out in phase 1 at the start of the children's first school year. Teachers were asked to complete their tasks by the end of the data collection phase with their class. Data collection with each class lasted up to two school weeks, with the occasional small extension to account for student absences or exceptional events occurring in the school calendar.

Teacher responses were gathered via the 'anonymous link' function of Qualtrics and the data was only accessible to the researcher via a password protected account. All child and teacher responses were collected and transferred onto a university supplied computer, anonymised using ID codes and password protected by the researcher.

4.3.4. Data analysis

Analyses were conducted using SPSS version 25 (2017). Initial Pearson's correlations were conducted to ascertain general bivariate associations between the variables and to inform use of controls in further analyses. Proceeding these exploratory analyses, the following analyses were conducted to address the aims and hypotheses of this study:

Aim 1 – Examine the relationship of resource control strategy, resource control success and social dominance with theory of mind in early childhood.

ToM's relationship to resource control strategy was investigated with resource control strategy as both a categorical variable via ANCOVA (controller subtype groups; section 4.4.2.2.1) and as the continuous-type prosocial and coercive variables via Pearson's correlations (section 4.4.1.1) as discussed in study 1.

Aim 2 – Examine the relationship of resource control strategy, resource control success and social dominance with empathy and emotion comprehension in early childhood.

Emotion comprehension's relationship to resource control strategy was investigated with resource control strategy as both a categorical variable via ANCOVA (controller subtype groups; section 4.4.2.2.1) and as the continuous-type prosocial and coercive variables via Pearson's correlations (section 4.4.1.1) as discussed in study 1.[1]

Empathy's relationship to resource control strategy was investigated with resource control strategy as both a categorical variable (controller subtype groups; section 4.4.2.2.1) and as the continuous-type prosocial and coercive variables via Pearson's correlations and hierarchical/multiple regression analyses (section 4.4.1.1 and 4.4.2.3, respectively) as discussed in study 1. Section 4.4.2.3 also reports regression results for empathy's relationship with social dominance.

Aim 3 – Examine the relationship of resource control strategy, resource control success and social dominance with selective moral disengagement in early childhood.

Selective moral disengagement's relationship to resource control strategy was investigated with resource control strategy as both a categorical variable via ANCOVA (controller subtype groups; section 4.4.2.2.1) and as the continuous-type prosocial and coercive variables via Pearson's correlations (section 4.4.1.1) as discussed in study 1.[1]

4.4. Results

4.4.1. Preliminary analyses

Note on gender coding. Where gender was entered into an analysis, gender was dummy coded: males = 0 and females = 1 for all analyses reported here (both preliminary and main analyses).

Descriptive statistics are for the variables investigated are reported in table 4.1. Prior to conducting analyses on the variables of interest or preliminary correlations, suitable tests were decided upon. Examination of the normality of the data was conducted via examination of Q-Q plots, histograms, skewness and kurtosis values and Shapiro-Wilks testing. As per study 1 (chapter 3), this examination found all variables, except for teacher-rated social dominance, to be non-normally distributed. Therefore, as per the central limit theorem (Cohen, 2008; Little, 2013) justification provided in study 1 (for details, see section 3.4.1) parametric tests were used in the analyses presented in this present study unless otherwise stated in the main analyses section (4.4.2).

A note on the deceit intent (i.e. lie/joke) comprehension scenarios. Following completion of data collection, only one child successfully distinguished between the scenarios, and this was inconsistent across phases (only succeeded at time 1 and time 3). Therefore, given the absence of any statistical power behind potential analysis, the lie/joke measure was dropped from further investigation for the studies presented in this project.

Table 4.1: Descriptive statistics of study variables.

	M	*SD*	*Min.*	*Max.*
Verbal ability	105.52	10.42	71.00	122.00
Age (years)	4.64	0.29	4.08	5.17
Social dominance	2.62	0.87	1.00	4.75
RC success	3.61	1.86	1.00	7.00
Prosocial RCB	3.62	1.40	1.00	6.33
Coercive RCB	2.05	0.93	1.00	5.17
Prosocial (non-RCB)	3.57	0.82	1.50	5.00
Overt agg. (non-RCB)	1.26	0.49	1.00	3.00
Rel. agg. (non-RCB)	1.33	0.53	1.00	3.00
Aff. Empathy	2.85	0.94	0.00	4.00
Cog. Empathy	3.42	0.51	0.63	4.00
TEC	2.22	1.05	0.00	4.00
FOFB	0.29	0.46	0.00	1.00
SOFB	0.19	0.40	0.00	1.00
SMD (never) frequency	10.56	3.93	0.00	14.00
SMD (sometimes) frequency	1.66	2.17	0.00	13.00
SMD (always) frequency	1.13	1.63	0.00	7.00

Note: RC = resource control; RCB = resource control strategy; SMD = selective moral disengagement; Aff. empathy = affective empathy; Cog. empathy = cognitive empathy; overt agg. = overt aggression; rel. agg = relational aggression.

4.4.1.1. Correlations

Tables 4.2 and 4.3 show multiple significant correlations between variables, some of which have been investigated in study 1; therefore, this study focused on those correlations highlighted in grey in these tables. Table 4.2 specifically presents correlations without partialling and shows that several the cognitive/affective variables (see grey region on table 4.2) were significantly correlated to verbal ability, with TEC scores also being marginally statistically significantly correlated with age and gender. Given these findings, a second correlational analysis was performed partialling out verbal ability (note: the gender and age correlation with TEC disappeared following partialling out verbal ability; table 4.3). These correlations are described below.

Empathy. Prior to partialling (i.e. for verbal ability), affective empathy showed a highly significant moderate positive correlation with social dominance, prosocial resource control strategy, coercive resource control strategy and cognitive empathy. After partialling the strength and significance of these correlations were increased (table 4.3). Prior to partialling c*ognitive empathy* showed a highly significant moderate positive correlation with verbal ability, TEC score and affective empathy. It also showed a small significant positive correlation with prosocial resource control strategy and the 'never OK' response for selective moral disengagement. Following partialling (table 4.3) cognitive empathy showed only a highly significant moderate positive correlation with affective empathy.

TEC total. Prior to partialling, TEC scores were found to have a small significant positive correlation with gender, age and SOFB, and a highly significant moderate positive correlation with verbal ability and cognitive empathy (note: but not affective empathy). It also showed a positive correlation with the 'never OK' response for selective moral disengagement (table 4.2). However, following partialling all significant correlations disappeared (table 4.3).

First-order false-belief. Prior to partialling FOFB showed a highly significant moderate positive correlation with verbal ability, and a significant moderate positive correlation with SOFB (table 4.2). After partialling however, all significant correlations for FOFB disappeared (table 4.3).

Second-order false-belief. In addition to its correlation with FOFB and TEC score, prior to partialling SOFB showed a significant moderate positive correlation with verbal ability and a small significant positive correlation with second-order deceit intent and the 'never OK' response for selective moral disengagement. It also showed a small negative correlation with the 'always OK' response for selective moral disengagement. However, after partialling all significant correlations disappeared (table 4.3).

Selective moral disengagement. *'Never OK' response.* Prior to partialling, this was significantly and positively correlated with verbal ability, in addition to the other correlations mentioned above. It was also strongly positively correlated with the other two response types for the selective moral disengagement scale measure (table 4.2). However, following partialling, the 'never OK' response was only significantly negatively correlated with the other two selective moral disengagement response types. *'Sometimes OK' response.* Prior to partialling, this was significantly and positively correlated with affective empathy and the 'always OK' response, whilst being negatively correlated with the 'never OK' response (table 4.2). Following partialling, the 'sometimes OK' response showed a non-significant correlation with affective empathy, maintained its correlation with the 'always OK' response and increased its strength of negative correlation with the 'never OK' response (table 4.3). *'Always OK' response.* Prior to partialling, in addition to the correlations mentioned above, this was also slightly negatively correlated with SOFB (table 4.2). Following partialling, this had increased its negative correlation strength with the 'never OK' response and broadly maintained its correlation strength with the 'sometimes OK' response, with a slight drop in significance (table 4.3).

Table 4.2. Pearson's bivariate correlations between variables. Those correlations that are of specific interest to this present study lie within the grey box to the right side of the table.

	1	2	3	4	5	6	7	8	9	10	11
1. Gender	-	.256*	-.005	.078	.037	.071	.026	.097	-.191	-.035	.043
2. Verbal ability		-	-.005	.184	.022	-.070	-.105	.362***	-.341**	-.237*	.190
3. Age (years)			-	.017	.016	-.067	-.115	.127	-.048	-.102	.035
4. Social dominance				-	.662***	.739***	.624***	-.094	.262*	.273**	.313**
5. RC success					-	.687***	.412***	-.208*	.130	.234*	.088
6. Prosocial RCB						-	.684***	-.319**	.355**	.432***	.331**
7. Coercive RCB							-	-.453***	.678***	.632***	.256*
8. Prosocial (non-RCB)								-	-.591***	-.608***	-.121
9. Overt agg. (non-RCB)									-	.629***	.042
10. Rel. agg. (non-RCB)										-	.109
11. Aff. empathy											-
12. Cog. empathy											
13. TEC											
14. FOFB											
15. SOFB											
16. SMD (never)											
17. SMD (sometimes)											
18. SMD (always)											

Note: *p < .05, **p <. 01, ***p < .001; RCB = resource control strategy; SMD = selective moral disengagement; Aff. empathy = affective empathy; Cog. empathy = cognitive empathy; overt agg. = overt aggression; rel. agg = relational aggression; (table continues on next page)

(Table 4.2 continued):

	12	13	14	15	16	17	18
1. Gender	.128	.245*	.045	-.128	.035	.081	.004
2. Verbal ability	.478***	.380***	.431***	.232*	.590***	-.128	-.102
3. Age (years)	-.009	.241*	.184	.151	.036	-.013	.005
4. Social dominance	.095	.104	.075	.054	.205	-.153	-.107
5. RC success	-.075	.127	-.003	.145	.120	-.046	-.161
6. Prosocial RCB	.018	.112	-.061	.104	.042	.053	-.045
7. Coercive RCB	-.011	.027	-.008	.118	-.100	-.030	-.047
8. Prosocial (non-RCB)	.041	.132	.295**	-.025	.190	-.115	.009
9. Overt agg. (non-RCB)	-.162	-.088	-.186	-.042	-.179	-.048	.006
10. Rel. agg. (non-RCB)	-.051	-.103	-.056	.060	-.262*	.066	.134
11. Aff. Empathy	.413***	.085	.179	.046	-.024	.212*	.166
12. Cog. Empathy	-	.190	.071	-.024	.254*	.040	.181
13. TEC		-	.131	.242*	.286**	-.015	.042
14. FOFB			-	.295**	.186	-.164	-.146
15. SOFB				-	.236*	-.145	-.272*
16. SMD (never)					-	-.594***	-.541***
17. SMD (sometimes)						-	.385***
18. SMD (always)							-

Table 4.3. Pearson's bivariate correlations between variables, with verbal ability partialled out. Those correlations that are of specific interest to this present study lie within the grey box to the right side of the table.

	1	2	3	4	5	6	7	8	9	10	11
1. Gender	-	-.027	-.006	.044	.072	.030	-.030	-.163	.030	-.033	.027
2. Age		-	.018	.035	-.100	-.095	.083	-.012	-.042	.014	-.073
3. Social dominance			-	.647***	.777***	.651***	-.270*	.302**	.374***	.400***	.064
4. RC success				-	.693***	.397***	-.327**	.095	.263*	.208	-.097
5. Prosocial strategy					-	.709***	-.496***	.351**	.527***	.441***	.116
6. Coercive strategy						-	-.593***	.671***	.688***	.374***	.199
7. Prosocial (non-RCS)							-	-.647***	-.625***	-.215	-.092
8. Overt aggression (non-RCS)								-	.675***	.161	.083
9. Relational aggression (non-RCS)									-	.202	.134
10. Affective empathy										-	.397***
11. Cognitive empathy											-
12. TEC											
13. FOFB (ToM)											
14. SOFB (ToM)											
15. SMD 'never ok'											
16. SMD 'sometimes ok'											
17. SMD 'always ok'											

Note: **p* < .05, ***p* <. 01, ****p* < .001; RCS = resource control strategy; SMD = selective moral disengagement; (table continues on next page)

(Table 4.3 continued):

	12	13	14	15	16	17
1. Gender	.161	-.053	-.189	-.166	.176	.086
2. Age	.243	.244	.176	.005	-.025	.024
3. Social dominance	.031	.036	.034	.069	-.083	-.022
4. RC success	.154	.022	.168	.077	-.010	-.138
5. Prosocial strategy	.123	.033	.161	-.024	.021	.018
6. Coercive strategy	.118	-.012	.120	-.039	.020	.048
7. Prosocial (non-RCS)	-.082	.194	-.101	-.047	-.016	.114
8. Overt aggression (non-RCS)	.056	-.100	.011	.009	-.048	.047
9. Relational aggression (non-RCS)	.113	-.020	.082	-.093	.052	.112
10. Affective empathy	-.045	.158	.018	-.206	.186	.151
11. Cognitive empathy	-.081	-.050	-.091	-.116	.031	.184
12. TEC	-	.074	.214	-.023	.004	.038
13. FOFB (ToM)		-	.219	.082	-.063	-.074
14. SOFB (ToM)			-	.188	-.093	-.240*
15. SMD 'never ok'				-	-.879***	-.761***
16. SMD 'sometimes ok'					-	.360***
17. SMD 'always ok'						-

4.4.2. Main analyses

Those relationships highlighted by the preliminary analyses were investigated in more detail for the main analyses. Focus was placed upon how the ToM, emotion comprehension, empathy and selective moral disengagement variables associated with the teacher-rated resource control and dominance variables. As with study 1 in this thesis, resource control strategy was analysed as both categorical subtypes and continuous-type scaled data from the teacher-ratings.

4.4.2.1. Statistical assumptions

For the main analyses reported below, a multivariate analysis of covariance (MANCOVA) was performed to investigate the relative differences in cognitive and affective empathy, emotion comprehension and SMD response frequency variables between the subtype controller groups. This test requires that variance in the residuals for each group should be normally distributed (Kirk, 2013). In some cases the variable being tested did not meet this requirement, however Central Limit Theorem (Cohen, 2008; see above) contends this does not mean the MANCOVA cannot be used, therefore these this test was used for the strategy subtype association tests below. MANCOVAs also require homogeneity of variance for each group within the categorical variable, in this case strategy subtype. This assumption was regularly violated, therefore the Welch's test (Welch, 1951) was taken as valid in these instances as this does not pool the variances (as the standard ANOVA does). It was noted that this did not result in a difference of significance compared to the standard MANOVA (no controls).

Linear and hierarchical multiple regressions were performed to examine how affective and cognitive empathy relate to the resource control strategy, resource control success and social dominance variables with which affective empathy was found to correlate with in the preliminary analysis, with the requisite test assumptions checked prior to performance. One assumption is that the relationship between predictor and outcome variables should be linear with no heteroscedasticity (Cohen, 2008). Via examination of standardised predicted vs. standardised residual scatter plots, this assumption was not met for multiple variables, therefore bootstrapped regressions were performed for the regression analysis reported below as bootstrapped regressions do not make assumptions regarding the distribution of the outcome variable so are not affected by violations of the homoscedasticity and normality assumptions (Cohen, 2008). Another assumption of hierarchical regressions is that there should be no multicollinearity (high correlation) between predictor variables (Kelley & Maxwell, 2010). No correlation between these variables exceeded .80, moreover tolerance values were all above .20 and VIF scores were all lower than 10. These examinations thus satisfied the assumption of multicollinearity. Another assumption of hierarchical regression is independence of residuals (Kelley & Maxwell, 2010). The Durbin-Watson value was derived for the regression models run in the main analysis and the values were all within 2.5 and greater than their lower bounds, therefore the assumption of independence held for all regressions (Wang & Jain, 2003).

4.4.2.2. Subtyped resource controller data

4.4.2.2.1. Associations between empathy, emotion comprehension, ToM, SMD and resource control strategy

A MANCOVA was carried out to investigate the relative differences in cognitive and affective empathy, emotion comprehension and SMD response frequency variables between the subtype controller groups. Verbal ability was (additionally controlling for age and gender revealed negligible differences) controlled for due to their correlation at least some of the cognitive/affective outcome variables entered in the MANCOVA.

The MANCOVA found no statistically significant difference between any of the subtype groups for any of the cognitive/affective factors of interest – cognitive and affective empathy, emotion comprehension, ToM or SMD – after controlling for verbal ability, $F(24, 245.41) = 1.32$, $p = .149$, Wilks' $\Lambda = .654$, $\omega2 = .05$.

4.4.2.3. Continuous resource control strategy data

4.4.2.3.1. Empathy, resource control and social dominance

With the exception of affective empathy, preliminary correlation analyses showed no relationships between any of the ToM, TEC score and SMD response frequency variables and the teacher-rated resource control strategy, resource control success and social dominance variables (tables 4.2 and 4.3). Therefore, only empathy – not ToM, TEC or SMD responses – was analysed in more detail in the main analyses below (tables 4.2 and 4.3).

Preliminary correlations found affective empathy to be correlated with both resource control strategy dimensions (prosocial and coercive) and social dominance, but not with resource control success. However, given the correlations found between affective empathy and the two resource control strategy variables, and the theoretical (Hawley, 1999, 2014) and empirical associations (study 1, chapter 3) between resource control strategy and resource control success, resource control success and its relationship with empathy was investigated further, in addition to social dominance (see analyses below).

Preliminary correlations suggested that cognitive empathy was not associated with behaviour, however this variable was also included in the analyses as theoretically (Hoffman, 2000) as it may have an moderating effect on affective empathy, i.e. cognitive understanding of an emotion may alter or enhance subjective empathic experience. As per the MANCOVA reported above, verbal ability was entered into block 1 of each regression (tables 4.4 and 4.5).

Prosocial resource control strategy. Only affective empathy was found to be correlated to prosocial resource control strategy, yet to investigate moderation effects, cognitive empathy was added to block 2 with affective empathy and the interaction term, *cognitive*affective* empathy, was entered into block 3 of the multiple linear regression. The multiple regression found only affective empathy to have a significant association with prosocial behaviour, with the overall model explaining 14% of the variance in prosocial resource control strategy, ${}_{\Delta adj}R^2$ =.14, $F(4, 87) = 4.62$, $p = .001$ (table 4.4).

Coercive resource control strategy. Only affective empathy significantly correlated with coercive resource control in the preliminary analysis, but as with the prosocial resource control strategy regression above, the cognitive empathy and the *cognitive*affective* empathy interaction terms were added alongside the affective empathy variable as additional predictors. Results showed that whilst cognitive empathy as a main effect was a non-significant factor, it was found to be a significant moderator of affective empathy's association with coercive resource control. Together, this interaction effect and the affective empathy main effect explained 12% of the variance in coercive resource control strategy, ${}_{adj}R^2$ =.12, $F(4, 83) = 4.62$, $p = .005$ (table 4.5).

Table 4.4. Hierarchical regression results for variables predicting prosocial resource control strategy.

	F	${}_{adj}R^2$	*β*	*SE β*	*β 95% CI*	
					Lower	*Upper*
Block 1	**0.43**	**.00**				
Verbal ability			-.069	.100	-.292	.113
Block 2	**6.11****	**.14**				
Verbal ability			-.088	.127	-.361	.149
Affective empathy			.471***	.102	.265	.675
Cognitive empathy			-.140	.136	-.391	.133
Block 3	**4.62****	**.14**				
Verbal ability			-.080	.126	-.351	.156
Affective empathy			.463***	.102	.258	.676
Cognitive empathy			-.105	.157	-.416	.192
Cognitive*affective [a]			.043	.089	-.123	.247

Note: * = *p* < .05 ** = *p* <. 01 *** = *p* < .001; [a] = interaction term for cognitive and affective empathy.

Table 4.5. Hierarchical regression results for variables predicting coercive resource control strategy.

	F	$_{adj}R^2$	*β*	*SE β*	*β 95% confidence intervals*	
					Lower	*Upper*
Block 1	**.98**	**.00**				
Verbal ability			-.106	.119	-.302	.166
Block 2	**3.23***	**.07**				
Verbal ability			-.124	.126	-.343	.156
Affective empathy			.348***	.087	.187	.531
Cognitive empathy			-.095	.149	-.336	.245
Block 3	**4.00****	**.12**				
Verbal ability			-.089	.130	-.311	.197
Affective empathy			.313***	.083	.166	.486
Cognitive empathy			.062	.137	-.202	.327
Cognitive*affective [a]			.193**	.090	.001	.361

Note: * = $p < .05$ ** = $p <. 01$ *** = $p < .001$; [a] = interaction term for cognitive and affective empathy.

To investigate the direction of this interaction effect, participants were categorised into three cognitive empathy groups (low, moderate, high). To investigate these interactions further, children were split into three groups (low, average and high) determined by their cognitive empathy score according to standard deviations from the cognitive empathy score mean for the sample overall. The low group members scored 1 standard deviation or more below the sample mean, the high group members scored 1 standard deviation or more above the sample mean, and the average group members scored less than 1 standard deviation above or below the sample mean (Aiken & West, 1991; Renouf et al., 2009). Figure 4.1 shows the inverse relationship found between affective empathy and coercive control behaviour for the low group, and an increasingly positive relationship between these factors for the average and high groups. A regression with affective empathy (predictor) and coercive resource control strategy (outcome) was carried out for each cognitive empathy group. For children scoring low or moderately in cognitive empathy, there was no significant relationship between affective empathy and coercive resource control strategy, β = 0.54, t(31) = .312, p = .770 and β = .245, t(24) = 1.14, p = .183, respectively. However, a significant effect of affective empathy was found for the high group, β = .39, t(31) = 2.14, p = .009 (represented by ** in figure 4.1).

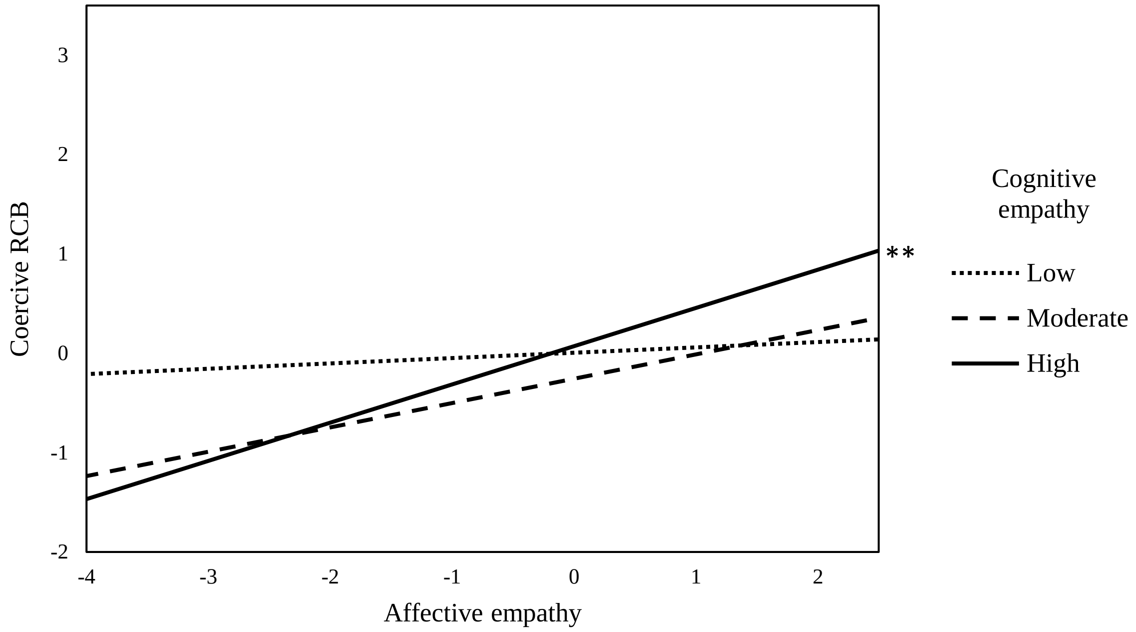

Figure 4.1. The moderated relationship between affective empathy and coercive resource control strategy for young children low, moderate and high in cognitive empathy. Axes display standardised values. ** = p < .01.

Resource control success. A multiple regression was conducted to investigate the contribution of affective empathy to the variance in resource control success rating (table 4.6). This model was an adaptation/extension of the hierarchical regression model used to examine the predictors of resource control success in study 1 (chapter 3, table 3.5). Specifically, both affective and cognitive empathy were added to block 1 along with verbal ability, accounting for cognitive variables that could influence subsequent behaviour. The cognitive*affective empathy interaction term was not added to the model reported here as it was found to have negligible impact on the analytical outcome in a preceding analysis , thus was removed from the final analysis. The non-strategy behaviours (resource-non-specific prosocial behaviour, overt and relational aggression) were entered into block 2, followed by the both strategy dimensions (block 3) and their interaction term (block 4).

Results showed the final model (block 4) explained a total of 52% of the variance in social dominance, $_{adj}R^2 = .52$, $F(10, 78) = 10.33$, $p < .001$ (table 4.6). Cognitive empathy added no additional explained variance in social dominance in any of the blocks. Affective empathy was a significant predictor in block 1, however following the addition of the non-resource-specific behavioural variables (block 2) its significance was lost. Similar to the results for the resource control success regression in study 1 (chapter 3, table 3.4), prosocial resource control was found to be a highly significant predictor of resource control success whilst coercive control was found to be non-significant; similarly, the interaction term was shown to be significant (block 4, table 4.6). The specifics of the interaction between prosocial and coercive control strategy is not reported here as this is reported in detail in study 1 (chapter 3).

Social dominance. Following the significant preliminary correlation between affective empathy and social dominance (table 4.3), a multiple regression was conducted to investigate the contribution of affective empathy to the variance in social dominance rating (table 4.7).

This model was an adaptation/extension of the hierarchical regression model used to examine the predictors of social dominance in study 1 (chapter 3, table 3.7). Specifically, both affective and cognitive empathy were added to block 1 along with verbal ability, accounting for cognitive variables that could influence subsequent behaviour. The non-strategy behaviours (resource-non-specific prosocial behaviour, overt and relational aggression) were entered into block 2, followed by the both strategy dimensions (block 3) and their interaction term (block 4), followed by resource control success (block 5).

Table 4.6. Hierarchical multiple regression results for resource control success regressed onto the significant predictors established in study 1, with the addition of the empathy variables involved in this present study.

	F	$_{adj}R^2$	*β*	*β SE*	*β 95% CI*	
					Lower	*Upper*
Block 1	**1.84**	**.04**				
Verbal ability			.106	.128	-.141	.362
Affective empathy			.272*	.137	.003	.552
Cognitive empathy			-.211	.173	-.580	.109
Block 2	**2.62***	**.11**				
Verbal ability			.231	.123	-.014	.468
Affective empathy			.218	.134	-.039	.510
Cognitive empathy			-.251	.159	-.604	.032
Prosocial (non-RCB)			-.343*	.158	-.680	-.045
Overt aggression			-.140	.134	-.408	.119
Relational aggression			.113	.140	-.162	.381
Block 3	**9.74******	**.47**				
Verbal ability			.170	.110	-.041	.392
Affective empathy			-.065	.103	-.254	.153
Cognitive empathy			-.148	.109	-.385	.048
Prosocial (non-RCB)			-.192	.100	-.398	.005
Overt aggression			-.186	.122	-.398	.094
Relational aggression			-.039	.112	-.289	.144
Prosocial strategy			.718***	.122	.503	.994
Coercive strategy			-.002	.163	-.327	.306
Block 4	**10.33******	**.52**				
Verbal ability			.180	.104	-.022	.393
Affective empathy			-.091	.098	-.263	.115
Cognitive empathy			-.131	.103	-.356	.048
Prosocial (non-RCB)			-.103	.094	-.296	.078
Overt aggression			-.176	.119	-.373	.102
Relational aggression			.054	.112	-.209	.225
Prosocial strategy			.632***	.117	.413	.885
Coercive strategy			.078	.163	-.253	.379
Prosocial*coercive[a]			-.248**	.086	-.454	-.094

Results showed the final model (block 5) explained a total of 70% of the variance in social dominance, $_{adj}R^2 = .70$, $F(11, 77) = 19.57$, $p < .001$ (table 4.7). Cognitive empathy added no additional explained variance in social dominance in any of the blocks. Affective empathy remained a significant predictor when accounting for both verbal ability and the non-resource-specific behaviour variables (blocks 1 and 2). However, when the resource control strategy dimensions were added in block 3, affective empathy's significance as a predictor disappeared.

Table 4.7. Hierarchical multiple regression results for social dominance regressed onto the significant predictors established in study 1, with the addition of the empathy variables involved in this present study.

	F	$_{adj}R^2$	*β*	*β SE*	*β 95% CI*	
					Lower	*Upper*
Block 1	**4.60****	**.180**				
Verbal ability			.212	.125	-.020	.474
Affective empathy			.420**	.097	.222[b]	.602
Cognitive empathy			-.132	.138	-.411	.129
Block 2	**4.63*****	**.286**				
Verbal ability			.311	.121	.067	.533
Affective empathy			.381**	.098	.193	.572
Cognitive empathy			-.144	.140	-.444	.113
Prosocial (non-RCB)			.083	.166	-.243	.405
Overt aggression			.247	.150	-.050	.541
Relational aggression			.189	.138	-.069	.464
Block 3	**17.71*****	**.63**				
Verbal ability			.205	.087	.044	.380
Affective empathy			.071	.071	-.074	.214
Cognitive empathy			-.067	.086	-.257	.094
Prosocial (non-RCB)			.221	.103	.032	.431
Overt aggression			.051	.135	-.180	.368
Relational aggression			-.038	.112	-.284	.158
Prosocial strategy			.603**	.119	.362	.842
Coercive strategy			.333*	.135	.079	.615
Block 4	**15.87*****	**.63**				
Verbal ability			.204*	.088	.041	.384
Affective empathy			.076	.073	-.074	.226
Cognitive empathy			-.070	.087	-.264	.091
Prosocial (non-RCB)			.202	.106	.009	.415
Overt aggression			.049	.137	-.183	.373
Relational aggression			-.057	.121	-.342	.141
Prosocial strategy			.620**	.129	.384	.906
Coercive strategy			.317*	.143	.036	.599
Prosocial*coercive[a]			.051	.083	-.094	.245
Block 5	**19.57*****	**.70**				
Verbal ability			.131	.076	-.009	.290
Affective empathy			.113	.081	-.061	.264
Cognitive empathy			-.017	.080	-.183	.140
Prosocial (non-RCB)			.244*	.093	.070	.433
Overt aggression			.119	.119	-.101	.383
Relational aggression			-.079	.108	-.328	.113
Prosocial strategy			.367**	.136	.129	.675
Coercive strategy			.285*	.121	.040	.515
Prosocial*coercive[a]			.151	.074	.025	.320
RC success			.402**	.093	.218	.581

Note: * = $p < .05$ ** = $p <. 01$ *** = $p < .001$; RC = resource control; [a] = interaction term for cognitive and affective empathy; [b] = interaction terms for coercive and prosocial resource control strategy

4.5. Discussion

In terms of specific resource-control theory-based research, there is very little empirical work on how cognitive, affective and moral judgment in early childhood associate with resource control strategy, resource control success and social dominance; this study intended to provide much needed data on how the above mentioned domains effect the resource-specific behavioural outcomes and social dominance of young children at the start of their first year at school. As with the previously presented studies in this thesis, analyses involving the teacher-rated resource control strategy was conducted on both the scaled form of that data, and the subtype resource control groups that were formed from that data.

Aim 1 – Examine the relationship of social dominance, resource control strategy and resource control success with theory of mind in early childhood.

Neither the subtype group nor the scaled resource control strategy data revealed any association with any of the ToM factors assessed in this present study. The hypothesis made was that ToM would have some positive effect on resource control success and social dominance, with potentially a positive relationship with prosocial resource control strategy. However, in this sample at least, this was not the case. Yet this may still be consistent with theoretical positions put forward by Hawley (1999, 2008) and the limited empirical data thus far (Pellegrini et al., 2011) regarding the association between ToM and social dominance and resource control; in that it may simply be too early in the school year and the new social environment for ToM to have a significant impact on social behaviour and resource attainment. Specifically, Pellegrini et al. (2011) measured ToM at the end of the school year but not at previous timepoints in the longitudinal study. Therefore, the children had been embedded in their social groupings for a much longer period of time compared to the participants in this present study; this may account for the difference in ToM and social dominance's association.

However, it should be noted that the Pellegrini study sample was aged between 2-4 years old (Pellegrini et al., 2011), with the eldest children being of similar age to the youngest children in this present sample. Therefore, based on the Pellegrini findings one perhaps should expect this present sample to exhibit the same pattern of ToM-social dominance association. Importantly however, Pellegrini notes that in the sole timepoint that measured ToM, only those children above the age of 4 years were permitted to take part on the ToM measures, due to ethical considerations. This significantly lowered the sample size for these measures to $n = 31$, as well as the age range of that subsample, as there were potentially still children under the age of three in the main sample at the final timepoint that were not included in the ToM assessments. In Pellegrini et al.'s study age was included as a control when examining the association between ToM and social dominance, however, given that the age range was restricted to the oldest subsection of the sample for the ToM measures, it is more understandable that age did not account for the association, given the restriction on range. It may well have been that age would have done so had the larger sample partaken in the ToM assessments.

This current study shows that in a larger sample ($N = 92$) of 4-5-year-old in the first term of school, both first- and second-order ToM has no significant bearing on social dominance or resource control outcome and does not provide further evidence as to the ongoing developmental relationship between ToM and resource control and social dominance. This may be because ToM's effect on resource control strategy and ensuing resource control or social dominance is dependent on social context. Whilst the 4-year-olds in Pellegrini and colleagues had their ToM measured at the end of the year having been imbedded in the class for that entire academic year, the 4-5-year-olds presented here were relatively new to their new class environment. An important caveat here however, is that no data was obtained as to the number of children in the classes who had attended nursery prior. Attending nursery may well have additional positive effects on ToM development (as well as the other cognitive/affective factors of interest) similar to being part of a reception class one academic year on in a child's life. This is certainly something to be investigated in future.

Another possible reason for the lack of significant findings for ToM is that perhaps the ToM scenarios were too far removed from resource control scenarios. Study 4 (chapter 6) of this thesis will longitudinally investigate whether ToM becomes a significant factor over the course of the first school year, yet future study may benefit from incorporating ToM reasoning into resource control contest situations that the child participant would encounter in their daily lives; for example, a false belief scenario based around someone hiding the class scooter (an incredibly popular resource in this sample). Ideally, such an investigation could utilise real-world, naturalistic observation of resource control situations between peers.

Aim 2 – Examine the relationship of social dominance, resource control strategy and resource control success with <u>empathy and emotion comprehension</u> in early childhood.

There is no direct evidence on which to base a hypothesised relationship between emotion comprehension (as measured by the TEC) and resource control and social dominance. However, as stated previously in this study, emotion comprehension lies in the definitional contentious grey area between cognitive empathy and ToM, with Pons and Harris defining it as the "understanding of the nature of emotions, their causes and the possibility of control", (Pons, Harris, & de Rosnay 2004, p. 127). In this current study only the first four components (of nine) were used to assess the child participants due to their age, thus the assessment can be seen to have measured basic facial emotion recognition (component 1 test), contextual emotion causation understanding (components 2-3 tests) as well as a first-order ignorance question that contains explicit emotional outcome options for the child to choose from (component 4 test), so clearly there are both elements of empathic and ToM reasoning required for the higher scores on the TEC. Given that there are arguably elements of ToM required, is it unsurprising that there were no significant differences between the subtype groups in terms of TEC score, nor associations between the scaled resource control strategy, resource control success or social dominance ratings and TEC score, akin to those results reported for ToM.

The association between social dominance/resource control and empathy has also been a thus far neglected area of research, therefore this study aimed to contribute novel data to field regarding such relationships. In this present study, unlike ToM and emotion comprehension, empathy was revealed to have significant associations with both the continuous-type prosocial and coercive strategy dimensions; of note, differences between the subtype groupings were universally found to be non-significant. These findings highlight may serve to corroborate one of the discussion points in study 1 of this thesis – that a re-drawing of the subtype group formation methodology may be required, as a further variable (i.e. empathy) is shown to have significantly different relationships to resource control strategy depending on how that behavioural data is analysed (i.e. as categorical or scaled data). However, as also mentioned in study 1, one would expect differences in findings for the subtypes and the continuous strategy variables, given that the subtypes combine both dimensions of behaviour in an attempt to provide a more complex and accurate representation of a child's behaviour. That said, questions surrounding the statistical accuracy of the subtype groupings remain; further investigation into the subtype groups' applicability to real-world behaviour is therefore required and is addressed in study 4 of this thesis.

Specifically, affective empathy, but not cognitive empathy, was shown to have a significant positive relationship with prosocial resource control strategy. Whilst there no research investigating empathy's association with resource-directed behaviour specifically, positive associations between empathy and prosocial behaviour in general is very well documented and has a long history in the literature (for reviews and meta-analysis see Eisenberg & Miller, 1987; Telle & Pfister, 2014). However, the relationship may be more nuanced when considering resource control strategies specifically; no prior studies have separated resource-directed and non-resource-directed behaviours. It is therefore possible that the prior studies in this field may well be capturing resource-directed prosocial behaviour in addition to non-resource-directed prosocial behaviour without explicitly referring to resource control theory. Williams et al. (2014) found that 5-6-year old children who viewed a 'sad protagonist' video were significantly more likely to give to others following the video, but crucially, even at the expense of their own material gains. This could be interpreted as more 'true altruism' as they are not behaving prosocially in order to gain or maintain control of their material resources. As Hawley also recognised, humans are certainly capable of this type of altruistic behaviour (Hawley, 1999), yet in keeping with resource control theory's tenets, such 'altruistic' behaviour may in fact be part of a resource control 'long game' – that children may desire a bolstered social resource (the recipient's friendship) in the medium/longer term more than the short-term gains that maintaining control of the possession would bring them. When interpreting empathy's association with prosocial and coercive resource control strategy is, one must always bear in mind that the behaviour discussed here is specifically *resource control strategy*, which, under resource control theory, is an evolutionarily conserved trait that is 'selfish' rather than 'altruistic', even if that selfishness takes the form of prosocial behaviour; the end goal of the individual remains the same: to acquire and maintain resource control. Thus, the empathy/prosocial resource control strategy findings suggest that those children who scored higher on this measure of affective empathy – i.e. those more susceptible to emotional contagion from another, in addition to be able to self-reflect on their own affect – tend to attempt gaining resource control via prosocial means, regardless of how well they recognise the resource contest opponent's emotion (i.e. a facet of cognitive empathy).

