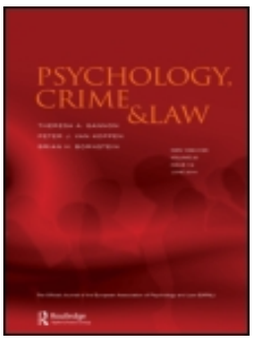

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After a storm comes a calm: International expert decision-making process regarding abstract definitions of emotional cool-off periods in sexual homicide

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ABSTRACT

The Federal Bureau of Investigation coined the term 'emotional cool-off period' in relation to serial homicide defining it as any amount of time between kills where the perpetrator returns to their everyday life (Douglas et al., 1986). Since the term's conception, cool-off periods have become a fundamental aspect of defining serial versus non-serial homicide cases in academia. Despite its usage frequency, it has been neither firmly defined nor empirically investigated. The present study aims to investigate the specific underpinnings of emotional cool-off periods in sexual homicide by utilising experts' opinion in relation to distinguishing between serial and non-serial homicide cases. Twenty-eight experts took part in the study and they each scored 10 sexual homicide scenarios for emotional cool-off presence as well as influential factors they relied on when making their decision. The results indicated that inter-rater agreement was 'poor' across experts. When experts believed an emotional cool-off period was present, they relied on cognitive state indicators whereas when they believed an emotional cool-off period was absent they relied on evidence of arousal. The time was second most frequent factor. This suggests that experts prefer to base their judgement on the presence (rather than absence) of forensic evidence available to them.

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Cool-off; definition; reliability; serial vs non-serial; sexual homicide

Sexual homicide is widely known as the most serious sexual and violent crime. Although feared by many, it is a statistically rare crime. A 10-year study of 4,860 convicted homicide offenders in both England and Wales identified approximately 3% of the sample as sexual murders (Francis & Soothill, 2000). A more recent study of prevalence in the UK has found an increase in the phenomenon from 6% in 2003 (Beech et al., 2005) to 13% as of 2012 (Stefanska, Beech et al., 2017). In comparison, the Federal Bureau of Investigation (FBI) reported only 1.1% of 14,121 homicides in the US as sexual in 2004 (FBI, 2005). Sexual homicide in the US may appear to be less prevalent; however, this disproportion may

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reflect differences in the ratio of homicide versus sexual homicide in the US. Cross-cultural prevalence findings are generally low overall (Häkkänen-Nyholm et al., 2009); however, due to the severe nature of sexual homicide, empirical understanding is crucial for investigative, preventative, and rehabilitative measures.

While new research investigating various aspects of sexual homicide emerging recently has broadened our knowledge regarding such offences (Stefanska et al., 2020), a thorough review of these issues is beyond the scope of this manuscript. Instead, we will examine aspects most relevant to emotional cool-off. First we will look at how sexual and serial homicides have been defined in the literature. Given that important differences have been found between serial and non-serial offenders who perpetrated sexual homicide, we will examine these next. Finally, we will review what is known about emotional cool-off. However although emotional cool-off has been used in sexual homicide to distinguish between non-serial and serial cases, it has not been scrutinised in relation to sexual homicide. As such, in that subsection, we will draw from a broader literature on homicide, in order to examine current knowledge of the term.

Sexual homicide definitions

There is currently no universal definition of sexual homicide; nevertheless, many definitional variations exist. Burgess et al. (1986) define sexual homicide as one individual killing another in the context of power, control, sexuality, and aggressive brutality. Ressler et al. (1988) provide criteria that rely entirely on physical evidence readily available at the crime scene or obtained during the investigation. To date, this is the most widely used definition although more recently, Chopin and Beauregard (2019) introduced more stringent criteria used for research purposes requiring at least two criteria of the FBI's definition to be present in order for the homicide to be considered sexual. Meloy (2000) explains that a successfully classified sexual homicide must have clear evidence of physical assault of the victim and a legally admissible confession of a sexual element from the perpetrator. This criterion is limited to describing straightforward cases of sexual homicide. Research has shown that identifying sexual elements in a homicide is not always possible from the crime scene and subsequent investigation (Clarke & Carter, 2000; Grubin, 1994). However, Meloy (2000) also provides a less assuming definition of sexual homicide: an intentional killing of another person where the perpetrator has exhibited sexual behaviour. Furthermore, Schlesinger (2007) classifies sexual homicide only where evidence of a sexual assault on the genital region is present. This poses an issue to circumstances in which the sexual element does not involve the genital region. According to Schlesinger's (2007) definition, in a case where the victim was left unclothed, had obvious signs of mutilation to the breasts, and showed visible bite marks on her thighs, this case would not constitute as a sexual homicide.

