



# Early adolescent disclosure and parental knowledge regarding online activities: Social anxiety and parental rule-setting as moderators

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## Abstract

Early adolescents spend a lot of time online, yet little is currently known about the links between parental rule-setting, adolescent disclosure about online activities, and whether social anxiety may interfere with these processes. Using a longitudinal sample of 526 adolescents (269 girls;  $M_{age} = 14.00$ ) and their parents (79% mothers,  $M_{age} = 43.66$ ), the results from the current study showed low correspondence between parental knowledge, adolescent disclosure, as well as parents' and adolescents' ratings of parental legitimacy to set boundaries about online activities. High social anxiety interacted with high adolescent-rated parental rule-setting in predicting the least disclosure about chatting with strangers and posting online content over time. Also, high social anxiety interacted with low parent-rated control to predict more adolescent disclosure about chatting with strangers and money spent online over time. Thus, social anxiety and parental rule-setting moderated the links between disclosure and knowledge for some early adolescent online activities. Our results conflict with the value typically placed on parental rule-setting in online contexts, at least for socially anxious adolescents.

**Keywords** Adolescent disclosure · Parental knowledge · Legitimacy of authority · Social anxiety · Online activities · Parental rule-setting · Early adolescence

Parents' knowledge about early adolescent activities is linked to positive adolescent adjustment, but these links seem to be explained by children's disclosure to their parents rather than parents' active monitoring or surveillance efforts (Kerr and Stattin 2000; Stattin and Kerr 2000). The majority of this research has overlooked the increasing time spent online by early adolescents, however. Early adolescence is of particular interest for these processes because this is typically the time when young people start spending added time with peers, making parents more dependent on children's own stories about their activities rather than information gained from active monitoring attempts (Kerr and Stattin 2000). Recent Swedish data indicate that 90% of early adolescents use the

Internet daily (Findahl 2010). It is therefore plausible to assume that adolescent information management regarding online activities does take place, yet little is currently known about how much adolescents share and how much parents actually know about adolescents' online activities. One study showed that parents have a tendency to underrate their children's risky online behaviors, such as for example visiting inappropriate websites, and they tend to overrate their own efforts at supervision and discussing Internet safety with their children (Liau et al. 2008). Young people partake in a number of activities such as surfing, posting content, communicating with friends and/or strangers, or spending money online. Because some of these online activities might be risky, more understanding about what parents know about these processes is needed.

Current literature indicates that parental rule-setting or behavioral control is associated with less problematic Internet use (Li et al. 2013). Rule setting about online content, such as websites adolescents are allowed to visit, has been associated with less problematic or compulsive Internet use (van den Eijnden et al. 2010). Nevertheless, perceptions of too much parental involvement in personal issues can lead to feelings of heightened psychological control instead (Smetana et al. 2005). This may depend on whether adolescents believe that

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parents have legitimacy of authority to set boundaries regarding various activities. According to the *social-cognitive domain* theory, parents' and adolescents' beliefs about parental legitimacy to regulate adolescent activities is dependent on whether they are negotiating *personal* issues, pertaining to preferences such as clothes or control over one's body; or *multifaceted* issues, referring to for example cleaning the room (Smetana et al. 2005; Smetana and Daddis 2002). Parents and adolescents tend to agree that parents should have a high degree of authority over *prudential* issues, relating to acts that may have consequences for the rights and well-being of others, as well as *conventional* issues, referring to social and cultural norms (Smetana et al. 2005; Smetana and Daddis 2002). Adolescents who believe that parents should have less control over personal acts, in addition to feeling that their parents exert restrictive control over such acts, tend to rate their parents as more psychologically controlling (Smetana and Daddis 2002). Thus, if parents are deemed to lack legitimate authority regarding control of online activities, adolescents may feel overly controlled – even if the parents do not exert overcontrol in reality, but rather merely try to supervise their children. Feelings of overcontrol might thus interfere with how much adolescents tell their parents, and consequently how much parents actually know about their children's online activities.

Previous research using the social-cognitive domain theory framework specifically has examined parental legitimacy of authority to set boundaries about some online activities such as visiting websites, chatting with others, and the content of chatting, grouped together into a multifaceted category (Smetana et al. 2006, 2009). Nonetheless, research on authority over online activities using the social-cognitive domain theory framework is generally scarce. For instance, when adolescents report about their obligations to disclose to parents, they feel more obliged to tell parents about behaviors regarding multifaceted issues compared with moral, conventional, or personal matters (Smetana et al. 2006). In another study, however, voluntary disclosure to parents was greater for prudential and personal than for multifaceted issues (Smetana et al. 2009). The seemingly contradictory results from these two studies might have arisen because the items about online activities were grouped together with other items such as staying out late at night, making it difficult to discern how these processes would work for online activities in particular. In fact, setting rules regarding online activities may be interpreted as a highly personal rather than a multifaceted issue by the adolescents, and therefore seen as interfering with their own domain of authority. Indeed, there is evidence for large individual differences in perceptions of parental legitimacy to set boundaries within various domains. For example, boys from divorced homes and girls from intact homes recognize parental authority over personal and multifaceted issues more than their peers (Smetana 1993), and lower-SES adolescents are

more likely to recognize parental legitimacy to set boundaries regarding personal issues compared with their middle-SES peers (Cumsille et al. 2006; Nucci et al. 1996). Nonetheless, little is yet known regarding whether or how personality traits that interfere with perceptions of parental rule-setting might affect the link between adolescent disclosure and parental knowledge.