This may indeed be at least one of the motivations behind reconciliation behaviour, as suggested by Pellegrini and colleagues (Pellegrini et al., 2011; Roseth et al., 2011), in that the ameliorating techniques used following coercive resource control strategy, may be to prevent a wider negative social impact if other children are friends with the contest loser, for example, which may have longer term consequences. Further research is required to see if children as young as 4- 5- and 6-years-old have the cognitive and affective discipline and capabilities to consider and enact such resource-oriented planning. Interestingly, though not officially documented as part of the data collection for this thesis, this author noted the frequent references to friendships (mostly their own and but sometimes their peers' friendships) that many of the children made throughout data collection suggesting that, in study's this sample at least, social relationships were of great concern to many of the children and thus likely an important resource. Clearly this is a further avenue to be studied empirically in future through the lens of resource control theory.

Coercive resource control strategy was also found to be significantly and positively associated with affective empathy, however this was only the case for those children who also scored highly in cognitive empathy. Many studies have found that in addition to positively associating with general prosocial behaviour, empathy negatively associates with general aggressive behaviour (Eisenberg & Miller, 1987; Telle & Pfister, 2014). In two separate studies Strayer and colleagues found that 5-year-old children who scored higher in empathy behaved more prosocially and less coercively towards others (Roberts & Strayer, 1996; Strayer & Roberts, 2004). Importantly, Strayer and Roberts (2004) recorded observed 'object struggles' as well as verbal and physical aggression, which therefore would directly measure coercive resource control strategy, at least in terms of material resources. This present study therefore presents what may seem a direct contradiction of the Strayer and Roberts' finding. However, there are key differences in how the studies collected empathy data. Whilst this present study used picture book and self-reporting, Strayer and Roberts (2004) used video recordings, teacher- and self-report. It can certainly be argued that the latter method would provide a more robust measure of empathy, however, importantly, the Strayer and Roberts study focused on what this present study has defined as *affective* empathy, rather than cognitive empathy. Therefore, this present study was able to investigate the moderation of affective empathy's association with coercive resource control strategy by cognitive empathy.

Prior to interpreting the findings regarding empathy and coercive resource control strategy, a measurement issue should also be noted at this point: the children's scores in the affective empathy measure may be dependent, at least to an extent, on cognitive empathic capabilities (Chrysikou & Thompson, 2015); in order for the child to comment on how they are feeling following the story scenario, this innately requires cognitive reflection on their own emotional state. Therefore, it should be noted that whilst this study's measure of 'affective' empathy is likely capturing at least in part the emotional state of the participant, it is also likely a reflection of their cognitive empathic self-reflection skills. In addition, one key advantage that the Strayer and Roberts (2004) study has is its participants' facial expression data, arguably a more reliable measure of true affective empathy, one that is not reliant on self-report and thus not dependent on cognitive empathic self-reflection. Therefore, whilst the cognitive moderation of affective empathy's association with coercive resource control strategy, as found in this present study, is certainly a pattern worth investigating in future, this author would suggest interpreting any 'affective' empathy measure reliant on self-report as rather a measure of affective empathy that is dependent on *both* a susceptibility to emotional contagion (i.e. 'catching' someone else's emotion) *and* an accurate cognitive empathy, specifically an 'affective self-reflection' subdomain of empathy requiring inputs from both affective and cognitive brain regions.

With this measurement caveat in mind, this study found that there was a similar association of affective empathy with coercive resource control strategy, as was found with prosocial resource control strategy, but crucially, this effect was only significant for those children scoring highly in cognitive empathy. Specifically, those who scored high in cognitive empathy but relatively low in affective empathy, scored lower in teacher-rated coercive resource control strategy, whilst those high scorers in cognitive empathy who also scored highly in affective empathy, scored higher for coercive resource control. Importantly, without 1) a larger sample and 2) a more in-depth investigation into how such cognitive-affective factors influence resource control strategy, it is unwise to draw any concrete conclusions regarding real world causations and reasons for these results; however, from this novel initial finding one can certainly propose possible reasons for such associations to be investigated in future studies.

The cognitive moderation effect presented here highlights that a subset of children, with high scores in both cognitive and affective empathy measures, use both prosocial and coercive resource control strategy at high frequency[5]; this finding may make more sense when interpreted in the light of Pellegrini and colleagues' *reconciliation* behaviours. They have theorised, and provided some initial data and (as they themselves state) 'very cautiously' interpreted these findings by suggesting that developing theory of mind may be involved in social dominance struggles and reconciliatory behaviour (Pellegrini et al., 2011, p. 255). Given the close theoretical and biological (Chrysikou & Thompson, 2015) overlaps of ToM and empathy, it is possible that those children who score highly on both affective and cognitive empathy are more likely to engage in reconciliation behaviour; that a combination of recognising their initial coercive acquisition of a resource has hurt their opponent (cognitive empathy) and them feeling bad themselves because of it (affective empathy) increases the likelihood of an attempt to prosocially sooth the situation. This in turn would make both the

[5] It should be noted that the bistrategic controller subtype, those who are classified as precisely those children who display coercive *and* prosocial resource control strategy resource control strategies at relatively high frequencies, were found to not be significantly different in empathy score to any other group. However, the non-significant patterns show they did show them to score highest. These findings further corroborate the points made in the previous studies of this thesis, that subtype groups should not necessarily be entirely abandoned, but rather reformed methodologically as they are currently statistically insensitive to possible real-world behavioural differences.

defeated opponent and themselves feel better. Additionally these children tend to be superior resource competitors and more socially dominant as shown by previous studies (Pellegrini et al., 2011; Roseth et al., 2011) as well as study 1 in this thesis, in which both greater prosocial and coercive resource control strategy was associated with higher social dominance status, with prosocial resource control strategy's mediation of coercive control behaviour's effect on resource control strategy possibly reflecting such reconciliation behaviour. Therefore, reconciliation behaviour may play a part in not just improving the emotions of both the resource winner and loser, but that the social resources (peer relationships) of the 'reconciliator' are not negatively impacted in the longer term, and the reconciliator gains resource control, at least in part (they may decide to share with opponent as their prosocial follow-up strategy), which is still a net resource gain from initially having nothing.

Further analyses showed that empathy had no direct effect on either resource control success or social dominance, with affective empathy's effect on both resource control success and social dominance being mediated by resource control strategy. These findings are logical in that having empathic ability alone cannot directly allow one to attain resource control or dominance, yet behaviour driven by those abilities can, however behaviour is very plausibly impacted by a child's empathy.

Aim 3 – Examine the relationship of resource control strategy, resource control success and social dominance with selective moral disengagement in early childhood.

The only previous work to look at moral involvement in resource control and social dominance in early childhood found that bistrategic controllers were the most adept of the subtype groups at appreciating moral rules but were rated by teachers as lacking emotion-based moral reasoning, termed internalized conscience (Hawley & Geldhof, 2012). Based on Hawley and Geldhof's prior findings this author cautiously hypothesised that similar findings would emerge from this study. However, this present study found no significant difference in selective moral disengagement score for any of the subtype groups. A reason for this difference may well be the different moral measures employed in each study. Whilst Hawley and Geldhof measured moral rule cognition, internalized conscience and selective moral engagement – where children would selectively enforce moral norms for personal benefit – this present study used an adapted measure of the selective moral disengagement scale (Pozzoli et al., 2012). An interesting finding, as hypothesised, was that there was low reliability in terms of the items on the scale mapping to the theoretical dimensions described by Bandura (2002), with the exception of the cognitive restructuring/moral justification dimension. This suggests that children this young may have not yet developed more sophisticated cognitive ways of immoral behaviour as seen in older children and adolescents (Gini et al., 2014; Pozzoli et al., 2012), yet simultaneously there was variance in their responses, suggesting young children do differentially justify immoral behaviour to some degree. One must also recognise the possibility that the adapted measure is not accurately capturing the dimensions expressed by Bandura. It may be that future work is required to further hone the adapted measure in order to assess whether such complex contextual moral application is undertaken by children in early childhood.

One finding that should be noted for further, more detailed investigation in larger samples, is the borderline correlation between the frequency of ‘never’ responses and social dominance. Interestingly, Hawley and Geldhof (2012) found a similar borderline association between social dominance and moral rule cognitions. This suggests that children in this current study were responding according to their knowledge of moral rules, rather than an emotion-based appreciation of the scenario posed by the measure. This interpretation is supported by the lack of association between the SMD scale response frequency variables and either the empathy or TEC variables. Though only borderline findings from two studies, this is so far from one hundred percent of resource control theory-based studies investigating moral behaviour, thus this certainly warrants further study in more detail and with larger samples.

Conclusions, limitations and further study.

Both within and outside of the resource control theory literature there have been theoretical and empirical indications that various cognitive, affective and moral factors affect resource-directed behaviour and, in turn, social dominance in early childhood. However, direct investigation of how empathy and theory of mind may relate to resource control strategy, resource control success and social dominance is sparse if present at all. This study was the first study to investigate the how such 'cold' and 'hot' cognitive abilities in addition to contextual moral judgment in early childhood relate to these attributes that are central to resource control theory. This study's findings have again highlighted differences between the subtype groupings and the continuous behavioural data and raise the question as to whether the subtype groupings require a methodological rethink to more precisely represent behavioural reality. This study highlighted the possible role of affective and cognitive empathy in shaping resource control strategy choices made by young children and though substantial weight should not be hung from such interpretation, these findings certainly warrant further investigation looking to test these contentions.

As with all studies in this thesis, a key limitation is the lack of observational data, with the study reliant on one member of staff for the behavioural reports. Future study should endeavour to collect behavioural data from the child's naturalistic classroom setting, along with cognitive and affective measures such as those used in this present study to more accurately address the question of how these factors affect resource control strategy in real-world terms. Associated with this point, is perhaps the need in future work for ToM tasks that are based around resource control contest scenarios which would marry more appropriately to the child's everyday experience, where the child would be likely to use ToM for resource control purposes.

Importantly, this study has investigated only the first time point of three for this thesis. Study 4 will longitudinally investigate these variables and their association with resource control strategy, resource control success and social dominance across all three timepoints spanning the first year of school for the child participants. As hypothesised, it may be that factors such as ToM increase in importance in regard to resource control as the year progresses. Moreover, there are conceptual/theoretical associations between ToM and empathy, and resource holding potential comprehension (Archer & Benson, 2008; Parker, 1974) – the capacity to judge the likelihood of success or defeat in a potential resource contest scenario – that are to be explored in the next study (study 3) of this thesis.

Chapter 5 – Study 3: What are the chances? Investigating resource holding potential's influence on resource control strategy choice in early childhood and its association between resource control and social dominance

Abstract

Aims. This study had two main aims. First, to investigate the relationship between resource holding potential (RHP) vignette responses and categorical and continuous resource control strategy constructs, resource control success and social dominance. Second, to examine the effect of resource contest opponent characteristics on child responses to RHP vignettes. ***Methods.*** Children (*N* = 92; 4-5 years old) completed the BPVS III (verbal ability) and responded to 12 RHP vignettes, in which resource control opponents varied in 'toughness', 'physical size' and whether or not they were accompanied by friends. Teachers completed an online behavioural survey assessing social dominance, resource control strategy and non-resource-directed behaviour for each participating child in their class. ***Results.*** Analyses of RHP vignette responses found no significant results for the controller subtypes grouping or for the continuous-type resource control variables. Girls exhibited significantly more prosocial responses compared to boys, and boys exhibited significantly more coercive responses compared to girls. Prosocial responses were given significantly more frequently for both male and female participants when the opponent was 'not very tough' as opposed to when they were 'very tough' in the RHP vignettes. ***Conclusion.*** Findings suggest that both boys and girls utilise some form of discrimination when deciding on how to respond to resource competition scenarios and that there are some gender differences in their reported response strategies. (with age associating with only male responses across vignette conditions). Observational data is required for more accurate insights into how RHP comprehension in early childhood impacts strategic choices in resource control contests.

5.1. Chapter overview

This chapter presents the third study of four for this thesis and is focused on the associations of RHP vignette responses with resource control and social dominance, as well as the contextual sensitivity of RHP comprehension in early childhood. The first aim is addressed via reporting the analyses comparing the child participants' responses to the 12 RHP vignettes to the teacher-rated resource control and social dominance data that was analysed in detail in study 1 (chapter 3). The vignette responses were analysed against both the controller subtypes and the continuous resource control data as established in study 1 (chapter 3). Following this, to address the second aim, analyses investigating how alteration of the vignette 'resource contest opponent's' characteristics affects participant response is reported. Given the preliminary significant correlations between gender and RHP comprehension response frequency, further investigation into these relationships were split by gender.

5.2. Introduction

5.2.1. Resource control and social dominance

Hawley's resource control theory (Hawley, 1999) defines social dominance as "the exercise of chief authority or rule – or occupying a commanding position" (Hawley, 2014, p. 327), and contends that an individual's social dominance status in a group is established by successful implementation of resource control strategies, that are part of a two-dimensional prosocial/coercive resource-directed behavioural spectrum. Resource control theory proposed an essentially linear mechanism for dominance achievement where skilled resource control strategy would lead to increased resource control success which in turn would lead to an increase in social dominance.

Aside from Hawley and colleagues, few other research groups have conducted research within the framework of resource control theory. Roseth et al. (2011) investigated prosocial and coercive resource control strategy in 2-4-year-old children over their first year at school/preschool comparing social dominance to the two behavioural dimensions without subtype classification, opting for a continuous measurement of prosocial and coercive control behaviour rather than the percentile cut-off-based subtypes described above. Via behavioural observations over a school year, Roseth et al. collected data for the number of observed coercive and prosocial resource-directed interactions and compared their relationship to teacher-rated social dominance.

The subtype grouping methodology of Hawley and colleagues and the non-categorical analyses of Roseth and colleagues are alternative ways that resource control strategy data can be analysed, however these two alternative methodologies have not been directly compared, prior to study 1 above. Given the importance of scrutinising variable formation (Goossens et al., 2006; Naggara et al., 2011; Schellingerhout et al., 2009) this study will continue as per study 1 and use both the controller subtypes and the continuous-type teacher-rated resource control strategy data from which the subtypes are formed in the analyses.

5.2.2. Resource holding potential and strategy selection

When discussing resource control theory, one should note its ethological origin; it can be comfortably positioned within Darwinian theory (Darwin, 1859). Since Darwin, the concept of ‘resource holding potential/power’ (RHP) has been used to explain resource-oriented confrontation (or active avoidance of confrontation) of animals in the their various habitats (Parker, 1974). Parker essentially defines RHP as an organism’s ‘fighting ability’. Across the duration of any given confrontation, be it posturing or actual physical assault, each individual will act to expend their opponent’s ‘fitness budget’, with the rate of the budget’s depletion being defined by the individual’s RHP, and the tolerance for fitness budget depletion being how much of their fitness the individual judges they can afford to lose before withdrawal from the confrontation becomes the most favoured strategy. RHP *comprehension* – the ability of an organism to assess a potential opponent's fighting ability, specifically relative to their own – is a crucial ability in weighing the risk-cost-benefit of a confrontation situation, with poor RHP comprehension potentially leading to death either through injury, or lack of access to resources.

Most of the RHP-oriented research has focussed extensively on a wide range of non-human animals ranging from sea anemones (Rudin & Briffa, 2012) to white-faced capuchin monkeys (Vogel, Munch, & Janson, 2007) and bonobo chimpanzees (Stevens, Vervaecke, De Vries, & Van Elsacker, 2005). RHP research focused on humans specifically is scarce, though there is at least one study. Using RHP as a framework, Archer and Benson (2008) investigated the responses of young adult males to various hypothetical confrontational scenarios, including one in which they were challenged in front of their girlfriend – Darwin would term this a 'sexual/reproductive resource' – by another man who varied in physical size, number of friends/allies and reputation for toughness, depending on the scenario that was presented. Results showed that the participants responded with greater aggression the lesser the perceived threat (i.e. smaller physical size, fewer allies and lowered reputation) from the opponent (Archer & Benson, 2008); suggesting that humans may make use of RHP judgements when considering their behaviour in resource-oriented confrontations. However, to date this is an under-researched area and no studies have looked at whether young children make RHP judgements when considering their responses to resource control situations.

Young children in a classroom are surrounded by material and social resources and RHP comprehension may serve as a critical facet in the child's development as they learn to navigate the material and social world; indeed RHP comprehension, though not named as such, is a crucial competitive trait central to resource control theory's view of social dominance (Hawley, 1999), though how resource control theory specifically views the development of RHP comprehension in relation to social dominance is not entirely clear. Hawley (1999) posits that, based on the work of Bernstein (1981) and others (Hand, 1986; Rowell, 1974), following multiple competitive encounters with another individual, the individual will learn their relative competitive ability and ensuing potential resource conflict will be avoided – the resource being taken without conflict by the individual who would win the conflict, based on past contest history. In this way, a dominance differential has been established between the individuals (Bernstein, 1981; Hand, 1986; Hawley, 1999; Hawley & Little, 1999; Hinde, 1974; Hinde & Stevenson-Hinde, 1976). Bernstein (1981) suggests that through the experience of defeat in resource contests against an individual with certain characteristics, an individual may learn that those characteristics are indicative of a more dominant individual, i.e. a better resource competitor, and therefore they may not engage in future competition with those other individuals who possess these characteristics also – this is in essence a form of RHP comprehension, though not explicitly stated. Therefore, in this way social dominance and RHP comprehension may be associated, with RHP comprehension being a 'resource winner/dominance detector' – though study 1 suggests that dominance may be achieved through other means than purely resource competition, it is still plausibly the major mechanism for its attainment, given the theoretical justification (Hawley, 1999, 2014a) and the findings reported in study 1 that, for this current sample at least, over 50% of the variation in social dominance is explained by resource control strategy. However, is there an innate RHP comprehension programming conserved in humans which acts as a foundation on which experience can build, or is it entirely learned through 'blind' competition, that brings success and failure which leads to learning and RHP comprehension development? Findings are mixed in this regard. One study found preverbal 10-13-month-old infants were able to predict the outcome of a contest scenario based on the individuals' differences in physical size , whilst 8-month-old infants were not, suggesting that although learned very early in life, RHP comprehension was a learned response (Thomsen et al., 2011). Conversely, another study has shown that 6-month-old infants are able to predict the outcome of a contest scenario based upon the number of individuals in the contest groups (Pun et al., 2016). Findings such as this, along with data gathered from non-human primate studies (Wilson et al., 2001) suggest there may be an innate capacity for 'social dominance' perception (Pun et al., 2016, 2017); Pun et al. (2016) found that preverbal infants expect individuals from numerically larger groups to win 'right of way' competitions against individuals from a smaller social group, it therefore would be plausible that similar infant expectations would stand for more overt resource competitions, though this remains to be empirically studied. However, whilst RHP comprehension has been somewhat studied in infants, how complex RHP comprehension is in early childhood remains to be studied.

RHP comprehension may be particularly relevant for children during their first year of formal schooling where social resources (e.g. the teacher's time or attention of peers) and material resources (e.g. toys/books etc.) are shared among a large group of individuals; other children may want the same resource as them at the same time, which may lead to resource contest situations. Yet there has been no study to date that attempts to investigate how knowledge of a resource opponent's RHP may impact resource control strategy selection in early childhood. The Archer and Benson (2008) study provides a convenient comparison for a similar study being conducted in young children. In the case of this present study, their approach – varying the opponent's characteristics – was adopted to investigate how varying an opponent's RHP may affect strategy selection, specifically in terms of explicit material resource contest scenarios. Variation in a child's response to scenarios featuring differing opponent characteristics would suggest that they are at least somewhat aware that behavioural approaches should be context dependent. However, as to whether their responses conform to the expected pattern of behaviour described by Parker (1974) or the actual responses recorded by Archer and Benson (2008) that adhere to Parker's theory – that the higher an opponent's RHP is, the less aggressively an individual will behave – is of key interest to this study. It may well be that other factors, such as ToM, empathy and emotion comprehension (see study 2) are critical to developed RHP comprehension, yet it remains to be clarified whether a young child's RHP comprehension is similar to those of older people. At the age of 4-5 egocentrism and less developed ToM may play an important role in an individual's RHP comprehension; egocentrism is conceptually and empirically linked (White & Carlson, 2016) to ToM. To this author's knowledge, there is to date no research investigating either cognitive empathy or ToM and their association with RHP comprehension and strategy selection, yet it is plausible to hypothesise that being able to accurately judge what chance one has to defeat a resource competitor may involve both cognitive empathy and ToM. For example, a developed ToM would allow an individual to appreciate the advantage of concealing, rather than displaying, a weapon from the opponent prior to the contest, i.e. depriving the opponent of important knowledge that alters the relative RHPs. Developed cognitive empathy would allow the individual to perceive how enraged or scared the opponent is, allowing the individual to more accurately predict the likelihood of the opponent capitulating.

Research has indicated clear differences in the dominance status between the resource control subtypes themselves. From the perspective of RHP theory (Parker, 1974), this would suggest that the most dominant subtypes – bistrategic, prosocial and coercive controllers (Hawley, 2003a, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007) – most effectively use RHP comprehension to select the best strategy in a given resource contest situation. Yet, importantly, RHP comprehension may in fact be more than a 'dominance detector'. Thus far, only coercive behaviour/responses have been focused on in human RHP studies (Archer & Benson, 2008), yet when brought under the umbrella of resource control theory, a well-developed RHP comprehension would allow well-chosen strategies to be selected thus the likelihood of resource control – and therefore potentially dominance – would increase. This too however, remains to be seen, indeed a child's understanding of what would be a successful strategy and their belief that they would be able to effectively use that strategy are two separate factors. Whether gender is a factor in the development of RHP comprehension and how that may influence subsequent strategy selection remains to be empirically documented also. Archer and Benson (2008) focussed solely on young adult males in their study, thus no prediction of gender differences can be made based on any direct evidence of gender comparisons.

5.2.3. Aims and hypotheses

The aims/hypotheses and corresponding analyses of this study are split into two broad sections. Aim 1 addresses RHP comprehension in early childhood and its associations with the behavioural and social dominance variables. Aim 2 addresses how varying the characteristics of the resource contest opponent in each hypothetical RHP comprehension scenario affects the response of the child participant.

Aim 1 – Examine child RHP vignette responses and their associations with ToM, empathy and emotion comprehension, and teacher-rated resource control strategy, success and social dominance.

First, this study investigated the association of the categorical controller subtypes and the continuous prosocial and coercive resource control strategy variables to the child RHP comprehension responses. There is little data within the field on which to base solid hypotheses. However, it is plausible to suggest that those children tending toward prosocial or coercive strategy selection may respond prosocially or coercively, respectively, more frequently in a resource contest scenario and that ToM, empathy or emotion comprehension may play an important role in determining responses in these situations.

Aim 2 – Examine the effect of opponent characteristic variation on child participant response

An investigation was conducted to establish the effects of age and gender of the participants on responses, as well as how varying specific characteristics – toughness, presence of friends/allies, and physical size – of the scenario's resource contest opponent can impact these responses. Whilst there is limited data regarding RHP comprehension in adult males (Archer & Benson, 2008) there is none to date (that this author is aware of) regarding such capability in early childhood. This prior adult data could guide a hypothesis that young children would provide a similar pattern of responses. However, given the significant difference in development in this study's participant age group, an open question regarding their response patterns in relation to a resource contest opponent's characteristics, rather than a hypothesis, is presented here.

5.3. Methodology

5.3.1. Participants

The participants in this study and the project as a whole, including demographics and recruitment strategy, are described in detail in the main methodology section (Chapter 3). Ninety-two children aged between 4 and 5 years (M = 4.64, SD = 0.29) old were recruited from 4 reception year classes from 3 state primary schools in the south east of England (males, n = 47; females, n = 45). Teachers from each class (N = 4; all female) also participated in the study by completing the teacher tasks described in detail in Chapter 3.

5.3.2. Measures

The measures described below are described in detail in the methodology section (chapter 2).

5.3.2.1. Teacher-rated child behaviour report and social dominance

Teachers completed a child behaviour questionnaire. More comprehensive detail is given in Chapter 2, section 2.9. In brief, teachers completed a child behaviour questionnaire for each child individually (appendix G). This questionnaire contained 4 items relating to dominance on a seven-point scale (Dodge & Coie, 1987, adapted for preschool children in Pellegrini et al. 2011), aggression on a four-point scale (Hawley, 2003b) and prosocial behaviour on a five-point scale (PSBS; Crick, Casas, & Mosher, 1997; Poland, Monks & Tsermentseli, 2015). In addition, 18 resource control-related items, on a seven-point Likert scale from the questionnaire used by Hawley (2003) and Hawley and Geldhof (2012) were used in order to provide specific data regarding prosocial and coercive resource control strategies as well as items regarding resource control success. Therefore, in total the questionnaire was composed of 32 items. As detailed in the general methodology (chapter 2), a social dominance composite was used as a measure of the child participant's social dominance (the composite being an aggregate of the standardised teacher dominance ratings and ranks; see chapter 2, section 2.9).

The resource control data from this questionnaire was used to form the strategy subtype categories using the method of Hawley and colleagues (Hawley, 2003b, 2003a; Hawley & Geldhof, 2012; Hawley et al., 2007). This approach considers strategy type as a categorical variable relative to the position in percentile grouping. The types were constructed using the coercive and prosocial resource control strategy scores for each child on the teacher questionnaire. Bistrategic controllers scored above the 66th percentile for both behavioural dimensions (i.e. prosocial and coercive resource control); prosocial controllers score above the 66th percentile for prosocial resource control strategy but below this percentile (i.e. average or low) for coercive resource control strategy; coercive controllers conversely scored above the 66th percentile for coercive resource control and below for prosocial resource control; typical controllers scored below the 66th percentile on both prosocial and coercive resource control and may have scored below the 33rd percentile for either one or none of the dimensions; non-controllers scored below the 33rd percentile for both dimensions (chapter 2, table 2.3).

5.3.2.2. Verbal ability

Children's verbal ability was measured with the British Picture Vocabulary Scale III (BPVS III; Dunn & Dunn, 2009) and administered in accordance with the instructions. The standardised scores were used for purposes of analysis.

5.3.2.3. RHP vignettes

An adapted version of the Archer and Benson (2008) method was used to assess RHP comprehension. The RHP scenarios were presented as simple stick figure vignettes and shown to the participants using a laptop connected to a separate participant viewing screen. There were 12 different scenarios, allowing for all possible combinations of opponent characteristics (physical size, 'toughness' and presence of friends/allies).

Participants were shown each of the 12 resource contest scenarios/vignettes. For each slide the researcher provided them with a brief verbal description/tutorial to ensure they understood what was happening. For example, for the scenario shown in figure 5.1.: Slide 1 – "Imagine this is you"; slide 2 – "so, who is this? [to check they understood the figure represented them]. That's right!"; slide 3 – "Now imagine that this boy/girl has the only scooter in school, they're smaller than you, they're not very tough…"; slide 4 – "…and they have friends with them. Imagine that you ***really*** want to have this scooter. What you do to get the scooter of them?" Responses were noted as either coercive (e.g. verbal threats or abuse, physical threats, physical attack/grabbing resource, telling teacher) prosocial (e.g. offer to share or help, offer of friendship, asking permission) or no strategy. Responses were categorised as either general 'prosocial', 'coercive' or 'no strategy' responses (for details see chapter 2, section 2.6.). Responses in the large majority of cases fell neatly under one specific type of response e.g. physical attack/grab; however, in the rare occasion a child responded with both a physical attack/grab and a verbal threat or abuse response, both these were recorded. However, due to the overwhelming majority of coercive responses being 'physically attack/grab' responses, resulting in the number other coercive responses having insufficient analytical power, the participant was coded as giving a general ‘coercive response’ (for details see chapter 2, section 2.6.). In the event that a child responded with both a prosocial *and* a coercive response, this would have been deemed a ‘bistrategic’ response; however, none of the participants responded in this fashion. This ‘bistrategic’ response category does not necessarily fall into the precise definition of a bistrategic controller as per Hawley’s resource control theory, as she defines a bistrategic controller via the relative frequency prosocial and coercive behaviour exhibited over a given time, rather than specific isolated behavioural events that are called bistrategic strategies. However, this category is more in line with Roseth’s definition of bistrategic control, which denotes ‘reconciliation’ behaviour as a specific occurrence of bistrategic strategy (Roseth et al., 2011) ; that is to say, through this definition a child can be said to employ a bistrategic strategy, without necessarily being classified as a bistrategic controller. Such a definition does in fact fit with the wider internal logic of Hawley’s own definitions, given that coercive and prosocial controllers can exhibit isolated/low frequency occurrences of prosocial and coercive resource control strategy, respectively, without then being classified as prosocial controller or coercive controller, respectively.

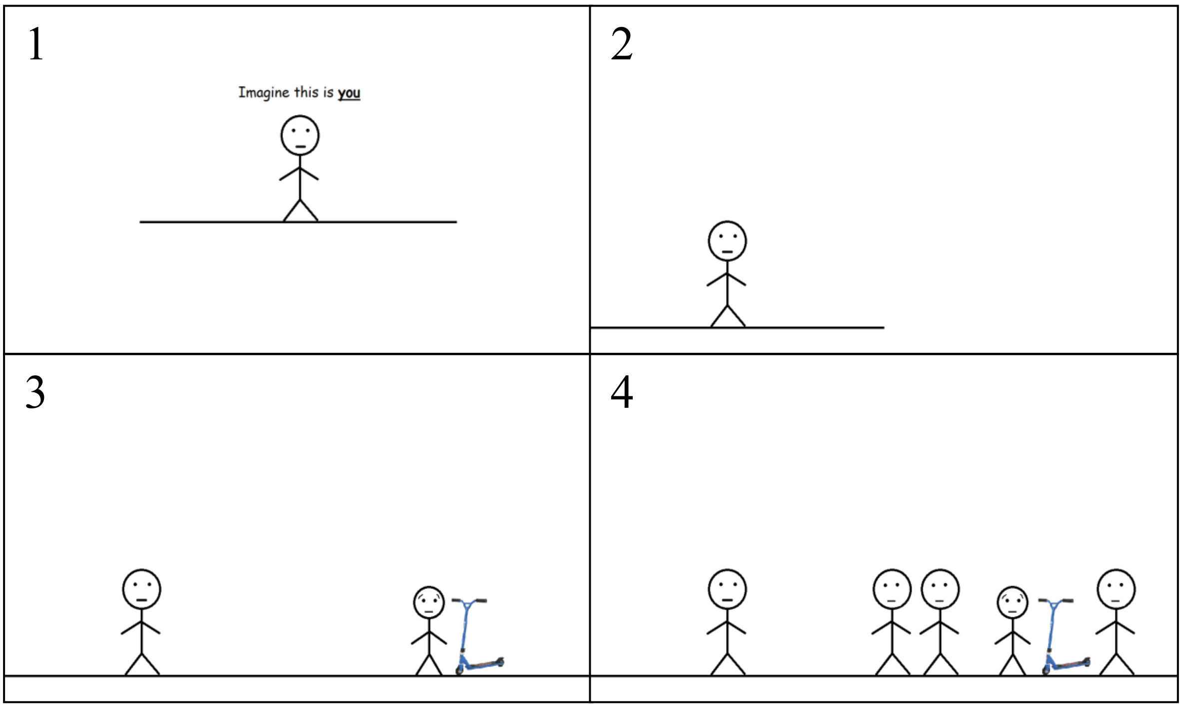

Figure 5.1. One of the twelve scenarios used in the RHP vignette measure (numbers added for display purposes in this report only). Slides were presented to each child in the numerical order shown. This specific scenario showed a physically smaller [than participant's stick figure representation], not very tough opponent, who was accompanied by friends/allies.

5.3.3. Data collection procedure

Data collection was carried out in the first term of the child participant's first year at school. Teachers were asked to complete their tasks by the end of the data collection with their class. Data collection with each class lasted up to two school weeks, with the occasional small extension to account for student absences or exceptional events occurring in the school calendar. Each child was worked with individually in a quiet area away from the classroom and their data collected over two sessions over two days, to reduce fatigue and limit absence from the classroom for extended periods of time. Each session lasted around 30 minutes. The researcher was introduced to the children prior to beginning the data collection and talked to each child participant in a friendly and engaged way for a short period of time to increase their comfort in taking part in the research. The child was told at the beginning of every session that they could stop at any time and verbal assent was given by each child at the start of each session, in addition to parental consent. All measures and tasks (chapter 2, table 2.4) were carried out in the same order with each child (chapter 2, table 2.5).

Teacher responses were gathered via the ‘anonymous link’ function of Qualtrics and the data was only accessible to the researcher via a password protected account. All child and teacher responses were collected and transferred onto a university supplied computer, anonymised using ID codes and password protected by the researcher.

5.3.4. Data analysis

Analyses were conducted using SPSS version 25 (2017). Initial Pearson’s correlations were conducted to ascertain general bivariate associations between the variables and to inform use of controls in further analyses. Following these initial analyses, the following analyses were conducted to address the aims and hypotheses of this study:

Aim/hypothesis 1 – Examine child RHP comprehension vignette responses and their associations with teacher-rated resource control strategy and social dominance

To address aim 1, this study investigated the variation in mean child response type (prosocial, coercive or ‘no strategy’ response) frequency across all 12 RHP vignettes. Bivariate correlations and *t*-tests were conducted to address this part of the aim. Following this, analyses were conducted to investigate RHP vignette response association with social dominance and the resource control variables: ANCOVAs were carried out to assess controller subtype relation to RHP vignette response.

Aim 2 – Examine the effect of opponent characteristic variation on child participant vignette response

The second aim was to investigate how child RHP vignette responses varied according to variation in resource contest opponent characteristics (toughness, presence of friends, physical size). Effects of age and gender were investigated according to the results of the first section outlined above. To analyse the effect of varying opponent characteristics on child response, the mean number of prosocial, coercive and 'no strategy' responses were calculated for all scenarios containing a fixed opponent characteristic, with all other characteristics free to vary, e.g. all scenarios featuring a 'very tough' opponent, all scenarios featuring a 'not very tough' opponent, all scenarios featuring a 'bigger than you' opponent etc. had their individual mean scores compiled for prosocial, coercive and 'no strategy' responses. They then could be analysed as separate variables. Repeated measures ANCOVAs for each gender sub-sample, with verbal ability for both genders (and additionally age for boys) as covariates, with Bonferroni correction applied for post-hoc testing were conducted to address aim 2.

5.4. Results

5.4.1. Preliminary analyses

Note on gender coding. Where gender was entered into an analysis, gender was dummy coded: males = 0 and females = 1 for all analyses reported here (both preliminary and main analyses), with the exception for those analyses where the genders were analysed separately.

Prior to conducting analyses on the variables of interest or preliminary correlations, suitable tests were decided upon. Examination of the normality of the data was conducted via examination of Q-Q plots, histograms, skewness and kurtosis values and Shapiro-Wilk testing. Examination found that all variables with the exception of teacher-rated social dominance were non-normally distributed. Parametric statistical testing assumes the variables of interest's sampling distributions to be normally distributed (Cohen, 2008; Little, 2013) with an increased likelihood of type II errors occurring when parametric tests are used when this assumption is violated (Qualls et al., 2010). However, the sampling distribution cannot be examined directly, thus it can be concluded that if the distribution of the data is normal then so is the sampling distribution (Mayers, 2013). Central limit theorem, however, states that population distribution notwithstanding, the distribution of sample means will meet the normality requirement if the size of the study's sample is sufficient – generally taken to be $N > 30$ (Cohen, 2008; Little, 2013). The sample size in this study was $N = 92$, with some slight reductions for some variables due to missing data. Therefore, given the contention of central limit theorem, parametric tests were used in the analyses presented in this chapter.

5.4.1.1. Correlations between RHP vignette responses, resource control strategy, resource control success and social dominance

Note: A fairly large number of correlations were conducted as part of the preliminary analyses, however, multiple testing correction was not employed due to the exploratory nature of the investigation and thus the aim to not discard potentially interesting preliminary findings that may otherwise be 'corrected out'.

Due to the initial significant Pearson's bivariate correlations between RHP vignette response frequency (prosocial and coercive; table 5.1) and gender, further correlations were conducted for each gender separately (tables 5.2 and 5.3) with verbal ability partialled out, due to correlations with one of the RHP variables (table 5.1) and its associations with behavioural variables noted in previous studies.

Table 5.1. Pearson's bivariate correlations between variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	-	-0.041	-0.005	0.017	-0.067	-0.115	0.016	0.127	-0.048	-0.102	0.046	-0.118	0.130
2. Gender		-	.317**	0.069	0.025	0.029	0.043	0.141	-.218*	-0.049	.429**	-.410**	-0.037
3. Verbal ability			-	0.184	-0.070	-0.105	0.022	.362**	-.341**	-.237*	.322**	-0.209	-0.176
4. Social dominance				-	.739**	.624**	.662**	-0.094	.262*	.273**	0.138	-0.034	-0.183
5. Prosocial RCB					-	.684**	.687**	-.319**	.355**	.432**	0.098	-0.003	-0.168
6. Coercive RCB						-	.412**	-.453**	.678**	.632**	0.098	-0.025	-0.133
7. Resource control success							-	-.208*	0.130	.234*	0.172	-0.121	-0.088
8. Prosocial behaviour (non-RC)								-	-.591**	-.608**	-0.166	0.126	0.074
9. Overt aggression (non-RC)									-	.629**	-0.034	0.010	0.037
10. Relational aggression (non-RC)										-	0.174	-0.128	-0.086
11. RHP prosocial total											-	-.841**	-.280**
12. RHP coercive total												-	-.284**
13. RHP 'no strategy' total													-

*Note: * = p < .05; ** = p <. 01; *** = p < .001; RC = resource control; RCB = resource control strategy.*

This study focused on those associations involving the RHP comprehension variables, therefore, correlations not involving these variables are not commented on here and are discussed in study 1 (chapter 3) and study 4 (chapter 6).

RHP comprehension responses. *Boys.* For boys, none of the RHP responses were significantly correlated with any other variable in the analysis (table 5.2).

Girls. For girls, prosocial response frequency to the RHP vignettes was moderately negatively correlated with teacher-rated non-resource-oriented prosocial behaviour. Prosocial response was also moderately positively correlated to teacher-rated relational aggression.

Table 5.2. Pearson's correlations between variables for boys with verbal ability partialled out. The greyed area highlights those correlations involving the RHP vignettes.