Serial homicide definitions

Defining serial homicide has been an ongoing concern in law enforcement and within the research community. The requirements within definitions contrast in terms of the number of homicides, motivations, and temporal elements. The FBI originally defined serial homicide as, 'three or more separate events in three or more separate locations with an

emotional cooling off period in between homicides' (Douglas et al., 1986, p. 21). This definition was later revised and currently the Crime Classification Manual defined serial homicide as, 'unlawful killing of two or more victims by the same offender(s) in separate events' (Douglas et al., 2013, p. 16). As such, the definitions require a period of time between the murders to allow for differentiation between non-serial, serial and mass murders. This break in time tends to be described as: separate occasions, cooling-off period, and emotional cooling-off period.

Serial vs non-serial sexual homicide

Studies show differences in homicide characteristics between single and serial sexual homicide offenders (Campos & Cusson, 2007). This highlights the importance of distinguishing between such offences for purposes of definition, research, and criminal investigation. Chan et al. (2015) analysed serial and non-serial sexual killers searching for distinctions in crime, paraphilias, and personality traits. Their results indicate that serial sexual homicide offenders are more likely than non-serial sexual homicide offenders to report deviant sexual fantasies; select their victim; target strangers; premeditate the homicide; and humiliate their victims during the offence. Further study has found that serial homicide offenders are more likely to kill women than men, kill strangers, and kill for sexual motivation reasons (Kraemer et al., 2004).

The above findings are supported by research that aimed to investigate possible differences in modus operandi in serial and non-serial sexual murderers. James and Proulx (2014, 2016) analysed 1,836 sexual murderers (serial sexual murderers = 176; non-serial sexual murderers = 1660) using pre-crime, crime scene, modus operandi, post-crime, and victimology variables. Their findings show that serial sexual killers tend to be socially isolated, rejected, and plan their murders to closely parallel their fantasies. Sexuality and sadism were also found to be key features in the profile of serial sexual killers. Non-serial sexual homicide offenders were found to be extremely quick to anger, impulsive, and extremely violent. The most notable difference between the serial and non-serial group was the function of the homicide to each type. For non-serial sexual homicide offenders, researchers found sexual murder was a function of releasing their internal tension; whereas the function of the homicide for serial sexual killers appeared to be highly sexual and a way to externalise their fantasies. Overall, research suggests that serial and non-serial sexual killers can be differentiated in terms of various crime-related factors. However, it should be highlighted that the findings from James and Proulx (2014, 2016) studies were descriptive only as the authors did not test statistically for these differences and adopted review methodology.

Giving consideration to serial/non-serial cases in sexual homicide studies is however important because of various methodological complications encountered by researchers within the wider research on sexual killing. Low prevalence rates and the difficulties in accessing detailed descriptions of sexual offence scripts inevitably meant that very small sample sizes were often used (Stefanska, Higgs et al., 2017). Early studies have especially suffered from small sample sizes and to overcome this problem researchers tended to combine serial and non-serial offenders in one group, ignoring the developing literature pointing to important differences between these offenders. Furthermore, many studies did not adhere to the concept of balanced sampling and, as noted by Beauregard and