One such trait is shyness or social anxiety, which is characterized by social fears, negative rumination, excessive discomfort, and somatic symptoms such as trembling, blushing and sweating before, during, and after social interactions (Heiser et al. 2009). One reason why adolescent social anxiety might be of consequence is its consistent link to parental control throughout childhood and adolescence. As a number of reviews indicate, various forms of shy, socially fearful behaviors in childhood are linked with heightened perceptions of parental psychological control (Dadds and Barrett 2001; Hastings et al. 2010; Masia and Morris 1998; Wood et al. 2003), and one explanation for these findings is that parents tend to overcontrol their socially anxious children in order to be helpful or as a way of reducing stressful circumstances (Rapee 2001). Though well-meaning, parents of socially anxious children are believed to restrict their children's development of self-efficacy and autonomy (Hastings et al. 2005). Albeit more scarce than research on social anxiety in childhood, research on adolescent social anxiety indicates that parents of anxious adolescents grant less autonomy and are more over-controlling compared to parents of non-anxious adolescents (Siqueland et al. 1996). Viewing these findings from a transactional point of view, however, there may be something to how socially anxious adolescents interpret control that could contribute to feeling overly controlled. In one longitudinal study with adolescents, for example, shyness predicted an increase in perceptions of intrusive, psychological control by parents one year later, which in turn predicted an increase in shyness two years later (Van Zalk and Kerr 2011). The authors reasoned that besides for being affected by parental control, shyness might also have affected adolescents' perception of parental control as being higher than it actually was. To our knowledge, no studies have examined whether social anxiety might interfere with parental control from the point of view of the social domain theory. A combination of social anxiety and parental rule-setting might affect perceptions of legitimacy of authority to set boundaries and lead to feelings of less autonomy and more intrusion, resulting in less disclosure to parents about online activities, but this remains to be tested.

In this study, we aim to gain better understanding about the links between parental legitimacy of authority to set boundaries, adolescent disclosure and parental knowledge about activities on the Internet, using the social-cognitive domain theory as the main framework of testing. Because the likelihood to endorse parental authority declines throughout early and

middle adolescence (Darling et al. 2008; Smetana and Asquith 1994), we focus on 13–15 year olds who were followed up for 8 months. We use both parent- and adolescent-ratings of disclosure and knowledge, as well as perceptions of parental rule-setting regarding online activities. In this way, we are able to distinguish between adolescent and parent perceptions. We also use parent- and adolescent-reported legitimacy of authority to set boundaries over online activities. We examine whether beliefs about parental legitimacy of authority to set boundaries a) affect adolescent disclosure about what adolescents do online, and b) affect parental knowledge about adolescent online activities. We then examine whether social anxiety and perceptions of parental rule-setting moderate the links between beliefs about legitimacy of parental autonomy and adolescent disclosure versus parental knowledge, respectively. Finally, as there are well-established gender differences on social anxiety (La Greca and Lopez 1998) and parents may treat shy girls more positively than shy boys (Stevenson-Hinde and Glover 1996), we control for gender in all analyses. Because we use a sample of 13–15 year olds, we also control for the effect of age. Thus, the questions for this study are: 1) Do social anxiety and parental rule-setting moderate the links between legitimacy of parental authority to set boundaries and adolescent disclosure regarding online activities, and 2) Do social anxiety and parental rule-setting moderate the links between legitimacy of parental authority to set boundaries and parental knowledge regarding online activities?

## Method

### Sample

The data are from a three-wave longitudinal project focusing on the role of online and offline friendships in early adolescent emotional adjustment. The participants were 7th–9th - graders (roughly aged 13 to 15) and their parents from a medium-sized town in Sweden (with a population of about 130,000). The adolescent measures were collected in two ways: via an in-school offline survey (only at Time 1) and via an online survey (collected at all timepoints). Parent data was collected via offline surveys only. The first data collection took place in September 2010 (Time 1), followed by the second measurement in May 2011 (Time 2), and a final measurement in January 2012 (Time 3). Thus, the lags between adjacent times of measurement were approximately 8 months. Because parent data was only collected at Times 1 and 2, however, only these timepoints were used in the current study. Approximately 12.1% of all participants were ethnic minorities at the onset of the study, which was slightly lower compared to 14.7% in the entire country according to official reports (Westström and Uhrlander 2013). The unemployment rate (6%) and the proportion of single-parent households in

the community (5.1%) were similar to the rest of the country (Westström and Uhrlander 2013). Mean incomes were about 5% lower compared to the rest of Sweden (Westström and Uhrlander 2013).

There were 423 adolescents from one school who were initially recruited to take part in the study (205 girls;  $M_{age} = 14.05$ ). These participants were evenly distributed across three classrooms per each grade. During the offline surveys collected at the school, the adolescents provided their e-mail address. They were then sent a link to complete an online part of the survey, with a specified username and password. During the online survey, the adolescents nominated close friends, and if these had not already participated in the study, they too were sent an e-mail in which they were invited to take part. The procedure for the friends' data collection was identical to the data collection of the targets, with the exception that all questionnaires were filled out online. This resulted in a final sample of 526 adolescents (269 girls and 254 boys; age range = 13–15,  $M_{age} = 14.00$ ).

At Time 1, 142 parents participated in the study (79% mothers,  $M_{age} = 43.66$ ), whereas 159 parents took part at Time 2 (81% mothers,  $M_{age} = 44.22$ ). There were 49.7% of the parents that were lost to attrition at Time 2. Nonetheless, there were 219 parents who took part in the study during at least one time point, thus providing 42% of parent data available overall. Little's MCAR (Little 1988) test using all study variables failed to reject the null hypothesis that the data were missing completely at random,  $\chi^2(26,842, N = 526) = 23,673.65, p = 1.00$ , thus revealing no identifiable patterns in the data. For this reason, the data were treated as missing completely at random.