	1	2	3	4	5	6	7	8	9	10	11
1. Age	-	-.158	-.215	-.068	-.162	.071	-.143	-.178	.376*	.094	.468**
2. Prosocial strategy		-	.704***	.632***	.709***	-.577***	.491**	.479**	-.015	.134	.167
3. Coercive strategy			-	.350*	.621***	-.549	.731***	.688***	-.123	.124	.108
4. RC success				-	.583***	-.355*	.117	.173	-.021	-.002	.305
5. Social dominance					-	-.351*	.445***	.400*	-.040	-.067	.149
6. Prosocial (non-RCS)						-	-.664***	-.667***	.153	-.117	-.074
7. Overt aggression (non-RCS)							-	.785***	-.068	.026	.057
8. Relational aggression (non-RCS)								-	-.125	-.004	-.132
9. FOFB (ToM)									-	.114	.239
10. SOFB (ToM)										-	.320*
11. TEC (emotion comprehension)											-
12. Affective empathy											
13. Cognitive empathy											
14. RHP prosocial response average											
15. RHP coercive response average											
16. RHP no response average											

*Note: * p < .05; ** p <. 01; *** = p < .001; RCS = resource control strategy;* (table continued on next page)

(Table 5.2 continued):

	12	13	14	15	16
1. Age	.081	-.028	.205	-.241	.114
2. Prosocial strategy	.398**	-.002	-.054	.212	-.286
3. Coercive strategy	.330*	.120	-.149	.157	-.052
4. RC success	.163	-.124	-.038	.205	-.295
5. Social dominance	.373*	-.021	-.162	.210	-.122
6. Prosocial (non-RCS)	-.260	.054	-.134	.031	.144
7. Overt aggression (non-RCS)	.172	.035	.022	-.055	.063
8. Relational aggression (non-RCS)	.241	.119	.067	-.075	.031
9. FOFB (ToM)	.212	.021	.279	-.228	-.018
10. SOFB (ToM)	.032	-.160	.029	.026	-.089
11. TEC (emotion comprehension)	.082	-.085	.152	-.053	-.133
12. Affective empathy	-	.399*	-.124	.269	-.281
13. Cognitive empathy		-	-.168	.121	.039
14. RHP prosocial response average			-	-.814***	-.068
15. RHP coercive response average				-	-.524***
16. RHP no response average					-

Table 5.3. Pearson's correlations between variables for girls with verbal ability partialled out. The greyed area highlights those correlations involving the RHP vignettes.

	1	2	3	4	5	6	7	8	9	10	11
1. Age	-	-.060	.008	.117	.144	.081	.182	.072	.131	.253	.051
2. Prosocial strategy		-	.734***	.735***	.830***	-.462**	.288	.564***	.059	.200	.076
3. Coercive strategy			-	.462**	.687***	-.645***	.689***	.692	.072	.145	.119
4. RC success				-	.694***	-.359*	.162	.332*	.033	.345	.019
5. Social dominance					-	-.241	.227	.354*	.069	.095	-.047
6. Prosocial (non-RCS)						-	-.654***	-.613***	.218	-.135	-.075
7. Overt aggression (non-RCS)							-	.648***	-.145	-.049	.115
8. Relational aggression (non-RCS)								-	.051	.175	.320*
9. FOFB (ToM)									-	.294	-.034
10. SOFB (ToM)										-	.195
11. TEC (emotion comprehension)											-
12. Affective empathy											
13. Cognitive empathy											
14. RHP prosocial response average											
15. RHP coercive response average											
16. RHP no response average											

*Note: * p < .05; ** p <. 01; *** = p < .001; RCS = resource control strategy;* (table continued on next page).

(Table 5.3 continued):

	12	13	14	15	16
1. Age	-.053	-.117	-.000	-.090	.146
2. Prosocial strategy	.471**	.210	.226	-.117	-.208
3. Coercive strategy	.416**	.264	.271	-.150	-.232
4. RC success	.227	-.089	.232	-.319*	.107
5. Social dominance	.408**	.122	.205	-.085	-.222
6. Prosocial (non-RCS)	-.203	-.252	-.455**	.369*	.203
7. Overt aggression (non-RCS)	.186	.177	.224	-.134	-.175
8. Relational aggression (non-RCS)	.170	.142	.349*	-.233	-.235
9. FOFB (ToM)	.107	-.107	-.006	-.047	.086
10. SOFB (ToM)	-.028	-.019	-.075	-.125	.332*
11. TEC (emotion comprehension)	-.135	-.086	-.185	.044	.253
12. Affective empathy	-	.398**	.212	-.079	-.245
13. Cognitive empathy		-	.266	-.120	-.271
14. RHP prosocial response average			-	-.826***	-.422
15. RHP coercive response average				-	-.163
16. RHP no response average					-

In order to determine associations between child responses to vignette resource opponents and the teacher-rated resource control variables (study 1, chapter 3) and the cognitive/affective variables introduced on study 2 (ToM, TEC and empathy), further correlations for both boys and girls were conducted (appendices J and K). The correlations between the vignette response types (prosocial, coercive and no strategy suggested) for each opponent characteristic were highly correlated, particularly the correlations between prosocial and coercive responses for each opponent characteristic, which approached $r = 1.00$. This was to be expected as there were no instances in which a child gave both prosocial and coercive strategy responses to the same vignette, and no strategy responses were rare. Of greater interest to this present study is the correlations between the responses to vignettes containing each opponent characteristic type (e.g. a tough opponent) and the teacher-rated resource control-related variables (prosocial and coercive strategy, resource control success and social dominance) introduced in study 1 (chapter 3) and the cognitive variables (ToM, TEC and empathy) introduced in study 2 (chapter 4). Due to the number of correlations conducted, for ease of presentation, the significant correlations involving the RHP vignette responses are described in-text below as these are of key interest, with the full correlation tables reported in appendices J and K

Due to the strong correlations between multiple variables and verbal ability in initial correlations (table 5.1) and the trend of verbal ability associating with variables in prior studies in this thesis, correlations controlled for verbal ability for both boys (appendix J) and girls (appendix K). Age also showed some significant correlation for variables in the initial correlations for boys (table 5.2) thus age was also added as a control to the boys' correlation analysis (appendix J).

Boys. For boys, none of the RHP vignette response variables correlated with either the teacher-rated resource control-related variables (prosocial or coercive strategy, resource control success or social dominance) or the cognitive variables (ToM, empathy or emotion comprehension), with the sole exception of a marginally significant moderate positive correlation between affective empathy and the total average prosocial responses to the vignettes (appendix J).

Girls. As per the boys, for girls none of the RHP vignette response variables correlated with either the teacher-rated resource control-related variables (prosocial or coercive strategy, resource control success or social dominance) or the cognitive variables (ToM, empathy or emotion comprehension). It was noted that, however, there was a consistent significant and weak-moderate negative correlation between teacher-rated non-resource-specific prosocial behaviour and girls' prosocial response, regardless of opponent characteristic (appendix K).

5.4.1.2. Associations of resource control strategy, social dominance and resource control success and RHP vignette response

Overall response type and gender. Independent samples *t*-tests were first conducted to establish whether gender had a significant effect on overall frequency of response type (prosocial, coercive or 'no strategy') across the 12 RHP vignettes.

Girls (M = 7.88, SD = 4.98) answered vignettes significantly more frequently with a prosocial response than boys (M = 3.36, SD = 4.66), $t(83) = -4.33$, $p < .001$. Conversely, males (M = 7.38, SD = 5.13) answered vignettes significantly more frequently with a coercive response than females (M = 3.05, SD = 4.61), $t(83) = 4.08$, $p < .001$. No difference was found in 'no strategy' response frequency between males (M = 1.26, SD = 3.13) and females (M = 1.26, SD = 2.86), $t(84) = .34$, $p = .74$.

These tests revealed the same pattern of significant differences between the mean frequencies of prosocial and coercive, but not 'no strategy' responses; males answered more frequently with a coercive response than females, whilst females answered more frequently with a prosocial response than males (figure 5.2).

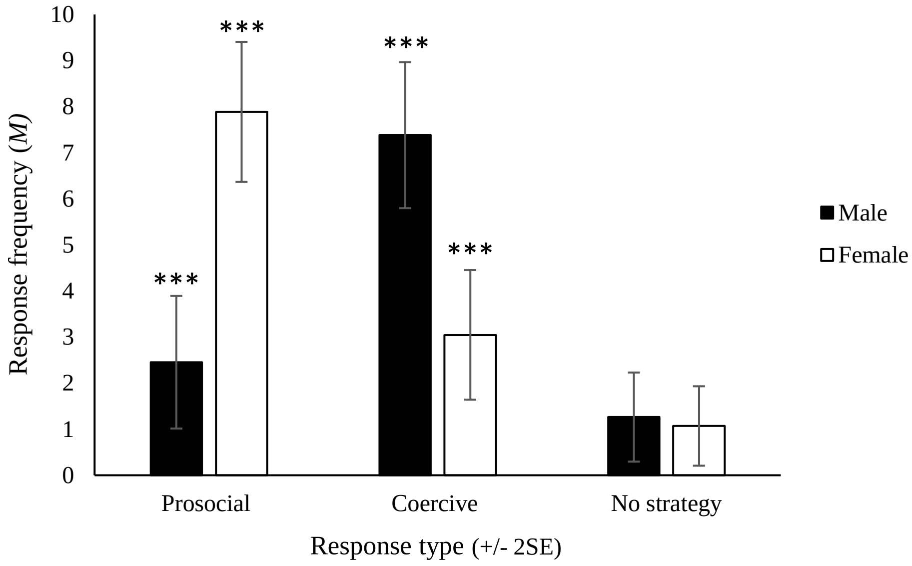

Figure 5.2. Overall gender differences in response frequency in the RHP vignettes measure. Significance * refers to comparison of response type between genders (shown by the three bar clusters).**

5.4.2. Statistical assumptions

For the main analyses reported below, Analysis of Covariance and repeated measures Analysis of Covariance (ANCOVA) tests were performed to examine the relationships between some of the variables reported in this study (see main analyses below). The ANCOVA test requires that variance in the residuals for each group should be normally distributed (Kirk, 2013). In some cases the variable being tested did not meet this requirement, however Central Limit Theorem (Cohen, 2008; see above) contends this does not mean the ANCOVA cannot be used, therefore ANCOVAs were used for all strategy subtype association tests below. ANCOVAs also require homogeneity of variance for each group within the categorical variable, in this case strategy subtype. This assumption was regularly violated, therefore the Welch's test (Welch, 1951) was taken as valid in these instances as this does not pool the variances (as the standard ANCOVA does). It was noted that this did not result in a difference of significance compared to the standard ANCOVA. Tukey post-hoc tests (if assumption of homogeneity of variance was not violated) and Games-Howell post-hoc tests (if this assumption was violated) were carried out to investigate specific subtype grouping differences in social dominance (Games & Howell, 1976).

Additionally, ANCOVA requires that the assumption of sphericity – that the variance in the differences between all iterations of the within-factor variable levels are equal – is met. In the present study it was found that in some analyses, this assumption was violated. Therefore, either the Greenhouse-Geisser correction (Greenhouse & Geisser, 1959) or the Huynh-Feldt correction (Huynh & Feldt, 1976) were applied if $\varepsilon < .75$ or $\varepsilon > .75$, respectively. The addition of the covariate itself to the analyses can also cause a reduction in the reliability of the ANCOVAs assessment of the relationship between the outcome variable and the predictor, therefore age (the covariate in this present study) was mean centred to counter this affect (Delaney & Maxwell, 1981).

5.4.3. Main analyses

5.4.3.1. RHP vignette response and resource control strategy

To address aim 1, analyses were split into two sections. First, section 5.4.3.1.1 reports ANCOVAs examining the association between controller subtype and RHP vignette responses. Due to preliminary analyses indicating gender differences in the RHP vignette responses, section 5.4.3.1.2 reports *t*-tests investigating these differences and their associations with the resource control strategy dimensions, social dominance and resource control success.

Note: Associations between RHP vignette responses and the continuous-type resource control and dominance variables were not further investigated due to the absence of initial correlations.

5.4.3.1.1. Associations of subtype and RHP vignette response

Controller subtypes. Verbal ability was controlled for due to the significant correlation with one of the RHP vignette variables (table 5.1). ANCOVAs found no significant difference in overall prosocial responses across the vignettes between any strategy subtype, $F(4, 80) = .69$, $p = .60$, $\omega^2 = .01$. No significant differences were found in overall coercive responses between any strategy subtype, $F(4, 80) = .78$, $p = .54$, $\omega^2 = .01$. No significant differences were found in overall 'no strategy' responses between any strategy subtype $F(4, 26.47) = .86$, $p = .49$, $\omega^2 = .007$, (figure 5.3).

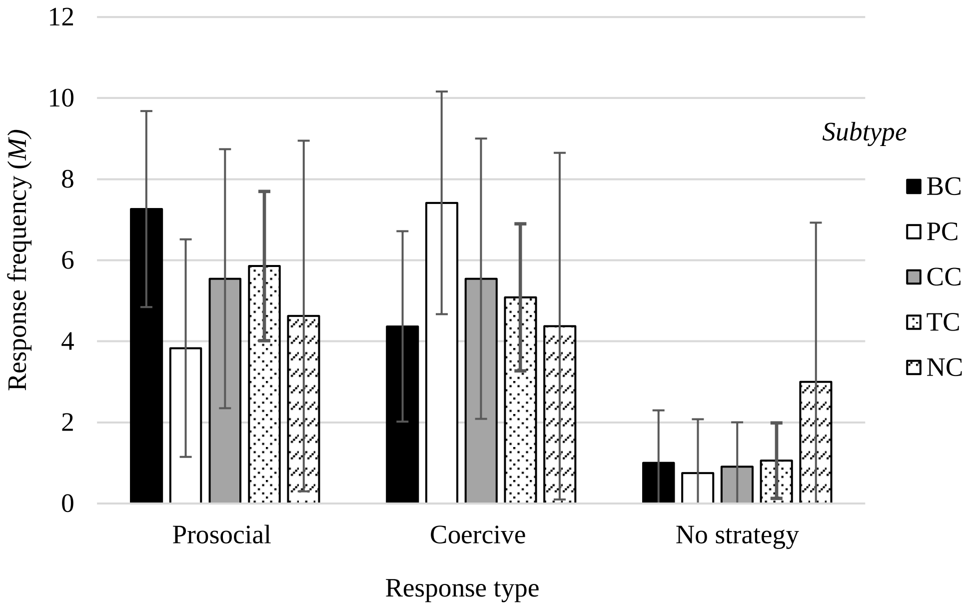

Figure 5.3. RHP vignette response frequencies according to subtype. BC = Bistrategic controller; PC = prosocial controller; CC = coercive controller; TC = typical controller; NC = non-controller. Error bars = +/-2SE.

5.4.3.1.2. Effects of opponent characteristic on responses

To address aim 2, the responses (prosocial, coercive or 'no strategy') to the RHP vignette scenarios were investigated via a series of repeated measures ANCOVAs for each gender, with age as a covariate and verbal ability (age made negligible difference for girls), with Bonferroni correction applied for post-hoc testing. Post-hoc results are displayed in table 5.4. Interaction effects of age and opponent characteristics on responses are reported in text.

Toughness of opponents.

Prosocial response frequency. In boys, the toughness of the opponent had a significant effect on the prosocial response frequency, $F(1, 40) = 8.09$, $p = .007$, $\omega^2 = .14$, with post-hoc testing showing prosocial responses were more frequent for 'not very tough' opponents (M = 1.98, SD = 2.54) than for 'very tough' opponents (M = 1.38, SD = 2.29), $p = .005$. A similar pattern was found for females' prosocial responses, $F(1, 41) = 10.196$, $p = .003$, $\omega^2 = .18$, with the 'not very tough' condition (M = 4.33, SD = 2.51) associated with higher prosocial response frequency than the 'very tough' condition (M = 3.56, SD = 2.71). $p = .003$. The between-subjects effects of age was significant for boys, $F(1, 40) = 5.39$, $p = .025$, $\omega^2 = .09$, with prosocial responses towards both 'not very tough' opponents, $p = .021$, and 'very tough' opponents, $p = .048$, increasing with age. Age effects were not found for girls, $F(1, 41) = 0.53$, $p = .472$, $\omega^2 = -.01$. Examination of interaction effects between age and toughness of opponents revealed no significant effect for males, $F(1, 40) = .935$, $p = .34$, $\omega^2 = -.002$, or females, $F(1, 41) = 1.71$, $p = .199$, $\omega^2 = .08$.

Coercive response frequency. Initial examination found a significant effect of toughness condition on male coercive response frequency, $F(1, 40) = 4.73$, $p = .036$, $\omega^2 = .08$. Post-hoc testing found males to respond coercively significantly more frequently towards 'very tough' opponents (M = 3.93, SD = 2.64) than 'not very tough' opponents (M = 3.45, SD = 2.67), $p = .027$. Again, similar patterns emerged for females, $F(1, 41) = 5.21$, $p = .028$, $\omega^2 = .09$, with the 'very tough' condition (M = 1.74, SD = 2.54) receiving more coercive responses than the 'not very tough' condition (M = 1.30, SD = 2.23), $p = .028$. The between-subjects effects of age was significant for boys, $F(1, 40) = 6.26$, $p = .017$, $\omega^2 = .11$, coercive responses towards both 'not very tough' opponents, $p = .009$ and 'very tough' opponents, $p = .043$, reducing with increased age. Age effects were not found for girls, $F(1, 41) = 0.15$, $p = .902$, $\omega^2 = -.02$. No interaction effect was found between age and toughness condition for males, $F(1, 40) = 1.71$, $p = .199$, $\omega^2 = .80$, or females, $F(1, 41) = .919$, $p = .343$, $\omega^2 = -.002$.

'No strategy' response frequency. There was no significant effect of toughness condition on male 'no strategy' response frequency, $F(1, 40) = 1.52$, $p = .22$, $\omega^2 = .01$. However, initial examination found a significant effect of toughness condition on 'no strategy' response in females, $F(1, 41) = 4.44$, $p = .041$, $\omega^2 = .07$, with the 'very tough' condition ($M = .68$, $SD = 1.67$) receiving more 'no strategy' responses than the 'not very tough' condition ($M = .37$, $SD = 1.40$), $p = .043$. The between-subjects effects of age was not significant for boys, $F(1, 40) = .324$, $p = .572$, $\omega^2 = -.02$, or for girls, $F(1, 41) = 1.13$, $p = .295$, $\omega^2 = .003$. No interaction effect was found between age and toughness condition for males, $F(1, 40) = .12$, $p = .735$, $\omega^2 = -.02$, or females, $F(1, 41) = .691$, $p = .411$, $\omega^2 = -.01$.

Presence of allies/friends

Prosocial response frequency. Initial examination found no significant effect of the presence of friends condition on prosocial response frequency for either males, $F(1, 40) = 0.85$, $p = .361$, $\omega^2 = -.004$, or females, $F(1, 41) = 0.03$, $p = .871$, $\omega^2 = -.02$. The between-subjects effect of age was significant for boys, $F(1, 40) = 5.39$, $p = .025$, $\omega^2 = .09$, with prosocial responses towards opponents both opponents with friends, $p = .021$, and without friends, $p = .035$, increasing with age. Age effects were not found for girls, $F(1, 41) = 0.53$, $p = .472$, $\omega^2 = -.01$. No interaction effect was found between age and presence of friends condition for males, $F(1, 40) = 0.42$, $p = .519$, $\omega^2 = -.01$, or females, $F(1, 41) = 0.13$, $p = .723$, $\omega^2 = -.02$.

Coercive response frequency. Initial examination found no significant effect of presence of friends condition on coercive response frequency for either males, $F(1, 40) = 2.88$, $p = .097$, $\omega^2 = .04$, or females, $F(1, 41) = 0.03$, $p = .856$, $\omega^2 = -.02$. The between-subjects effects of age was significant for boys, $F(1, 40) = 6.26$, $p = .017$, $\omega^2 = .11$, with coercive responses towards opponents both with friends, p = .007 and without friends, p = .038, decreasing with increasing age. Age effects were not found for girls, $F(1, 41) = 0.15$, $p = .902$, $\omega^2 = -.02$. No interaction effect was found between age and presence of friends condition for males, $F(1, 40) = 1.43$, $p = .239$, $\omega^2 = .01$, or females, $F(1, 41) = 0.01$, $p = .940$, $\omega^2 = -.02$.

'No strategy' response frequency. Initial examination found no significant effect of presence of friends condition on 'no strategy' response frequency for either males, $F(1, 40) = 1.70$, $p = .200$, $\omega^2 = .02$, or females, $F(1, 41) < 0.001$, $p = .989$, $\omega^2 = -.02$. The between-subjects effects of age was not significant for boys, $F(1, 40) = .324$, $p = .572$, $\omega^2 = -.02$, or for girls, $F(1, 41) = 1.13$, $p = .295$, $\omega^2 = .003$. No interaction effect was found between age and presence of friends condition for males, $F(1, 40) = 0.84$, $p = .365$, $\omega^2 = -.004$, or females, $F(1, 41) = 0.51$, $p = .480$, $\omega^2 = -.01$.

Physical size of opponents

Prosocial response frequency. Initial examination found no significant effect of the opponent size condition on prosocial response frequency for males, $F(2, 80) = 0.66$, $p = .520$, $\omega^2 = .008$, and a borderline significant effect in females, $F(2, 82) = 2.95$, $p = .058$, $\omega^2 = .04$. Examination of the within subjects contrasts found a significant quadratic effect, $F(1, 41) = 5.38$, $p = .025$, $\omega^2 = .09$ with post-hoc analyses finding that the equal size condition ($M = 2.74$, $SD = 1.63$) received more female prosocial responses than the bigger size condition ($M = 2.56$, $SD = 1.71$), $p = .046$. The between-subjects effects of age was significant for boys, $F(1, 40) = 5.39$, $p = .025$, $\omega^2 = .09$, prosocial responses towards smaller opponents, $p = .038$, same-sized opponents, $p = .019$, and bigger opponents, $p = .033$ increasing with age. Age effects were not found for girls, $F(1, 41) = 0.53$, $p = .472$, $\omega^2 = -.01$. No interaction effect was found between age and size condition for males, $F(2, 80) = 0.565$, $p = .571$, $\omega^2 = -.01$, or females, $F(2, 82) = 1.84$, $p = .165$, $\omega^2 = .02$.

Coercive response frequency. Initial examination found no significant effects of opponent size condition on male coercive response frequency, $F(1.75, 70.10) = 1.76$, $p = .183$, $\omega^2 = .02$, but found significant effects in females, $F(2, 82) = 5.47$, $p = .006$, $\omega^2 = .09$. Examination of the within subjects contrasts found a significant quadratic effect, $F(1, 41) = 8.95$, $p = .005$, $\omega^2 = .16$ and post-hoc tests showed that the 'same size' condition ($M = 0.88$, $SD = 1.47$) received less female coercive responses than both the 'smaller' condition ($M = 1.09$, $SD = 1.60$) $p = .033$, and the 'bigger' condition ($M = 1.07$, $SD = 1.61$), $p = .020$. The between-subjects effects of age was significant for boys, $F(1, 40) = 6.26$, $p = .017$, $\omega^2 = .11$, with coercive responses towards smaller opponents, $p = .010$, to same-sized opponents, $p = .025$, and bigger opponents, $p = .024$, decreasing with increasing age. Age effects were not found for girls, $F(1, 41) = 0.15$, $p = .902$, $\omega^2 = -.02$. No interaction effect was found between age and size condition for males, $F(1.75, 70.10) = 0.148$, $p = .836$, $\omega^2 = -.02$, or females, $F(2, 82) = 2.70$, $p = .073$, $\omega^2 = .04$.

'No strategy' response frequency. Initial examination found no significant effect of opponent size condition on 'no strategy' response frequency for males, $F(2, 80) = 1.74$, $p = .182$, $\omega^2 = .02$, or females, $F(2, 82) = 0.58$, $p = .561$, $\omega^2 = -.01$. The between-subjects effects of age was not significant for boys, $F(1, 40) = .324$, $p = .572$, $\omega^2 = -.02$, or for girls, $F(1, 41) = 1.13$, $p = .295$, $\omega^2 = .003$. No interaction effect was found between age and size condition for males, $F(2, 80) = 1.10$, $p = .339$, $\omega^2 = .002$, or females, $F(2, 82) = 0.61$, $p = .541$, $\omega^2 = -.01$.

Table 5.4. Repeated-measures ANCOVA post-hoc analyses for RHP vignette responses and opponent characteristics. Means are shown with standard deviations below in parentheses. Significant differences are in bold and superscripted.

	Boys			*Girls*		
	Prosocial	*Coercive*	*No strategy*	*Prosocial*	*Coercive*	*No strategy*
Toughness^{a}						
Not tough$^{(a)}$	**1.98**^{b}	**3.45**^{b}	0.57	**4.33**^{b}	**1.30**^{b}	**0.37**^{b}
	(2.54)	(2.67)	(1.48)	(2.51)	(2.23)	(1.40)
Very tough$^{(b)}$	**1.38**^{a}	**3.93**^{a}	0.69	**3.56**^{a}	**1.74**^{a}	**0.70**^{a}
	(2.29)	(2.64)	(1.70)	(2.71)	(2.55)	(1.66)
Friends						
Friends$^{(c)}$	1.74	3.57	0.69	3.95	1.51	0.53
	(2.38)	(2.51)	(1.60)	(2.52)	(2.32)	(1.53)
No friends$^{(d)}$	1.62	3.81	0.57	3.93	1.53	0.53
	(2.35)	(2.69)	(1.58)	(2.54)	(2.36)	(1.40)
Physical size						
Smaller$^{(e)}$	1.17	2.38	0.45	2.58	**1.09**^{f}	0.33
	(1.58)	(1.67)	(1.11)	(1.72)	(1.60)	(0.94)
Same size$^{(f)}$	1.12	2.55	0.33	2.74^{g}	**0.88**^{eg}	0.37
	(1.63)	(1.80)	(1.00)	(1.63)	(1.47)	(1.00)
Bigger$^{(g)}$	1.07	2.45	0.48	2.56^{f}	**1.07**^{f}	0.37
	(1.55)	(1.76)	(1.13)	(1.71)	(1.61)	(1.00)

Note*: The superscripts indicate significant differences using Bonferroni correction ($p < .05$; unless otherwise stated in the main text). E.g. the top two rows, first column (prosocial), indicate the mean differences in prosocial response frequency between scenarios containing a 'not very tough' opponent and a 'very tough' opponent.*

Summary

Toughness. The opponent toughness condition had a significant effect on the prosocial and coercive response frequencies of both males and females, with 'very tough' opponents associated with more frequent coercive responses and 'not very tough' opponents associated with more frequent prosocial responses. In females only 'very tough' opponents were associated with more frequent 'no strategy' compared to 'not very tough' opponents.

Friends/allies. No significant main effects for either males or females were found for the 'presence of friends' opponent condition.

Physical size. The physical size of opponent was associated with coercive response frequency in females; here, coercive responses were made significantly less frequently to scenarios with opponents of equal size (compared to the participant's own stick figure) compared to smaller and bigger opponents.

General age effects. Between-subject age effects also showed a clear pattern of association with boys' prosocial and coercive, but not 'no strategy' responses, regardless of opponent characteristics. Increased age was associated with higher frequency of prosocial responses and lower frequency of coercive responses. No interaction effects between age and opponent characteristics on response type frequency were found.

5.5. Discussion

This present study investigated behaviour and cognition within the framework of resource control theory and RHP theory in early childhood, via addressing the two key aims set out in section 5.2.4. The following discussion is structured in terms of exploring these aims.

Aim 1 – Examine child RHP vignette responses and their associations with ToM, empathy and emotion comprehension, and teacher-rated resource control strategy, success and social dominance

To begin the investigation into the vignette responses and their associations with resource control and social dominance, initial examination of the response data found significant associations with age and gender. *t*-tests revealed that across the 12 scenarios, females responded more frequently with prosocial responses and that males responded more frequently with coercive responses in relative to each other. However, correlations with age partialled showed that these gender differences were not age dependent.

Considering these significant findings, an examination of association between the participant's hypothetical behaviours in a resource contest (RHP vignettes) and their teacher-rated real-world behaviours was conducted. Boys, during early childhood have been found to behave more physically aggressively towards peers (Hudziak et al., 2003; for a review, see

Coie & Dodge, 1998), particularly other boys (Ostrov, Pilat, & Crick, 2006). Whilst girls have been shown to be more relationally aggressive (Hudziak et al., 2003; for a review, see Coie & Dodge, 1998), particularly to other girls (Ostrov et al., 2006), a more recent meta-analysis suggests that such gender differences are trivial (Card, Stucky, Sawalani, & Little, 2008). Regarding resource control strategy specifically, however, little or no gender differences have been reported – indeed none were found in study 1 (chapter 3) presented above – potentially due to this factor not being a focus of those particular studies (Hawley, 2003a, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007).

Regardless of gender, this present study found no associations between the teacher-rated resource control/social dominance data (prosocial and coercive strategy, resource control success and social dominance) and the cognitive data (ToM, empathy and emotion comprehension) and the responses to the RHP vignettes: neither analyses by controller subtype nor by the continuous resource control data revealed significant associations between these teacher-rated variables and the RHP vignette response type frequency (prosocial, coercive or 'no strategy suggested'). Importantly, the vignettes were hypothetical, so the child was aware that they would not really be acquiring the actual scooter; therefore, there may have been a reduced pressure upon the child to 'select' (vocalise) the strategy they would have chosen in a similar real-world scenario, thus other factors, such as empathy or ToM may well have played an enhanced role in their response in a real-world resource contest scenario. Moreover, social desirability could also be an important factor in their response in the hypothetical scenarios. The lack of desire to acquire an actual scooter, combined with an adult – likely seen by the child as a moral authority figure – delivering the questions, may also have an impact on their responses. However, it may be that children in this age-group are not introspective enough to accurately predict how they would behave in a real contest situation. Evidently further research taking observational data from similar real-world contest situations should be compared to these hypothetical scenarios to establish how accurate these scenarios are as behavioural predictors.

Aim 2 – *Examine the effect of opponent characteristic variation on child participant response.*

Aim 2 investigated the effects of resource opponent characteristics on RHP vignette response. Analysis was therefore also conducted to investigate how varying context, specifically the hypothetical resource contest opponent's characteristics in each scenario, affected participant responses. The measure on which the RHP vignette battery was based (Archer & Benson, 2008) was originally used to ascertain the effect an aggressor's perceived RHP would have on a participant's response. Comparing the findings of Archer and Benson (2008) and this present study raises interesting questions, yet the following acknowledgments should be made. Whilst Archer and Benson originally investigated the responses of young adult males, the present study's participants were 4-5-year-old boys and girls. However, Archer and Benson did investigate a resource control scenario, in addition to the otherwise non-resource control confrontation scenarios presented in their study. Specifically, as well as studying the participant responses to themselves or their girlfriend being insulted in a bar, they also included a scenario in which another man put his arm round the participant's girlfriend without invitation. Put in a Darwinian context, this scenario implicitly defines the girlfriend as a 'reproductive resource' – a mate – requiring defence. This scenario invoked the second highest aggressive response overall from the participants, superseded only by a direct insult to the girlfriend. An argument can also be made stating that, if not responded to effectively, such insult can affect an individual's RHP in the longer term thus reducing their own RHP and thus could be classified as a challenge to *future* resources, yet this is still clearly a different scenario to the vignettes presented in the current study. Here, the vignettes depicted a clear and direct material resource contest situation. Given these differences, comparing the studies highlights interesting differences and similarities. From the discussion above, the significant difference in coercive response between boys and girls is an interesting parallel to the Archer and Benson study. When comparing the two studies the pattern of aggression is converse; specifically, Archer and Benson (2008) found that with *increasing* threat level from the adversary – increasing physical size, reputation for fighting and presence of allies – participants responded *less* aggressively. In contrast, the present study found that both males and females responded coercively *more* frequently when faced with a 'very tough' opponent as opposed to a 'not very tough' opponent. Moreover, participants responded prosocially more frequently to vignettes in which the opponent was described as 'not very tough' compared to those scenarios when the opponent was described as being 'very tough'; viz. whilst Archer and Benson (2008) found that the participants were more likely to 'back down' from confrontation with increasing opponent threat, the present study finds that young children tended to report that they would counter increased toughness with aggression.

The reasons for this disagreement between the studies are likely multiple, yet an important one is likely the age difference between the samples (adults compared to 4-5-year-old children) and as such, extensive developmental differences. Furthermore, in this present study, age had a unique independent effect on prosocial and coercive responses in boys only (increasing age associated with higher prosocial and lower coercive response frequency across all RHP comprehension opponent condition), suggesting there may be gender-specific delays in other cognitive processes that affect boys' responses relative to girls.

The Archer and Benson study's 'girlfriend scenario' – when taking the Darwinian perspective discussed above – effectively positioned the participant as the resource controller, whereas this present study placed the participant as the resource contender/challenger, which could significantly influence the choice of behavioural responses, both hypothetically and in real-world terms. Future work, particularly if observation of real-world is not possible, should investigate the effect that varying the initial possession of the resource between the participant, the opponent and placing the resource in a neutral ‘no man’s land’.

The lack of significant findings, for both boys and girls, in terms of response-type frequency’s association with the ‘friends/allies’ condition is interesting, when compared with the significant findings of both the ‘physical size’ and ‘toughness’ conditions. This may well be a reflection of the visual prominence and degree of focus the latter two conditions compared to the former, and thus the weight these characteristics of a potential resource opponent have a 4-5-year old is assessing their RHP. Pun and colleagues (Pun et al., 2016, 2017) describe that 6-month-old pre-verbal infants focus on the numerical differences between groups when determining who are the most dominant (and possibly most effective resource controlling) individual. Additionally, other findings suggest 8-month-old preverbal infants cannot determine dominance based on physical size, whilst 10-13-month-olds can. It may be therefore that the seeming lack of effect the ‘presence of allies’ condition has on child response is reflective of young children placing more weight on the size and toughness of their opponent in resource control contest scenarios.

The responses given by both boys and girls – in terms of scenario opponent physical size – evidence a difference between genders in this current sample at least. Girls (but not boys) responded coercively less frequently to opponents who were of equal physical size compared to those who were smaller or bigger than their own avatar. Little, if any, prior research (that this author is aware of) can suggest why such a specific difference in female response in these scenarios would occur. It is possible that girls more readily relate to a peer of similar size which therefore affects their response, with the present finding that girls scored higher in verbal ability than boys being an indication of other cognitive differences that may explain the response difference. However, this is a very tenuous contention and further empirical study is required. Importantly, this is data from the start of the academic year, therefore, whether such gendered trends continue over the course of the first school year remains to be seen (study 5). Previous research indicates that greater physical size is associated with aggressive resource contest victory in early childhood (Hawley & Little, 1999; Pellegrini, Roseth, et al., 2007; Pellegrini, Long, et al., 2007; Roseth et al., 2007). However, what was not well documented in these studies, if at all, is how the smaller child behaves in the contest. Moreover, if the smaller child is the initiator of the contest – as was the case in some of the hypothetical scenarios presented here – noting their strategic approach – prosocial or coercive – could be an indicator of RHP comprehension. The evidence of real-world successful resource control based on physical size does little to comment on the attempted (and failed) resource control strategy by a smaller contender. Future longitudinal observational study should therefore investigate the behavioural approach of both resource controller and contender, noting potential changes in strategy according to contextual changes, such as physical growth and failure/success rate of their resource control strategy, which may cause some children to adapt, or 'learn from their mistakes'. The RHP comprehension results for boys presented here may therefore reflect a more inflexible strategy choice when faced with different sized opponents, which over time may become more context-appropriate due to repeated failure against larger opponents and their own cognitive development.

It is important to note that children did vary their response according to specific characteristics of the hypothetical opponent, indicating not only a comprehension of the task but a flexibility of cognitive processes that could plausibly be involved in real-world resource contest situations, though empirical evidence in this regard is needed. However, the pattern of variation is in direct contrast to that predicted by RHP theory itself (Parker, 1974). The responses by Archer and Benson's participants reflect those expected from individuals with an RHP comprehension functioning efficiently to balance risk and gain (as per Parker, 1974) – e.g. reduce aggressive response when faced with tougher opponent – whilst the results of this present study are reversed, thus may reflect an immaturity of RHP comprehension. It is also possible, however, that RHP comprehension could be well formed in these children, but behavioural enactment/response based on that comprehension may be moderated or suppressed by other factors. Moreover, children were not left to decide by themselves what the characteristics of their opponents in the vignettes were, which would have been a truer assessment of their RHP comprehension abilities. Rather they were given information about their characteristics – i.e. size, number of friends and toughness. Therefore, it seems most plausible that the children were fully aware of the opponents ‘fighting ability’, but that alternative factors, e.g. recognition that the scenarios were not real, that can explain the discrepancy between these findings and Parker’s RHP theory.

These moderating/suppressive factors may be cognitive factors such as a nascent view of morality and justice, empathy and sympathy, not captured by the measures used in this present thesis. Moreover, the interpretation of the vignette opponent’s characteristics may have been important. Though not empirically quantified in this present study, it was noted that some participants vocalised their opinion that the ‘very tough’ opponent was ‘mean’ and/or ‘angry’, after being told they were ‘very tough’ by the researcher. It may therefore be that case that other participants held a similar view of the opponent but did not vocalise it. Multiple studies have shown that young children are capable of appreciating moral codes and values (Eisenberg et al., 2006; Hawley & Geldhof, 2012; Kochanska et al., 2002; Miller et al., 1996), therefore such an interpretation of the opponent’s character may have led to the child’s decision to ‘stand up to’ the tough opponent, or ‘teach them a lesson’. Likewise, some children vocalised their opinion that the ‘not very tough’ opponents were ‘scared’ or ‘sad’. Thus, it is possible that the prosocial tendency towards these opponents can be explained by a developed empathy and sympathy in these children. Yet such explanation would superficially imply that those young male adults studied in Archer and Benson (2008) had comparatively poor empathetic abilities, which seems dubious. However, as noted above, the adult scenarios saw the participant as the resource holder (their girlfriend), compared to this study placing the child as the challenger for the resource, which may therefore explain the reversal of response type between the studies. Future research beyond this thesis must investigate the multifactorial influences on RHP comprehension and behavioural response via detailed observational study. It may be when the children are the resource contender in *real-world* contests, rather than the hypothetical ones posed to them in this present study, that their actual behaviour, compared to their vocalised opinions about how they would behave, are different. Perhaps the consideration of their opponent's RHP is not a significant factor at all in real situations in early childhood and the findings presented highlight the child's *potential* for RHP comprehension - by drawing the child's attention to those characteristics – but that it is not actually utilised in the 'hustle and bustle' of their lived experience, e.g. perhaps wanting that (real) scooter would be too tempting and the child's knowledge that their opponent is too strong would be insufficient to prevent them attacking the opponent anyway. Clearly observational data is needed to establish whether this is the case, along with data regarding impulse control and executive function. Additionally, perhaps children consider the longer-term friendship that may be at stake with the resource opponent in real life, whereas in the RHP vignettes presented here, their sole target was the *material* resource and not the social one as well. This is a very important point to consider in future work, especially in light of the work of Pellegrini Roseth and colleagues (Pellegrini et al., 2011; Roseth et al., 2011) which empirically suggests that children in this age group may well consider such social resource ramifications when involved in material resource struggles, as reconciliation behaviour is often a key strategic approach to both achieve immediate material resource control, and possibly limit negative social ramifications in the longer term.