Martineau (2017), have focused on the worse cases which ultimately meant that the samples were over-represented by sadistic killers and/or indeed by serial killings. However, ignoring balanced sampling most likely affected the conclusions drawn. Stefanska et al. 2020 highlighted that if the sample was over-represented by serial cases, the results might have indicated a higher prevalence of characteristics mainly related to serial offenders for example sadistic tendencies. The authors further argued that in depth analysis of non-serial offenders (or adhering to balanced sampling) is crucial as it would deliver much needed research-based evidence guiding professionals in their working practices. As such, the newly emerging research has been scrutinising the make-up of their samples in more detail (e.g. Beauregard et al., 2007; Carter & Hollin, 2010; Chan et al., 2015; Higgs et al., 2017; Proulx et al., 2007; Stefanska, Higgs et al., 2017). Emotional cool-off has been used as criteria distinguishing serial from non-serial homicides.

Emotional cool-off periods

Homicide research seems to maintain a consistent assumption of reliability for the definition of serial versus non-serial homicide (i.e. emotional cool-off periods). However, the reality of investigating a topic without properly defined and understood terminology is an ultimate threat to both the validity and reliability to any research conducted on the topic of serial sexual homicide. Interestingly, very few studies looked at how the term is operationalised and almost no research has critiqued such a vital aspect within the homicide literature. Indeed, research continues to use emotional cool-off periods as the standard for differentiation between serial and non-serial homicides (as well as mass murders[1], not covered by the current study). Despite the frequency of its usage, there have been limited attempts to define emotional cool-off periods. The FBI originally described an emotional cool-off period as the main aspect of a killer's behaviour that differentiates serial from other multiple-homicide killers (Burgess, 2006; Douglas et al., 1986). While the FBI has never properly defined the phenomenon, it has become widely used terminology and standard within both dated and modern literature on serial homicide (DeFronzo et al., 2007; Edelstein, 2020; Ferguson et al., 2003; Geberth, 1986; Higgs et al., 2017; McNamara & Morton, 2004; Yaksic et al., 2021). Although currently the 'separate events' definition is preferred (Douglas et al., 2013) research on serial and non-serial homicide continue to rely on cool-off as a way to separate one killing event from another, especially if the two are committed in a relatively short timeframe (Arndt et al., 2004; Higgs et al., 2017; Stefanska et al., 2015).

At this time, there is no existing research that has attempted to empirically distinguish between serial and non-serial crimes using emotional cool-off periods as a defining factor in an attempt to understand what would constitute 'two separate events'. Although the concept of emotional cool-off periods is fairly straightforward (supposing that the perpetrator returns to 'normality' during that time), the criteria that define this are vague and vary depending on the situation. In case when two murders occur in a relatively short timeframe, it is difficult to define the offender as a serial killer rather than a non-serial killer. Research into serial homicide is thus dependent on further understanding the systematic underpinnings of emotional cool off periods – which variables constitute an emotional cool-off occurring and which variables undermine the actual classification of serial homicide.

Osborne and Salfati (2015) studied cool off period temporally – stating the best way to define the phenomenon is to exclusively study temporal aspects rather than including any clinical applications of cooling-off from the crime. While researchers determined a median length of time intervals within a series as 34.5 days. Simkin and Roychowdhury (2014) investigated the statistics of inter-murder intervals for three serial homicide offenders finding that most of the temporal breaks were of the order of few days whereas some intervals were months and very few were years long. Yaksic et al. (2021) examined 2837 inter-murder intervals for 1012 American serial homicide offenders (587 of those had three or more victims). The longest interval was 16,963 days which is over 46 years; however, there were 111 intervals where interval length was only 1 day.

While very useful, the studies on time periods between the homicides are unlikely to have a complete record of each individual's offending and therefore they will not accurately portray the length of time elapsed between offences. They also cannot reflect upon a perpetrator's emotional disposition towards their kills. For example, if the killer has spent the entirety of the time between the next and last kill with the body of the previous victim, does this necessarily constitute proper reflection and emotionally distancing themselves from the last crime? While time is an influential factor, other moderating variables seem to exist that elicit emotional cool-off periods. Indeed, Douglas et al. (2013) highlight that 'separate event' is not a term that relates to timeframe but rather the term relates to the qualitative than quantitative characteristics and as such professionals should take into account intent and the circumstances of crimes.