### Procedure

Trained research assistants visited the adolescents in their classrooms during school time, with no teachers present. The adolescents were informed about the types of questions they would answer, and the time it would take to finish the questionnaires. They were also informed that their participation was voluntary, and that if they chose not to participate, they could do something else instead. They were guaranteed that if they did participate in the study, their answers would never be shown to anyone. Parents were informed about the study through a meeting at the school prior to the commencement of the data collection. They were sent a pre-paid post card, along with additional information about the study, to return if they did not want their child to participate (only 2% of the parents did so), informing them they could withdraw their child from the study at any time. They were also sent questionnaires to fill out and return to us via pre-paid envelopes, with questions corresponding to several adolescent measures. No participant was paid for taking part in the study, but the adolescents received two gift cards for cinema tickets –

whether or not they chose to participate. The Regional Ethics Committee approved the procedures and measures used in the study.

## Measures

**Adolescent Disclosure and Parental Knowledge** Adolescents and parents reported on how much they disclose or know about five types of online activities, respectively. This measure was loosely based on disclosure and knowledge items reported in previous research (see e.g., Smetana et al. 2006). We selected the items based on previous pilot testing and theoretical considerations, and we believed the items would reflect relevant online activities important to early adolescents in their everyday lives at the time of the data collection. The items were about which websites the adolescents visit, chatting with friends (someone their parents already knew), chatting with strangers (someone their parents did not know), posting content online (such as pictures and/or videos), and spending money online (on e.g., games). Rather than creating a single measure, these items were used separately in the analyses. Parent ratings of knowledge about what their child did online mirrored the adolescent-rated disclosure about online activities. The adolescents were asked how much they tell their parents about each of the online activities, and the response items for adolescents ranged from *Tell almost everything* (1), *Tell quite a lot* (2), *Partly tell* (3), *Keep a lot to myself* (4) to *Keep almost all to myself* (5). Parents were asked how much they knew about what their child does regarding each of the online activities, and the response items for parents ranged from *No, never* (1), *Yes, sometimes* (2), to *Yes, often* (3). Correlations between Time-1 and Time-2 items ranged between  $-.25$ – $.61$  for parental knowledge, and between  $-.08$ – $.96$  for adolescent disclosure.

**Legitimacy Ratings** The adolescents were instructed to report on the extent of how much they tell their parents regarding the same online items used in the disclosure and knowledge measures - which websites the adolescents visit, chatting with friends (someone their parents already knew), chatting with strangers (someone their parents did not know), posting content online (such as pictures and/or videos), and spending money online (on e.g., games; Smetana et al. 2006). The adolescents and parents were both asked whether it was okay for parents to set boundaries regarding each of these specific online issues. The response items ranged from *Definitely not* (1) to *Yes, definitely* (5). Correlations between Time-1 and Time-2 items ranged between  $-.19$ – $.86$  for parent ratings, and between  $.10$ – $.66$  for adolescent ratings.

**Parental Rule-Setting Regarding Online Activities** There were three items that measured how much control the adolescents felt their parents had over their online activities (van den

Eijnden et al. 2010). This scale measures distinctive aspects of parenting, as it does not correlate highly with either traditional measures of psychological nor behavioral control (van den Eijnden et al. 2010). The items refer to parents allowing adolescents to do whatever they like online, allowing them to visit every website they want, and allowing them to have online contact with anyone. The same items were used for parents, but were reformulated so that the questions referred to whether it is ok to allow these activities for adolescents. An additional item was added for parents regarding how much time the adolescents were allowed to spend online. The response items ranged from *Absolutely not true* (1), *Not true* (2), *True* (3), *Often true* (4), to *Absolutely true* (5). The Cronbach's alpha at Time 1 was  $.86$  for both adolescent and parent reports.

**Social Anxiety** Social anxiety was measured via adolescent reports about their own fears in different social situations (Gren-Landell et al. 2009). This instrument is a modified version of the Social Phobia Screening Questionnaire, which was originally created for adults (Furmark et al. 1999), and adjusted for children and adolescents up to age 18 (SPSQ-C, or the Social Phobia Screening Questionnaire for Children; Gren-Landell et al. 2009). The measure contains eight questions about fears in social situations that tend to elicit social anxiety, such as "speaking in front of the class," "going to a party," and "being with classmates during breaks." The response items ranged from having *No fear* (1), *Some fear* (2), to *A lot of fear* (3). The Cronbach's alpha for this scale was  $.70$  at Time 1.

## Analytical Strategy

In order to assess the links between all study variables, regression models were conducted using MPlus 7.0 (Muthén and Muthén 1998–2012) and the FIML (Full Information Maximum Likelihood) procedure. The use of the FIML procedure allowed for the recovery of the missing data for parents, as FIML makes use of all available data to estimate information about missing data in the dataset (Enders 2010; Little 2013). By estimating the data, FIML provides less biased results than both pairwise and listwise deletion (Little 2013). Due to the variations in response items, all items were  $z$ -transformed before creating the measures and interactions.

As all of the path models only used one indicator per manifest variable, they were fully saturated models with perfect model fit, and the model fit is therefore not reported. The covariance coverage matrix in MPlus calculates the proportion of missing values in the dataset, which yields an estimated proportion of all available observations for each variable used in the analyses (Muthén and Muthén 1998–2012). In the current sample, the participants had between 14 and 100% of data available at both time points for adolescent and parent reports.