Conclusions and limitations

This was the first study to attempt to investigate young children use knowledge of RHP in a resource contest situation. Overall in terms of this study's investigation of young children's potential RHP comprehension and how they may use that in resource contests, findings should be interpreted with caution. The above discussion provides plausible explanation as to why the present results differ from those of Archer and Benson (2008) yet does not negate the possibility that young children possess this comprehension ability (given the researcher providing them with details of the opponents characteristics) it being potentially superseded by more prominent feelings of morality and empathy/sympathy, theory of mind, and the simple possibility that the children treated the vignettes as a game. The vignettes were overtly hypothetical, a key limitation to note here. Again, direct observational studies, specifically focused on RHP comprehension in the context of real-world resource contest situations are required to ascertain more accurately the extent to which children use RHP comprehension to shape their behaviour in resource contest situations. Future works utilising direct observation of this age group in their day-to-day behavioural habitats are required to investigate the extent to which comprehend – and take into account – a potential resource opponent's RHP relative to their own. Moreover, more in depth measures of empathy, ToM and other cognitive attributes are required in order to elucidate more concretely the role of such cognitive and affective capacities may have on whether or not young children apply resource control strategies to a contest based solely on RHP comprehension, or whether, for example, empathy or moral understanding play a significant role in strategy selection that may counter what is stipulated by RHP theory (Parker, 1974).

Whilst broad associations between prosocial and coercive response frequencies to the vignettes and the teacher-rated strategy data were not found here, this study only examined data collected near the beginning of the school year and cannot comment as to the changing nature of such a relationship across the school year. Study 4 (chapter 6) longitudinally examined these relationships to elucidate the relationship between the behavioural, cognitive and affective variables – including RHP comprehension – examined in the previous studies reported in this thesis.

Chapter 6 – Study 4: Once on top, always on top – does early theory of mind, emotion recognition, resource control strategy use and establishment of social dominance predict social dominance at the end of the school year?

Abstract

Aims. Study 1 (chapter 3) examined how resource control strategy associated with resource control success and social dominance, whilst studies 2 and 3 (chapters 4 and 5) examined how cognitive/affective factors associate with these strategies. These prior studies focused on T1, the initial phase of a child's first year at school. This current study aimed to investigate, how these factors associated and influenced resource control success and social dominance across the school year. Specifically, this study investigated whether early behavioural strategy and establishment of social dominance was a significant factor in achievement of high social dominance status at the end of a child's first year at school. ***Methods.*** Teacher-ratings of behaviour, resource control and social dominance were taken, along with measures of empathy and theory of mind from the children themselves, as well as peer sociometric nominations (N = 92, 4-5-years old). ***Results.*** Regardless of social preference, ToM, empathy, emotion comprehension and selective moral disengagement, as well as overall changes in class prosocial and coercive resource control strategy over the year, both social dominance and resource control success at the start of the year predicted themselves at the end of the year. Whilst resource control success was found to be directly predictive of social dominance in the immediate-short term, it did not predict social dominance across the year, suggesting that teacher-ratings of social dominance may be influenced by the social prominence of the child when rating their social dominance.

6.1. Chapter overview

Study 1 (chapter 3) examined how resource control strategy associated with resource control success and social dominance, whilst studies 2 and 3 (chapters 4 and 5) examined how cognitive/affective factors associate with these strategies. These prior studies focused on T1, the initial phase of a child's first year at school. This current study expands on these studies by investigating how these factors associated and influenced resource control success and social dominance across the school year. Following a brief literature review and methods summary, results of this study are reported addressing two key aims: 1) to investigate child resource control strategy use over course of the year; 2) to investigate the time-lagged effects of early strategy use, resource control success and social dominance on resource control success and dominance outcomes at the end of the year, and whether the social, cognitive or affective variables assessed in this thesis affect these relationships. To address both these aims, first a preliminary examination of resource controller subtype group stability across the year was conducted to determine whether examination by subtype should be included in the proceeding analyses. To address aim 1 specifically, analyses were conducted to examine differences between coercive and prosocial strategy use at each timepoint, and whether there were significant changes in these behaviours over time. Aim 2 was then addressed by first examining the predictors of resource control success and social dominance at each timepoint. Results from these analyses, along with theory, informed the subsequent longitudinal analysis examining the concurrent and time-lagged factors contributing to resource control strategy use, resource control success and social dominance at the end of a child's first year at school.

6.2. Introduction

Published longitudinal study of resource control strategies in early childhood is very limited, nevertheless findings to date suggest that prosocial strategies and reconciliation behaviour become increasingly effective behavioural methods for achieving resource control and social dominance by the end of a year of preschool (Pellegrini et al., 2011; Roseth et al., 2011). These studies suggest that over the course of the year, coercive control strategies reduce in both effectiveness and frequency (possibly due to their reducing effectiveness), whilst prosocial strategies of control increase in both effectiveness and frequency. Given the dearth of longitudinal data regarding patterns of resource control strategies, it is important to investigate whether these behaviours change over the course of a child's first year at school, and how they may change in relation to each other. Specifically, if repeated studies begin to establish consistent patterns regarding strategy changes over the course of early school life in different samples, results can be more confidently seen as trend that occurs in the early school population at large. Such similarities would also point to possible cognitive affective and social factors causing and interacting with these changes.

Thus, another key question that has yet to be tackled by any resource control theory-based research is whether factors, such as resource control strategy choice, more developed cognitive and affective processes, or resource control success and social dominance themselves *at the start* of the academic year have predictive value as to resource control or social dominance outcomes at the end of the year. If those children who establish their social dominance at the beginning of the school year are able to maintain that dominance throughout the year, it could be indicative of various possible factors, including: 1) those initially dominant individuals possess a flexibility of behavioural decisions that can change if behavioural norms shift, thereby choosing the most effective strategy that limits social repercussions, or even boosts social image amongst peers; 2) establishment of social dominance early on, rather than flexibility of behaviour over the course of the year, is the crucial factor in determining end-of-year dominance status. Either point offers a plausible mechanism for the maintenance of social dominance. Behavioural flexibility could be suggestive of greater cognitive and emotional development compared to less dominant peers, such as theory of mind or empathy (Hawley, 1999; Pellegrini et al., 2011). However, if it is *early* establishment of dominance that is more predictive of social dominance at year end, rather than other factors more temporally proximal to year end, then this may be at least somewhat reflective of Bernstein (1981); Bernstein stated that social dominance relationships can only be said to exist between individuals if one individual submits to the other prior to a contest commencing, based on the more submissive individual's knowledge of prior contest wins by the dominant individual. This therefore means that following the initial conflict/s, the dominance relationship is formed and the dominant individual no longer needs to challenge for, or defend, a resource from the submissive (or at least this may occur much less frequently, more as a maintenance mechanism for the dominance differential). It may be therefore, that once initial dominance relationships are formed, there may be little need for the dominant individuals to utilise other behaviours or cognitive skills to maintain dominance, as their dominance would rarely be challenged. Evidently, these contentions require empirical corroboration.

6.2.1. Behavioural and social predictors of social dominance over time

Peer interaction and behaviour in early childhood is still rarely studied through the lens of resource control behaviour, with a particular dearth of longitudinal investigation of resource control behaviour in this age group. Earlier studies suggest that in early childhood nascent social dominance hierarchies and peer regard are established and maintained through coercive or 'agonistic' behaviour (Abramovitch & Grusec, 1978; Freniere & Charlesworth, 1983; Jones, 1984; McGrew, 1969; Russon & Waite, 1991; Strayer & Strayer, 1976; Strayer & Trudel, 1984). Later investigations suggested that over agonist-based dominance in peer groups faded as aggression became less socially favourable (Dodge et al., 1990; Pettit et al., 1990; Wright et al., 1996).

More recently, longitudinal observations of children in nursery/infant classrooms aged between 2- 5-years-old have shown, in agreement with resource control theory (Hawley, 1999, 2014), that prosocial strategy use quickly becomes a critical factor in resource control and social dominance for this age group (Pellegrini et al., 2011; Pellegrini, Long, et al., 2007; Roseth et al., 2011, 2007). These studies found that, not only did aggression and its association with social dominance decrease over the course of one academic year, but that affiliative behaviour and reconciliation behaviour (prosocial behaviour toward opponent following aggressive resource contest) increased in their associations with social dominance over the school year.

One of the above longitudinal studies in this area (Roseth et al., 2011) also collected sociometric nominations (Coie et al., 1982), collecting most liked and least liked peer nominations, with the addition of a 'special friend' nomination category. The results showed that, across the school year, social dominance was consistently positively associated with positive peer social regard (popularity, and like most and 'special friend' nominations), corroborating prior cross-sectional suggestions (Hawley, 2003a; Pellegrini, Long, et al., 2007; Roseth et al., 2007) that dominance is viewed by peers as socially attractive, as well as suggesting that the relationship between peer social regard and dominance demonstrates some stability over time.

Caputi, Lecce, Pagnin, and Banerjee (2012) collected longitudinal behavioural and sociometric data from children aged 5-, 6- and 7-years-old, and found that prosocial behaviour at age 5 predicted prosocial behaviour and negatively predicted peer 'like least' nominations at age 6. This same pattern was found for the children aged 6 and 7. Similarly, for both these age groups, prosocial behaviour positively predicted 'liked most' nominations. Liked most and liked least nominations at age 6 predicted themselves at age 7 (nominations were not collected at age 5). Not only are there positive time-lagged associations between prosocial behaviour and social preference/likability, these sociometric showed strong stability over time. Whilst Caputi et al. (2012) did not directly measure social dominance or resource control, as mentioned above

(Roseth et al., 2011), positive peer regard and social dominance has been found to have a relatively stable relationship over time, yet how earlier social dominance and resource control impacts on later peer sociometric ratings and vice versa, remains to be investigated in detail.

6.2.2. Cognitive and affective predictors of social dominance over time

Theory (Pellegrini, 2008; see below) and limited empirical data (Hawley, 2008; Pellegrini, 2008; Pellegrini et al., 2011) have suggested that developed ToM and empathy-based capacities in young children may provide important advantages to resource contests against peers

6.2.2.1. Theory of mind

Pellegrini (2008) hypothesised that children using reconciliation strategy would require a developed ToM to 'read the minds' of their defeated opponent and successfully reconciliate. Pellegrini (2008) suggests that both experience of contests and developing ToM cyclically develop each other, in essence they may act as a mutual reinforcement mechanism. In empirical terms, Pellegrini et al. (2011) found that above all other measured factors (i.e. affiliative behaviour, aggressive behaviour and reconciliation behaviour), teacher-rated social dominance was significantly associated with theory of mind. This is the only study explicitly linked with resource control theory to date that takes any measure of theory of mind, yet there are other studies not directly associated with resource control theory that provide some insight into the possible time-lagged relationships between behaviour, sociometric status and theory of mind in children. Caputi et al. (2012) found that superior theory of mind in 5-year-old children predicted higher levels of prosocial behaviour when they were 6-years-old, which in turn negatively predicted peer 'like least' nominations and positively predicted peer 'like most' nominations at age 7. This result suggested that from the age of around 5, the effect of theory of mind on peer regard at age 7 is mediated by greater prosocial behaviour at age 6. A further longitudinal study (Banerjee et al., 2011) found that more peer rejection at age 7 was predictive of poorer faux pas understanding – whether the child appreciates that a social blunder committed by another was inadvertent – at age 8. Moreover, greater faux pas understanding at age 9 was also associated with greater peer acceptance at age 10 and that greater faux pas understanding at age 10 was negatively predictive of peer rejection at age 11. From these studies, there is a clear pattern of association between ToM and greater peer regard and acceptance. What remains to be studied is whether such cognitive and social factors impact the resource control strategy choice that in turn may determine resource control success and social dominance.

6.2.2.2 Empathy and emotion comprehension

To date there is no literature explicitly examining the associations between empathy in early child and resource control and strategy selection, at least not explicitly through the lens of resource control theory. Yet affective and cognitive empathy may be influential in resource control behaviour and social dominance, specifically in young children just starting school as children are exposed to complex social interactions on scale they have not yet encountered, therefore any developed ability to 'read the minds' of their peers or teachers, whether it be through cold logic (ToM), and affect (empathy, emotion comprehension) would likely confer competitive advantages upon those individuals (Hawley, 1999, 2008, Pellegrini 2008, 2011). Hawley proposes that 'psychological altruism' – prosocial behaviour that is motivated by a philosophical selflessness – broadly does not marry with an evolutionary perspective on human behaviour (Hawley, 2014a), though Hawley herself recognises the potential for humans to behave in such a fashion (Hawley, 1999). Rather, Hawley ascribes to the 'selfish gene' perspective (Dawkins, 1976) – that animals are genetically programmed behave in ultimately selfish ways – with evidence showing that infants were offered resources to a distressed person far more often when the resource was not the infant's own (Svetlova et al., 2010). Notably, Hawley (2012) suggests that resource control strategies may contain an 'empathic component' reflecting internalised norms of the society such as 'moral codes'. In the only study to date that touches upon empathy in the context of resource control theory.

Other research outside the theoretical basis of resource control theory has found time-lagged associations between affective measures and social behaviour. One study found that in a sample of U.S. 1st and 2nd grade children (~6-8-year-olds) teacher-rated 'social skills' – including a prosocial resource control item ('sharing with other and helping peers') – and 'emotional knowledge' – a child assessment battery including cognitive empathy-type assessments such as emotional vignettes and emotional face recognition – at the start of school year were strong predictors of themselves and each other by the middle/end of school year (Mostow, Izard, Fine & Trentacosta, 2002). The results suggest that both cognitive empathy and prosocial behaviour at the start of the school year may be predictive of each other by the end of the school year in older children. However, further research must be conducted to ascertain whether greater cognitive empathy and prosocial behaviour at the start of the first school year predict those outcomes in these variables at the end of the first year at school. Even more pertinent to this current study, is whether these variables have any longitudinal bearing on resource control or social dominance. To this author's knowledge there is no study to date that investigates this question.

6.2.3. Aims and hypotheses

Aim 1 – Examine the changes in prosocial and coercive resource control strategy use over time.

Longitudinal research (Pellegrini et al., 2011; Pellegrini, Long, et al., 2007; Roseth et al., 2011, 2007) to date suggests that over the course of the first year at school, early childhood prosocial control strategies increase over time, whilst coercive strategies decrease. However, this data is only from one sample and any solid conclusions as to wider population trends in this age group will require further data from other samples. Therefore, this study intends to examine these behavioural changes in this present sample and add to currently scarce data in this area. Based on previous research, it is hypothesized that the present study will find that prosocial strategy use will increase across the school year, whilst coercive strategy use will decrease over this time.

Aim 2 – Examine how prosocial and coercive strategy use frequency earlier in the school year relate to resource control success and social dominance at the end of the year, and whether sociometric status or cognitive/affective factors affect these relationships

Pellegrini, Roseth and colleagues (Pellegrini et al., 2011; Roseth et al., 2011) have provided the only longitudinal studies to date that investigates how resource control strategy relates to social dominance over the course of the first year at school. However, it is yet to be investigated whether initial strategy selection and indeed initial establishment of dominance has any bearing on resource control and social dominance status at the end of that year. It is therefore hypothesized, based on the theoretical works of Bernstein (Bernstein, 1981) and Hawley (Hawley, 1999), that initial dominance and/or resource control success, but not resource control strategy, at the start of the year will be a significant predictor of social dominance/resource control success at the end of the year.

Roseth et al. (2011) showed that over the course of the first school year, positive peer regard was consistently associated with social dominance. Furthermore, theory (Hawley, 1999) and empirical findings (Pellegrini et al., 2011) suggest that cognitive and affective factors have some relation to resource control and social dominance, affecting the behaviours chosen in contest situations. Findings from study 3 (chapter 5) of this present thesis suggest this may not be the case. However, study three was cross-sectional and did not consider the possibility that factors such as theory of mind and empathy may require time to affect social relationships and behaviour. Based on this possibility, and empirical findings that evidence the time-lagged effect of theory of mind on other factors such as peer acceptance and general prosocial behaviour (Banerjee et al., 2011; Caputi et al., 2012), the current study therefore aims to examine whether initial peer social regard and cognitive/affective factors (e.g. ToM and empathy) have longitudinal effects on the relationships between resource control strategy use and resource control and/or social dominance at the end of the year, with the hypothesis being that some cognitive factor (either ToM or empathy, or both) earlier in the year will significantly affect social dominance and/or resource control later in the year.

6.3. Methodology

For full descriptions and details of the procedures outlined below, see the main methodology section (chapter 2) of this thesis.

6.3.1. Participants

Ninety-two children aged between 4-5-years-old (M = 4.64, SD = 0.29) old from 4 reception year classes from 3 state primary schools in the south east of England (males, n = 47; females, n = 45) and their teachers (N = 4; all female) were recruited to participate.

6.3.2. Data collection procedure

Data collection was carried out in three phases in at the start middle and end of the academic year. At each phase with each class, teachers were asked to complete the questionnaire via Qualtrics by the end of the collection with their class. Data collection at each phase with each class lasted up to two school weeks, with the occasional small extension to account for student absences or exceptional events occurring in the school calendar. Each child was worked with individually in a quiet area away from the classroom and their data collected over two sessions over two days, to reduce fatigue and limit absence from the classroom for extended periods of time. Each session lasted around 30 minutes. The researcher was introduced to the children prior to beginning the data collection and talked to each child participant in a friendly and engaged way for a short period of time to increase their comfort in taking part in the research. The child was told at the beginning of every session that they could stop at any time and verbal assent was given by each child at the start of each session, in addition to parental consent. All measures and tasks (table 2.4) were carried out in the same order with each child, at each phase of the data collection (table 2.5).

6.3.3. Measures

6.3.3.2. Teacher-rated child behaviour report and social dominance

Teachers completed a child behaviour questionnaire. This questionnaire contained 14 items relating to dominance on a seven-point scale (Dodge & Coie, 1987, adapted for preschool children in Pellegrini et al., 2011), aggression on a four-point scale (Hawley, 2003b) and prosocial behaviour on a five-point scale (PSBS; Crick, Casas, & Mosher, 1997; Poland, Monks, & Tsermentseli, 2015). 18 resource control-related items, on a seven-point scale from the questionnaire used by Hawley (2003) and Hawley and Geldhof (2012) were used in order to provide specific data regarding prosocial and coercive resource control behaviours as well as items regarding resource control success. As detailed in the general methodology (chapter 2), a social dominance composite was used as a measure of the child participant's social dominance (the composite being an aggregate of the standardised teacher dominance ratings and ranks; see chapter 2, section 2.9).

The resource control data from this questionnaire was used to form the strategy subtype categories using the method of Hawley and colleagues (Hawley, 2003b, 2003a; Hawley & Geldhof, 2012; Hawley et al., 2007) as described in the general methodology section of this thesis (chapter 2, table 2.3).

6.3.3.1. Verbal ability

Children's verbal ability was measured with the British Picture Vocabulary Scale III (BPVS III; Dunn & Dunn, 2009) and administered in accordance with the instructions. The standardised scores were used for purposes of analysis.

6.3.3.3. ToM measures

First-order false-belief. The Sally-Anne unexpected transfer task (Wimmer & Perner, 1983) was used to assess first-order false-belief and has been widely used, including with the age group of interest here (e.g. Bensalah et al., 2015) using physical Sally and Anne dolls. Scores were created based on absolute 'correct' or 'incorrect' responses, with 1 point for a correct answer for each of the questions (first-order false-belief and justification questions), as per Bensalah et al. (2015). However, unlike Bensalah and colleagues, this project adopted the method used by Sullivan et al. (1994; see second-order false-belief below), in that if the check question was incorrectly answered, the child could still attain a score for the test questions after provided both the false-belief and justification questions were answered correctly.

Second-order false belief. The adapted Perner and Wimmer (1985) birthday puppy scenario created by Sullivan et al. (1994) was used for this study, but with the characters changed from those in Sullivan's study, to Sally and Anne. Check questions and memory prompts were used to ensure the child was following the scenario. Scores were created similarly to the first order method above, whereby 1 point each was given for a correct response to the second-order false-belief question and the justification question.

6.3.3.4. Emotion comprehension

The Test of Emotion Comprehension (Pons et al., 2004) was used to measure emotion comprehension. Based on the age ranges deemed appropriate for each of the measures in the test booklets by Pons et al. (2004), this study used only the first 4 components: recognition (component 1), external cause (component 2), desire (component 3) and belief (component 4). Scoring was conducted according to the same procedure given by Pons et al. (2004).

6.3.3.5. Empathy assessment

The Empathy Test for Preschoolers (EMP; Sezov, 2002) was used for empathy assessment of the child participants. Child participants were presented with a series of short illustrated stories from the EMP storybook ending in a focal character expressing happiness, sadness, fear or anger. The child was then asked, “how does this make *you* feel [child’s name]?” (the ‘affective empathy’ question in the EMP), followed by “how do you think [story’s focal character] feels?” (the ‘cognitive empathy’ question in the EMP). Scoring was performed according to the guidance from the instruction manual.

6.3.3.6. Peer sociometrics

Each child participant was asked by the researcher to nominate three peers whom they liked the most in their class and three they liked the least (Coie et al., 1982), with cross-sex nominations allowed for both behavioural and like/dislike nominations. If the child nominated teaching staff (this happened on occasion), the researcher replied, “Oh, I mean which other boys or girls in your class…”.

Scoring. The like most (LM) and like least (LL) nomination scores were summed. Following standardisation across classes, a social preference (SP) score was derived by subtracting the standardised LL score for the standardised LM score, SP = LM – LL, as per the method of Slaughter, Dennis, and Pritchard (2002).

6.3.3.7. Data analysis

Analyses were conducted using SPSS version 25 (2017). Initial Pearson’s correlations were conducted to ascertain general bivariate associations between the variables and to inform use of controls in the hierarchical multiple regressions then conducted. AMOS version 26

(2018) was used to construct the ARCL panel models, and SPSS and PROCESS were used to investigate the mediation/moderation analyses described in the below sections.

6.4. Results

6.4.1. Preliminary analysis

Note on gender coding. Where gender was entered into an analysis, gender was dummy coded: males = 0 and females = 1 for all analyses reported here (both preliminary and main analyses).

Prior to conducting analyses on the variables of interest or preliminary correlations, suitable tests were decided upon. Examination of the normality of the data was conducted via examination of Q-Q plots, histograms, skewness and kurtosis values and Shapiro-Wilk testing. As per study 1 (chapter 3), this examination found all variables, except for teacher-rated social dominance, to be non-normally distributed. As per the central limit theorem justification in study 1 (Cohen, 2008; Little, 2013; for details, see section 3.4.1) parametric tests were used in the analyses presented in this present study unless otherwise stated in the main analyses section of this study.

A note on the sociometric data. Sociometric data was found to have no association with any of the cognitive or behavioural variables and the omission of the sociometric variables had a negligible effect on any of the subsequent analyses conducted. Therefore, the sociometric variables are not reported on in the proceeding sections.

6.4.1.1. Resource controller subtype stability

Prior to conducting any in-depth longitudinal analyses using the controller subtype groupings, it was necessary to investigate if the subtypes were 1) stable over time, viz. the same children belonged to each subtype group across each time point; 2) if there were children that changed subtype classification, was there a pattern to this change. In order for the subtype classifications to have predictive utility, one of these points must be true. Similar to Bernstein's comment in regards to the concept of dominance (Bernstein, 1981), if there is no predictive utility, then there is little point in using the groups in order to explain developmental trajectories.

Preliminary investigation of subtype stability across the timepoints found that only 17 out of the 92 children (18%) remained in under the same subtype label. More specifically, out of 92 children, only 10 were consistent typical controllers, 4 were consistent bistrategic controllers and 3 were consistent coercive controllers. No children were found to be consistent prosocial controllers or non-controllers. Given the low percentage of subtype stability, next to be examined were patterns in those subtype changes. However, changes in subtype classification across the three timepoints was virtually idiosyncratic, with a maximum of just 3 children who showed the same pattern of subtype change over time, with most changes being unique to each child. Any meaningful statistical analysis to determine possible factors behind subtype change was therefore impossible.

Given the findings reported above, it was deemed that any further longitudinal analysis utilising the subtype groups, for developmental investigation at least, would be inappropriate with this sample. Therefore, proceeding analyses focused on the continuous behavioural dimensions only.

6.4.1.2. Correlations

Initial Pearson's correlations were carried out between all variables included in each study of this thesis, to assess their preliminary correlations with resource control success and social dominance across the three timepoints, both concurrent correlations and time-lagged correlations at the three different time points. Given the consistent significance that verbal ability has had with multiple variables throughout the previous studies, this was partialled out and results are shown in table 6.1 below (note: gender and age were also initially partialled out but had a negligible effect, thus this correlational analysis is not shown here).

Significant correlations were found for all variables displayed in table 6.1. For ease of presentation, only those variables with significant correlations to resource control success or social dominance are shown in table 6.1.

Resource control strategy. Both prosocial and coercive strategy frequency at T1 had significant correlations with coercive strategy frequency, resource control success and social dominance at T3. *Coercive strategy frequency* also had significant correlations with 'like least' nominations at T3.

Resource control success and social dominance. Neither resource control success or social dominance at T1 had significant correlations with any variable at T3.

Affective empathy. Affective empathy at T1 was significantly correlated with social dominance at T3.

Table 6.1. Correlations, controlling for verbal ability, between variables of interest measured at the start (T1) and the end (T3) of the child participants' first school year.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. T1 prosocial RCB	-	**.739*****	**.744*****	**.684*****	**.410****	**.427****	**.687*****	**.720*****	**.574*****	**.739*****	**.508*****	**.528*****	**-.319****	**-.338****	**-.297****
2. T2 prosocial RCB		-	**.739*****	**.425*****	**.382*****	**.340*****	**.630*****	**.787*****	**.677*****	**.546*****	**.562*****	**.517****	-.166	**-.211***	-.201
3. T3 prosocial RCB			-	**.472****	**.265***	**.409****	**.680*****	**.727*****	**.699*****	**.527*****	**.393*****	**.394****	**-.284****	**-.351****	**-.361****
4. T1 coercive RCB				-	**.530****	**.521****	**.412*****	**.383****	**.274****	**.624*****	**.392****	**.379****	**-.453****	**-.396****	**-.320****
5. T2 coercive RCB					-	**.484*****	**.256***	**.364****	.154	**.461****	**.739*****	**.459*****	-.041	**-.224***	-.042
6. T3 coercive RCB						-	**.279****	**.289****	**.217***	**.410****	**.375****	**.430****	**-.289****	**-.414****	**-.449****
7. T1 RC success							-	**.834*****	**.832*****	**.662*****	**.403*****	**.396*****	**-.208***	**-.342****	**-.362****
8. T2 RC success								-	**.840*****	**.558*****	**.552*****	**.430*****	-.174	**-.296****	**-.351****
9. T3 RC success									-	**.501*****	**.400*****	**.452*****	-.099	-.192	**-.225***
10. T1 dominance										-	**.684*****	**.737*****	-.094	-.123	-.087
11 T2 dominance											-	**.761*****	.109	-.035	.046
12. T3 dominance												-	.097	.044	.010
13. T1 prosocial (non-RCB)													-	**.731****	**.674****
14. T2 prosocial (non-RCB)														-	**.772****
15. T3 prosocial (non-RCB)															-
16. T1 overt aggression															
17. T2 overt aggression															
18. T3 overt aggression															
19. T1 relational aggression															
20. T2 relational aggression															
21. T3 relational aggression															
22. T1 affective empathy															
23. T2 affective empathy															
24. T3. affective empathy															

Note: (table 6.1 continued on next page)

	16	17	18	19	20	21	22	23	24
1. T1 prosocial RCB	**.355****	**.334****	**.241***	**.432****	**.329****	.173	**.331****	**.215***	.156
2. T2 prosocial RCB	.199	**.292****	.103	**.248***	**.310****	.012	.123	**.321****	**.225***
3. T3 prosocial RCB	**.307****	**.252***	.094	**.253***	.193	-.023	.098	.151	.130
4. T1 coercive RCB	**.678****	**.420****	**.343****	**.632****	**.273****	**.283****	**.256***	.129	-.069
5. T2 coercive RCB	.182	**.293****	**.250***	.187	**.225***	.138	**.243***	**.296****	.102
6. T3 coercive RCB	**.342****	**.577****	**.575****	**.390****	**.429****	**.459****	.167	.166	-.018
7. T1 RC success	.130	.187	.054	**.234***	**.248***	.054	.088	.145	.021
8. T2 RC success	.114	**.245***	.031	.189	**.246***	-.027	.153	**.316****	**.234***
9. T3 RC success	.097	.134	-.045	.113	.119	-.129	.068	**.257***	.146
10. T1 dominance	**.262***	**.287****	**.313****	**.273****	.164	.084	**.313****	**.243***	.081
11 T2 dominance	.047	**.234***	**.206***	.027	.124	-.042	**.280****	**.396****	**.290****
12. T3 dominance	.141	**.277****	**.275****	.105	.191	.040	**.327****	**.318****	.192
13. T1 prosocial (non-RCB)	**-.591****	**-.301****	**-.247***	**-.608****	**-.369****	**-.281****	-.121	.010	.063
14. T2 prosocial (non-RCB)	**-.392****	**-.437****	**-.284****	**-.564****	**-.518****	**-.430****	-.150	-.062	.096
15. T3 prosocial (non-RCB)	**-.360****	**-.398****	**-.307****	**-.481****	**-.472****	**-.440****	-.024	.021	.120
16. T1 overt aggression	-	**.565****	**.463****	**.629****	**.290****	.169	.042	-.109	**-.226***
17. T2 overt aggression		-	**.740****	**.520****	**.610****	**.375****	.022	.077	-.057
18. T3 overt aggression			-	**.308****	**.372****	**.459****	.047	.000	-.058
19. T1 relational aggression				-	**.655****	**.467****	.109	.038	-.181
20. T2 relational aggression					-	**.475****	-.003	.087	-.066
21. T3 relational aggression						-	.014	.071	-.083
22. T1 affective empathy							-	**.490****	**.424****
23. T2 affective empathy								-	**.656****
24. T3. affective empathy									-

Note: For ease of display only variables that showed significant correlations with social dominance or resource control success are displayed here.

6.4.2. Main analysis

The main analysis was split into two broad sections in line with the two aims of this study. Section 6.4.2.1 of this study addresses aim 1 by investigating the patterns of resource control strategies over time. Sections 6.4.2.2 addresses aim 2 by modelling the cross-lagged relationships between the variables outlined in that aim. It should be noted however that preliminary correlations found that there were no significant or sizable correlations between social preference and either social dominance or resource control success at any timepoint, therefore cross-lagged analyses focused on purely behavioural effects on resource control and social dominance over time, with the added appropriate cognitive/affective controls.

6.4.2.1. Resource control strategy over time

Two repeated-measures ANCOVAs, controlling for verbal ability, were conducted: one examining prosocial strategy use across the three time points and the other examining coercive strategy use over these time points. Means and standard deviations for both behavioural dimensions at each time point are reported in table 6.2. Following this paired *t*-tests were then carried out to assess whether there are significant differences between the mean rates of prosocial and coercive resource control strategy usage at each time point.

Table 6.2. Prosocial and coercive resource control strategy use frequencies at all time points. Means are in bold, standard deviations are given in parentheses underneath.

	T1	*T2*	*T3*
Prosocial	**3.64** (1.40)	**4.08** (1.25)	**4.07** (1.34)
Coercive	**2.05** (0.91)	**2.31** (1.30)	**1.76** (0.79)

Prosocial strategy use over time. Initial results of the ANCOVA found a significant difference in mean usage of prosocial resource control strategy usage across the school year, $F(1, 90) = 16.83$, $p < .001$, $\omega^2 = .15$. Pair-wise comparisons following FDR corrections found significant differences in mean prosocial strategy use between T1 and T2 ($p < .001$), T1 and T3 ($p < .001$) but not T2 and T3 ($p = .887$); shown in figure 6.1a.

Coercive strategy use over time. Initial results of the ANCOVA found a significant difference in mean usage of coercive resource control strategy usage across the school year, $F(1, 90) = 12.42$, $p = .001$, $\omega^2 = .11$. Pair-wise comparisons following FDR corrections found significant differences in mean coercive strategy use between T1 and T2 ($p = .042$), T1 and T3 ($p = .003$) and T2 and T3 ($p < .001$); shown in figure 6.1b.

Prosocial and coercive control at each time point. Following FDR correction paired *t*-tests found prosocial strategy use to be significantly more frequent than coercive strategy use at T1, $t(90) = 14.67$, $p < .001$, at T2, $t(90) = 11.92$, $p < .001$, and at T3, $t(90) = 17.42$, $p < .001$ (figure 6.1c).

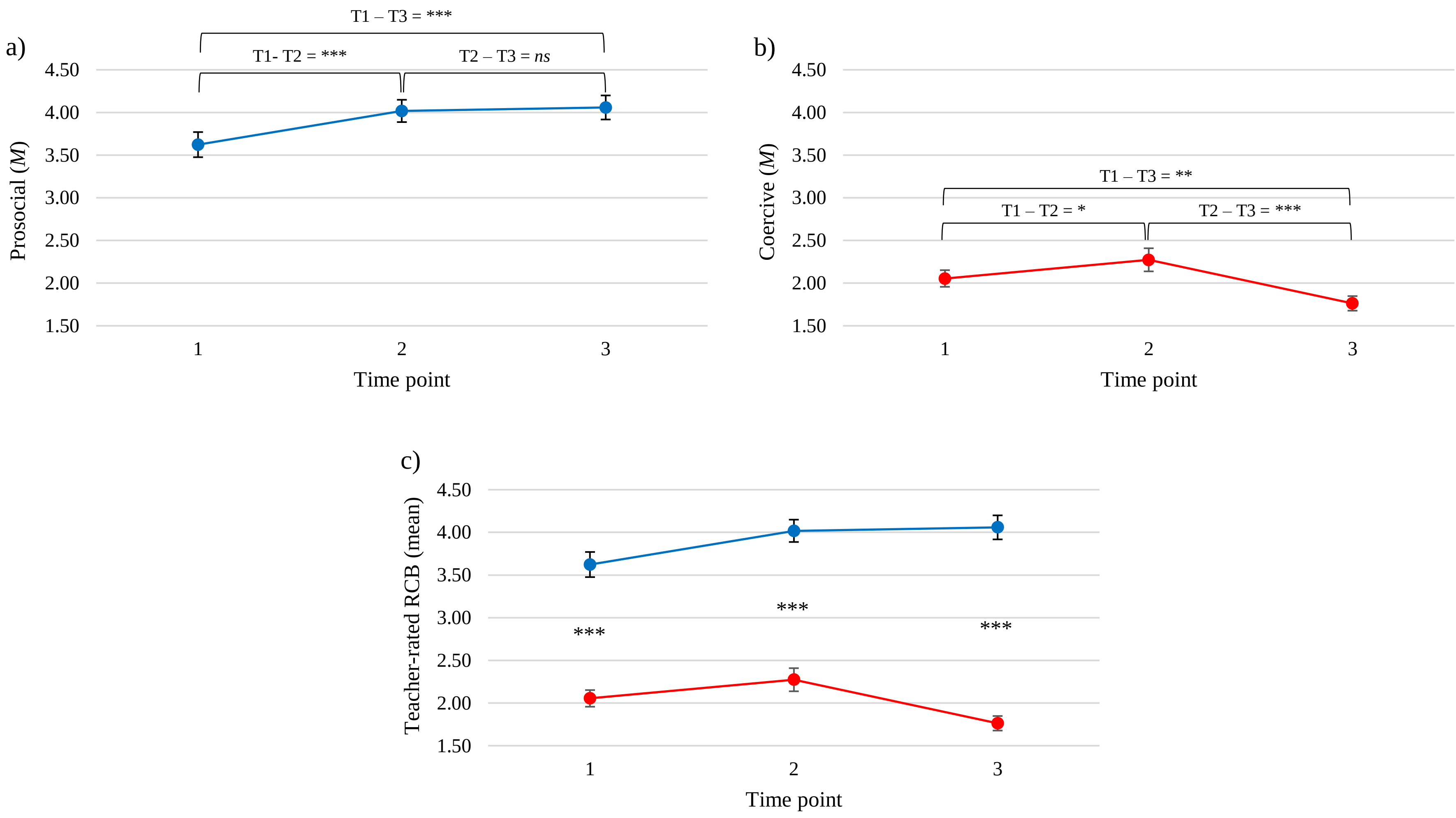

Figure 6.1. Changes in resource control strategy use frequency over time Top left graph (a) shows differences in prosocial behaviour over time. Top right graph (b) shows differences in coercive strategy use frequency over time. Bottom graph shows (c) differences between prosocial (top three points/line) and coercive (bottom three points/line) strategy use at each time point; asterisk between the points at each timepoint indicate level of significant difference between those points for each timepoint. * = *p* < .001; ** = *p* < .01; * = *p* < .001.**

6.4.2.2. Time-lagged effects of behavioural strategy on resource control success and social dominance.

To investigate the effect of cognitive, affective and behavioural factors on resource control success and dominance, analysis was split into two main sections. First (section 6.4.2.2.1), hierarchical multiple regressions for resource control and social dominance were carried out for T2 and T3, akin to those reported in study 1 and 2 of this thesis. This would allow comparisons of which factors contribute to the explained variance in resource control success and social dominance at each time point. This would also provide guidance as to which variables to include in the subsequent cross-lagged panel analysis in the next section.

The second section (section 6.4.2.2.2), provides the resultant cross-lagged panel analysis following, which describes the time-lagged effects of resource control strategy use on resource control success and social dominance and vice versa, with a particular interest in the direct effect of T1 factors on T3 factors.

6.4.2.2.1. Resource control and social dominance at each time point

To investigate how predictors of resource control success and social dominance at T1 may have differing relationships with these variables at T2 and T3, hierarchical regressions – using the same predictors that were used in the regressions for resource control success and social dominance in study 2 (chapter 4) – were conducted.