Current study

Separate event and the term 'emotional cool-off' ultimately lacks operationalisation and is an under-researched, yet heavily relied upon, criterion distinguishing serial/non-serial killings within the sexual homicide literature. Consequently, this study aims to begin a narrative surrounding a grossly understudied topic; to understand experts' decision-making process regarding abstract definitions of emotional cool-off periods in sexual homicide by identifying directly influential elements of homicide cases that constitute the phenomenon's occurrence, or lack thereof. This study also aims to find consensus among experts in the field surrounding serial vs non-serial sexual homicide based upon the current assumptions of emotional cool-off periods. This is to be done by providing experts with sexual homicide scenarios and requesting them to determine if an emotional cool-off has occurred, followed by questioning which elements were most influential in this decision. Attempting to find consensus of which factors may be influential in defining serial versus non-serial cases has important implications for research in the future. Operationalising the definition of emotional cool-off periods may enable researchers of serial homicide to better distinguish between cases, enabling more accurate data to be considered.

Methodology

Design

This study utilised a similar methodology to the Marshall et al. (2002) study of the diagnostic reliability of sexual sadism examining the way forensic psychiatrists diagnose an offender's

potential to meet the criteria for sexual sadism. Based upon a series of detailed accounts for each offender, each psychiatrist determined if they believed sexual sadism was present, as well as indicating their confidence level on each criterion. Their results showed an inadequate level of diagnostic agreement between the professionals while there was a significant level of agreement for the importance of each criterion. Based upon Marshall et al.'s work, Nitschke et al. (2009) operationalised these core defining factors of sexual sadism; ultimately creating the Severe Sexual Sadism Scale (SeSaS) to distinguish between sexually sadistic and non-sadistic offenders – highlighting the utility of such work.

The present study is designed in a parallel fashion – where experts were asked to account for emotional cool-off's presence in each sexual homicide scenario, as well as indicate the importance of related criterion. Six categories of ratings of importance were established, each factor containing multiple levels. These included: (1) time (lees or more than 24 h, more than 48 h); (2) location to crime scene (whether or not perpetrator remained or returned to crime scene); (3) location to body (whether or not the body was kept close by); (4) premeditation (whether or not one of the killings was premeditated); (5) arousal (whether or not there was evidence of ongoing sexual arousal or anger); and (6) cognitive state (whether or not slept between the killings or was under the influence of substances). The categories were related to forensic evidence that would most likely be available in a homicide case description. However, contrary to the diagnostic criteria for sexual sadism in the *Diagnostic and Statistical Manual* (*DSM*; American Psychiatric Association, 1994) used within Marshall et al.'s research, emotional cool-off has no existing definitional criteria. Therefore (as suggested by the experts during a pilot stage), this study permitted alternative reasoning in its design via a text box labelled 'other'. This allowed participants to add factors they believed to be influential in their decision of emotional cool-off's presence, should they not have been provided.

Experts

Approximately 100 experts, from various countries such as Canada, England, Germany or USA, were chosen based upon their highly regarded reputations, relevant publications to the field and/or experience gained through work. These experts were contacted via email and asked to participate in the study. All participants were given an anonymous Qualtrics link. Of the contacted experts, 28 responses were recorded. The response rate constituted approximately 30% of the sample contacted, a smaller number in comparison to 60% response rate obtained by Marshall et al. (2002). The response rate was smaller than expected and could be due to busy work schedule of agents working in the Homicide Units. Experts were provided with a brief demographics questionnaire to gather a baseline of their highest level of education, self-reported area of expertise, and years of expertise in the field. Years of expertise ranged from 4 to 40 years ($M = 18.03$; $SD = 10$). While professionals were chosen on the basis of their experience, the majority (70%) of the sample held a PhD in relevant areas, with the rest of the sample having degrees ranging from BSc, MSc, PhD candidates, and police/ FBI graduates. Self-reported areas of expertise included: forensic psychology; serial homicide; homicide; sex offending and violence; investigative psychology; and criminology.