## Results

### Descriptives

**Disclosure and Knowledge about Online Activities** Table 1 shows the descriptives and correlations between Time-1 adolescent disclosure and parental knowledge items, including correlations with other main study variables. There was a low correspondence between parent-rated knowledge and adolescent-rated extent of disclosure in general regarding what adolescents do online. In addition, parent-ratings of knowledge items seemed unrelated to one another, whereas adolescent ratings showed medium to high correlations between the items. High perceptions of parent-rated knowledge about which websites the adolescents commonly visit were positively linked with high levels of adolescent-rated disclosure about which websites they visited, how they spent their money online, and whether they chatted with strangers. Parent-reported rule-setting was also positively associated with parental knowledge about chatting with friends and visited websites, whereas it was negatively linked to knowledge about chatting with strangers. Adolescent ratings of parental rule-setting were negatively linked with adolescent disclosure about all online activities. Finally, high levels of adolescent-reported rule-setting were positively associated with social anxiety, which would be expected from previous findings.

**Legitimacy of Parental Authority to Set Boundaries over Online Activities** Table 2 shows the descriptives and correlations for all items concerning legitimacy of parental authority to set boundaries about what adolescents do online. Just as with ratings of disclosure and knowledge, parent- and adolescent-ratings appear unrelated. Parent-rated rule-setting was positively associated with parent-rated legitimacy of authority for most online activities, and the same was true for associations between adolescent-rated rule-setting and parental legitimacy. Overall then, there is a low correspondence between adolescent and parent reports of knowledge and legitimacy of authority.

### Do Social Anxiety and Parental Rule-Setting Moderate the Links between Legitimacy of Parental Authority to Set Boundaries and Adolescent Disclosure Regarding Online Activities?

To answer our first research question, we conducted five regressions in MPlus for each online activity. We included adolescent- and parent-rated disclosure and knowledge, legitimacy of authority, and rule-setting, as well as adolescent-rated social anxiety. We controlled for gender, age, and Time-1 ratings of disclosure for each specific item in question. Because we expected social anxiety to interact with ratings of legitimacy, rule-setting, and gender, we created interactions

**Table 1** Descriptives and correlations for time-1 parent- and adolescent-ratings of disclosure and knowledge with main study variables

	Mean <sup>a</sup>	SD <sup>b</sup>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. PR <sup>c</sup> chatting known	2.56	.64	–											
2. PR chatting unknown	1.76	.60	.11	–										
3. PR websites	2.70	.54	.11	–.11	–									
4. PR posting content	1.59	.63	.22	* .34	*** .02	–								
5. PR spending money	1.14	.34	–.07	–.04	.14	.04	–							
6. PR rule-setting	4.17	.89	.19	* –.17	* .27	*** –.06	–.13	–						
7. AR <sup>d</sup> chatting known	3.31	1.33	–.04	.07	–.16	* –.15	–.04	–.05	–					
8. AR chatting unknown	3.75	1.27	–.15	–.04	–.27	* –.15	.08	–.03	.80	***	–			
9. AR websites	3.37	1.39	–.07	.08	–.19	* –.09	.02	–.05	.73	***	.80	***	–	
10. AR posting content	3.51	1.30	–.07	–.01	–.07	–.03	–.002	.03	.63	***	.74	***	.75	***
11. AR spending money	2.29	1.45	–.16	.08	–.33	* .01	–.10	–.05	.37	***	.35	***	.32	***
12. AR rule-setting	2.99	1.12	.08	–.05	.09	.03	.03	.01	–.27	***	–.16	*	–.34	***
13. AR social anxiety	1.38	.30	.01	–.10	–.06	.03	.09	–.08	–.10	–.05	–.16	*	–.16	*
													.08	.22

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001. <sup>a</sup> = based on raw scores. <sup>b</sup> = standard deviation. <sup>c</sup> = parent-rated. <sup>d</sup> = adolescent-rated

**Table 2** Descriptives and correlations for time-1 parent- and adolescent-ratings of parents' legitimacy of authority with main study variables

	Mean <sup>a</sup>	SD <sup>b</sup>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. PR <sup>c</sup> Chatting known	2.96	1.48	—											
2. PR Chatting unknown	3.90	1.17	.27	**										
3. PR Websites	4.15	1.03	.19	*	.35	***								
4. PR Posting content	4.42	1.29	-.13	.28	***	.29	***							
5. PR Spending money	4.22	1.06	.05	.40	***	.53	***	—						
6. PR Rule-Setting	4.17	.89	.16	.19	*	.12	.20	*						
7. AR <sup>d</sup> Chatting known	2.48	1.54	.05	.10	.03	.05	.01	.12	—					
8. AR Chatting unknown	2.80	1.44	-.05	.04	.03	-.03	.03	-.01	.49	***				
9. AR Websites	2.94	1.39	-.06	-.07	-.12	-.05	-.16	.03	.44	***	.61	***		
10. AR Posting content	3.60	1.37	-.05	-.11	.003	.002	-.09	.07	.12	*	.36	***	.40	***
11. AR Spending money	3.06	1.48	-.09	-.04	.02	-.13	-.06	-.04	.42	***	.59	***	.60	***
12. AR Rule-Setting	2.99	1.12	.05	.07	.08	-.002	.09	.01	.32	***	.37	***	.46	***
13. AR Social anxiety	1.38	.30	.09	-.01	-.08	-.14	-.09	-.08	.05	.09	.12	*	.09	.21

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001. <sup>a</sup> = based on raw scores. <sup>b</sup> = standard deviation. <sup>c</sup> = parent-rated. <sup>d</sup> = adolescent-rated

between adolescent- and parent-reported legitimacy of authority and social anxiety, between social anxiety and parent- and adolescent-reported rule-setting, and between social anxiety and gender. The results are shown in Table 3. As the table shows, adolescent-rated disclosure was the strongest predictor of disclosure for the various online activities. Time-1 parent-rated knowledge significantly predicted less adolescent disclosure about visiting websites at Time 2. Adolescent-rated rule-setting at Time 1 also significantly predicted less adolescent disclosure about visiting websites and chatting with friends at Time 2.