Study 2 (chapter 4) conducted hierarchical regressions for the T1 data which included affective empathy, cognitive empathy and their interaction term; however, it was found that for each timepoint, both cognitive empathy and the interaction term were non-significant predictors and made negligible difference to the final model for all timepoints. Therefore, for simplicity, tables 6.3 and 6.4 below show the regression results for resource control success and social dominance, respectively, with these removed and only affective empathy (and not cognitive empathy or the interaction term) displayed. Moreover, age and gender, across all timepoints made negligible difference to the models, thus were not included in the regressions reported (tables 6.3 and 6.4).

Hierarchical regression structures. *Resource control success.* This resource control success regression was split into three blocks (table 6.3). The first block containing the variables verbal ability and affective empathy (table 6.3, block 1). Block 2 added the non-resource-specific behaviour variables (non-resource-oriented prosocial behaviour, overt and relational aggression). Block 3 added the prosocial and coercive strategy variables, along with an interaction term between the two strategy dimensions to investigate potential moderation effects. This structure would allow examination of the relationship strategy use has with resource control success once other factors have been accounted for.

Social dominance. The structure for this regression at each time point consisted of four blocks (table 6.4). Blocks 1-3 consisted of the same variables as the resource control success model described above. The final block (block 4) added the resource control success variable.

Resource control success at each time point. At all three time points, the addition of the strategy dimension variables, particularly prosocial strategy, explained a large amount of the variance in resource control success, with block 3 explaining 52% of the variance at T1, ${}_{adj}R^2$ =.52, $F(8,79) = 12.51$, $p < .001$, 64% of the variance at T2, ${}_{adj}R^2 = .64$, $F(8,78) = 15.86$, $p < .001$, and an additional 48% of the variance at T3, ${}_{adj}R^2 = .48$, $F(8,79) = 8.40$, $p < .001$. Specifically, coercive strategy use was not found to be a significant predictor, at any time point, whereas prosocial strategy use was highly significant at all three time points (table 6.3). Furthermore, there was a significant interaction effect between the strategy dimensions at T1 (and a borderline significance at T2, $p = .064$). This is reflective of the moderated mediation found in study 1 (chapter 3) however, in the present case, this model includes affective empathy, whereas study 1 did not include affective empathy in the regression model. Affective empathy was initially borderline significant in the T1 model (table 6.3, block 2 and 3), but lost significance in the final model. Re-running the moderated mediation analysis performed in study 1 but including affective empathy as a control resulted in a negligible difference in outcome and thus is not reported here.

Table 6.3. Factors contributing to the variance in resource control success at each time point.

	T1				*T2*				*T3*			
	F	$_{adj}R^2$	*β*	*SE β*	*F*	$_{adj}R^2$	*β*	*SE β*	*F*	$_{adj}R^2$	*β*	*SE β*
Block 1	**1.30**	**.01**			**2.91***	**.08**			**1.80**	**.02**		
Verbal ability			-.010	.108			.156	.089			.123	.095
Affective empathy			.175	.122			.260*	.117			.141	.110
Block 2	**2.35***	**.07**			**4.67*****	**.23**			**4.76****	**.18**		
Verbal ability			.102	.119			.215	.088			.186	.105
Affective empathy			.109	.119			.225†	.118			.165	.102
Prosocial (non-strategy)			-.309*	.159			-.281	.130			-.460***	.098
Overt aggression			-.104	.142			.072	.148			-.017	.088
Relational aggression			.111	.140			.034	.178			-.324	.115
Block 3	**11.72*****	**.46**			22.64***	.64			**12.37*****	**.48**		
Verbal ability			.086	.100			.136*	.067			.145	.085
Affective empathy			-.142	.089			.071	.065			.050	.072
Prosocial (non-strategy)			-.168	.097			-.193*	.073			-.125	.093
Overt aggression			-.180	.123			-.083	.072			-.041	.082
Relational aggression			-.053	.106			-.050	.093			-.132	.077
Prosocial strategy			.732***	.123			.770***	.081			.645***	.099
Coercive strategy			.030	.157			-.001	.070			-.051	.138
Block 4	**12.51*****	**.52**			**21.21*****	**.64**			**10.70*****	**.48**		
Verbal ability			.116	.094			.126†	.067			.146	.086
Affective empathy			-.156	.081			.090	.069			.049	.074
Prosocial (non-strategy)			-.076	.091			-.141†	.075			-.125	.095
Overt aggression			-.168	.119			-.079	.073			-.042	.083
Relational aggression			.052	.104			.069	.104			-.133	.080
Prosocial strategy			.640***	.114			.621***	.103			.638***	.113
Coercive strategy			.101	.155			.036	.064			-.045	.148
Prosocial*coercive[a]			-.268**	.084			-.267*	.119			-.015	.126

*Note:***p < .001; **p < .01; *p < .05; †p < .065.* [a] = interaction term for prosocial and coercive strategy.

Table 6.4. Factors contributing to the variance in social dominance at each time point.

	T1				*T2*				*T3*			
	F	$_{adj}R^2$	β	*SE* β	*F*	$_{adj}R^2$	β	*SE* β	*F*	$_{adj}R^2$	β	*SE* β
Block 1	**7.37****	**.13**			**7.82****	**.14**			**3.16***	**.05**		
Verbal ability			.119	.105			.109	.099			.149	.115
Affective empathy			.353**	.098			.345***	.088			.189†	.105
Block 2	**5.86*****	**.22**			**3.98****	**.15**			**3.64****	**.13**		
Verbal ability			.227*	.109			.114	.097			.198	.120
Affective empathy			.316**	.098			.327**	.090			.198*	.094
Prosocial (non-strategy)			.105	.160			.036	.127			-.034	.121
Overt aggression			.271†	.148			.240	.132			.355**	.106
Relational aggression			.189	.139			-.039	.132			-.128	.131
Block 3	**23.11*****	**.63**			**19.67*****	**.63**			**5.67*****	**.27**		
Verbal ability			.182*	.070			-.033	.072			.100	.105
Affective empathy			.043	.063			.118	.068			.135	.082
Prosocial (non-strategy)			.229*	.100			.169*	.081			.222	.129
Overt aggression			.056	.122			.065	.090			.193*	.100
Relational aggression			-.041	.103			-.085	.089			-.087	.107
Prosocial strategy			.613***	.114			.326**	.082			.280**	.108
Coercive strategy			.330**	.125			.615***	.060			.311**	.121
Block 4	**20.10*****	**.63**			**22.76*****	**.63**			**5.38*****	**.29**		
Verbal ability			.177	.072			-.034	.073			.089	.110
Affective empathy			.045	.064			.119	.071			.145	.089
Prosocial (non-strategy)			.213*	.103			.171	.088			.225	.127
Overt aggression			.054	.126			.066	.092			.210*	.101
Relational aggression			-.058	.114			-.080	.117			-.069	.105
Prosocial strategy			.628***	.125			.319**	.098			.403**	.120
Coercive strategy			.318*	.132			.617***	.065			.213	.126
Prosocial*coercive[a]			.044	.078			-.012	.134			.248	.157
Block 5	**24.51*****	**.70**			**19.42*****	**.66**			**6.43*****	**.36**		
Verbal ability			.130	.062			-.069	.071			.033	.095
Affective empathy			.108	.074			.093	.075			.126	.089
Prosocial (non-strategy)			.244**	.090			.211*	.092			.273*	.115
Overt aggression			.122	.111			.088	.085			.225*	.095
Relational aggression			-.079	.104			-.099	.110			-.019	.107
Prosocial strategy			.370**	.133			.143	.126			.159	.133
Coercive strategy			.278*	.112			.606***	.060			.230*	.121
Prosocial*coercive[a]			.152*	.073			.064	.136			.254*	.145
RC success			.403***	.093			.284*	.129			.382**	.115

*Note:****$p < .001$; ***$p < .01$; **$p < .05$; †$p < .065$.* [a] = interaction term for prosocial and coercive strategy; *RC* = resource control

Social dominance at each time point. T1. The block 1 variables, of which only affective empathy was a significant predictor, explained an initial 13% of the variance in social dominance, ${}_{adj}R^2$ =.13, $F(2,89)$ =7.37, p = .001. The addition of the non-resource-specific variables in block 2 saw both affective empathy and verbal ability as significant predictors of social dominance, with the model at block 2 explaining a total of 22% of the variance in social dominance, ${}_{adj}R^2$ =.22, $F(5,86)$ =5.86, p < .001. Block 3 added the resource control variables and showed both T1 prosocial and coercive strategy use both significantly contributed to the social dominance model, explaining an additional 41% of the variance in social dominance, with the model after block 3 explaining 63% of the variance, ${}_{adj}R^2$ =.63, $F(8,79)$ = 20.09, p < .001. Study 1 (chapter 3) found that neither strategy was a significantly greater predictor of dominance than the other. Adding the strategy dimensions also reduced affective empathy's predictive significance to non-significance (from p = .002 to p = .476). Block 4 added the prosocial*coercive interaction term but no explanatory change was found, whist in block 5, the addition of T1 resource control success explained an additional 7% of the variance in social dominance, with this final model explaining 70% of the variance in social dominance at T1, ${}_{adj}R^2$ =.70, $F(9,76)$ =24.51, p < .001. The addition of resource control success to the final model also caused a noticeable drop in the coefficient value and predictor significance of prosocial strategy use but not coercive strategy use.

At T2 (table 6.4), block 1, again only affective empathy was a significant predictor, explained an initial 14% of the variance in social dominance, ${}_{adj}R^2$ =.14, $F(2,85)$ = 7.82, p = .001. The addition of the non-resource-specific variables in block 2 saw affective empathy maintain its significance, whilst the addition of these behavioural variables did little to increase the explanatory power of the model, with the model at block 2 explaining a total of 15% of the variance in social dominance, ${}_{adj}R^2$ =.15, $F(5,82)$ =5.86, p < .001. Block 3 added the resource control variables and showed both strategy dimension to be significant predictors of social dominance, with block 3 explaining 63% of the variance in social dominance, ${}_{adj}R^2$ =.63, $F(8,79) = 19.67$, $p < .001$. Adding the prosocial*coercive interaction term in block 4 explained no additional variance; however, the overall model (block 5) added the resource control success variable and explained a total of 66% of the variance in social dominance, ${}_{adj}R^2$ =.66, $F(9, 78)$ =19.42, $p < .001$.

At T3 (table 6.4), block 1, neither affective empathy nor verbal ability were significant predictors (though affective empathy was borderline, $p < .065$), with this initial model explaining 5% of the variance in social dominance, ${}_{adj}R^2$ =., $F(2, 89) = 3.16$, $p = .047$. The addition of the non-resource-specific variables in block 2 saw affective empathy increase its significance, whilst overt aggression was also found to be a significant predictor of dominance, with the model at block 2 explaining a total of 13% of the variance in social dominance, ${}_{adj}R^2$ =.13, $F(5, 86)$ =3.64, $p = .005$. Block 3 added the resource control variables and showed both strategy dimension to be significant predictors of social dominance, explaining an additional 16% of the variance in social dominance, whilst this additional caused affective empathy to reduce to non-significance. The overall model after block 3 explaining 27% of the variance in social dominance, ${}_{adj}R^2$ =.27, $F(8, 83) = 5.38$, $p < .001$. The prosocial*coercive strategy interaction term was added in block 4, reducing coercive strategy to non-significance; however, adding resource control success in block 5 resulted in the reduction of prosocial strategy use to a non-significant predictor whilst coercive strategy use was significant. The overall model after block 5 was added explained a total of 36% of the variance in social dominance, ${}_{adj}R^2$ =.36, $F(9,82) = 6.43$, $p < .001$.

6.4.2.2.2. Time-lagged effects on resource control and dominance

Aim 2 posed the question as to whether behavioural factors earlier in the school year had an effect on resource control and social dominance at the end of the year. To investigate this possibility, an autoregressive cross-lagged (ARCL) panel model was constructed using the two strategy dimension variables and the resource control success and social dominance variables at each time point. Resource control theory and previous empirical data (Hawley, 1999; Roseth et al., 2011) informed the path composition of the initial theoretical model, described below and depicted in figure 6.2. From this model, two models were formed: model 1 (figure 6.3) included no control variables; model 2 (figure 6.4) contained control variables. These models' formation and findings are described in the following sections.

According to the recommendations of Hu and Bentler (1998), maximum likelihood-based fit indexes suitable for models with samples equal to or below 250 were used to judge the suitability of the model (given the present sample size, $N = 92$), specifically comparative fit index (CFI) and standardized root mean square residual (SRMR), with recommended approximate cut-offs of CFI > .95 and SRMR < .08 to indicate a good fit of the model to the data.

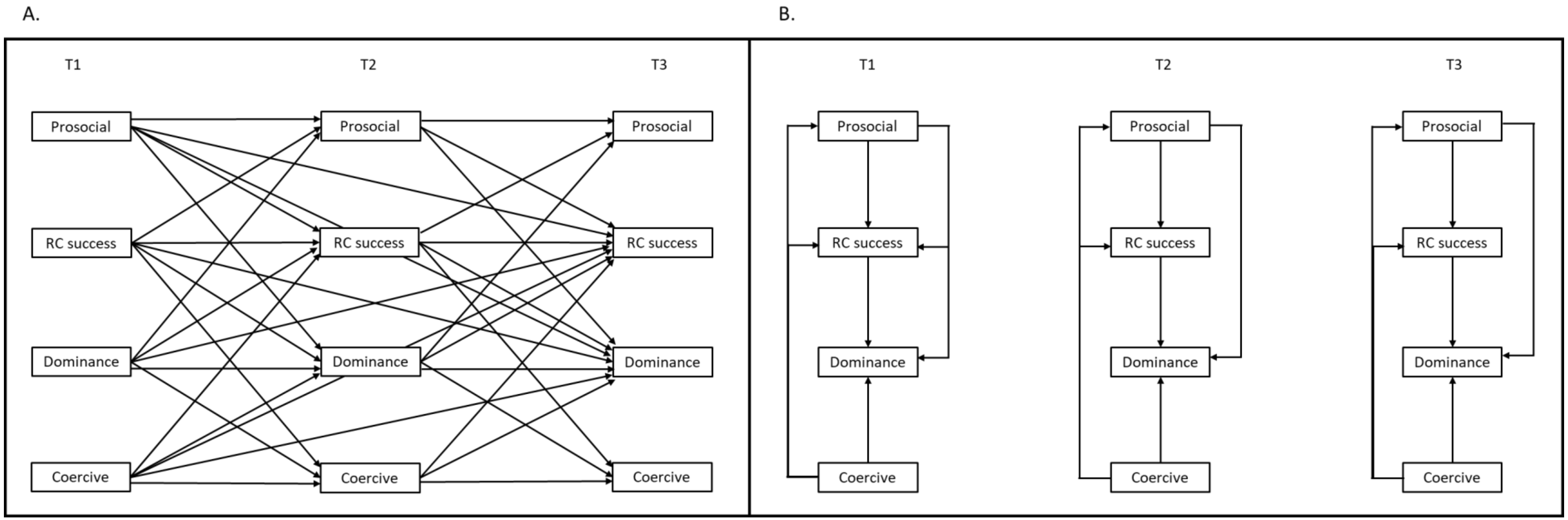

Figure 6.2. Initial theoretical ARCL model with all autoregressive, cross-lagged and concurrent paths of interest drawn. The model is shown in two panels to enhance visual clarity. Panel A (left) depicts all autoregressive and cross-lagged paths of interest. Panel B (right) depicts all concurrent paths of interest. Error terms are not shown are not shown for clarity.

Theoretical model design (figure 6.2). *Concurrent paths* – Paths were added between the variables within all timepoints to reflect the theoretical contention that in the short-term (i.e. with a matter of days, rather than across months or a year) prosocial and coercive control strategies lead to resource control, which in turn leads to social dominance. Additionally, three other concurrent paths were added at each time point. One path was added from coercive strategy to prosocial strategy to reflect both the findings of Roseth et al. (2011) and the findings presented in study 1 of this thesis regarding reconciliation – that resource control behaviour can be maintained through prosocial acts towards a defeated resource opponent immediately/shortly following a resource contest. Two other concurrent paths, from each strategy dimension to social dominance were added to reflect that dominance may be directly competed for as a social resource in itself, as suggested by the study 1 findings. Adding these concurrent relationships also serve to control for these effects and allow examination of how factors earlier in the year impact later factors despite more short-term variations. These concurrent/within timepoint paths are not shown on the ARCL models to aid clarity.

Autoregressive paths. At each variable was autoregressed between each time point (T1-T2 and T2-T3 and between T1 and T3) in order to assess whether, if there is an autoregressive effect on the T3 variable in question, the effect of that variable at the start of the year has a direct on itself at the end of the year, or whether it's effect is dependent on mediation by the T2 measurement. To investigate intervariable time-lagged effects of interest, cross-lagged paths were reciprocally drawn between the following variables at consecutive time points (i.e. T1-T2 and T2-T3): 1) resource control success and social dominance, as theory and evidence suggests these variables are strongly associated, yet a time-lagged examination of their relationship is yet to be studied; 2) resource control success and each strategy dimension, as theory and evidence suggests it is through control strategies that resource control is attained and maintained; 3) social dominance and each strategy dimension, as study 1 of this project suggests that social dominance may be competed for *directly* as a broader social resource in itself.

Cross-lagged paths. Both strategy dimensions at T1 were also directly cross-lagged with resource control and social dominance at T3 to investigate if any direct effects of these behaviours at the start of the school year on resource control or dominance at the end of the year, remained after accounting for other potential mediators. Similarly, resource control success and social dominance had cross-lagged paths drawn between their T1 and T3 measures. Theory suggests that once dominance is established, resource control, or first access to resources, is a privilege conferred upon the more dominant following that establishment; equally resource control is theoretically a prerequisite for establishment of social dominance, yet whether achievement of these factors at the start of the year, important enough to determine one another at the end of the year was to be investigated by this analysis.

Theoretical model fit. The theoretical model (with all paths of interest included, figure 6.2) with verbal ability added as a control at all timepoints showed good fit with the data, $\chi^2(26)$ =28.69, p = .325, CFI = .998, SRMR = .033, however, many of the paths were non-significant. Both models 1 and 2 below included verbal ability as a control given its consistent significant correlations to multiple variables throughout the studies reported in this thesis.

Model 1. Another model with all non-significant paths removed was evaluated, shown in figure 6.3. This model also showed good fit with the data, $\chi^2(27)$ =33.31, p = .187, CFI = .994, SRMR = .038. This model was named model 1.

Model 2. To investigate what possible effects other cognitive/affective or behavioural factors may have on the relationships between the variables of interest, control variables were added to the initial theoretical model, shown in figure 6.2, to create a model that included pertinent control variables, whilst maintaining good model fit to the data. This model, model 2, could then be compared to the model with only verbal ability as a control (model 1). Control variable paths were drawn to all variables in the model both concurrent and lagged. Specifically control variables measured at T1 predicted both strategy dimensions, resource control success and social dominance at T1, T2 and T3; controls measured at T2 predicted these variables at T2 and T3; controls measured at T3 predicted these variables at T3. This allowed the model to account for control effects that could take several weeks or months to impact behavioural or social outcomes as well as more immediate effects.

Only affective empathy, in addition to the verbal ability control added to model 1, was a suitable addition to the model 2, with this control model maintaining good fit to the data, $\chi^2(22)$ =26.95, p = .213, CFI = .996, SRMR = .033, with all other control variables (age, gender, non-resource oriented prosocial behaviour and overt and relational aggression) reducing the model to poor fit, CFI < .90, SRMR = > .09. Similar to model 1, there were many non-significant paths, therefore another model with all these paths removed was examined. This model (figure 6.4) also showed good fit to the data, $\chi^2(39)$ =49.12, p = .129, CFI = .991, SRMR = .040.

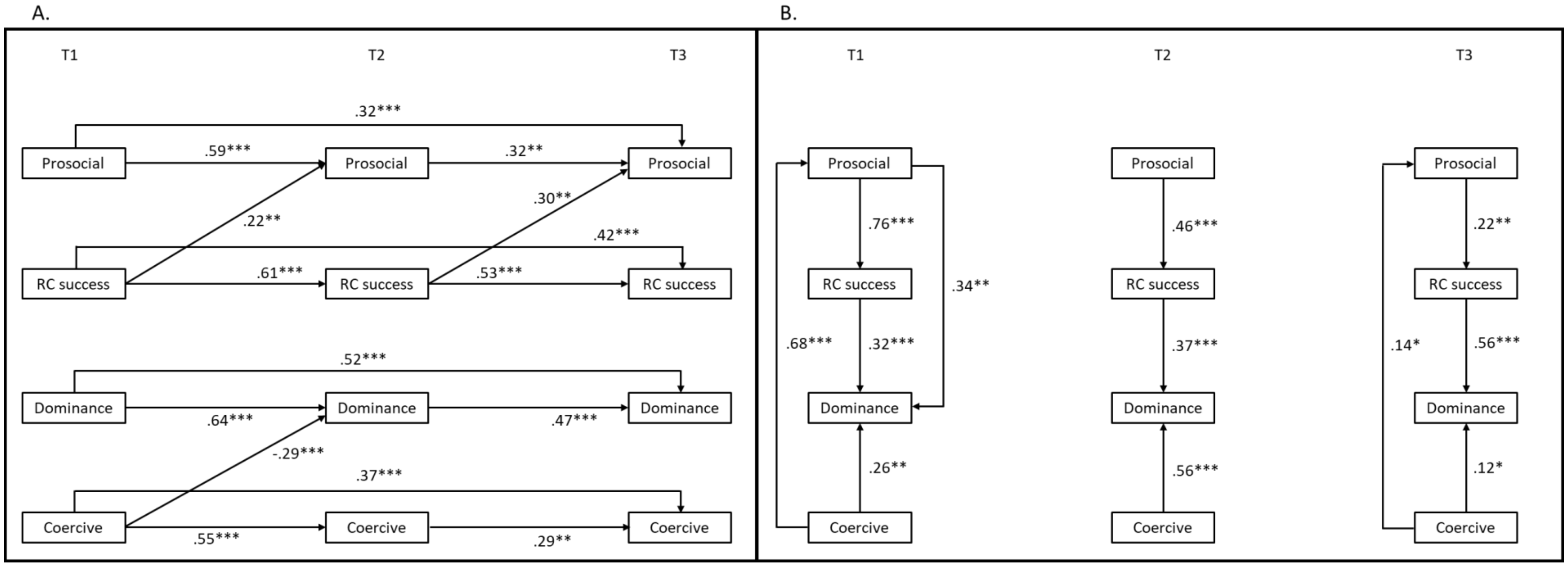

Figure 6.3. Model 1: final ARCL model controlling for verbal ability, with only significant paths. The model is shown in two panels to enhance visual clarity. Panel A (left) depicts all significant autoregressive and cross-lagged path of interest. Panel B (right) depicts all significant concurrent paths of interest. Error terms are not shown are not shown for clarity. Path coefficients are standardised.

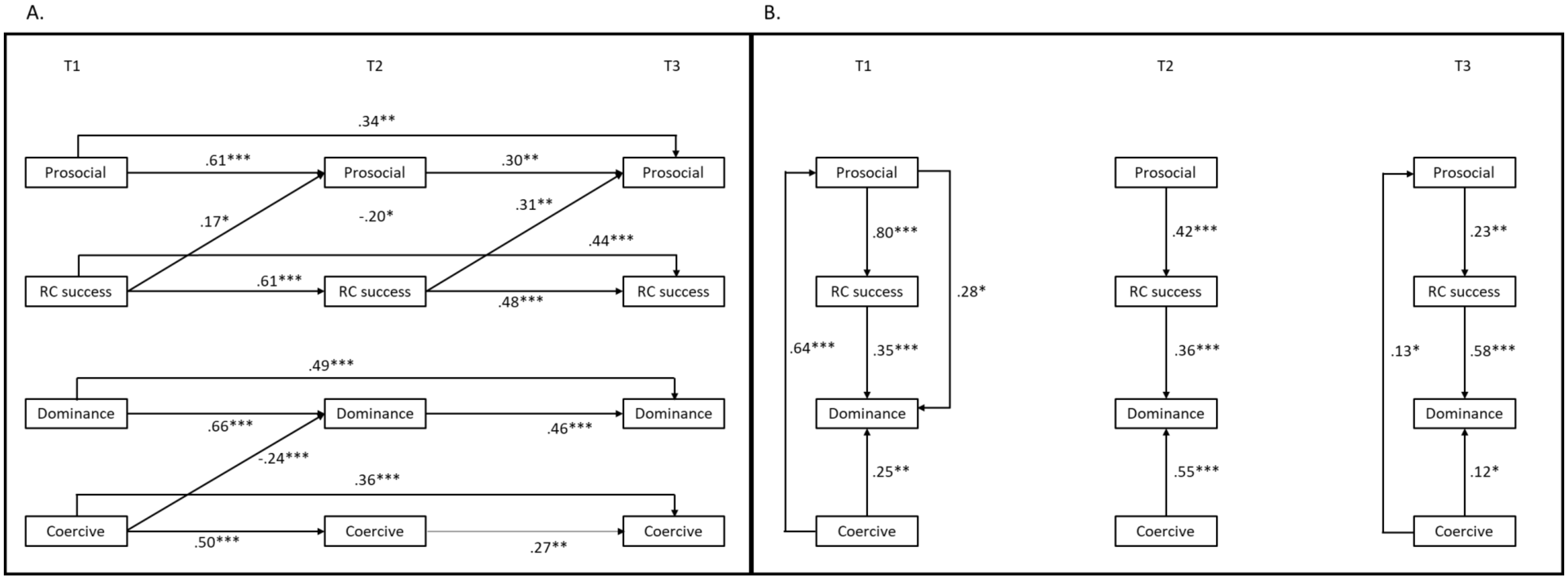

Figure 6.4. Model 2: final ARCL model with verbal ability and affective empathy added as control variables, with only significant paths drawn.The model is shown in two panels to enhance visual clarity. Panel A (left) depicts all significant autoregressive and cross-lagged paths of interest. Panel B (right) depicts all significant concurrent paths of interest. Error terms and the control variable (affective empathy) are not shown are not shown for clarity. Path coefficients are standardised.

Model findings. Regardless of the presence of controls, the two models showed very similar results. Overall the models show that the addition of affective empathy as a control had marginal effects on the relationships (figures 6.3 and 6.4).

Concurrent relationships. For effects on resource control success and social dominance, the concurrent paths in both final models broadly reflected the predictors in the final model of the cross-section timepoint hierarchical regressions reported in section 6.4.2.1. T1 found that there was a significant direct effect on social dominance from both prosocial strategies and resource control success, whilst only prosocial strategy use had a direct effect on resource control success, with coercive strategy use effecting resource control success via prosocial strategy, a reflection of the moderated mediation effect discussed in detail in study 1 of this thesis. T2 showed only coercive strategy and resource control directly affected social dominance, whilst only prosocial strategy directly affected resource control success. At T3, results mirrored those of T2, with the addition of a slightly significant direct effect of coercive strategy on prosocial strategy.

Autoregressive paths. Again, both model 1 and model 2 showed the same path patterns. All T1-T2 paths were highly significant and betas were all $\beta \geq .50$. All T2-T3 betas remained significant, however they had all decreased relative to their T1-T2 values, particularly for both strategy dimensions, which also saw a reduction in significance. A similar trend was found for the T1-T3 direct autoregressive paths, with all paths highly significant, but both strategy dimensions exhibiting the lowest coefficients.

Cross-lagged paths. Again models 1 and 2 showed the same path patterns. Both models found that resource control success and T1 and T2 positively predicted prosocial resource control strategy use at T2 and T3, respectively.

Both models found that coercive strategy use at T1 negatively predicted social dominance at T2, but neither found this relationship at T2-T3.

To investigate this negative lagged association described above, further regression analyses were conducted to investigate mediation effects. It was hypothesised that both T1 social dominance and T2 coercive strategy were both acting as mediators/moderators, resulting in the negative relationship between T1 coercive strategy and T2 social dominance. However, when *separately* entering these potential mediators as predictors alongside T1 coercive strategy predicting T2 social dominance, each mediator only acted to completely mediate the positive relationship (shown by the preliminary correlation analysis) between T1 coercive strategy and T2 social dominance, rather than reverse to relationship to negative (see figure 6.5). Whereas when entered into the same regression together both mediators caused the reversal seen in the ARCL models. Therefore, interaction between these two mediators were suspected to be causing this effect. An interaction term T1 dominance and T2 coercive strategy use was added to the regression model, $_{\Delta adj}R^2$ =.64, $_{\Delta}F(4, 12) = 7.98$, $p = .002$. and was found to be significant, $\beta = -.91$, $p = .048$. Upon splitting the sample into low, average and high dominance groups for further interaction investigation (Aiken & West, 1991; Renouf et al., 2010), it was found that a positive relationship remained between T1 coercive strategy use and T2 dominance for those children who scored both high on dominance at T1 and high in coercive strategy use at T2. Children who did not high in both showed the negative relationship trend shown in the panel diagrams above (figure 6.3 and 6.4).

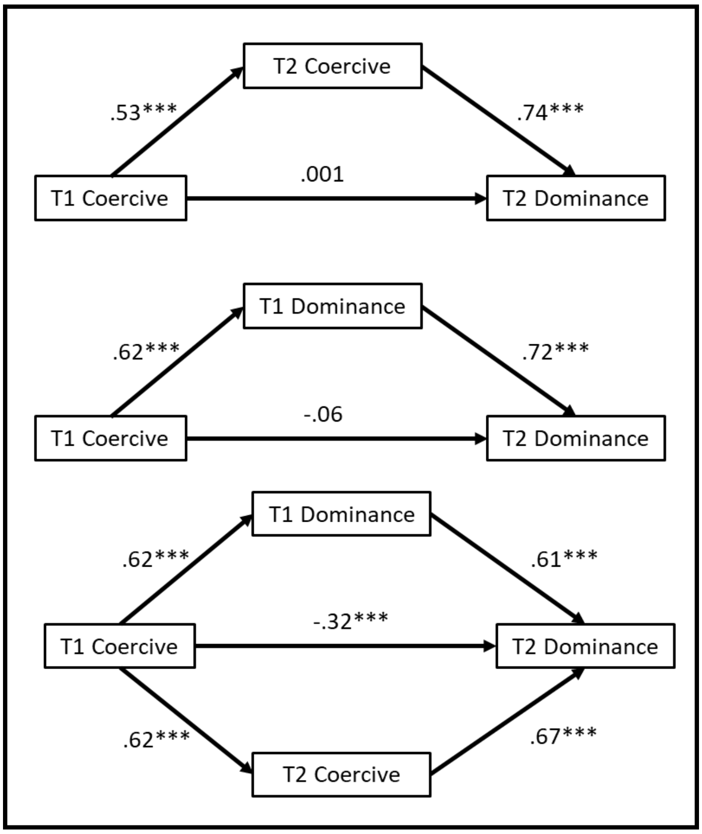

Figure 6.5. Mediation models for the relationship between T1 coercive strategy use and T2 social dominance. Top diagram includes T2 coercive strategy as mediator, middle diagram includes T1 dominance as mediator, followed by the bottom diagram, a double mediation model included both mediators.

6.5. Discussion

Resource control theory (Hawley, 1999, 2014a) and related empirical evidence (Pellegrini et al., 2011; Roseth et al., 2011) has suggested that successful resource control is related to, and predictive of, social dominance in early childhood. Furthermore, research has found that across the first year at school prosocial strategy use increases in frequency whilst coercive strategy use decreases (Roseth et al., 2011). Whilst in some ways this present study corroborates these prior data and theoretical contentions, in others it contradicts.

One important test to carry out prior to any further analyses was an investigation into the stability of the resource controller subtype groups. Whilst these groupings have been utilised in multiple studies, to date they have not been investigated longitudinally. Results revealed that the subtypes were highly unstable across the school year, rendering their predictive utility of other cognitive, affective and socio-behavioural factors ineffective. Therefore, whilst a cross-sectional case-study of a specific group of young children in a peer group may benefit from these behavioural groupings, a study attempting to establish specific group traits that can be applied to the population as a whole cannot rely on such dynamic shifts in group membership (Bernstein, 1981) and the concept of controller subtypes – as they are currently formed at least – serves little predictive utility if this sample is representative of young children as a whole. This sample is not large (N = 92), thus clearly this finding must be corroborated in a larger study; however, given the statistical short-comings of the subtype formation methodology discussed in study 1, re-evaluation and reformation of the subtypes should be a prime concern of future endeavours in the field of resource control theory.

The results from the longitudinal analysis of strategy use over time are in accordance with previous findings. McGrew (1969) found young children's agonistic behaviour to decrease from year start to year finish, whilst Roseth et al. (2011) found that coercive resource control strategy use specifically (McGrew did not specify the aim of the aggressive behaviour) decreased over the course of the first school year. The current results also corroborate Roseth and colleagues' findings – that prosocial strategy use increases across the school year. These results intuitively make sense; whilst data regarding the teacher's behaviour towards the children, their teaching style and classroom ethos were not collected, it is reasonable to assume that a behavioural norm of prosocial behaviour was promoted by the teaching staff across the year. Anecdotally, this author noticed many occasions where teachers intervened during agonistic contests and encouraged the aggressor to admit they were wrong and say how they should have behaved. These occurrences seemed to become less frequent over the three data collection phases. Future research should gather data on such teaching staff behaviours as it seems very plausible that ‘top-down’ moral models are a crucial feature in shaping the patterns of behavioural change noted in this present study.

Analysis of the relationships between behaviour, resource control success and social dominance revealed some interesting results. Regressions at T1 revealed results broadly in line with resource control theory (Hawley, 1999), in that both prosocial and coercive strategy use contributed to social dominance. Similarly, as discussed in more detail in study 1, T1 regressions also suggested the impact of reconciliation behaviour, evidencing a moderated mediation relationship, whereby, in part, coercive strategy use impacts resource control success through prosocial strategy use. This indirect effect was also found via the T3 regression analysis, though the effect was significantly reduced. As discussed in study 1 however, one must be cautious when interpreting these relationships as evidence of reconciliation behaviours, as whilst Roseth, Pellegrini and colleagues evidenced reconciliation via direct observation where time between the initial coercive move to obtain the resource and the follow up reconciliation behaviour was noted, in this current data set, no such immediate/short-term temporal data was gathered and no questions specifically regarding these reconciliation behaviours asked of the teachers. Clearly this is a further avenue for future research, as still to this date, there are only two longitudinal studies (Pellegrini et al., 2011; Roseth et al., 2011) that have included such reconciliation data.

At each timepoint, the hierarchical regressions also found non-resource-oriented prosocial behaviour to significantly predict social dominance. It is possible that the teacher-rated measure used may include information regarding other prosocial resource control strategy that was perceived by the teachers as not targeting a desired resource when in fact it was. When added to the ARCL panel model as a control (either including lagged effects or simply as a concurrent control variable), non-resource-oriented prosocial behaviour reduced the model to a poor fit according to the indices, suggesting that its longer-term effects are not significant and its concurrent effects become redundant when accounting for the lagged effects of the other variables in the model. However, if this measure did indeed account for some more subtle prosocial strategy use, then this may yet be an important factor, which should be investigated by future studies with a larger sample size.

It is interesting also to note that social preference had no relation to social dominance or resource control at any timepoint throughout the year. Whilst Roseth et al. (2011) found positive peer regard to be positively related to dominance throughout the year, no association was found via correlations or when added into multiple regressions. It may be that dominant children in this sample were not preferred by the class overall as they tended to associate with a select group of peers in which they were the dominant individual, therefore preference would only be in terms of that small group and not necessarily bare out across the class. Evidently, further research is needed to examine this possibility.

Whilst empathy was a non-significant predictor in the final models for the resource control success and social dominance hierarchical regression, it was the only control added to the ARCL models that sustained model fit. Whilst there were some significant time-lagged effects of empathy suggested by the preliminary correlations, controlling for this factor made no significant difference to the relationships modelled in the panel analyses. As discussed in study 2, it is likely that the measure of affective empathy used also picked up cognitive empathy, thus this factor should realistically be viewed as a combination of both affective and cognitive empathy. It is therefore counter-intuitive that there is no evidenced relationship between behavioural outcomes and empathic capability (as well as ToM), as understanding others' emotional state would plausibly confer behavioural benefits in terms of persuasion skills or tailored behavioural approaches to resource contest situations (Pellegrini et al., 2011). This lack of significant finding therefore, rather than reflecting such a puzzling reality, may in fact represent an issue that many studies such this are confounded by: the measurement of psychological capabilities through the removal of the participant from their usual behavioural environment. That is to say, given the necessary practical limitations placed on this study, children were required to undergo ToM and affective measures in isolation from their normal classroom social interactions. It may therefore be that empathy and/or ToM is a key factor in behavioural and strategic decision-making, but only when inextricably linked to the immediate social environment that a young child finds themselves in at that specific time. Future observational studies should attempt to gather data on ToM and empathy being used in real-time social interactions – though how this would be accurately achieved is certainly a topic for thought in itself – as such context may be the trigger for otherwise unmeasurable empathic skills.

The present results also mark a change over time in potential causal factors of resource control success and social dominance. T1 corroborates prior theory and findings that both prosocial and coercive control strategy use contribute to both resource control success and social dominance. However, at both T2 and T3 these relationships diverge. At both time points, coercive strategy use but not prosocial use predicts social dominance, however this pattern is reversed for resource control success. The concurrent paths in the panel diagrams corroborate this finding, though there is a slight indirect effect of coercive strategy (via mediation by prosocial strategy at T3). These panel model findings are also regardless of the other cross-lagged and autoregressive effects included in the models. That resource control and social dominance may be achieved via *different* means, suggests that they should not be treated as one-and-the-same. Importantly, resource control success is a stable and strongly significant predictor of *concurrent* (within-timepoint) social dominance across the school year. Taken together, these concurrent findings suggest that in the initial few weeks of school, both strategies are used to in combination (e.g. potentially reconciliation) to *successfully* compete for control of resources. However, they are also both used to compete for social dominance *directly* as a social resource in itself. Therefore, social dominance may be achieved via two routes/mechanisms, one through direct behavioural competition for it as a social resource, the other through attainment of resources which likely creates the resource-based dominance differential as previously described in earlier dominance works (e.g. McGrew, 1972; Strayer & Strayer, 1976). As the school year progresses however, the most effective strategies for achieving social dominance diverge, depending which route is pursued (whether intentionally or not); whilst prosocial strategy use maintains its supremacy over coercive strategy use in terms of successfully gaining resource control, it loses effectiveness as a strategy used in direct competition for social dominance as a resource itself, with coercive strategy becoming the sole effective behavioural strategy. Similarly, coercive behaviour by the middle of the year (and largely at the end – the mediation effect suggested by the T3 panel model is barely significant) has lost its effectiveness – even in combination with prosocial reconciliation behaviour – as a strategy for resource control, other than competing for social dominance itself.