Table 1. Examples of scenarios used in the study.

Scenario examples
Scenario #1: After visiting a friend's house in a neighbouring town, a perpetrator sees a young female walking towards him alone along an unlit street. When close enough, he grabs her and knocks her unconscious. After carrying her to a nearby ally, he rapes her. He kills her via strangulation to avoid possible victim identification should he be caught. Leaving the victim, he exits the ally in the other direction from which he came – taking the longer route home. Upon returning home he goes to sleep for around 8 h. The following morning, the perpetrator wakes up and goes on a few jobs around town, as he is a part-time plumber. After around 6 h of work, the perpetrator heads to a nearby pub he frequents. He meets a couple of friends and has dinner, followed by a few drinks. His friends eventually have to leave, so the perpetrator (feeling tired from a long day of work) decides to leave as well and begins to walk home. On his walk, he sees yet another young female walking alone down a similar road where the lighting and visibility is limited. Almost impulsively, the perpetrator grabs the second victim from behind and violently rapes her. In a similar fashion to the first victim, he strangles her to death then leaves the crime scene to return home.
Scenario #2: A perpetrator meets a woman at a pub in the early evening. Throughout the evening, the woman seems to enjoy his company and goes along with his advances. Towards the end of the evening, the perpetrator suggests he could give the woman a lift home. The perpetrator leads her out of the pub and brings her to his car. It is there he makes a blatant sexual advance, which the victim strongly refuses. The perpetrator, angered because he feels as though she led him on, rapes her and ultimately stabs her to death to teach her a lesson. The perpetrator then drives to a local quarry to dispose of her body. While disposing the victim's body, the perpetrator ruminates and blames the victim for what she made him do; thinking about how all women are 'bitches' and she 'deserved what she got'. He begins to masturbate but is interrupted when he hears a group of teenagers in the distance. He hurriedly gets back into his car and drives home. After returning home, the perpetrator decides to take a walk through a local park. He passes a woman rushing past who accidentally bumps into him. Perceiving this as an intentional slight, he pulls her off of the path and into a heavily wooded area. He kills her as punishment and rapes her post-mortem.

Measures

Ten fictional sexual homicide scenarios were created (see Table 1 for examples). Each scenario describes a brief synopsis of a perpetrator and two homicides and they were all similar in length. Although the scenarios were fictional the circumstances surrounding the killings were based on real cases of offenders serving a prison sentence for sexual homicide at Her Majesty's Prison Service. Every scenario was designed to contain all the six variable themes (e.g. Scenario 1: 24 h between victims; perpetrator does not revisit crime scene; body is not kept close-by; not premeditated; perpetrator not emotionally aroused from the first victim when encountering the second victim; no drugs/ drank alcohol; slept approximately 8 h).

Each scenario was followed by a questionnaire, containing a total of 20 items, which aimed to measure: (a) emotional cool-off presence (1 item) and (b) the most important and second most influential factors in that decision (out of 18 items). Items pertaining to the ratings of the importance of the factors include the previously described six variables and their respective levels to choose from. The scenarios were piloted to improve their validity and reliability. All material was then transferred to Qualtrics (Qualtrics, Provo, UT), a survey-based software. This allowed for experts to be contacted via email whilst maintaining anonymity.

Procedure

Pilot of scenarios

As the questionnaire is the first of its kind, no previous study enables reliability and validity comparison. To account for this, the scenarios and questionnaire were piloted prior to official data collection by two experts. Supplementary statements for the pilot were

created specific to the six elements placed within each scenario to determine if the factors were apparent enough for future participants. Disagreement with any of the provided statements was used to modify and better convey that aspect in the correlated scenario.

Study's procedure

Data was collected by directly contacting experts known to be in the field of sexual homicide via email. Experts were provided with a brief definition of emotional cool-off periods (Proulx et al., 2007) and asked to determine if an emotional cool-off period occurred, followed by a question of which factors were most influential in that decision (indicated by #1 for most important and #2 for second most important). Following Marshall et al. (2002) study design, experts were forced to make a categorical choice. Fleiss kappa was employed using SPSS add-on to examine agreement between the experts while descriptive statistics looked at prevalence of influential factors that experts used when deriving at their decision.