Overall, two significant interactions emerged. First, there was a significant negative interaction between social anxiety and parent-rated rule-setting regarding chatting with strangers. This interaction is depicted in the upper part of Fig. 1. The lower parental rule-setting was at Time 1, the more adolescents disclosed at Time 2 – particularly those with higher social anxiety. Second, there was a significant negative interaction between social anxiety and parent-rated rule-setting for posting online content, as shown in the lower part of Fig. 1. As in the previous case, it was the combination of high social anxiety and low parental control that was linked to the highest level of disclosure about posting online content at Time 2. Thus, the less the socially anxious adolescents felt monitored by parents, the more they were prone to disclose over time.

### Do Social Anxiety and Parental Rule-Setting Moderate the Links between Legitimacy of Parental Authority to Set Boundaries and Parental Knowledge Regarding Online Activities?

To answer our second research question, we adopted the same analytical strategy as for the above models, using parent-rated knowledge about the various online activities as outcome at Time 2. The results are shown in Table 4. Parent-rated knowledge was a predictor of their own knowledge 8 months later for all activities, except for money spent online. As Table 4 shows, no significant interactions or direct predictors apart from parental knowledge emerged for chatting with friends or posting online content. There were several significant findings for the other activities, however. Time-1 parent-rated rule-setting and social anxiety were significant positive predictors of parental knowledge about visited websites at Time 2. The interaction between social anxiety and gender significantly predicted parent-rated knowledge 8 months later, as shown in the upper left part of Fig. 2. As the figure depicts, boys with low social anxiety provided least parental knowledge, whereas girls with high social anxiety provided the most parental knowledge about visited websites, indicating that highly socially anxious girls may be more prone to divulge information about which websites they visit to their parents. There was one significant interaction between social anxiety and adolescent-rated rule-setting, as shown in the upper right

**Table 3** Regression models for adolescent-rated disclosure regarding online activities (N = 526)

Time-1 Predictors	Visited websites T2		Chatting with friends T2		Chatting with strangers T2		Money spent online T2		Posting content T2						
	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE					
Age	.03	.06	.03	.06	-.03	.07	.08	.10	.17	*	.08				
Gender	-.02	.06	-.01	.06	-.12	.07	.14	.13	.06		.09				
PR legitimacy <sup>a</sup>	.06	.10	.05	.09	-.05	1.00	.10	.18	-.08		.11				
AR legitimacy <sup>a</sup>	-.01	.07	-.05	.07	-.03	.07	.13	.13	.03		.09				
PR knowledge	-.22	**	.09	-.004	.10	-.09	.11	.11	.13	.09	.13				
AR disclosure	.36	***	.06	.45	***	.06	.46	***	.07	.61	***	.11	.44	***	.08
PR rule-setting	-.07	.10	-.05	.10	-.15	.11	-.03	.16	-.10		.12				
AR rule-setting	-.22	**	.07	-.17	**	.07	-.10	.07	.03	.12	-.07	.09			
Social anxiety	.14	.21	.12	.22	.04	.25	-.03	.45	.35		.29				
Social anxiety X PR rule-setting	-.09	.10	-.06	.10	-.25	*	.12	.23	.17	-.36	**	.13			
Social anxiety X AR rule-setting	.05	.07	.03	.07	.08	.08	.16	.14	.001		.09				
Social anxiety X gender	-.11	.22	-.14	.23	-.13	.26	.02	.45	-.45		.32				
Social anxiety X AR Legitimacy <sup>a</sup>	.01	.08	.07	.07	.06	.08	.13	.15	.02		.09				

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . PR, parent-rated; AR, adolescent-rated; SE, standard error. <sup>a</sup> = the equivalent item at Time 1 was used to predict Time-2 disclosure

part of Fig. 2. High adolescent-rated rule-setting and high social anxiety predicted less parent-rated knowledge about chatting with strangers at Time 2. Contrariwise, low adolescent-rated rule-setting and low social anxiety were linked to highest parental knowledge about chatting with strangers 8 months later.

Finally, there were also two significant interactions between social anxiety and adolescent-rated parental legitimacy of authority, depicted in the lower part of Fig. 2. High social anxiety paired with high adolescent-rated parental legitimacy of authority predicted the least parental knowledge about chatting with strangers and spending money online 8 months later. The interactions also indicate that a combination of low social anxiety and low adolescent ratings of parental authority regarding spending money online and chatting with strangers at Time 1 were linked to most parental knowledge about how adolescents spend their money online and whether they chat with strangers at Time 2. Taken together then, these results denote that a combination of high social anxiety and high parental rule-setting and legitimacy of authority to set boundaries, respectively, appear to be linked to less parental knowledge about some, but not all, online activities.