Yet one must be wary to conclude from these findings that reconciliation following coercive contest is increasingly ineffective over the first year at school. The present behavioural data gathered – aside from being teacher-ratings-based which necessarily will introduce at least some measurement error – is specifically concerning behaviour use *frequency* and not *context*. Therefore, the behavioural reality may therefore be, that whilst coercive strategy use decreases over the year, reconciliation remains effective, just used less often given the need to reconcile reduces. Indeed Roseth et al. (2011) have shown that whilst coercive behaviour decreases, reconciliation behaviour becomes *more* associated with social dominance across this first year at school.

The time-lagged effects presented here also reveal some notable findings. The positive lagged relationships shown between T1 resource control success and T2 prosocial strategy use, and T2 resource control success and T3 prosocial strategy use, are in-keeping with theory and the finding that prosocial control strategy use increases across the year whilst coercive strategy decreases by the end of the year. Specifically, that resource control success – when primarily achieved via prosocial control – would encourage proceeding prosocial strategy use as it has proven both a successful strategy and may well be increasingly seen as the behavioural norm by the class.

However, a strong note of caution should be applied when attempting to interpret the negative relationship depicted by the ARCL models. Specifically, the results show that time-lagged correlations, such as the preliminary positive correlation between T1 resource control success and T2 social dominance, are in accordance with resource control theory as resource control success to confer increased social dominance (Hawley, 1999). However, when mediating variables T1 social dominance and T2 resource control success are added to the regression as predictors, this relationship reduces to non-significance (figures 6.3 and 6.4).

Similarly, the positive lagged relationship between T1 coercive strategy use and T2 dominance found in the preliminary correlation analysis actually becomes negative due to the interaction between its mediators T1 dominance and T2 coercive strategy use. However, this is in line with theory when considering T1 coercive strategy use remains a *positive* predictor of T2 dominance for these children who have both 1) achieved high dominance status at T1; and 2) continue to behave highly aggressively at T2. That is to say, those who achieved social dominance early in the year, likely through aggressive means, continued to behave aggressively at T2 as this was an affective strategy for attaining dominance. However, those who behaved aggressively at T1 but *failed* to achieve high dominance status, if they continued to behave aggressively at T2, they would decrease in dominance status. This may be a true reflection of the benefits of establishing social dominance early in the year – one may have more behavioural freedom later, even if the average behaviour of the classroom has increased in terms of prosocial displays. Indeed, this may also be reflected in the slight increase of coercive strategy use (as well as prosocial use) at T2.

Regarding the cross-lagged results, a notable finding is the *absence* of significant paths between resource control success and social dominance, not in keeping with theory, which contends that resource control results in social dominance which in turn sustains increases resource control. Whilst the concurrent regressions within the panel models suggest that resource control is indeed a short-term predictor of social dominance, the lack of lagged effects suggest that similar longer-term effects do not occur, neither does the ability of social dominance to allow advantageous access to resources exists in the long term. These findings may reflect a fundamental error in resource control's reasoning; however, perhaps more likely, they may reflect the biasing of the teacher ratings by the child's 'social *prominence*' rather than actual social dominance. Whilst social prominence has been linked to peer status and social regard (Antonius H. N. Cillessen & Mayeux, 2004; Hawley et al., 2007) it is not synonymous with social dominance. Aggression in particular has been found to be effective at maintaining prominence in adolescents (Antonius H. N. Cillessen & Mayeux, 2004) and it is perhaps no coincidence that teacher-ratings of coercive strategy use is directly positively associated with their ratings of social 'dominance' at all time points. Thus, it is plausible that those children, in their attempt to win resources, or their more direct 'bid' for social dominance amongst their peers, use aggression, but fail. Rather, they succeed in catching the eye of teachers as they are socially prominent due to their aggressive displays; to a teacher dealing with upwards of twenty-five or thirty children in their class, such prominence can understandably be synonymised with dominance. Yet the reality may in fact be that their aggression failed in gaining resource control (present and previous findings suggest this is likely, particularly when not paired with reconciliatory behaviour (Roseth et al., 2011)) and/or dominance, but simply gained attention.

Nevertheless, this is not to say, that prominence is not a key requirement of dominance in early childhood; it by necessity is. The idea of Machiavellian puppet master, pulling strings from the shadows is a poetic hypothetical example of someone with high social dominance but little social prominence. Importantly, however, young children lack such subtle subversive capabilities – social prominence, the ability to get noticed in the first place, is critical to attaining higher social dominance status at this age. Importantly however, one cannot assume prominence innately and certainly results in dominance. Such potential confounding of the dominance measure by social prominence is difficult to avoid when gathering the data via teacher ratings as they will not have the time to carefully assess whether social interactions result with dominance or 'stop short' at prominence. Once more, detailed observational studies will be key in separating these two concepts in the future.

Without exception, the autoregressive findings from the panel model showed strong positive prediction across the year. Taking into account the results from the analyses of mean strategy use change over year, this shows that overall, those children using more prosocial or coercive strategies at the start of the year continued to do so throughout the year, relative to their peers. However, absolute prosocial behaviour gradually increased throughout the first two timepoints and plateaued by the end of the year, whilst coercive behaviour slightly increased at timepoint 2 but sharply dropped by the end of the year. Resource control success also predicted itself consistently over the year, showing that, regardless of other concurrent or time-lagged factors, those adept at resource control at the start of the year, remained so by the end. This was also found to be the case for social dominance.

This stability of social dominance across the year in agreement with the theoretical position of Bernstein (1981), in that once established, dominance is somewhat self-enforcing – that by definition, the need to compete for dominance is nullified upon its achievement. Yet Bernstein (1981) contends that dominance is, to an extent, dynamic; it requires occasional reinforcement and this may explain the slight increase in coercive strategy use at T2. Both McGrew (1969) and Roseth et al. (2011) found this same slight significant increase in aggression part-way through the year in an otherwise decreasing aggression trend over the whole year. Whilst both these studies attributed the increase to the children's return from a school break, which had led to decay of dominance relationships and therefore needed (aggressive) reinforcement, this present study can find no such break they can uniformly explain this increase. However, this does not mean that decay of dominance relationship does not occur over time unless prolonged social separation occurs.

It may be that simply the passage of time, which also sees a steady reduction in coercion, naturally leads to the situation where a 'subordinate' child 'tries their luck', having not been the victim to an (or as many) aggressive outburst by a dominant child for some time. It may therefore take some weeks or months for this decay to occur, regardless of holidays. Regardless, the results indicate that the establishment of superior dominance status early on in the year is a key factor in possessing a similar status at the end of the year. An interesting question for future examination, is whether such dominance decay occurs of social dominance is achieved via purely prosocial strategies. Prior research has shown that dominance relationships are maintained through prosocial means (Pellegrini et al., 2011; Roseth et al., 2011), therefore for those children who only use prosocial means (or very limited coercion) to establish dominance, do they simply continually reinforce their relationships by using the same strategies that they used to establish dominance initially?

Conclusions

In keeping with theory and prior findings, this study found that whilst coercive strategy use dropped significantly by the end of the first school year, prosocial strategy use increased. Moreover, panel models suggested that the causal pathway – strategy use leads to resource control, leads to social dominance – has merit in the short-term. Disagreements with such a contention arose however, when examining the time-lagged relationships; whilst the negative associations found between resource control and social dominance later in the year are quite possibly artefacts of low sample size and power, the consistent lack of positive association between the two concepts (along with the prominence of aggression as a short-term predictor of the dominance variables), suggest that the dominance measure may be confounded by social prominence. Future study should endeavour to include detailed observations of larger child samples to not just gain accurate data on differences between prominence and dominance, but to also investigate how empathy, ToM and other cognitive/affective factors contribute to strategy use, resource control and social dominance in early childhood.

Chapter 7 – General discussion

7.1. Chapter summary

This final chapter integrates the findings from each of the empirical studies presented in this thesis, as described in chapters 3-6, in a detailed discussion to provide a holistic picture of this project's achievement. First, the findings from each study will first be reviewed in the context of answering the research questions described in the literature review (chapter 1); second, how the findings contribute to the wider field of research and theoretical implications will be discussed. Third, limitations of the project will be remarked upon. Finally, overall conclusions will be drawn and directions for future research and implications for practiced will be summarised.

7.2. Overview of findings in relation to the research questions

The overarching questions of this thesis were:

1) What are the relationships between frequency of resource control strategy use, resource control success and social dominance over the first year at school?
2) What are the potential influences of social, cognitive and affective factors on the relationships examined in response to question 1 over the first year at school?

To this author's knowledge, this was the first research project to investigate the associations of resource control strategies with resource control success and social dominance along with a variety of cognitive and affective factors, both cross-sectionally and longitudinally. It was also the first project too, within one research study, to directly compare both categorical and continuous data for resource control strategy, i.e. strategy subtype and continuous strategy dimensions. Studies 1-3 (chapters 3-5) focused specifically on the data gathered at timepoint 1 (T1), the start of the school year, whilst study 4 (chapter 6) examined relationship across all three timepoints – the start, middle and end of the children's first year at school.

Question 1 *– What are the relationships between frequency of resource control strategy use, resource control success and social dominance over the first year at school.*

Research question 1 aimed to highlight novel areas of research – key areas within resource control theory-based work that have not yet been scrutinised in detail. First, it proposed examination of how resource control strategy use relates to resource control success and social dominance as separate variables, rather than using one as a proxy for the other or combining them into a social dominance composite as previously done (Hawley & Geldhof, 2012; Hawley et al., 2007). Second, it proposed direct comparison of the two prior methods of classifying resource control strategy variables – either formed into categorical resource controller subtypes into which participants be put (Hawley, 2003b, 2003a; Hawley & Geldhof, 2012; Hawley et al., 2007) or as two different continuous prosocial and coercive 'strategy dimensions' (Pellegrini et al., 2011; Roseth et al., 2011).

Study 1 (chapter 3) investigated the relationship between resource control strategy, resource control success and social dominance, using cross-sectional data taken early in the child participants' first year at school (T1). It found that there was no statistical difference between the coercive, prosocial and bistrategic controller subtypes in terms of social dominance at the start of the school year, but they were all significantly more dominant than both typical and non-controllers. Analysis of the continuous strategy data revealed a roughly similar finding – that both prosocial and coercive behaviour positively predicted social dominance and did not significantly differ in their contribution to social dominance teacher ratings at T1. However, analysis also found that controller subtype groups did not statistically differ from each other in terms resource control success. Analysis of the continuous prosocial and coercive strategy data found a negative moderated mediation effect. Specifically, prosocial strategy use mediated coercive strategy use's effect on resource control success. In turn, coercive strategy use moderated its own mediation.

A further analysis in study 1 (chapter 3) examined and compared the relative and absolute prosocial and coercive strategy use frequencies for the resource controller subtype groups. Comparison of the relative strategy use between the subtypes revealed that bistrategic controllers scored joint highest in coercive resource control strategy use along with coercive controllers. Bistrategic controllers scored joint highest in prosocial strategy use with prosocial controllers, and both used prosocial strategies more frequently than the other controller types. However, no significant difference in prosocial strategy use was found between prosocial controllers and coercive controllers. Analysis of differences on strategy use within each subtype showed that all subtypes used prosocial behaviour significantly more frequently than they did coercive strategies of control.

As the summary of study 1's findings above show, results from the examination of the relationship between resource control strategy use, resource control success and social dominance was largely dependent on whether the strategy variables were formed as categorical subtypes or continuous, with clear discrepancies between the subtype and continuous strategy variables found in relation to resource control success. Study 4 (chapter 6) continued to answer this first question by expanding the examination to all timepoints, finding differences between how strategy (the continuous variables) use relates to resource control and social dominance at each timepoint. Whereas study 1 (chapter 3) found that both prosocial and coercive strategy use at year start were direct predictors of social dominance, study 4 (chapter 6) found that at the middle (T2) and end (T3) of the school year, only coercive strategy use was a direct predictor, with prosocial control strategies acting via resource control success as a means to social dominance. Moreover, whilst study 1 (chapter 3) established that coercive strategy use predicted resource control success when mediated by prosocial control strategy, study 4 (chapter 6) found that at T2, this mediation was lost in addition to coercive strategy use not showing a significant direct effect on resource control success when accounting for prosocial strategy use, suggesting that coercive strategy was ineffective at attaining/maintaining control of resources; at the end of the year, study 4 (chapter 6) found that this mediation had returned to marginal significance. Comparison to the subtype findings at T1 found in study 1 (chapter 3), and in previous literature, was deemed empirically inconsequential as study 4 (chapter 6) also examined the stability of the subtype groups across the three time points and found that the subtypes were to dynamic to provide reasonable predictive utility (Bernstein, 1981), with no statistically discernible shared factors that could account for the seemingly random patterns of change seen over the three time points.

Studies 2 and 3 (chapters 4 and 5) examined the cross-sectional T1 data for the cognitive/affective variables of interest in this thesis (ToM, empathy, emotion comprehension, selective moral disengagement, discussed below), however, in order to fully address research question 1, longitudinal examination of the data was required which was provided by Study 4 (chapter 6). (Note: Study 4 also provided the longitudinal analysis required to fully address question 2, but is discussed in the section regarding question 2 below).

Study 4 (chapter 6) examined the stability of resource control strategy, resource control success and social dominance over the course of the year (whether they predicted themselves at each time point) and whether use of either strategy type earlier in the year, accounting for the effect of affective empathy (having been shown to be a significant predictor of initial strategy use in study 3) predicted resource control success and/or social dominance at the end of the first school year. Similarly, would resource control success and social dominance at the start of the year predict each other at the end of the year? These relationships also took into account possible mediation by variables at T2.

Study 4 (chapter 6) found that both strategy dimensions, resource control success and social dominance at the start of the year directly predicted themselves at the middle and end of the year. Further findings were that resource control success at the start and middle of the year positively predicted prosocial strategy use at the middle and end of the year, respectively. Coercive control strategy at the start of the year only positively predicted social dominance at the middle of the year for those children who had initially been rated as high for social dominance and continued to be aggressive in the middle of the year. If this was not the case, then initial coercive strategy use *negatively* predicted dominance at the middle of the year. These results suggest that a child who more often uses coercive strategy but fails to establish high social dominance status towards the start of the school year, will nevertheless continue to use these strategies and continue to fail to increase their dominance status. However, a child who has succeeded in establishing high dominance status towards the start of the school year, may actually benefit in terms of dominance by continuing this higher aggression (relative to their peers) at the middle of the year.

Study 4 also examined changes in overall prosocial and coercive strategy use frequency over the academic year as well as how factors earlier in the year may have impacted resource control success and social dominance at the end of the year. Prosocial strategies were found to increase significantly by the middle of the school year and then plateau by the end of the year. Coercive strategies were overall used significantly less across all time points compared to prosocial strategies and saw a slight rise at the middle of the year with a subsequent drop by the end of the year, resulting in an overall significant decrease in coercive strategy use over the school year.

Overall, question 1 was answered in part by study 1, with a more detailed longitudinal investigation of the stipulated relationships in study 4. The theoretical implications of these findings are discussed in detail in section 7.2 below.

Question 2 – Examine the potential influences of social, cognitive and affective factors on the relationships examined in response to question 1.

This question was answered by studies 2-4 (chapters 4-6) of this thesis. Study 2 (chapter 4) focused on empathy, emotion comprehension and ToM's relationships with resource control strategy use, resource control success and social dominance near the start of the school year, whilst study 3 (chapter 5) focused on a resource contest opponent's RHP's relationship with strategy selection, resource control success and social dominance near the start of the school year, accounting for the ToM, empathy and emotion comprehension variables introduced in study 2 (chapter 4). Study 4 (chapter 6) then investigated whether these findings were borne out across the whole score year, and whether such cognitive and effective factors, in addition to social factors, have a significant longitudinal effect on the aforementioned behavioural relationships to resource control success and social dominance.

Study 2 (chapter 4) continued the focus on the beginning of the school year (T1) and expanded upon study 1 (chapter 3) to include ToM, empathy and emotion comprehension factors, as well as selective moral disengagement, in the investigation into strategy use, resource control and social dominance. As with previous studies, both subtypes and continuous strategy use data were analysed. Results showed that no cognitive or affective factor introduced in this study associated with any of the subtypes. However, analyses showed that empathy significantly predicted strategy use when in continuous form. Specifically, affective empathy was found to positively predict prosocial strategy use, whilst affective empathy only had a positive effect on coercive strategy use if the cognitive empathy score was high. When affective empathy was added to hierarchical regressions for social dominance, affective empathy (having shown significant positive correlation to social dominance) exhibited non-significant prediction of social dominance following the addition of the resource control strategy factors. These findings showed partial agreement with the hypotheses – that ToM, emotion comprehension and empathy would some positive relation to resource control success and social dominance – in that affective empathy, with interaction with cognitive empathy were shown to predict, at least in part, strategy use at the start of the school year, which in turn were significantly associated with resource control success near the start of the school year, as shown in study 1 (chapter 3).

Study 3 (chapter 5) continued the focus on resource control strategy at the start of the school year but expanded the examination of the control strategy associations with resource control success and social dominance to include resource holding potential (RHP) comprehension, measured via child responses to resource contest cartoon vignettes. As with study 1 (chapter 3), associations with the responses to the RHP comprehension scenarios (prosocial or coercive responses) were analysed for both the controller subtypes and the continuous strategy data. No associations were found between response type and either subtype or continuous strategy dimension. Study 3 (chapter 5) also investigated whether the children's response to the resource contest scenario depended on the characteristics of the resource opponent in control of the resource. Girls exhibited significantly more prosocial responses compared to boys overall, and boys exhibited significantly more coercive responses compared to girls overall. Prosocial responses were given significantly more frequently for both male and female participants when the opponent was 'not very tough' as opposed to when they were 'very tough' in the RHP comprehension vignettes. However, none of these gender differences appeared to have any effect on overall resource control success or social dominance ratings by the teachers.

Interestingly, study 4 found that, whilst T2 prosocial and coercive strategy were found to be positively predicted by affective empathy as shown at T1 in study 2, by the end of the year (T3) affective empathy had no significant predictive value on either behavioural dimension. Overall these comparisons of the predictors of resource control and social dominance show that the behavioural predictors of resource control and social dominance – and their cognitive/affective influencers – may well change over the course of a child's first year at school.

7.3. Methodological considerations

7.3.1. Resource controller subtypes

Currently, only one methodology exists in the literature that categorises children based on their resource control behaviour. This methodology (e.g. Hawley, 2003b) divides participants into the five subtypes grouping detailed in this present thesis and determines which subtype a child belongs to based on the frequency that they use both coercive and prosocial resource control relative to their peers (for details of this methodology, see chapter 2). Multiple studies have used the subtypes as a means to distinguish what are assume to be distinct behavioural types and attribute the variation in a variety of characteristics (Hawley, 2003a, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007), including resource control and social dominance to the presumed differences in resource control behaviour shown by these different subtypes; however, whether there are *actual* statistical differences in the frequencies of prosocial or coercive behaviour between the different subtype groups has not been examined to date. As stated in chapter 1, for example, an individual classed as a prosocial controller may have virtually identical rates of coercive resource control behaviour compared to an individual who is classified as a coercive controller – that is to say, they show no statistical difference in coercive control strategy use frequency. Yet they are classified as different behavioural types because they have fallen just either side of the 66th percentile cut-off for that is requisite for classification coercive control. This could result in the misleading behavioural differentiation between subtype groups, with one being classified as a coercive controller, the other being classified as a prosocial or typical controller (depending on their prosocial strategy use). Study 1 (chapter 3) found this to be the case, at least in this present sample, as there was no statistical difference in prosocial control strategy use between coercive and prosocial controllers. Coercive controllers were found to use coercive strategy significantly than prosocial controllers, however, whilst not found in this specific example, the lack of statistical guarantee of behavioural difference remains built into the formulation methodology of the subtypes.

A second issue highlighted in chapter 1 regards subtype stability over time, which has not been examined empirically in any study to date. Studies have found that dominant children reduce coercive behaviour over time (Roseth et al., 2011). As a highly socially dominant subtype, bistrategic controllers would therefore decrease their rate of coercive strategy use over time and increase their prosocial control behaviour rates. This thesis hypothesised that if, for example, a bistrategic controller dropped these coercive strategy rates enough in relation to their peers, then by the subtype formation methodology, they would reclassify as *prosocial* controllers, in that they could ultimately employ low rates of coercive behaviour and high rates of prosocial behaviour, relative to their peers. Whilst things (specifically in this case a child's strategy use frequency) may change categorisation boundaries, the frequency – and the predictability – with which they do so determines the utility of invoking the use of that category in the first place (Bernstein, 1981). In terms of subtype usage specifically, this study found that a small minority of children remained classified as the same subtype between any of the timepoints. Moreover, the subsamples that showed the same change patterns, e.g. from bistrategic to prosocial to typical, were very low, sometimes with only 1 child displaying a specific transition, suggesting there was no clear patterns to the changes and making statistical analyses attempting to associate those changes with other factors redundant. This evidence clearly shows high instability of the subtypes as they are currently formulated – which makes the predictive utility of the subtypes in terms of medium/long term associations with other characteristics unreliable.

A further consideration, in light of these findings regarding subtype unreliability, is the issues surrounding the continued use of these specific subtype labels. The specific labelling of the subtype groups causes a further problem in terms of clarity. In the only resource control theory-based study to date (that this author is aware of) to provide any data describing rates of resource control behaviour in the controller subtype groups, Hawley (2003a) also provided the *absolute* mean scores for self-reported prosocial and coercive resource control behaviour according to controller subtype (p. 286, table 1.). Coercive controllers showed *higher prosocial* control behaviour than *coercive* control behaviour. Coercive controllers are labelled as such due to the *relative* frequency of their behaviour therefore in respect to the methodology's own parameters such a group name can be justified. However, in addition to there being no statistical guarantee that coercive controllers will be significantly different to others in terms of coercive strategy use as discussed above, such a naming convention may not be particularly appropriate in terms of representing real-world behaviour. As stated in chapter 1, if a hypothetical school class *as a whole* exhibits a significantly higher frequency of prosocial resource control behaviour compared to coercive, which is extremely uncommon in the class, then a participant who uses prosocial resource control behaviour the *vast majority* of the time compared to coercive control behaviour, would likely be classified as a 'coercive' controller as only very occasional use of coercive strategies would be needed to methodologically place them under this group label. This raises the question as to whether the 'coercive' label, being purely based on relative behavioural output, is semantically appropriate. Indeed, this hypothesis was in part empirically evidenced in this present thesis. Study 1 found that all subtypes used prosocial strategy significantly more frequently than they did coercive strategy at the start of the year, whilst study 4 showed that overall there was a significantly greater use of prosocial strategy compared to coercive strategy at all timepoint, with the former increasing and the latter decreasing significantly by the end of the year, in accordance with previous findings (Roseth et al., 2011). It is therefore a reasonable to hypothesise further based on this evidence that, given time, coercive strategy use frequency may well drop to levels that can be reasonably construed as isolated or sporadic.

A further issue with the subtype formation methodology not empirically examined in this study but highlighted in chapter 1 is specifically how the group boundaries are decided upon; for example, Renouf et al. (2010) determined the relative rates of non-resource-oriented coercive and prosocial behaviour by standard deviations from the mean scores, rather than percentile divisions. Clearly, subtype classification via standard deviation split rather than percentile split could significantly affect subtype group a child is placed in, thus affecting the ensuing analysis and interpretation of the data.

Evidently, the theoretical arguments and the empirical findings presented in this thesis show that the resource subtype controller categories are in need of revisiting. What such reformation would entail remains to be considered in future study, however one suggestion for improvement would be the inclusion of contextual behavioural data, such as reconciliation behaviour (Pellegrini et al., 2011; Roseth et al., 2011, 2007). A key strength of the subtype groupings is that they combine information from both the prosocial and coercive strategy dimensions in an attempt to provide a more realistic representation of child behaviour, as generally children will not always use solely one or the other strategy type. Yet, importantly the subtype groups (and the continuous behavioural data in this thesis) contain little if any contextual data regarding how and in what circumstances these strategies were employed. Particularly, should resource strategy efficiency and success/efficacy – a child's ratio of attaining and maintaining resource control – be a utilised rather than simply frequency? This could dramatically alter the make-up of the subtype groupings. Such a finding may already be hidden in previous data. Roseth and colleagues (2011) found that young children rated high in social dominance by teachers used coercive strategies to gain resource control toward the start of the year and prosocial strategies to maintain in, with decreases in coercive strategy and increases in prosocial strategy across the school year. Though they did not analyse this data via the subtype grouping, it is plausible to hypothesise that these dominant children would likely be classified as coercive or bistrategic controllers at the start of the year, transitioning into prosocial controllers over the course of the year. Perhaps, rather than defining resource control subtype groups according to the frequencies with which the utilise strategies of resource control within a certain time-point, future resource control groups should consider short-term success of strategy use (and what sort of strategy) whilst also considering the longer-term flexibility of strategic deployment. Roseth and colleagues (2011) showed the most dominant children in the sample not only displayed adaptive strategy use (moving away from coercive strategy and towards prosocial strategy) but they increasingly were socially favoured by peers. Therefore, success/efficacy and contextual adaptation and flexibility may be the key focal points for future strategy group formation.

Evidently a great deal of further work will be required to create resource control strategies that accurately represent the behavioural differences and complexities exhibited by children in their first year at school and beyond, yet this thesis has provided some potential investigative avenues for future research.

7.4. Theoretical implications

Following discussion of issues surrounding the controller subtypes (above), the rest of this final discussion chapter will focus on discussion of the findings in relation to the continuous resource control strategy dimension specifically, unless otherwise explicitly stated.

7.4.1. Strategy's relationship to resource control success and social dominance

7.4.1.1. Concurrent within-timepoint relationships

Resource control theory's definition of social dominance shares features with other earlier definitions of the concept (McGrew, 1972; Schjelderup-Ebbe, 1922; Sluckin & Smith, 1977) such that victory in a resource contest with another individual is key to achieving higher dominance status. Resource control theory has described resource control and social dominance in closely synonymous terms (Hawley, 1999, 2003a, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007). Hawley (1999) defines 'dominant individuals' as "those who are superior at resource control" (p. 110) and that "social dominance inevitably results when individuals are unequal in their ability or motivation to acquire and control resources" (p. 122). In earlier resource control theory studies social dominance was not measured as a separate variable but rather combined with resource control success into a dominance composite (Hawley & Geldhof, 2012; Hawley et al., 2007). Given the theoretical position of resource control theory – that controlling resources is the mechanism by which social dominance is achieved – combined with strong correlations between the two variables, such a composite can be justified. However, prior to this present project, no investigation has been conducted (that this author is aware of) that investigates how resource control success and social dominance relate to other factors as separate (albeit related) variables.

The findings of these present studies show differences between teacher-rated resource control success and social dominance in their relationships to the control strategy frequencies and affective empathy, whilst maintaining strong short-term (within time point) positive predictive associations, empirically suggesting that they are related, as stipulated by resource control theory (Hawley, 1999, 2014b). Yet study 1 did highlight differences. The moderation analysis in study 1 found that at the start of the year prosocial strategy use positively predicted resource control success but only for those who (according to teacher-ratings) exhibited moderate to high use frequency for coercive strategies; whilst coercive strategy use had no direct effect on resource control success. However, social dominance was found to be directly predicted by both strategy dimensions with no mediation or moderation effects. These findings agree with resource control theory in some ways but contradict it in others (Hawley, 1999, 2014b).

A strict resource control theory-based hypothesis would either predict that either both strategies would directly and positively predict resource control success, or – when accounting for more recent findings regarding reconciliation behaviour (Pellegrini et al., 2011; Roseth et al., 2011) – coercive strategies would only contribute to resource control success if quickly followed up with a prosocial reconciliation. In this way, the moderated mediation result presented in study (described above) 1 fits such a prediction. However, what appear to be disagreements – at least initially – between resource control theory-based predictions and the data presented in this thesis begin to emerge when focus is turned to interpreting the strategy dimensions relationships to dominance over time and the differences between resource control success and dominance in terms of their relationships to those strategies. Specifically, resource control theory would predict that social dominance is a result of resource control success, therefore one would not expect to see direct relationships between the strategy dimensions and social dominance. Yet study 1 (chapter 3) evidences that both dimensions are direct predictors of social dominance, even when accounting for resource control success, which suggests that gaining control of resources is not a prerequisite for increasing one's dominance status. The same direct prediction of social dominance – but only for coercive strategy use – was shown in study 4 (chapter 6) for at the middle and end of the year. However, it should be noted that this is not necessarily a disagreement with resource control theory if social dominance is considered as a social resource in itself, from this perspective therefore, it could be competed for directly like any other resource. This is something not overtly discussed in previous resource control theory-based research but can by justifiably viewed as a deepening of the same theoretical position. Therefore, social dominance could plausibly be achieved via two routes, one being through control over resources which creates a dominance differential as previously described in earlier dominance works (e.g. McGrew, 1972; Strayer & Strayer, 1976) and the mechanism proposed by resource control theory (Hawley, 1999).

The other route being through direct behavioural competition for dominance as a social resource itself, a mechanism not explicitly expressed by resource control theory. It is plausible that, for example, attempts to secure material resources may fail, but competing for social attention – logically a prerequisite for command/leadership/dominance in young children – succeeds; in terms of this studies finding, this may have been achieved through coercive control behaviour, it being a significant predictor of social dominance but not resource control success. From here the child could use further social behaviours (either prosocial or coercive) to issue commands or instructions to their peers, which, crucially, may result in them accessing other resources they were previously unable to access. When considering this contention, the relationship between resource control strategy/behaviour, resource control success and social dominance becomes less linear – e.g. not just: resource control strategy use > resource control success > social dominance – and more complex, with feedback loops from social dominance to resource control, for example. Whilst dominance can still be seen as the inevitable 'ultimate' result of successful resource competition (as per current resource control theory), social dominance can also be a specific social resource in and of itself which can be competed for, with it also being a unique 'gateway' resource that allows access to many other resources not directly competed for, e.g. access to resources more traditionally defined under resource control theory (e.g. toys, friendships). Equally, through the hypothetical passive control mechanism outlined above, dominance itself could be conferred on an individual by another benevolent dominant peer, e.g. by the dominant commanding people to do as the individual says.

This ‘dominance as a meta-resource’ mechanism is clearly an important research avenue, one that has been highlighted by this thesis. Longitudinal observational data are required to be able to ascertain whether such dominance-resource control feedback loops exist in early childhood peer groups. Extrapolating from resource control theory (Hawley, 1999) and other work (Bernstein, 1981) this seems very plausible, yet only further research can corroborate this contention.

The within timepoint findings of study 4 – specifically the consistent positive prediction of social dominance by resource control success, supports resource control theory in that, control of resources being a key factor in the establishment of social dominance. However, by maintaining these variables as separate rather than a resource control success/social dominance composite or using one as a proxy for the other, as with previous studies (Hawley, 2003a, 2003b; Hawley & Geldhof, 2012), study 4 (chapter 6) showed that whilst resource control certainly seems a key mechanism in young children’s establishment of social dominance, it is not necessarily the sole mechanism and that behavioural/strategic paths to achieving resource control and paths to achieving social dominance are not necessarily the same.

Additionally, it is plausible that children may gain control of resources without competing for them. For example, a resource controller may attempt to win the friendship of the child by giving them a resource without competition. In this situation the initial resource controller is treating the friendship as the resource. This is not strictly competing as they are not competing against anyone, however importantly the other child uses no behavioural strategy or engages in any form of competition to gain resource control. Control over resources could also be attained via another resource controller’s benevolence, or the “psychological motivational system characterized by altruism” (Hawley, 1999, p. 109), in which a resource is gifted by one child to another due to ‘caring behaviour’. Specifically, this would mean the attainment of a resource for the recipient, but the loss of that resource for the benefactor.

Hawley does recognise the capability of young children to be ‘psychologically altruistic’ (Hawley, 1999, p. 106, footnote 7), yet resource control theory does not consider – at least not explicitly – such an altruism-based mechanism of resource control, however would still fit with in the central theoretical mechanic for the achievement of social dominance – that dominance is achieved through resource control through context-dependent means. A further mechanism for resource control that does not involve direct behavioural input on the part of the child could be a sort of ‘dominance by association’. Though not applicable in this current sample, hypothetically, children that are not effective at competing for resources themselves, my gain dominance status due to association with, say, a sibling in the class who is highly dominant and provides the child with an amount of command or authority that they would otherwise be unable to obtain. This may also be the case with children who are related to staff members for example.

Some of these alternative mechanisms (or others not considered in this discussion) may explain the small but significant 6% of the variance in social dominance accounted for by resource control success found in study 1 that could not be explained by the combined resource control strategy dimensions, though this could possibly be measurement error. Such contentions are currently hypothetical but are plausible alternative ‘passive’ mechanisms for achievement of dominance that does not involve use of resource control strategies and should certainly be examined in future study.

7.4.1.2. Time-lagged relationships

Study 4 revealed some notable findings regarding the time-dependent relationships between strategy use, resource control success and social dominance, with results showing both agreement and disagreement with prior theory and empirical findings in the literature. Moreover, it was the first resource control-based study to investigate how factors at the start of the year impact the outcome of factors at the end of the year.

The time-lagged effects presented here reveal some more interesting and, in some cases, theoretically counter-intuitive findings, at least initially. The positive lagged relationships shown between 1) T1 resource control success and T2 prosocial strategy use, and 2) T2 resource control success and T3 prosocial strategy use, fits with resource control theory. When primarily achieved via prosocial strategy, resource control success would encourage proceeding prosocial strategy use as it has proven both a successful strategy and may well be increasingly seen as the behavioural norm by the class. These positive findings also marry with the other study 4 finding that prosocial control strategy use increases across the year whilst coercive strategy decreases by the end of the year.

As discussed in study 4 however, attempts to interpret the negative relationships found by the cross-lagged models should be done so with caution. Specifically, the results show that time-lagged correlations, such as the preliminary positive correlation between T1 resource control success and T2 social dominance, are in accordance with resource control theory as resource control success is found to confer increased social dominance (Hawley, 1999). However, when mediating variables T1 social dominance and T2 resource control success are added to the regression as predictors, this relationship is changes to non-significance. This could be an artefact of low sample size or may be an effect of adding T2 resource control success and T1 social dominance, which are significant predictors of T2 social dominance.

With this caution in mind, one should at least offer possible genuine relationships that are reflected by such seemingly counter-theoretical findings; only further study of a larger sample will determine how accurate these present findings were. Indeed, closer inspection of the negative prediction of social dominance in the middle of the year by coercive strategy use at the start of the year makes theoretical sense when accounting for mediation and interaction effects and may plausibly be more than a reflection sample size insufficiency. The positive relationship between T1 coercive strategy use and T2 dominance becomes negative due to the interaction between its mediators T1 dominance and T2 coercive strategy use. Closer examination of the findings revealed that those who employed coercive strategies at higher frequencies at the start of the year but *failed* to achieve high dominance status, if they behaved similarly at T2, they would likely *decrease* in dominance status. As cautioned above, this may well be an artefact of low sample size, yet this could be a true reflection of the benefits of establishing social dominance early in the year – young children may have more behavioural freedom later in the year, regardless of overall changes in behavioural and social norms, due to their initial establishment of 'command'. Indeed, this may also be reflected in the slight increase of coercive strategy use (as well as prosocial use) at T2. In line with this rationale, T1 coercive strategy use remained a *positive* predictor of T2 dominance for children who have both achieved high dominance status at the start of the year and who use coercive strategy at a high frequency relative to their peers in the middle of the year. This further corroborates the notion regarding the importance of achieving higher social dominance status, early on in the school year, in so much as achievement of such status early on through aggressive means could likely mean a continuation of similar relative aggressive frequencies as this was an affective strategy for attaining dominance initially, so there would be no incentive for the child to alter behaviour. This interpretation also makes sense given the study 4 finding that T1 coercive strategy use predicted itself at T2 strongly. Such findings are also in line with prior evidence (Roseth et al., 2011) which, like study 4, found a slight but significant increase part-way through the year.

However, it is important to note that the Roseth study gathered data almost every day throughout the academic year compared to this present project's collection which was on 3 timepoints over the year. Specifically, what Roseth et al. (2011) found was that between data collection start and the point at which the coercive 'uptick' occurred, there had been a steady decrease in coercive behaviour. It is therefore plausible that this present study was unable to capture this decrease as it occurred between the timepoints. Therefore, the autoregressive positive prediction of coercive strategy use at T2 by coercive strategy use at T1 should not necessarily be interpreted simply as a non-interrupted continuation of this behaviour, as in the light of previous findings (Roseth et al., 2011) it may in fact be a reflection of a temporary increase.

Study 4 provided a conspicuous absence of positive significant paths between resource control success and social dominance, running counter to the theoretical position that resource control results in social dominance which in turn maintains an individual's control of resources (Hawley, 1999, 2014a). Whilst study 4 finds that resource control is a short-term predictor (perhaps casual factor) of social dominance, it found no positive time-lagged effects between resource control success and social dominance. However, rather than indicating fundamental problems with resource control theory itself, it may be the case that such absence of positive association indicates the biasing effect of a child's 'social prominence' rather than actual social dominance on the teacher ratings of social dominance. Previous studies have linked social prominence to peer status and social regard (Cillessen & Mayeux, 2004; Hawley et al., 2007) yet it should not be conflated with social dominance. Aggression has been shown to maintain adolescent social prominence (Cillessen & Mayeux, 2004) so it may well be that study 4's finding that coercive strategy use is strongly associated with 'dominance' ratings, particularly in the middle and at the end of the school year, may in fact be a reflection of an association between aggression and social prominence. In essence, it is plausible that those children, in their attempt to win resources, or a direct attempt at gaining social use coercion unsuccessfully. However, these aggressive displays would be likely noticed by teaching staff as they would be socially *prominent*; such prominence could easily be mistaken for, or assumed to be a proxy for, leadership and command by a teacher bust with many other children in their class. However, this coercion could fail to gain command – a child's aggressive attempts to 'order around' other children may simply be ignored by them. Indeed failure to achieve social dominance or resource control via coercive means becomes increasingly likely over the school year unless paired with reconciliatory behaviour (Roseth et al., 2011)

Logically however, social prominence *is* crucial to the establishment of social dominance in early childhood. Whilst it is plausible to imagine an adult who can command people indirectly, without establishing dominance directly over those individuals, it is equally plausible to contend that at such a young age, children do not have such extensive cognitive skills, and social, not to mention professional, networks to allow such relatively abstract dominance over others. Thus, for a child attempting to establish higher dominance rank over others, either through resource control or directly attempting a 'leadership bid', being noticed – having social prominence – is an absolute prerequisite for such establishment, yet other factors may well be required to convert such attention into leadership. Avoidance of this 'prominence confounder' to teacher-rated dominance is problematic as they may not have the time to observe in detail whether they have noticed a child's prominence or dominance. Again, observational studies would be key in being able to examine this accurately.