Results

Interrater reliability

Collective expert responses to the presence of an emotional cool-off in each of the 10 scenarios is presented in Table 2. In terms of simple percentage agreement, in only four scenarios out of the 10 the agreement was 80% or better (Scenario 2, 3, 4 and 5). Interestingly, in three (Scenario 2, 4 and 5) out of the four scenarios experts believed that emotional cool-off was not present suggesting that perhaps it is easier to assess the lack of emotional cool-off rather that its presence.

To determine the consistency of agreement between the 28 experts on emotional cool-off's presence across all 10 scenarios, Fleiss' kappa (κ) was run, $\kappa = .294$, 95% CI [.293 to .295], $p < .001$. According to Fleiss (1981) interpretation of kappa values, there was significantly 'poor' agreement (i.e. < 0.40) across experts.

Ratings of importance

Table 3 provides the number of experts who rated the feature as having the level of importance in their decision-making process. Some experts utilised the 'other' option

Table 2. Frequency of emotional cool-off presence across scenarios.

	Yes		No	
Scenario	*n*	%	*n*	%
1	22	78.6	6	21.4
2	2	7.1	26	92.9
3	24	85.7	4	14.3
4	5	1.9	23	82.1
5	5	1.9	23	82.1
6	20	71.4	8	28.6
7	15	53.6	13	46.4
8	19	67.9	9	32.1
9	18	64.3	10	35.7
10	20	71.4	8	28.6

Table 3. First and second most important factors in an emotional cool-off's decision process.

Influential factors	Most important *n*	Important *n*
Time		
Less than 24 h elapsed	17	10
More than 24 h elapsed	10	10
More than 48 h elapsed	7	8
Location to crime scene		
Remained close to CS until next killing	1	9
Returned to CS before next killing	3	4
Has not revisited CS	0	0
Location to body		
First victim's body is kept close by	5	4
Body is left at the scene	0	0
Premeditation		
The act of killing in both homicides were premeditated	10	8
The act of killing in neither homicide was premeditated	2	4
The act of killing in one homicide was premeditated	3	9
Arousal		
Ongoing sexual gratification from first kill	14	14
Continuous anger (e.g. angry with first victim when encounters the second)	17	15
No arousal from first crime to the second	10	10
Cognitive State		
Slept/ did not sleep between kills	10	12
Was/ was not under the influence of drugs/ alcohol	5	1
Went back/ did not to routine activities	9	12

Note: The numbers shown in each column indicate the number of experts who rated the feature as having the level of importance in their decision-making process.

instead of making a choice with the existing factors. Upon analysing the responses, an overall theme of 'the perpetrator returned to routine' emerged. For instance, 'returned to normal routine' was given as an explanation of why this expert felt an emotional cool-off occurred. Furthermore, few responses noted, 'no other activities between the two homicides that could have distracted his thoughts' as their reasoning for an emotional cool-off not taking place. These responses were added to already existing theme of 'cognitive state'. The results show what the 'most important' feature on which experts relied on at some point during their decision-making were. The top three factors were: (1) less than 24 h between the killings of the two victims, 17 experts; (2) as well as continuous anger, 17 experts; (3) ongoing sexual gratification from first kill. Additionally, the 'important' top three factors were: (1) continuous anger, 15 experts; (2) ongoing sexual gratification, 14 experts; and (3) weather or not the perpetrator slept between the kills, 12 experts; as well as whether perpetrator returned or did not return to his routine activities, 12 experts.

Table 4. Total percentages of the top two most important factors for cool-off when endorsed and not endorsed by the six overall themes.

Factor Themes	Cool-off Present (n = 274)	Cool-off Not Present (n = 268)
Time	24% (66)	26% (69)
Location	1% (3)	10% (26)
Premeditation	13% (36)	14% (38)
Arousal	19% (53)	38% (103)
Cognitive State	38% (104)	8% (22)

Collective analysis

Table 4 provides a more cohesive idea of the influence of the original five overall themes of factors. As not all experts specified factors that influenced their decision, all entry points were first calculated. We then calculated percentage ratios for each theme factor.