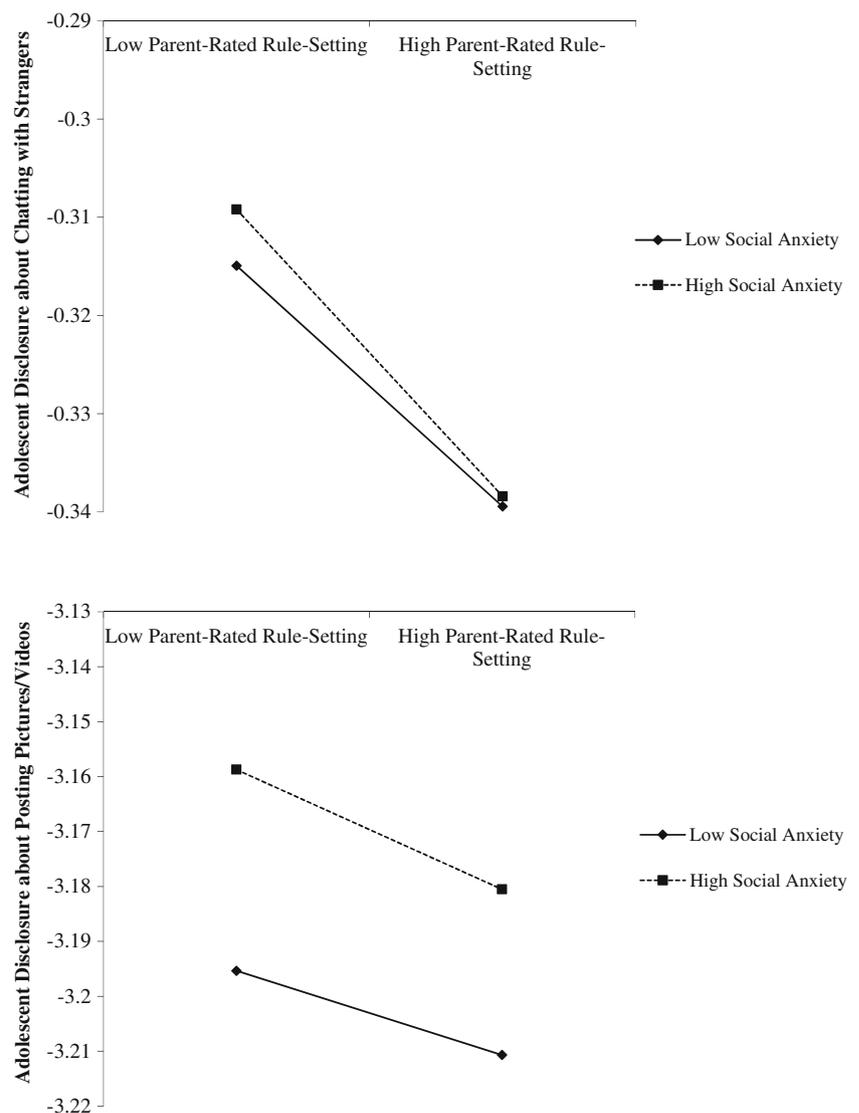
## Discussion

The results from the current study indicated a low correspondence between what parents know, how much adolescents disclose, parents' own ratings of legitimacy to set boundaries, and adolescents' ratings of parental legitimacy to set

boundaries about online activities. To our knowledge, this is the first study that employs the social-cognitive domain theory as framework using longitudinal parent and adolescent reports of disclosure, knowledge, legitimacy of authority, and rule-setting in predicting how much adolescents tell and how much parents know about online activities in particular. The existing literature regarding parental knowledge and adolescent disclosure about online activities indicates that parents tend to underestimate adolescents' risky online behaviors and overestimate their own attempts at supervision and safety discussions about the Internet (Liau et al. 2008). Parental behavioral control or rule-setting is associated with less problematic Internet use (Li et al. 2013), and rule-setting about online content – such as visiting websites – has been associated with less problematic or compulsive Internet use (van den Eijnden et al. 2010). These studies have looked at online activities and problematic behavior without taking into account personality traits, however. The results from the current study indicate that adolescent social anxiety may interact with perceptions of rule-setting in predicting how much adolescents tell their parents regarding some online activities. As far as we know, this study is the first of its kind to examine the links between parental rule-setting and perceptions of legitimacy of authority, while taking social anxiety into account.

The social-cognitive domain theory stipulates that parental legitimacy of regulating activities is contingent upon whether adolescents consider the issues at hand to be personal, prudential, conventional, or multifaceted (Smetana et al. 2005; Smetana and Daddis 2002). Adolescents who believe that parents should not be allowed to encroach upon acts of a

**Fig. 1** Significant interactions between social anxiety and parent-rated rule-setting on adolescent disclosure about online activities. High and low social anxiety are plotted at  $\pm 1$  SD, respectively



personal nature tend to rate their parents as more psychologically controlling, particularly when they feel that their parents exercise restrictive control over the personal domain (Smetana and Daddis 2002). In this study, we did not group together items as in previous research, as there may be some uncertainty regarding which items fall under which domain. For example, visiting websites may be seen as multifaceted, but perhaps as long as the websites are under the realm of what parents are expected to condone. Websites of a riskier nature, such as for example those with sexual content, may instead be viewed as falling within the prudential or conventional domain. Therefore, we aimed to look at various issues regarding online activities separately instead of grouping them together. Our results partially support the notion that if parents are deemed to lack legitimate authority regarding rule-setting for certain online activities, adolescents with high social anxiety may provide less knowledge over time about what they are up to online. Nevertheless, when it comes to disclosure rather than

knowledge, it seems that high social anxiety and low parent-rated rule-setting interact in predicting more disclosure about chatting with strangers and posting online content, specifically. Because chatting with strangers may be a particularly risky endeavor, it seems that parents' attempts to set rules about this activity might backfire for adolescents who are socially anxious. More research is required to understand the links between different online activities and their links to perceptions of parental rule-setting by adolescents with varying levels of social anxiety.