All autoregressive findings from the panel model in study 4 showed significant positive prediction between all timepoints over the school year, suggesting that – when accounting for the additional study 4 finding that prosocial strategy increased and coercive strategy use decreased by the end of the year – children using more prosocial or coercive strategies at the start of the year tended to do so throughout the year, relative to their peers. This is an interesting finding suggesting that there may be less change in the relative behavioural frequencies between the children than the longitudinal changes in subtypes suggested. Therefore, this indicates that there is a predictive behavioural quality to the data that the controller subtypes did not reflect. Rather, the large majority of children were found to change subtypes across the year, the subtype groups incorrectly suggest that children were not behaviourally consistent relative to one another. Whilst the discussion above has already reasonably established that the subtypes require reformulation, this comparative finding by the ARCL models in study indicate that there is in fact relative behavioural predictability in this present data, thus alternative behavioural groupings could be constructed to explicitly reflect that, whilst maintaining the important feature of including both strategy dimensions in the classification method as per the original subtype group formulation (Hawley, 2003b).

The auto-prediction of social dominance across the year in particular shows agreement with previous theory (Bernstein, 1981), which contends that once established, dominance is somewhat self-enforcing and confers a certain prestige to the dominant individual allowing them to go relatively unchallenged, where previously they would have been Yet Bernstein (1981) contends that dominance is, to an extent, dynamic; it requires occasional reinforcement and this may explain the slight increase in coercive strategy use at T2. Both McGrew (1969) and Roseth et al. (2011) found this same slight significant increase in aggression part-way through the year in an otherwise decreasing aggression trend over the whole year. Whilst both these studies attributed the increase to the children's return from a school break, which had led to decay of dominance relationships and therefore needed (aggressive) reinforcement, this present study can find no such break that can uniformly explain this increase. However, this does not mean that decay of dominance relationship does not occur over time unless prolonged social separation occurs. It may be that simply the passage of time, which also sees a steady reduction in coercion, naturally leads to the situation where a 'subordinate' child 'tries their luck', having not been the victim of an (or as many) aggressive outburst by a dominant child for some time. It may therefore take some weeks or months for this decay to occur, regardless of holidays. Regardless, the results indicate that the establishment of superior dominance status early on in the year is a key factor in possessing a similar status at the end of the year. An interesting question for future examination, is whether such dominance decay occurs of social dominance is achieved via purely prosocial strategies. Prior research has shown that dominance relationships are maintained through prosocial means (Pellegrini et al., 2011; Roseth et al., 2011), therefore for those children who only use prosocial means (or at least very limited coercion) to establish dominance, their relationships may be constantly reinforced by using the same strategies that they used to establish the initial dominance differential.

Overall, studies 1 and 4 of this thesis provided data that largely either agree with previous empirical evidence and the contentions of resource control theory, or expand upon the theoretical framework provided (Hawley, 1999, 2014a), in terms of the relationships between resource control strategy use, resource control and social dominance. Studies 2 and 3 (chapters 4 and 5) of this thesis investigated potential causal (theoretically) or influencing cognitive and affective factors that may affect the choice of strategy by a young child, therefore affecting the outcome of their resource control and/or social dominance status.

7.4.2. Possible cognitive and affective factors of strategy selection

To date, there is very little empirical work, on how cognitive, affective and moral judgment in early childhood associate with resource control behaviour, resource control success and social dominance. Studies 2, 3 and 4 (chapters 4, 5 and 6, respectively) of this thesis provided novel data regarding how these domains effect the resource-specific behavioural outcomes and social dominance of young children in their first school year.

7.4.2.1. Theory of mind

Theory of mind was found to have no significant relationships with either resource control strategy dimension or resource control or social dominance, regardless of the specific variable was related to first- or second-order-based assessments. This was the case at the start of the year (study 2, chapter 4) and across the year as a whole (study 4, chapter 6). This contradicted this thesis' hypothesis that ToM would have some positive effect on resource control success and social dominance, possibly with a positive relationship with prosocial resource control behaviour. Yet one could still argue that these findings are consistent with theoretical positions (Hawley, 1999, 2008) and empirical data (Pellegrini et al., 2011) regarding the association between ToM and social dominance and resource control. Specifically, Pellegrini et al. (2011) measured ToM at the end of the school year but not at previous timepoints in the longitudinal study. Therefore, the children had been embedded in their social groupings for a much longer period of time compared to the participants in this present study; this may account for the difference in ToM and social dominance's association. It should be noted that the Pellegrini study sample was younger than the present one (2-4-years-old). Importantly however, only those children above the age of 4 years were permitted to take part on the ToM measures at the timepoint that measured ToM. This significantly lowered the sample size for these measures to *n* = 31, reduced the age range of that subsample. In Pellegrini et al.'s study, age was included as a control when examining the association between ToM and social dominance, however, given that the age range was restricted to the oldest subsection of the sample for the ToM measures, it is more understandable that age did not account for the association, given the restriction on range. It may well have been that age would have done so had the larger sample partaken in the ToM assessments. Study 2 found that ToM has no significant bearing on social dominance or resource control outcome in a sample of 4-5-year-old children at the start of their first school year and this was mirrored by similar nonsignificant findings in the middle and at the end of the year in study 4. Thus, this thesis has provided no corroborative evidence in terms of the prior theory (Hawley, 1999, 2008) and empirical data (Pellegrini et al., 2011) which suggest that a developmental relationship exists between ToM and resource control and social dominance. Given these prior publications, it is somewhat surprising that no significant findings can be reported, yet there are plausible reasons as to why no such results were found. The 4-year-olds in Pellegrini and colleagues had their ToM measured at the end of the year meaning that the children (with the exception of late arrivals) would have been developing in the context of that class social environment for that entire academic year. Whilst this may explain why study 3 found no relationships between theory of mind and the resource control and social dominance variables at the start of the year, it cannot explain the similarly nonsignificant findings found by study four spanning the rest of the year. Importantly in terms of this thesis' findings however, no data was obtained regarding nursery attendance prior to reception class attendance. Attending nursery may well have additional positive effects on ToM development (as well as the other cognitive/affective and behavioural factors of interest) similar to being part of a reception class one academic year on in a child's life. Moreover, some of the children may have attended the same nursery and already have established dominance relationships between them. This is certainly something to be investigated in future.

Another possible reason for the lack of significant findings for ToM is that social context may be a critical confounder, in that that the ToM scenarios were too abstracted from the child's everyday resource control scenarios in which they may very well utilise a context-dependent ToM. This is an important consideration for future research, which could benefit greatly from incorporating ToM reasoning into resource control contest situations that the child participant would encounter day-to-day amongst their peers. Ideally, such an investigation could utilise real-world, naturalistic observation of resource control situations between peers.

7.4.2.2. Emotion comprehension and empathy

As discussed in detail in chapter 1, ToM, empathy and emotion comprehension are somewhat inter-related concepts in the literature. As highlighted in chapter 1, a significant problem within the literature is this that many different researchers and research groups have differing definitions of these concepts. It was therefore necessary in chapter 1 to explicitly state how this thesis defined these concepts and it is these definitions that will used in the ongoing discussion, unless otherwise explicitly stated.

The 'understanding of the nature of emotions, their causes and the possibility of control', (Pons, Harris, & de Rosnay 2004, p. 127) was the definition of emotion comprehension given by the creators of the TEC which was used to assess emotion comprehension in this project. The similarities between this concept and cognitive empathy and ToM are clear. As discussed in study 3, the TEC measures used in the study would require a child to use aspects of both of empathy and ToM to gain higher scores, thus it is understandable that there were no significant associations between resource control behaviour, resource control success or social dominance ratings and TEC score, akin to those results reported for ToM.

The associations between social dominance/resource control and empathy have also been a thus far neglected area of research, therefore study 3 and 4 aimed to contribute novel data to field regarding such relationships. Interestingly, unlike ToM and emotion comprehension, empathy, specifically the affective empathy variable, showed significant associations with both resource control strategy dimensions. Positive associations between empathy and prosocial behaviour is very well documented (for reviews and meta-analysis see Eisenberg & Miller, 1987; Telle & Pfister, 2014). However, there is no direct evidence of such relationships with prosocial resource control strategies specifically and the relationship may be more nuanced when considering these specific forms of prosocial behaviour; no prior studies have separated resource-directed and non-resource-directed behaviours.

It is possible that previous studies that examined prosocial behaviour more generally may have captured prosocial strategy also. 5-6-year old children who viewed a 'sad protagonist' video have been found significantly more likely to give their own possessions to other after watching the video (Williams et al., 2014). This could be interpreted as more 'true altruism' as they are not behaving prosocially in order to gain or maintain control of their material resources. As Hawley also recognised, humans are certainly capable of this type of altruistic behaviour (Hawley, 1999). Conversely however, and perhaps more fitting with resource control theory's 'selfish gene' tenets (Dawkins, 1976), such seeming altruistic behaviour may rather be that children may desire a social resource, such as a friendship and are willing to give up possession of a less important material resource. Under resource control theory, control strategies have been evolutionarily conserved as traits that are 'selfish' rather than 'altruistic', even if that selfishness takes the 'proximal' form of prosocial behaviour; the end or 'distal' goal of the individual is to survive, and thus acquisition of resources are crucial for that. Thus, the empathy/prosocial resource control behaviour findings in study 3 suggest that children more susceptible to emotional contagion from another, attempt to control resources via prosocial strategies more frequently than their peers regardless of how well they recognise their opponents' emotions (cognitive empathy).

Studies have found that empathy negatively associates with aggressive behaviour (Nancy Eisenberg & Miller, 1987; Telle & Pfister, 2014), yet the findings of study 3 found positive association between coercive strategy and affective empathy. 5-year-old children who scored higher in empathy have been found to exhibit reduced coercion and increased prosocial behaviour towards others (Roberts & Strayer, 1996; Strayer & Roberts, 2004) including in material resource contests.. However, there are notable differences in how these studies collected empathy data which could explain the seeming contradictory findings of this present these, with Strayer and Roberts (2004) using video recordings to capture affective empathic facial expressions. However, discussed in study 3, not only did this present research use a picture booked-based measure but that this also was likely capturing cognitive empathy as well (Chrysikou & Thompson, 2015); given the requirement of the child to reflect upon how they are feeling before reporting that to the researcher. Therefore, the affective empathy measure used in this current project was most likely measuring a combination of affective empathy and basic cognitive empathy in the form of self-reflection. The cognitive empathy measure captured 'other' focused cognitive empathy, as the question posed to the children was regarding how the protagonist felt rather than themselves. Study 3 found that those who scored high in cognitive empathy but relatively low in affective empathy, scored lower in teacher-rated coercive resource control behaviour, whilst those high scorers in cognitive empathy who also scored highly in affective empathy, scored higher for coercive resource control.

This cognitive moderation effect suggests that a subset of children, scoring high in both cognitive and affective empathy at the start of school, use both prosocial and coercive control strategies at high frequency; this finding may make more sense when interpreted in the light of Pellegrini and colleagues' *reconciliation* behaviours, they themselves 'very cautiously' suggest that developing theory of mind may be involved in social dominance struggles and reconciliatory behaviour (Pellegrini et al., 2011, p. 255). Given the close conceptual and biological (Chrysikou & Thompson, 2015) overlaps of ToM and empathy, it is possible that those children who score highly on both affective and cognitive empathy are more likely to engage in reconciliation behaviour; that a combination of recognising their initial coercive acquisition of a resource has hurt their opponent (cognitive empathy) and them feeling bad themselves because of it (affective empathy) increases the likelihood of an attempt to prosocially sooth the situation. This would make both the defeated opponent and themselves feel better. Additionally, these children tend to be superior resource competitors and more socially dominant as shown by previous studies (Pellegrini et al., 2011; Roseth et al., 2011) as well as study 1, in which both greater prosocial and coercive resource control behaviour was associated with higher social dominance status at the start of the year, with prosocial resource control behaviour's mediation of coercive control behaviour's effect on resource control behaviour possibly reflecting such reconciliation behaviour. Therefore, reconciliation behaviour may play a part in not just improving the emotions of both the resource winner and loser, but that the social resources (peer relationships) of the 'reconciliator' are not negatively impacted in the longer term, and the reconciliator gains resource control, at least in part (they may decide to share with opponent as their prosocial follow-up strategy), which is still a net resource gain from initially having nothing.

This theoretical association between empathy and reconciliation behaviour maps interestingly onto the findings reported in study 4, which found that not only did associations between empathy and the resource control strategies disappear in the middle and at the end of the school year, but that the moderated mediation involving prosocial and coercive strategy discussed above – which may be a reflection of reconciliation behaviour – disappeared in the middle of the year and weak at the end of the year. This could indicate that empathy-based, or empathy-reliant specific resource control strategies such as reconciliation are not required for resource control social dominance attainment. This could because of the longitudinal effect teaching staff 'interventions' and rule setting in the classroom. Specifically, children may over time simply learn and increasingly obey the prosocial rules of conduct in the classroom, through repeated lessons by the teacher. Thus, at the start of the year, those children who had greater empathic capacities learnt to use strategies successfully because of this cognitive/affective advantage over their peers; however, over the year the other children, though simply learning the rules of conduct laid down by staff (and possibly other peers), in addition to watching other children behave, learned to use these strategies without requiring a developed empathy. Clearly this contention, though credible, is in need of empirical corroboration, and future study is thus needed.

7.4.2.3. Selective moral disengagement

Hawley and Geldhof (2012) was the only previous work to look at moral factors associated with resource control and social dominance in early childhood prior to this present thesis, that this author is aware of. Hawley and Geldhof measured moral rule cognition, internalized conscience and selective moral engagement (the selectively enforcement of moral norms for personal gain), however this present study used an adapted measure of the selective moral disengagement scale (Pozzoli et al., 2012). An interesting finding, as hypothesised, was that there was low reliability in terms of the items on the scale mapping to the theoretical dimensions described by Bandura (2002), with the exception of the cognitive restructuring/moral justification dimension. This suggests that children this young have not yet developed more sophisticated cognitive ways of immoral behaviour as seen in older children and adolescents (Gini et al., 2014; Pozzoli et al., 2012), yet simultaneously there was variances in their responses, suggesting young children do differentially justify immoral behaviour to some degree.

One finding that should be noted for further, more detailed investigation in larger samples, is the borderline correlation found in study 3 (chapter 5) between the frequency of 'never' responses and social dominance at the start of the school year. Interestingly, Hawley and Geldhof (2012) found a similar borderline association between social dominance and moral rule cognitions. This suggests that children in this current study were responding according to their knowledge of moral rules, rather than an emotion-based appreciation of the scenario posed by the measure. This interpretation is supported by the lack of association between the SMD scale response frequency variables and either the empathy or TEC variables. However, study 4 showed that this association in the middle and at the end of the academic year was not significant, along with non-significant findings for all associations between the SMD responses and the strategy, control success and dominance variables.

Given that so few studies (with two being studies 3 and 4 of this thesis) to date have investigated associations between resource control and social dominance and morality cognition in early childhood and given that some of the findings presented were of borderline significance, the impact of moral cognition on resource control strategy selection remains uncertain. Results presented in this current thesis show that young children do not discriminate between different moral contexts in the same way as older participants in other studies. Specifically, prior research found that older children and adolescents' responses to the selective moral disengagement scale mapped to the four theoretical constructs set out by Bandura (2002): 1) *cognitive restructuring,* where the agent frames the behaviour as positive; 2) *displacement and diffusion of responsibility,* where the agent obscures or minimises the role of the perpetrator in the harmful outcome); 3) *minimising/misconstruing of consequences,* where the agent disregards or distorts their behaviour's consequences); 4) *the dehumanising/blaming of the victim,* where the agent strips the victim of human characteristics or blame them for provoking the behaviour (Bandura, 2002; Gini et al., 2014; Pozzoli et al., 2012). However, the methodology (chapter 2) and study 2 (chapter 4) show that the children's responses do not map onto these complex dimensions. Given that this is the first study, to this authors knowledge, to investigate SMD in this age group, study 2's finding indicates that in early childhood, more complex moral flexibility has yet to develop. It is also plausible that the adapted measure is not accurately capturing the dimensions laid down the work of Bandura. It may be that future work – qualitative as well as quantitative – will be required to further hone the adapted measure to assess whether such complex contextual moral application is undertaken by children in early childhood.

Moreover, social desirability may well play a role in affecting many of the children's responses in the SMD measure in the studies reported here, given the researcher administering the measure was likely viewed as a moral authority, given their 'adult' status. It may therefore be that some children base their responses to this measure on how they think an adult would want them to respond – i.e. not selectively disengage their normal moral code – whereas in a real situation in which the child may behave 'immorally' towards a peer, selective moral disengagement may be deployed ‘in the heat of the moment’ and the immediate follow-up to such a confrontation in which the child may have to justify their actions to a teacher or other peers. Once more, future studies would benefit greatly from detailed observational data that records such real-time behavioural justifications and compare that to responses that those children give to SMD-style measures.

Evidently, this thesis has highlighted the clear need for considerable further study into selective moral disengagement in early childhood. It may be that such complexity of moral cognition yet exists in such young children, or, for the reasons discussed above, that the measure has not adequately captured the reality; either way, positions will not be clarified until further investigations are carried out.

7.4.2.4. RHP comprehension and strategy selection

Theoretically, RHP comprehension is very likely associated to strategy selection and resource competition success/efficacy, yet little investigation into human RHP comprehension has been published. This thesis developed a series of vignettes to serve as a hypothetical proxy to real-world resource contests that a young child may encounter in their daily school lives. Interestingly, unlike the teacher-reported real-world resource control strategy findings reported in this thesis as well as in previous resource control theory-based research (Hawley, 2003a, 2003b; Hawley & Geldhof, 2012; Hawley et al., 2007), study 3 (chapter 5) found significant gender differences in frequency of response type to the vignettes. Rather than mirroring prior resource control strategy findings, finding these gender differences mirror behavioural studies that examine more general behaviour. For example, boys in early childhood have been shown to be more physically aggressively towards peers (Hudziak et al., 2003; for a review, see Coie & Dodge, 1998), particularly other boys (Ostrov et al., 2006). Findings in young girls have been somewhat more controversial, with some studies finding girls to be more relationally aggressive (Hudziak et al., 2003; for a review, see Coie & Dodge, 1998), particularly to other girls (Ostrov et al., 2006), whilst a meta-analysis suggests that these findings may be marginal (Card et al., 2008).

However, more specific to the focus of this present study – resource control and social dominance, study 3 (chapter 5) found no significant associations between the teacher-reported resource control and social dominance data and the responses to the RHP vignettes at the start of the school year; moreover study 4 mirrored this finding no significant relationships between the teacher-rated data and RHP vignette responses at any of the other time points, regardless of gender. A key plausible explanation for the lack of association between the hypothetical vignettes and the teacher-reported real-world resource contest-based data the vignettes were attempting to emulate may be the simple fact that they were hypothetical. Therefore, the child was aware that the resource contest was a story, so the pressure to 'select' (vocalise) the strategy they would have chosen in a similar real-world scenario would be removed as there was no real-world material resource to be gained. However, a real-world social resource may have been a critical factor instead – the approval of the researcher. The combination the absence of an actual scooter, combined with an adult – likely seen by the child as a moral authority figure – delivering the questions, may have altered their choice of response. The classic 'marshmallow test' (Mischel, Shoda, & Rodriguez, 1989) and the multiple derivations of this seminal study since have shown, aside from the development of delayed gratification understanding in young children, that logic and rational appreciation of a situation and the understanding of ramifications of behaviours can be dramatically undermined when a resource that is tempting enough is available in the moment. In the case of this present thesis, the RHP vignette responses may be a reflection of a child's appreciation of what they deem appropriate behaviour in a resource contest situation when not concurrently tempted the prospect of gaining that resource. Alternatively, it may simply be that children in this age-group are not introspective enough to accurately predict how they would behave in a real contest situation.

Another explanation still may be that they are sufficiently introspective, yet simply understand the vignettes to be a ‘game’ and are responding playfully, rather than mimicking their would-be real-world response in similar scenarios. Evidently, future research should compare these hypothetical responses to their actual behaviour in real-world contests.

Study 3 (chapter 5) also revealed novel findings regarding how (albeit in a hypothetical scenario) the variance of an opponent’s characteristics affects young children’s responses to resource control situations. The measure on which the RHP vignette battery was based (Archer & Benson, 2008) was originally used to ascertain the effect an aggressor’s perceived RHP would have on a participant’s response. Whilst Archer and Benson’s sample consisted of adult males, they did investigate what can be classified as resource control scenario, in addition to the otherwise non-resource control confrontation scenarios presented in their study, thus some direct comparison between studies can be made. Specifically, one scenario comprised another man (the resource opponent) putting his arm round the participant’s girlfriend thus challenging for, in Darwinian terms, the ‘reproductive resource’ that the participant would have the option of defending. Apart from responses to a direct insult to the girlfriend, participants responded most aggressively to this scenario. In the present thesis, the scenarios depicted a clear and direct *material,* rather than a social or reproductive, resource contest situation. Given these differences, comparing the studies highlights interesting differences and similarities. Archer and Benson (2008) found that with *increasing* threat level from the adversary – increasing physical size, reputation for fighting and presence of allies – participants responded *less* aggressively. Conversely, the present study found that both males and females responded coercively more frequently when shown scenarios with tougher opponents. Similarly, participants responded prosocially more frequently when shown scenarios with less tough opponents. Thus, unlike the findings from Archer and Benson (2008), study 3 (chapter 5) found that 4-5-year-old boys and girls countered (verbally at least) increased toughness with aggression.

Age difference between the samples (adults compared to 4-5-year-old children) and the inextricable developmental differences that accompany such an age gap are very likely a key factor in the differences. In boys only, age was positively associated with prosocial response frequency and negatively associated with coercive response frequency across all scenario opponent conditions. This could be indicative of gender-specific time-dependent differences in other cognitive processes that affect boys' responses relative to girls. Additionally, the Archer and Benson scenario outlined above positioned the participant as the resource controller, whereas this present study placed the participant as the resource contender, which could significantly impact both hypothetical and real-world behavioural responses. Future work should investigate the effect that varying the initial possession of the resource between the participant, the opponent and placing the resource in a neutral 'no man's land'.

The lack of significant findings in terms of response-type frequency's association with the 'friends/allies' condition is interesting. Pun and colleagues (Pun et al., 2016, 2017) describe that 6-month-old pre-verbal infants focus on the numerical differences between groups when determining who are the most dominant individuals, whilst other findings suggest 8-month-old preverbal infants cannot determine dominance based on physical size, whilst 10-13-month-olds can. The non-significant effect the 'presence of allies' condition has on child response found in this thesis therefore may well be indicative the narrow narrow focus on the single resource controller that a challenger has in early childhood.

The responses given by both genders – in terms of scenario opponent physical size – evidence a difference between genders in this current sample at least. Girls responded coercively less frequently to opponents who were of equal physical size compared to those who were smaller or bigger than their own avatar. Little, if any, prior research can suggest why such a specific difference in female response in these scenarios would occur. It is possible that girls more readily relate to a peer of similar size which therefore affects their response, with the present finding that girls scored higher in verbal ability than boys being an indication of other cognitive differences that may explain the response difference. However, this is a very tenuous contention and further empirical study is required.

Previous research indicates that greater physical size is associated with aggressive resource contest victory in early childhood (Hawley & Little, 1999; Pellegrini, Roseth, et al., 2007; Pellegrini, Long, et al., 2007; Roseth et al., 2007). However, what was not well documented in these studies, if at all, is how the smaller child behaves in the contest. If the smaller child is the initiator of the contest, as in some scenarios the participant's scenario avatar was physically smaller than the opponent who held the resource, then noting their strategic approach could have provided an indicator of RHP comprehension. Future study should thus endeavour to record such information, with longitudinal observational study investigating the behavioural approach of both resource controller and contender, noting potential changes in strategy according to contextual changes, such as physical growth and failure/success rate of their resource control behaviour, which may cause some children to adapt and potentially learn from previous defeats or the repercussions that ensue from coercive approaches that are not followed up with reconciliation (Roseth et al., 2011). The RHP comprehension results for boys presented here may therefore reflect a more inflexible strategy choice when faced with different sized opponents, which over time may become more context-appropriate due to repeated failure against larger opponents and their own cognitive development.

As discussed in study 3 (chapter 5), the variance in children's response according to opponent characteristics does indicate some form of cognitive/affective sensitivity to scenario context and a flexibility of cognitive processes that may be involved in similar real-world situations. Notably though, the pattern of variation is in direct contrast to that predicted by RHP theory itself (Parker, 1974). The responses by Archer and Benson's participants reflect those expected from individuals with an RHP comprehension functioning efficiently to balance risk and gain (as per Parker, 1974) – e.g. reduce aggressive response when faced with tougher opponent – whilst the results of this present study are reversed, thus may reflect an immaturity of RHP comprehension. It is also possible, however, that RHP comprehension could be well formed in these children, but moderated or suppressed by cognitive factors such as a nascent view of morality and justice, empathy and sympathy, and the interpretation of the opponent's characteristics.

7.4.2.5. Limitations

As discussed in the preceding studies, this thesis presents many novel findings, yet also recognises key limitations that affect the certainty with which overarching conclusions can be drawn from the data.

Whilst the use of observational data was beyond the scope of this thesis, in terms of being able to make more concrete statements about the child participants' behaviour and dominance status, a key limitation is the lack of such data, reflected by the use of teacher-rated behavioural and dominance-related variables, and the batteries of non-observational measures conducted with the child participants throughout the study. Teacher-ratings of resource control have been previously shown to not fully reflect the behaviours of their students (Hawley, 2003a) where older children may hide certain behaviours from teachers to avoid negative consequences. If such a result reflects a teacher ignorance regarding pupil resource control behaviour, then some of results presented here can be called into question, though given the above study (Hawley, 2003a) focused on early adolescents and not 4-5-year-old children as was the case in this thesis, such an effect in these present data should not be assumed. However, clearly such discrepancy needs further investigation. Future study should endeavour to collect behavioural data from the child's naturalistic classroom setting, as this would negate the need for the RHP comprehension vignettes used here, along with cognitive and affective measures such as those used in this present study to more accurately address the question of how these factors affect resource control behaviour in real-world terms. Associated with this point, is perhaps the need in future work for ToM tasks that are based around resource control contest scenarios which would marry more appropriately to the child's everyday experience, where the child would be likely to use ToM for resource control purposes.

Another limitation of the teacher-rating measures for the behavioural variables is their capacity to reliably differentiate between closely related concepts (e.g. resource control and social dominance) and behaviours that may present as similar (e.g. prosocial resource control strategy and non-resource-specific prosocial). Whilst this thesis has provided a rationale for how resource control and social dominance are closely related yet distinct concepts, along with providing empirical findings showing a statistical differentiation between the two, the accuracy of this differentiation can be questioned when considering the ability of teachers to observe the difference between resource control success and social dominance. For example (hypothetically), to an external observer (i.e. a teacher), seeing a child forcibly taking a scooter from other children on several different occasions may result in the teacher scoring that child high on both resource control success and social dominance. However, simply winning a resource contest does not automatically mean that the child gains a 'commanding position' (dominance as defined by Hawley, 2014, p. 327) over their peers – the child may well be ostracised by their peers for their coercive behaviour rather than gaining a commanding position over them.

As mentioned above, this present investigation does show statistical differentiation between the two concepts. Furthermore, when comparing the findings for prosocial strategy and non-resource-specific prosocial behaviour in regard to resource control success and social dominance, they have a positive and negative relationship, respectively. This clearly indicates the teacher rating measure has differentiated between these prosocial behaviour types. Yet, in order to accurately gauge the measure's capacity for such differentiation – particularly concerning resource control success / social dominance – future investigations should conduct factor analyses, with the potential outcome of augmenting the current teacher rating measures (or developing new ones). If these subsequent studies find a similar pattern of differentiation in the concepts and behaviours presented here, this thesis' theoretical contentions and findings – that 1) prosocial and coercive resource control strategies are distinct from non-resource-specific prosocial and coercive behaviour, respectively; and 2) resource control success is distinct from social dominance – will have been corroborated at least to some extent. Clearly, further investigation of such teacher rating measures must be conducted before any more concrete claims as to the distinction between the variables discussed here can be made.

A key requirement for accurate understanding of behaviour is the context in which the behaviour occurs. A strength of some previous resource control theory-based research (Pellegrini et al., 2011; Roseth et al., 2011) has been the detailed context-specific observational data gained over a school year with samples of young children. Whilst for practical reasons this present study was unable to gather observational data like this, such data is crucial for accurate understanding of certain strategies of resource control and social dominance. As discussed above, reconciliation behaviour may be one of many highly specific strategies adopted by young children that are perhaps a more appropriate discerning factor for the formation of different 'subtype' style behavioural groupings, rather than simply frequency of strategy use. Whilst teacher/staff reports are practical alternative to direct researcher observation data, the ability of staff – embedded in the environment one would need to observe – to provide large quantities of detailed information whilst maintaining accuracy is clearly limited.

Sample size and associated power is also a limitation of these present studies. A small sample size may have limited statistical power in the current research, such that power may have been too low to produce significant results for some analyses due to type II error (Wilson Van Voorhis & Morgan, 2007) as well as the chance of type I error. Whilst it is certainly a possibility that false significance values may be attributed to the findings due to low power, many of the results reported here can be justified through comparison to previous findings and prior theoretical frameworks. Yet as stated previously, only through examination of similar data from a larger sample can identify more accurately the relationships suggested by this thesis.

Another limitation is the absence of data relating to the child's domestic life. This was beyond the scope of this current thesis, however, when investigating behaviour, a study would benefit from data multiple behavioural contexts, e.g. domestic/familial, academic/professional situations. Specifically, for this thesis, early childhood is particularly formative and being able to account for both school-based and domestic factors – e.g. sibling and parental information – would likely increase further the understanding of a child's behaviour and the factors behind resource control and social dominance. Similarly, the child's attendance at a nursery, could also be an important factor to consider in terms of resource control and dominance outcome. Exposure to these early group social experiences under the structure set out by adult staff – key similarity between nursery and school, would plausibly give children who had attended nursery a cognitive and behavioural advantage over those who did not, in the first year of school (reception class in the UK). In addition to giving children time to learn from strategic success and failure and learning prosocial social norms that would likely continue to be enforced by their future teachers, nursery may well introduce some of the children to new friends that would be in their reception class (this would be particularly likely if the child attended a 'feeder nursery', a nursery attached to the school, run by school staff). In this scenario, children may well be starting school with already established and consolidated friendships and rivalries, which could be a critical factor in resource control and social dominance over their first year at school proper.

7.4.2.6. Implications and future directions

The present thesis has provided data and analyses that raise many questions regarding the implications for resource control theory and future research into resource control and social dominance in early childhood. These will be reviewed here briefly as they have largely been discussed in detail earlier in this section.

As stated above, without direct observational data, the accuracy of conclusions regarding resource control and social dominance in early childhood will be limited, therefore future study must endeavour to capture observational data. However, the research presented here presents other implications.

Whilst the findings broadly concur with current resource control theory (Hawley, 1999, 2014), this thesis has suggested extensions of this theory, in that the mechanism highlighted explicitly by the theory – resource control leads to social dominance – may not be the sole mechanism for achieving social dominance. Competition for social dominance directly as a ’meta resource’, one that provides a gateway to accessing other resources, may be a phenomenon not just seen in adult resource behaviour (e.g. successfully competing to become a CEO may well bring access to expensive meals, selection of team members, trips abroad etc.) but may well be something competed for in early childhood. Future work must endeavour to see if such a phenomenon does exist in this age group.

Methodologically, this thesis suggests that amendment to the current subtype category formation methodology is required. As stated in chapter 1, theoretically the subtypes currently provide no statistical guarantee that participants placed in one subtype group are behaviourally distinguishable from a participant placed in another. Study 1 (chapter 3) empirically found that in this studies sample, some coercive controllers were statistically no less prosocial (in terms of strategy selection) than prosocial controllers, corroborating the theoretical contention from chapter 1. Additionally, study 4 (chapter 6) did not find membership to any of the resource control subtypes to be stable across the year, nullifying the predictive utility – at least in the medium-term – of these groupings. This instability may be an artefact of this thesis only viewing stability across the overall sample, and that subtype membership may be more stable when examined within classes/peer groups. However, this does not negate the aforementioned lack of statistical guarantee. Future work evidently needs to amend the formation methodology to provide this statistical guarantee, and also investigate whether these new subtype groups are stable over time.

A more general point regarding children’s resource control and social dominance should be made. An implication for future research – or rather a question – this study makes, essentially via omitting it from the scope of the thesis research questions, is: do children maintain the relative differences in resource control behaviours to their peers, if their peer group *changes*? That is, for example, if they are classified as a coercive controller in their class, but then change school, will they remain coercive controller in the new class? Whether or not their relative behaviour (compared to their peers) changes or not when placed in another peer group, future research must investigate the factors behind such behavioural stability/flexibility. If the augmented subtype groups still show an instability across different peer groups, this again calls into question their predictive utility.

Future studies may also benefit from investigating a child’s use of empathy and ToM in real-world behavioural settings, in order to more accurately capture these capabilities in young children. Removing a child from such environments and performing the much more abstracted ToM, emotion comprehension and empathy test as conducted here and in previous studies, can only serve to reduce data accuracy as children will not necessarily respond as they would in contest situations. Perhaps a combination of these standard-type assessments *and* direct observational data highlighting use of ToM and empathy in real-world contexts will shed greater light on the relationship between these cognitive/affective abilities and resource control and social dominance in early childhood. It is also plausible that empathy or ToM may be suppressed by a child's desire for a resource. The classic marshmallow test (Mischel et al., 1989) was key in exemplifying how poor executive function and impulse control can supersede knowledge that would encourage alternative behaviour. It may be a similar case for young children in resource control situations: those with poor executive function impulse control may chose strategies due to immediate resource desire, rather than strategies that may benefit them more in the medium to longer-term, for example. This is another contention that requires future examination.

This thesis has also highlighted an important potential future research avenue – the examination of social dominance as a resource in itself. It should be noted that this thesis aimed to capture (though see the social *prominence* discussion above) the 'social dominance' concept that refers to the level of command/leadership – the ability to manipulate a social/peer group to get what they want – rather than the other social dominance concept that refers to the resultant power imbalance between two individuals that results from dyadic resource contest, yet these are two related but different concepts (Hinde, 1976). As discussed in section 1.2.3 of this thesis, social dominance as an overall rank/position in a social group is traditionally said to emerge from the comparative success of each individual in their numerous dyadic encounters, i.e. the more people one beats, the higher one's dominance rank overall (Sluckin & Smith, 1977; Strayer & Strayer, 1976). Whilst this thesis certainly does not provide evidence to counter this mechanism for overall group dominance, it does highlight the possibility of an alternative mechanism for high dominance rank achievement – competing for dominance (command/leadership) directly as it's own meta resource that allows further resource control once acquired.

Future research should longitudinally investigate, via observations, both the outcomes of dyadic contests and the formation of dominance relationships, and, rather than the researchers forming assumed social dominance ranks from these outcomes (as traditionally done), compare this to directly observed broader social dominance (i.e. command/leadership) behaviour amongst their peers. It is from this latter type of behavioural observation (not from the dyadic contest observations) that the researchers could form overall group dominance ranks/positions. By this method future research could examine the extent to which dyadic contest contributes to dominance rank/position, whilst also collecting other data on other potential mechanisms for achieving higher dominance status.

7.5. Conclusions

This thesis set contributed multiple novel findings regarding resource control and social dominance in early childhood and has highlighted key areas for future investigation, as like most research endeavours, more questions have been raised than answered. This project has corroborated previous findings and theory that successful control of resources is a key mechanism for the establishment of social dominance (Hawley, 1999), yet has highlighted possible alternative mechanisms for dominance achievement as well as specific behavioural differences in how resource control and social dominance may be achieved by children in their first year at school, which now require further investigation in larger samples.

It was first study to investigate the associations between multiple cognitive and affective factors resource control and dominance outcomes, finding that although empathy may well be a factor in determining strategy selection in the short-term at the start of the school year, it seems to reduce in importance as a resource-specific behavioural predictor as the year progresses. The current study does provide novel data regarding cognitive and affective factors involved in resource control and social dominance. However, future study should endeavour to investigate data on the cognitive and affective variables presented in this thesis using direct observation of the children in real-world, real-time contexts, where resource contest scenarios can be examined in detail and observation of the use of ToM, empathy and moral justifications are likely to be on display and may be used differently to how they were employed in the measures used for the studies reported here.

The thesis also established that, whilst there are clear potential benefits to having method of behavioural classification that accounts for both coercive and prosocial strategies, the current subtype formulation method requires adjustment to more appropriately reflect reality. This thesis found statistical grey areas in the current subtype controller group formation methodology, along with the lack of behavioural context data (such as reconciliation behaviour data) called the accuracy of the current subtype controller groups into question, with analysis at each timepoint showing the subtypes to be too unstable to be predictively useful. Longitudinal analysis of the continuous strategy use data showed that whilst both strategy dimensions at the start of the year predicted themselves at the end of the year to an extent, this prediction was not overly high, leaving space for future examination of other factors involved in longitudinal changes in resource control strategy choice in early childhood.

This thesis, by and large was an exploratory investigation into the impact on young children's resource control and social dominance of a wider range of factors than ever previously examined and has highlighted many interesting avenues for future research in larger, observation-based studies.

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Appendices

A. *Teacher letter and consent form*

Getting what you want: different factors affecting behaviour choice in young children

Dear <insert teacher's name>,

Following discussions with the school and yourself, I have been approved to work with you and your class for my study.

The first part of the study will take place in XXXX (dependent on the school's availability). I would visit the school for around XXXX working days (could be less depending on class size and parental consent) during which the children will be asked to take part in several fun and age appropriate questionnaires and tasks focusing on the understanding of other people's emotions and beliefs, and what is 'right and wrong' in different situations. These will be conducted by myself (I have DBS clearance) with each individual child, preferably in a quiet room or quiet part of the classroom or school. The second part would follow the same students up in XXXX, using the same assessments. The final part would occur in XXXX 2017 with the same format. As the class teacher, you will be asked to fill out three short questionnaires regarding the students' behaviour and a short task at each data collection period (3 in total).