One interesting finding regarding rule-setting emerged from the current results. It was parents' own reports of rule-setting that interacted with social anxiety to predict more knowledge about certain activities over time, whereas it was adolescents' ratings of parental rule-setting that interacted with social anxiety to predict disclosure to parents over time. Generally speaking, there was no correlation between parent- and adolescent-ratings of rule-setting over online activities, which may be an indication of adolescent

**Table 4** Regression models for parent-rated knowledge regarding online activities (N = 526)

Time-1 Predictors	Visited websites T2		Chatting with friends T2		Chatting with strangers T2		Money spent online T2		Posting content T2					
	$\beta$	<i>SE</i>	$\beta$	<i>SE</i>	$\beta$	<i>SE</i>	$\beta$	<i>SE</i>	$\beta$	<i>SE</i>				
Age	-.03	.09	-.00	.09	-.01	.09	.22	***	.09	.03	.09			
Gender	-.06	.08	-.11	.09	-.05	.08	.25	**	.08	-.09	.08			
PR legitimacy <sup>a</sup>	.06	.10	-.01	.11	.05	.11	-.01		.11	-.09	.09-			
AR legitimacy <sup>a</sup>	.15	.10	-.03	.09	-.12	.09	-.34	***	.09	-.15	.09			
PR knowledge	.33	***	.09	.52	***	.09	.23	*	.11	.11	.10	.61	***	.08
AR disclosure	-.08	1.00	-.06	.11	.06	.11	-.10		.16	-.04	.11			
PR rule-setting	.24	**	.09	.05	.10	-.01	.09	.24	**	.10	.07	.09		
AR rule-setting	-.10	.10	-.08	.10	-.23	**	.09	.15	.10	-.02	.09			
Social anxiety	.66	**	.28	.02	.29	-.15	.28	-.11	.29	.44	.29			
Social anxiety X PR rule-setting	-.03	.09	.09	.11	-.04	.11	-.11	.12	.08	1.00				
Social anxiety X AR rule-setting	.01	.08	-.01	.08	.23	**	.08	-.05	.08	.02	.07			
Social anxiety X gender	-.63	**	.26	.03	.28	.02	.27	.02	.29	-.40	.27			
Social anxiety X AR legitimacy <sup>a</sup>	-.04	.09	-.17	.09	-.24	**	.08	.16	*	.08	-.02	.08		

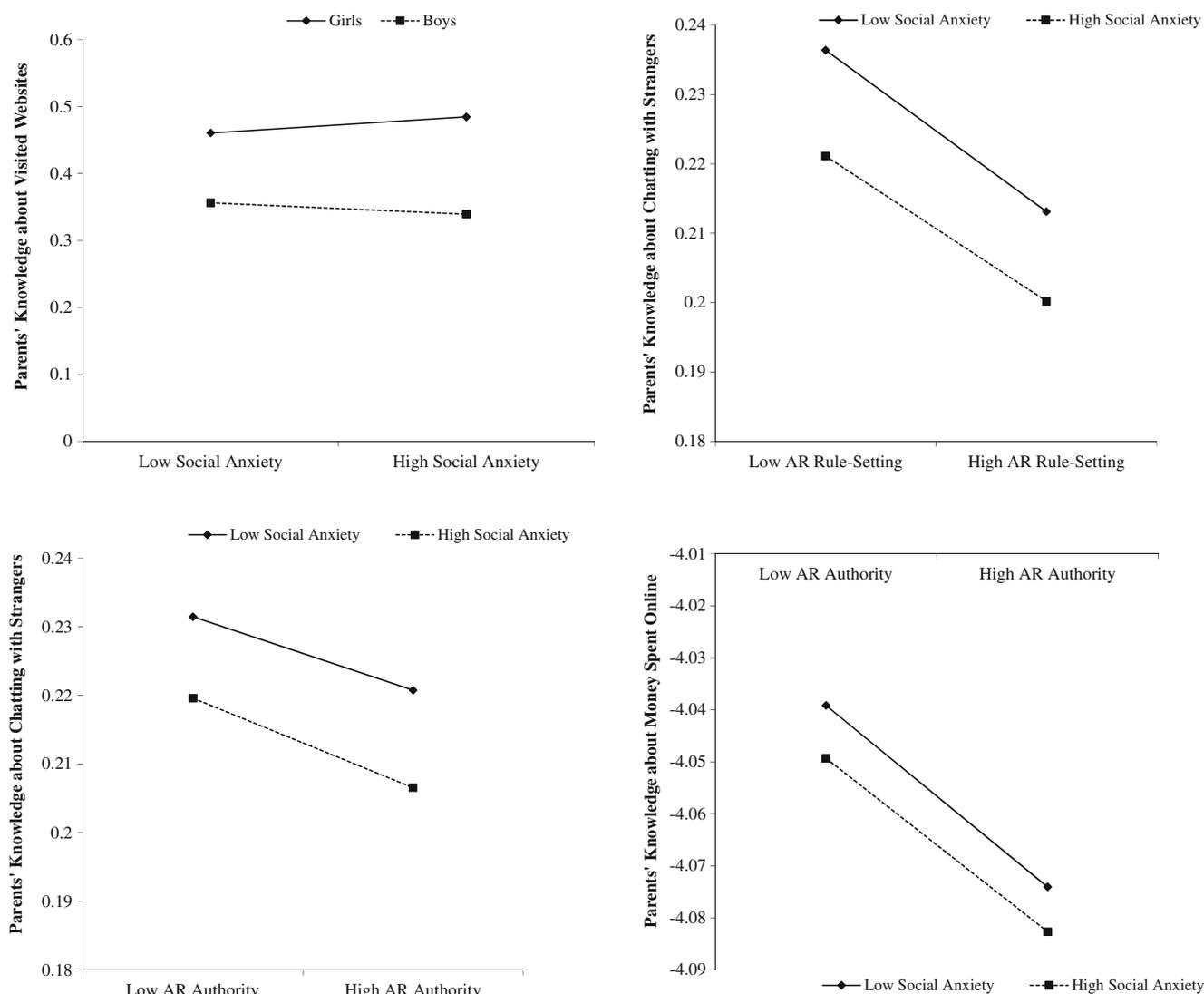
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . PR, parent-rated; AR, adolescent-rated; SE, standard error. <sup>a</sup> = the equivalent item at Time 1 was used to predict Time-2 knowledge

misperceptions of how much parents attempt to monitor them, of parents' misunderstanding about how much rule-setting they exert, or both. Because these questions regarded rule-setting regarding online activities in particular, it is difficult to compare it with other typical ratings of parental rule-setting and control. Indeed, previous research indicates that there are low to moderately high associations between general parenting measures and the specific measure of parental rule-setting for online activities used in this study (Van Rooij and van den Eijnden 2007). As such therefore, this measure may be tapping a distinctive feature of parenting, which differs from traditional measures of behavioral control (van den Eijnden et al. 2010; Van Rooij and van den Eijnden 2007). Nevertheless, because adolescents reported on their own perceptions of parental rule-setting, and perceptions of parental control predict higher social anxiety (e.g., Van Zalk and Kerr 2011), perhaps it is what the adolescents themselves see that matters more in terms of how much they disclose about certain online activities. Similarly, parents' actual attempts at monitoring might be linked to reported knowledge because it is what they believe to be true.

One aspect of what adolescents tell their parents not examined in this study is the distinction between adolescent disclosure and secrecy. Previous literature has distinguished between *not* telling parents about something versus *actively* keeping a secret about it, indicating that the two constructs are negatively related (Frijns et al. 2010). Scholars have hypothesized that actively keeping secrets from parents compared to not disclosing about what they do is bound to entail more work (Frijns et al. 2010; Pennebaker 1997). In the case of online activities, keeping secrets about what adolescents do

online would likely involve more cognitive processing as opposed to simply not disclosing something to parents. Studies have found a link between being adolescent secretiveness and internalizing and externalizing problems, but the same was not true for lack of disclosure (Frijns et al. 2010). Because research indicates that secrecy rather than disclosure is linked with internalizing, perhaps adolescent social anxiety would be affected as well because it is consistently linked with internalizing symptoms such as depressive symptoms (for an extensive review, see Epkins and Heckler 2011). Our results may therefore have been even stronger if we had measured secrecy compared to disclosure instead. Because we did not have information about active secret keeping regarding online activities, however, this remains an issue for further research.

The current study has several limitations. First, there was a large amount of data missing for parents due to high parental attrition between Times 1 and 2. This is a limitation shared with many other studies, however, and our use of the FIML procedure in the longitudinal regressions estimated parental data instead. In addition, we only used single items to indicate knowledge and disclosure, whereas multi-item indicators would have been preferable. In addition, we had parents' and adolescents' ratings on all measures except social anxiety. Nevertheless, individuals themselves appear to be the best judges of their own social fears, as these may not always be apparent to others (Zimbardo 1977). Finally, even though we used both parent and youth reports of parental rule-setting, thus distinguishing between the two, these are still self-reports – which are always subject to bias, and not necessarily reflective of actual behavior. Despite these limitations,



**Fig. 2** Significant interactions between social anxiety and gender, adolescent-rated parental authority, and adolescent-rated rule-setting, respectively, on parental knowledge about adolescent online activities. High and low social anxiety are plotted at  $\pm 1$  SD, respectively

nonetheless, the current study has several strengths. We employed a longitudinal sample of early adolescents and their parents, and we also used measures allowing for comparisons between what parents actually know about adolescents' online activities and what adolescents tell them in turn. Thus, this study provides a unique insight into a realm of knowledge hitherto inadequately explored in the current literature.

Adolescents in the Western world today have access to the Internet using various means, such as smartphones, tablets, and/or personal computers. With the ever-increasing level of connectivity and access to the Internet almost anywhere, it is of interest to examine what types of online activities young people believe they should legitimately share with parents. In addition, it is of importance to understand more about how traits such as social anxiety might affect these processes. Our results indicate that highly socially anxious adolescents are

more prone to sharing things about what they do online with their parents in case they don't feel the parents have exerted too many rules. The more rule-setting parents exert and the higher their children's social anxiety is, the less they are bound to know about what their children actually do online. As such, therefore, our results go against the notion that high level of parental rule-setting is a good idea for all adolescents. Taking this into account, perhaps parents should take a gentler route with children who are socially fearful, because it may help their children to open up and share information about online activities - thus increasing parents' own knowledge over time.

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### Compliance with Ethical Standards

**Conflict of Interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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