The tasks each child will be asked to undertake will be spread across 2 sessions for each child. Parents/guardians will be asked to provide written consent that they wish for their child to take part in the study. I will also provide you with a summary of the findings once the research is completed.

Please complete and return the consent form below to either my email address or hand it to me in person. I hope to hear from you soon and I am more than happy to answer any questions regarding the research.

Kind Regards,

Alan Parry Roberts
<insert contact details>

Supervisors:
Dr Claire Monks
<insert contact details>

Dr Stella Tsermentseli
<insert contact details>

UNIVERSITY *of* GREENWICH

CLASS TEACHER CONSENT FORM

PLEASE RETURN THIS FORM TO THE RESEARCHER (ALAN ROBERTS) AS SOON AS POSSIBLE, THANK YOU.

Study: Getting what you want: different factors affecting behaviour choice in young children **I am willing for the children in my class to participate in the above-mentioned research study.**	
School	
Class teacher	
Signature	
Date	

B. *First-order false-belief change of location scenario*

Here's Sally and Anne. They both have boxes. This is Sally's box and this is Anne's box. Sally doesn't have anything in her box. But Anne has a ball in her box, see?

One day Anne goes outside to play. Off she goes. While Anne is playing outside, she can't see what is happening inside the house. And sneaky Sally, sneaks over to Anne's box, takes the lid off and moves the ball into her own box, and quickly puts the lids back on and pretends nothing has happened.

Probe Question 1: "Did Anne see Sally move the ball?"

Then Anne comes back in.

First-order false-belief question: "Where does Anne think the ball is?"

Justification question: "Why does Anne think that?"

C. *Second-order ignorance and false-belief scenario*

Tonight it's Sally's birthday and Anne is surprising her with a dinosaur. Anne has hidden the dinosaur in the basement. Sally says, "Anne, I really hope you get me a dinosaur for my birthday." Remember, Anne wants to surprise Sally with a dinosaur. So, instead of telling Anne she got her a dinosaur, Anne says, "Sorry Sally, I did not get you a dinosaur for your birthday. I got you a really great teddy bear instead."

Probe Question 1: "Did Anne really get Sally a teddy bear for her birthday?"

Probe Question 2: "Did Anne tell Sally she got her a teddy bear for her birthday?"

Probe Question 3: "Why did Anne tell Sally that she got her a teddy bear for her birthday?"

Now, Sally says to Anne, "I'm going outside to play." On her way outside, Sally goes down to the basement to fetch her roller skates. In the basement, Sally finds the birthday dinosaur! Sally says to herself, "Wow, Anne didn't get me a teddy bear, she really got me a dinosaur for my birthday." Anne does not see Sally go down to the basement and find the birthday dinosaur.

Non-linguistic control question: "Does Sally know that Anne got her a dinosaur for her birthday?"

Linguistic control question: "Does Anne know that Sally saw the birthday dinosaur in the basement?"

Now, the telephone rings, ding-a-ling! Sally's grandma calls to find out what time the birthday party is. Grandma asks Anne on the phone, "Does Sally know what you really got her for her birthday?"

Second-order ignorance question: "What does Anne say to Grandma?"

Memory aid: Now remember, Anne does not know that Sally saw the present in the basement.

Then, Grandma says to Anne, "What does Sally think you got her for her birthday?"

Second-order false-belief question: "What does Anne say to Grandma?"

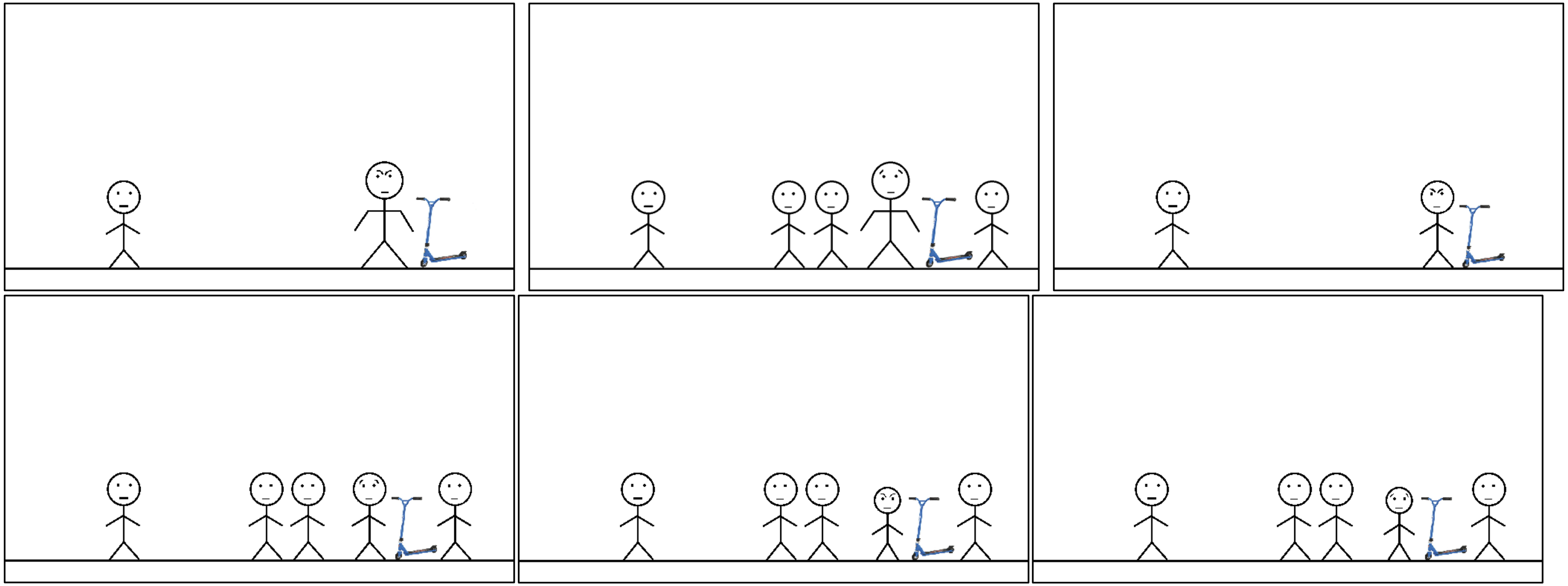
Justification question: "Why does Anne say that?"

D. ***Presentation order for RHP comprehension measure. Second column denotes the characteristics of the resource contest opponent.***

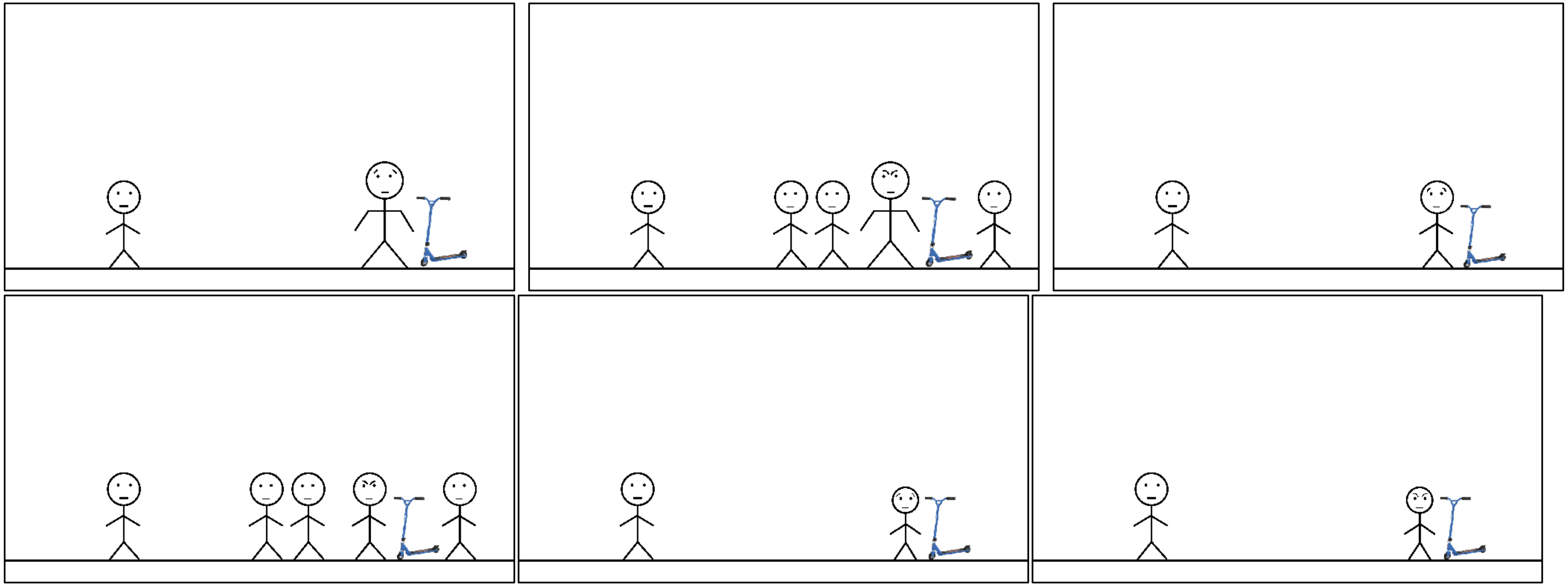
1	SWF
2	BTA
3	EqWF
4	BWF
5	STF
6	EqTA
7	EqWA
8	EqTF
9	BWA
10	STA
11	SWA
12	BTF

Note: B = Bigger (than participant avatar); Eq = Same size; S = Smaller; F = Accompanied by friends; A = Alone/no friends present; T = Very tough; W = Not very tough

E. ***RHP comprehension vignettes.*** *The end screen for each of the 12 different scenarios. Each scenario varies the combination of 1) physical size; 2) presence of friends; 3) toughness of the opponent. In the actual measure, the stick figure representing the participant (far left of each image) is shown first, then the opponent with the resource, then (if present in that scenario) the friends/allies.*



Opponent description from top left to bottom right: *Big, alone, tough; Big, friends, not tough; same size, alone, tough; same size, friends, not tough; small, friends, tough; small friends, not tough.*



Opponent description from top left to bottom right: *Big, alone, not tough; Big, friends, tough; same size, alone, not tough; same size, friends, tough; small, no friends, not tough; small, no friends, tough.*

F. ***Items for the Selective Moral Disengagement scale.*** *Items are presented here as structured according to Pozzoli et al. (2012), however, the re-worded items below only reliably mapped to one factor according to Cronbach's alpha scores.*

Factor	*Item*
Cognitive Restructuring	It's OK to hit someone if they're mean about your family.
	It's OK to hit mean children just to teach them a lesson.
	It's OK to steal one toy because stealing lots of toys is worse.
	It's alright to fight when someone is mean to your friend.
	It's alright to take someone's bike without asking because it's just borrowing.
	It's OK to say mean things to a classmate because hitting them is worse.
Minimising one's agentive role	It's OK to be naughty if the teacher lets you.
	It's alright to be naughty when all your friends are being naughty.
	It's OK to be naughty if your parents are too strict.
Disregarding/ distorting the consequences	It's OK to tease other children because it's just playing.
	It's alright to tease someone because it doesn't really hurt them.
Blaming/ dehumanising the victim	It's OK to be mean to someone if they weren't being nice.
	It's alright for some children to get treated meanly because they usually deserve it.
	It's OK to be mean to some children if they don't have any feelings that can be hurt.

G. ***Teacher Report for child behaviour. Teachers completed the below items online via Qualtrics software. The below tables provide the items and the accompanying scale that the teachers used to answer those items.***

This child…

No.	Item	Strongly disagree	Mostly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Mostly agree	Strongly agree
1	is someone whose plans are usually liked by others and followed by them.							
2	gets what s/he wants by 'helping' others (even if they don't really need it).							
3	promises friendship (ex: "I'll be your best friend if…') to get what s/he wants.							
4	gets what s/he wants by promising an invitation (ex: 'You can come to my house/birthday party', etc).							
5	promises to do something in to get what s/he wants return (ex: sharing, reciprocating, turn-taking).							
6	gets what s/he wants by being really nice about it.							
7	is someone who gets others to do what s/he tells them to do, even if they don't really want to.							
8	makes others follow his/her plans to gets what s/he wants.							
9	gets what s/he wants by bullying others.							
10	tricks others to get what s/he wants.							

11	gets what s/he wants by forcing others.					
12	gets what s/he wants by making verbal threats or threats of aggression.					
13	usually gets first access to preferred toys when with peers.					
14	usually gets what s/he wants when with peers.					
15	usually gets the best roles in games when with peers.					
16	usually is the centre of attention when with peers.					
17	usually plays with the favoured toys when with peers.					
18	seems to win out over peers.					
19	is a leader.					
20	gets what they want.					
21	is competitive.					
22	is frequently the centre of the group.					

		Almost never	Not often	Sometimes	Often	Almost Always
23	is good at sharing and taking turns.					
24	is helpful to peers.					
25	is kind to peers.					

26	says or does nice things for other kids.				

		Almost never	**Seldom**	**Sometimes**	**Almost always**
27	fights with others.				
28	pushes, kicks or punches others.				
29	says mean things to others.				
30	ignores others or stops talking to them.				
31	gossips or spreads rumours.				
32	keeps others from being in his/her group of friends.				

H.

Getting what you want: different factors affecting behaviour choice in young children

Alan Parry Roberts (PhD student)
<insert contact details>

Supervisors:
Dr Claire Monks
<insert contact details>

Dr Stella Tsermentseli
<insert contact details>

Dear <insert head teacher's name>,

I am a PhD student at the University of Greenwich and I am currently conducting a study into the behaviour of children who have just started school. I hope to identify trends in the children’s behavioural development depending on their empathetic ability, as well as their ability to understand another’s thoughts, intentions and beliefs (this is known as ‘Theory of Mind’). This research can provide important contributions to child developmental psychology, increase the understanding of various child behaviours, and can help develop important interventions in extreme behavioural cases.

I intend to work with children who have just started their first school year (~4-5 years old), and assess them at three points in the school year.

Currently the project is in its pilot phase, which will use the same tasks as the main study (see below). For the pilot I would visit the school for a few working days (4-5) before the end of this summer term, the time being arranged at the school’s convenience.

Following the pilot phase in this summer term (2015-16), the first part of the study will take place in September 2016 when I would visit the school for a few working days (4-5) during which the children will be asked to take part in several fun and age appropriate tasks measuring empathy and Theory of Mind, conducted by myself with each individual child. The second part would follow the same students up in early 2017, using the same assessments. The final part would occur May-July 2017 with the same format. Teachers of the children participating will be asked to fill out three short questionnaires regarding their students’ behaviour.

In addition, the tasks each child will have to undertake will be spread across 1 or 2 sessions, which will be arranged with the teachers for minimal disruption.

I am writing to ask your permission to work with children at your school and to approach teachers, teaching assistants and parents/caregivers of children in the relevant classes about this study. Parents/guardians will be asked to provide written consent that they wish for their child to take part in the study, as well as the class teachers.

Your school's participation in this research would be greatly appreciated. I will also provide you with a summary of the findings once the research is completed.

Thank you for taking the time to consider my research. Please contact me at a.p.roberts@greenwich.ac.uk to arrange a meeting or phone conversation. If you are happy for me to contact those concerned about the research please complete and return the consent form below to either my email address, my office address (see top of letter), or hand it to me in person. I also have DBS clearance.

I hope to hear from you soon and I am more than happy to answer any questions regarding the research.

Kind Regards,

Alan Parry Roberts

Study: Resource control behavioural strategies in young children: cognitive, affective and social factors involved in strategy selection

I am willing for the teachers, teaching assistants and parents/caregivers of children in the relevant classes in my institution to be approached about participating in the above-mentioned research study.

School	
Head teacher	
Date	
Signature	

I. Parent*/caregiver cover sheet, letter, information sheet and consent form*

Important!

Please read the following information, and complete and return the form to school tomorrow, thank you.

Getting what you want: different factors affecting behaviour choice in young children

Dear Parent/Caregiver,

The school has agreed to participate in my PhD research project and I am writing to inform you of the project's details and ask for your consent for your child's participation.

The study will explore how children learn to behave and play with their peers, based on their ability to understand another's thoughts, feelings and desires as well as their understanding of what is 'right and wrong' in different social situations.

Children who participate in the study will be asked to complete a selection of short age-appropriate tasks and questions with myself at school, at three different times in the school year. The tasks are designed as stories and games. The responses given by your child will **in no way** affect the child's schooling. To conduct the tasks, I will arrange times with the school that will not be detrimental to your child's learning.

The first part of the study will take place in <*insert date*>, the second part in <*insert date*>, using the same assessments. The final part would occur in <*insert date*> with the same format. Your child's participation would be greatly appreciated. It is hoped that this research will identify new patterns of development in young children and may yield crucial contributions to plan successful educational projects and future teacher training methods. If you have any questions please do not hesitate to contact me.

My research also has full ethical clearance from the University of Greenwich and I am DBS checked. All data will be treated confidentially. Should you wish to withdraw your child's data from the study you will have up until <*insert date*>.

If you are happy for your child to participate in the study, please complete the attached consent form and return it to your child's class teacher as soon as possible. For more detailed information about the study, please see the information sheet attached.

Thank you for taking the time to consider my research.

Kind regards,

Alan Parry Roberts
<insert contact details>

Supervisors:
Dr Claire Monks
<insert contact details>

Dr Stella Tsermentseli
<insert contact details>
Tel: 020 8331 8566

Study information sheet

Getting what you want: different factors affecting behaviour choice in young children

My name is Alan Roberts and this study is being carried out as part of my MPhil/PhD and will explore the thought processes, emotional and social factors that affect how young children behave in their first year of school. Specifically, this study will focus on factors affecting young children's 'resource control behaviour' within their peer groups, a 'resource' being either material (e.g. toy) or social (e.g. attention from peers).

The study will involve children being asked to take part in a selection of fun and age appropriate tasks and questions, which look at the children's ability to understand other people's beliefs, intentions and emotions, as well as their social standing in their peer group and how fixed their understanding of moral rules are.

Each child will individually complete these tasks with me (Alan Roberts) at the school (I have DBS clearance). The tasks are designed to be like games and fun stories. For example, the Sally/Anne doll task is a tried and tested task for young children, where the child to listen to and watch a few short stories about Sally and Anne (two dolls). During the stories I will ask some questions about what Sally and Anne think each other believes, based on what's happened. At the end they will get a sticker for helping me. In addition, as part of the study teachers will be asked to complete a questionnaire about the children's behaviour. This process will occur near the start, middle and end of the school year: <insert date>, <insert date>, <insert date>, respectively, when I will work with the same children on each of these occasions.

The data from this study will be written up as part of my doctoral thesis and may be published. All data will be treated confidentially and all data will be published anonymously; the name of the school, teachers and children will not be published. Should you wish to withdraw your child's data from the study you will have up until the <insert date> to withdraw their data. Withdrawing your child's data from the study will not affect your or your child's standing with the school or the university and you do not have to provide a reason.

If you are happy for your child to participate in the study please complete the enclosed consent form and return it to your child's class teacher. If you have any questions please do not hesitate to contact me directly or through the school. If you would like to see a summary of the findings of the research once it is completed please let me know.

Thank you for taking the time to consider my research. Your child's participation would be greatly appreciated.

Many thanks,

Alan Parry Roberts
<insert contact details>

Supervisors:
Dr Claire Monks
<insert contact details>

Dr Stella Tsermentseli
<insert contact details>

PARTICIPANT CONSENT FORM

PLEASE RETURN THIS FORM TO YOUR CHILD'S CLASS TEACHER AS SOON AS POSSIBLE, THANK YOU.

To be completed by the parent/caregiver of the child participant.

If you consent to your child's participation in the study, understand and agree with the information provided, **please sign below and return to the school**, thank you.	
Child's name (BLOCK letters): Child's class:	
Parent/caregiver name (BLOCK letters):	
I understand that my child's research data may be used for other research projects **in anonymous form** (your child will not be identified). To opt out of this tick here: ☐	
Signed (parent/guardian):	Date
Signature of researcher:	Date

J. Correlation table for ***boys***, age and verbal ability controls. Grey area shows correlations between RHP responses and teacher-rated variables and cognitive measures.

	1	2	3	4	5	6	7	8	9	10	11
1. Prosocial strategy	-										
2. Coercive strategy	.696***	-									
3. RC success	.631***	.345*	-								
4. Social dominance	.690***	.618***	.585***	-							
5. Prosocial (non-RCS)	-.564***	-.552***	-.359*	-.351*	-						
6. Overt aggression (non-RCS)	.453**	.724***	.106	.422**	-.667***	-					
7. Relational aggression (non-RCS)	.419**	.670***	.155	.352	-.666***	.776***	-				
8. FOFB (ToM)	.067	-.006	-.021	-.070	-.029	.121	.065	-			
9. SOFB (ToM)	.156	.158	.001	-.048	-.123	.051	.019	.106	-		
10. TEC	.315	.269	.393*	.270	-.186	.197	-.006	-.070	.322	-	
11. Affective empathy	.444**	.354*	.174	.415*	-.297	.156	.230	.144	.033	.049	-
12. Cognitive empathy	.060	.126	-.097	.063	.043	.009	.108	.027	-.104	-.077	.417
13. Average prosocial response	.138	-.062	.035	.057	-.276	.116	.202	.051	-.036	-.030	-.163
14. Average coercive response	.067	.079	.162	.018	.148	-.154	-.217	.003	.109	.173	**.341***
15. Average no strategy response	-.283	-.038	-.291	-.102	.138	.082	.064	-.072	-.118	-.224	-.305
16. Prosocial response 'not tough'	.187	-.021	.044	.058	-.300	.087	.206	.167	.036	.015	-.138
17. Coercive response 'not tough'	.030	.082	.153	.036	.172	-.091	-.205	-.104	.051	.130	.319
18. No response 'not tough'	-.332†	-.103	-.316	-.147	.175	.017	.021	-.083	-.139	-.236	-.310
19. Prosocial response 'tough'	.070	-.101	.020	.050	-.221	.135	.177	-.081	-.111	-.077	-.173
20. Coercive response 'tough'	.097	.069	.158	-.001	.113	-.202	-.211	.107	.155	.201	.336
21. No response 'tough'	-.229	.021	-.259	-.060	.100	.136	.099	-.061	-.096	-.205	-.289
22. Prosocial response 'friends'	.072	-.097	-.010	.023	-.215	.083	.180	.059	-.052	.008	-.187
23. Coercive response 'friends'	.126	.109	.214	.032	.100	-.137	-.194	.004	.151	.131	.355
24. No response 'friends'	-.277	-.029	-.296	-.076	.139	.088	.043	-.083	-.148	-.200	-.265
25. Prosocial response 'alone'	.197	-.025	.077	.088	-.326	.143	.217	.042	-.018	-.066	-.133
26. Coercive response 'alone'	.013	.050	.111	.006	.186	-.164	-.230	.002	.069	.205	.320
27. No response 'alone'	-.280	-.046	-.277	-.125	.132	.073	.083	-.059	-.086	-.239	-.335
28. Prosocial response 'smaller'	.080	-.142	.038	.008	-.205	.018	.082	.057	-.007	-.048	-.164
29. Coercive response 'smaller'	.140	.171	.190	.089	.106	-.072	-.113	-.005	.109	.193	.346
30. No response 'smaller'	-.298	-.055	-.312	-.134	.117	.076	.052	-.067	-.142	-.207	-.270
31. Prosocial response 'same size'	.136	-.024	-.008	.058	-.269	.176	.248	.065	-.027	-.002	-.190
32. Coercive response 'same size'	.024	.024	.142	-.021	.135	-.188	-.246	-.010	.088	.143	.354
33. No response 'same size'	-.231	-.005	-.223	-.047	.155	.061	.056	-.076	-.107	-.233	-.315
34. Prosocial response 'bigger'	.188	-.015	.074	.102	-.335†	.142	.261	.027	-.071	-.039	-.119
35. Coercive response 'bigger'	.040	.045	.146	-.008	.191	-.184	-.268	.024	.123	.174	.302
36. No response 'bigger'	-.284	-.047	-.301	-.112	.126	.098	.075	-.067	-.094	-.207	-.297

(Appendix J table continued)

	12	13	14	25	26	17	18	19	20	21	22
12. Cognitive empathy	-										
13. Average prosocial response	-.171	-									
14. Average coercive response	.129	-.760***	-								
15. Average no strategy response	.028	-0.157	-.523***	-							
16. Prosocial response 'not tough'	-.237	.955***	-.728***	-.145	-						
17. Coercive response 'not tough'	.178	-.756***	.958***	-.464**	-.800***	-					
18. No response 'not tough'	.069	-0.216	-.457**	.978***	-.213	-.416*	-				
19. Prosocial response 'tough'	-.081	.945***	-.715***	-.153	.805***	-.628***	-.198	-			
20. Coercive response 'tough'	.072	-.704***	.961***	-.538***	-.602***	.842***	-.460**	-.742***	-		
21. No response 'tough'	-.009	-.099	-.561***	.983***	-.081	-.490**	.922***	-.108	-.586***	-	
22. Prosocial response 'friends'	-.224	.981***	-.730***	-.177	.953***	-.740***	-.240	.908***	-.662***	-.116	-
23. Coercive response 'friends'	.165	-.743***	.983***	-.520***	-.726***	.957***	-.459**	-.683***	.930***	-.553***	-.742***
24. No response 'friends'	.059	-.225	-.454**	.984***	-.212	-.404*	.980***	-.215	-.466**	.952***	-.251
25. Prosocial response 'alone'	-.112	.981***	-.761***	-.131	.921***	-.744***	-.185	.945***	-.718***	-.078	.925***
26. Coercive response 'alone'	.094	-.754	.987***	-.511**	-.710***	.932***	-.441**	-.723***	.962***	-.553***	-.699***
27. No response 'alone'	-.002	-0.086	-.574***	.985***	-.076	-.509**	.946***	-.088	-.591***	.983***	-.100
28. Prosocial response 'smaller'	-.164	.968***	-.706***	-.196	.931***	-.708***	-.259	.906***	-.649***	-.134	.955***
29. Coercive response 'smaller'	.139	-.738***	.967***	-.502	-.708	.944***	-.465**	-.694***	.913***	-.516**	-.704***
30. No response 'smaller'	.018	-.222	-.434**	.950***	-.217	-.399*	.979***	-.204	-.433**	.889***	-.252
31. Prosocial response 'same size'	-.236	.975***	-.790***	-.079	.939***	-.783***	-.149	.912***	-.733***	-.016	.962***
32. Coercive response 'same size'	.159	-.742***	.981***	-.517**	-.717***	.935***	-.437**	-.691***	.947***	-.569***	-.721***
33. No response 'same size'	.071	-.151	-.505**	.964***	-.141	-.439**	.930***	-.145	-.528***	.959***	-.167
34. Prosocial response 'bigger'	-.094	.976***	-.721***	-.186	.916***	-.714***	-.226	.941***	-.670***	-.143	.945***
35. Coercive response 'bigger'	.081	-.751***	.987***	-.515**	-.714***	.935***	-.441**	-.714***	.960***	-.561***	-.717
36. No response 'bigger'	-.005	-.083	-.569***	.973***	-.064	-.501**	.914***	-.094	-.590***	.988***	-.096

(Appendix J table continued)

	23	24	25	26	27	28	29	30	31	32	33
23. Coercive response 'friends'	-										
24. No response 'friends'	-.463**	-									
25. Prosocial response 'alone'	-.716***	-.190	-								
26. Coercive response 'alone'	.940***	-.433**	-.780***	-							
27. No response 'alone'	-.559***	.938***	-.070	-.571***	-						
28. Prosocial response 'smaller'	-.686***	-.271	.944***	-.704***	-.117	-					
29. Coercive response 'smaller'	.955***	-.447	-.744***	.951***	-.540***	-.724***	-				
30. No response 'smaller'	-.442**	.970***	-.184	-.414*	.901***	-.284	-.457**	-			
31. Prosocial response 'same size'	-.783***	-.142	.950***	-.772***	-.016	.908***	-.743***	-.137	-		
32. Coercive response 'same size'	.968***	-.444**	-.734***	.964***	-.573***	-.668***	.912***	-.406*	-.797***	-	
33. No response 'same size'	-.493**	.932***	-.129	-.501**	.967***	-.178	-.455**	.862***	-.095	-.526***	-
34. Prosocial response 'bigger'	-.696***	-.246	.971***	-.723***	-.121	.917***	-.685***	-.230	.935***	-.697***	-.168
35. Coercive response 'bigger'	.962***	-.442**	-.757***	.981***	-.570***	-.685***	.934***	-.414*	-.774***	.963***	-.497**
36. No response 'bigger'	-.563***	.939***	-.067	-.558***	.976***	-.107	-.533***	.879	-.000	-.562***	.926***

(Appendix J table continued)

	34	35	36
34. Prosocial response 'bigger'	-		
35. Coercive response 'bigger'	-.733***	-	
36. No response 'bigger'	-.138	-.573***	-

K. Correlation table for ***boys***, age and verbal ability controls. Grey area shows correlations between RHP responses and teacher-rated variables and cognitive measures.

	1	2	3	4	5	6	7	8	9	10	11
1. Age	-										
2. Prosocial strategy	-.019	-									
3. Coercive strategy	.033	.730***	-								
4. RC success	.095	.733***	.464**	-							
5. Social dominance	.155	.827***	.686***	.689***	-						
6. Prosocial (non-RCS)	.005	-.457**	-.623***	-.336*	-.223	-					
7. Overt aggression (non-RCS)	.219	.292	.684***	.162	.229	-.645***	-				
8. Relational aggression (non-RCS)	.065	.579***	.703***	.315*	.354*	-.610***	.667***	-			
9. FOFB (ToM)	.085	.068	.053	.037	.126	.296	-.179	-.024	-		
10. SOFB (ToM)	.230	.171	.130	.320*	.065	-.116	-.061	.137	.298	-	
11. TEC	.078	.097	.115	.014	-.016	-.072	.108	.293	-.015	.205	-
12. Affective empathy	-.073	.469**	.426**	.239	.404**	-.174	.196	.195	.156	-.040	-.120
13. Cognitive empathy	-.179	.177	.269	-.097	.075	-.227	.194	.166	-.108	-.090	-.110
14. Average prosocial response	-.108	.178	.266	.187	.130	-.404**	.234	.317*	-.029	-.044	-.230
15. Average coercive response	.035	-.076	-.153	-.271	-.007	.328	-.156	-.197	-.002	-.150	.094
16. Average no strategy response	.133	-.189	-.217	.111	-.216	.176	-.157	-.234	.053	.320*	.249
17. Prosocial response 'not tough'	-.026	.210	.277	.247	.176	-.426**	.207	.301	.032	.008	-.180
18. Coercive response 'not tough'	-.011	-.086	-.178	-.261	-.032	.362*	-.155	-.208	-.031	-.124	.062
19. No response 'not tough'	.067	-.248	-.219	-.026	-.274	.191	-.127	-.214	-.008	.189	.232
20. Prosocial response 'tough'	-.175	.133	.233	.115	.076	-.349*	.239	.304	-.083	-.089	-.256
21. Coercive response 'tough'	.073	-.062	-.121	-.262	.016	.276	-.147	-.175	.024	-.164	.116
22. No response 'tough'	.174	-.124	-.196	.213	-.149	.148	-.166	-.230	.099	.398**	.241
23. Prosocial response 'friends'	-.115	.186	.256	.177	.110	-.402**	.248	.344*	-.035	-.047	-.185
24. Coercive response 'friends'	.026	-.090	-.137	-.263	.004	.310	-.168	-.221	-.013	-.158	.049
25. No response 'friends'	.150	-.170	-.214	.108	-.188	.191	-.153	-.230	.077	.319*	.231
26. Prosocial response 'alone'	-.099	.165	.268	.191	.145	-.394*	.213	.281	-.022	-.040	-.267
27. Coercive response 'alone'	.043	-.060	-.164	-.270	-.017	.335	-.139	-.167	.009	-.139	.136
28. No response 'alone'	.109	-.203	-.213	.110	-.239	.153	-.155	-.231	.026	.311	.260
29. Prosocial response 'smaller'	-.096	.180	.266	.185	.149	-.371*	.244	.331	-.010	-.003	-.253
30. Coercive response 'smaller'	.048	-.082	-.163	-.279	-.027	.329	-.174	-.218	.024	-.157	.133
31. No response 'smaller'	.096	-.191	-.214	.135	-.231	.123	-.155	-.240	-.022	.275	.240
32. Prosocial response 'same size'	-.156	.167	.259	.162	.089	-.411*	.205	.286	-.046	-.055	-.224
33. Coercive response 'same size'	.076	-.084	-.160	-.276	.009	.352	-.133	-.183	.027	-.140	.083
34. No response 'same size'	.144	-.151	-.189	.143	-.160	.155	-.141	-.200	.036	.299	.245
35. Prosocial response 'bigger'	-.070	.180	.260	.203	.142	-.410**	.239	.316	-.030	-.073	-.202
36. Coercive response 'bigger'	-.017	-.060	-.132	-.247	-.001	.292	-.153	-.183	-.054	-.148	.063

37. No response 'bigger'	.149	-.214	-.235	.050	-.245	.236	-.165	-.249	.139	.365	.247

(Appendix K table continued)

	12	13	14	15	16	17	18	19	20	21	22
12. Affective empathy	-										
13. Cognitive empathy	.384*	-									
14. Average prosocial response	.245	.267	-								
15. Average coercive response	-.114	-.123	-.825***	-							
16. Average no strategy response	-.243	-.266	-.412**	-.175	-						
17. Prosocial response 'not tough'	.237	.252	.951	-.798***	-.371*	-					
18. Coercive response 'not tough'	-.090	-.115	-.802***	.961***	-.152	-.844***	-				
19. No response 'not tough'	-.291	-.278	-.439***	-.108	.939***	-.461**	-.088	-			
20. Prosocial response 'tough'	.232	.257	.958***	-.779***	-.414**	.823***	-.693***	-.381*	-		
21. Coercive response 'tough'	-.129	-.123	-.793***	.970***	-.183	-.707***	.865***	-.118	-.804***	-	
22. No response 'tough'	-.183	-.233	-.353*	-.214	.960***	-.264	-.192	.806***	-.405**	-.219	-
23. Prosocial response 'friends'	.254	.233	.984***	-.811***	-.408**	.937***	-.790***	-.433**	.942***	-.777***	-.351*
24. Coercive response 'friends'	-.128	-.078	-.794***	.984***	-.205	-.763***	.943***	-.144	-.753***	.957***	-.236
25. No response 'friends'	-.224	-.266	-.416**	-.162	.986***	-.385*	-.134	.934***	-.408**	-.176	.940***
26. Prosocial response 'alone'	.229	.292	.985***	-.814***	-.404**	.935***	-.789***	-.432**	.945***	-.784***	-.345*
27. Coercive response 'alone'	-.097	-.164	-.831***	.985***	-.140	-.808***	.949***	-.069	-.780***	.953***	-.185
28. No response 'alone'	-.257	-.258	-.395*	-.183	.983***	-.343*	-.168	.914***	-.408**	-.184	.951***
29. Prosocial response 'smaller'	.249	.229	.981***	-.821***	-.385*	.939***	-.798***	-.422**	.935***	-.788***	-.321*
30. Coercive response 'smaller'	-.123	-.116	-.825***	.986***	-.153	-.801***	0.946***	-.078	-.776***	.958***	-.201
31. No response 'smaller'	-.251	-.224	-.403**	-.170	.977***	-.366*	-.143	.916***	-.402**	-.183	.939***
32. Prosocial response 'same size'	.266	.320	.981***	-.787***	-.439**	.924***	-.762***	-.455**	.947***	-.759***	-.388*
33. Coercive response 'same size'	-.139	-.164	-.808***	.984***	-.178	-.782***	.950***	-.119	-.762***	.950***	-.211
34. No response 'same size'	-.231	-.284	-.417**	-.162	.987***	-.362*	-.153	.925***	-.430**	-.159	.950***
35. Prosocial response 'bigger'	.210	.242	.988***	-.825***	-.392*	.941***	-.803***	-.420**	.945***	-.791***	-.334*
36. Coercive response 'bigger'	-.080	-.089	-.810***	.990***	-.186	-.780***	.949***	-.122	-.768***	.963***	-.221
37. No response 'bigger'	-.235	-.274	-.393*	-.182	.978***	-.362*	-.153	.923***	-.387*	-.196	.936***

(Appendix K table continued)

	23	24	25	26	27	28	29	30	31	32	33
23. Prosocial response 'friends'	-										
24. Coercive response 'friends'	-.805***	-									
25. No response 'friends'	-.424**	-.196	-								
26. Prosocial response 'alone'	.939***	-.758***	-.395*	-							
27. Coercive response 'alone'	-.792***	.939***	-.123	-.844***	-						
28. No response 'alone'	-.376*	-.207	.938***	-.401**	-.153	-					
29. Prosocial response 'smaller'	.969***	-.797***	-.384*	.963***	-.820***	-.374***	-				
30. Coercive response 'smaller'	-.818***	.974***	-.136	-.807***	.968***	-.167	-.846***	-			
31. No response 'smaller'	-.393*	-.194	.946***	-.400**	-.141	.979***	-.403**	-.148	-		
32. Prosocial response 'same size'	.959***	-.741***	-.453**	.972***	-.809***	-.411**	.936***	-.769***	-.417**	-	
33. Coercive response 'same size'	-.783***	.954***	-.162	-.808***	.983***	-.190	-.783***	.951***	-.179	-.800***	-
34. No response 'same size'	-.417**	-.193	.985***	-.403**	-.125	.957***	-.380*	-.144	.952***	-.460**	-.165
35. Prosocial response 'bigger'	.976***	-.800***	-.391*	.970***	-.823***	-.381*	.956***	-.817***	-.370*	.958***	-.801***
36. Coercive response 'bigger'	-.800***	.984***	-.181	-.796***	.966***	-.185	-.800***	.968***	-.177	-.764***	.964***
37. No response 'bigger'	-.389*	-.214	.969***	-.385*	-.145	.957***	-.353*	-.159	.926***	-.415**	-.181

(Appendix K table continued)

	34	35	36	37
34. No response 'same size'	-			
35. Prosocial response 'bigger'	-.391*	-		
36. Coercive response 'bigger'	-.170	-.823***	-	
37. No response 'bigger'	.951***	-.392*	-.199	-