In scenarios where experts believed cool-off was present, 'cognitive state' was the most influential factor and found in 38% of responses. 'Time' was the second most frequent factor used by the experts when deciding that emotional cool-off did occur (24%). 'Arousal' and 'premeditation' had 19% and 13% response rate, respectively, whereas 'location' was deemed far less important when reasoning why a cool-off did occur (1%).

Arousal was found to be the most influential factor in deciding that a cool-off had not occurred (38%) and 'time' was the second most frequent (26%). 'Premeditation' and 'location' had 14% and 10% response rate, respectively. Cognitive state had the lowest endorsement of the six categories when deciding that a cool-off did not occur (8%).

Discussion

Overview of results

The aim of the present study was to understand experts' decision-making process regarding abstract definitions of emotional cool-off periods in sexual homicide. The first stage in this process was to analyse how well experts could agree on whether or not an emotional cool-off occurred. Provided with current definitions of an emotional cool-off period, inter-rater reliability analysis showed that experts currently have 'poor agreement', or an almost 50/50 chance of agreeing overall on the 10 provided scenarios. It is possible that a better agreement might have been reached on scenarios where an emotional cool-off period was believed to be absent.

Secondly, collective data on both the first and second most important factors for those who believed an emotional cool-off period was present revealed that cognitive state was the most influential factor, whereas when an emotional cool-off period was not present arousal was found to be the most influential factor. The time was the second most frequent factor. The results indicate that experts prefer to base their judgement on the presence (rather than absence) of forensic evidence available to them. Specifically, it is easier for them to decide that the offender cooled-off because he went back to his routine activities or because he slept (as opposed to perpetrator not returning to routine activities or not sleeping). On the other hand, it was easier to establish that emotional cool-off had not taken place because the evidence indicated that he was still angry or there was an ongoing sexual gratification between the kills (as opposed to absence of these factors). Similarly, experts also relied on the measurement of time during their decision-making process. Moreover, despite the poor agreement on the actual presence or absence of cool-off, the experts were in reasonably good agreement about the features that enabled them to reach their decision. This is interesting given that it resembles the conclusions drawn in the study by Marshall et al. (2002) who

also noted that while experts lacked agreement on the diagnoses of sexual sadism, there was a reasonably good agreement about the features of the offences and the offenders relevant to making the diagnosis of sexual sadism. As experts were more inclined to agree on evidence that was present at the crime scene, Nitschke et al. (2009) introduced a diagnostic instrument (the Severe Sexual Sadism Scale [SeSaS]) that relied entirely on the offence-related behavioural aspects available from the crime scene that improved professional agreement.

Interrater reliability

According to Fleiss (1981) benchmark scale of interrater reliability, the results show that experts had 'poor agreement' regarding the presence or absence of emotional cool-off periods across scenarios. Research suggests that those wanting to investigate the overall extent of agreement should use Fleiss' interpretation, and benchmarks such as Altman (1990) are used for finer categorisation (Gwet, 2012). Even if Altman's benchmark was applied, the level of agreement based upon the current results would only be 'fair'; the second-lowest interrater agreement categorisation. Using either interpretation scale, the results indicate the level of agreement is certainly not high although of note is the fact that, following the Marshall et al. (2002) study design, experts were forced to make a categorical choice of whether they believed the cool-off occurred or not. While there is no 'universal standard' of acceptability, researchers state that in practice, considering levels as low as .41 as a threshold of reliability is considered 'unacceptable' (McHugh, 2012). Thus, the current findings show expert agreement to be significantly below a satisfactory rate. Due to the lack of concrete definition surrounding emotional cool-off periods, this is to be expected.

The implications for this finding are far-reaching in the world of academia. Previously mentioned research on serial and non-serial sexual homicide use the term emotional cool-off as the baseline for categorising cases used for analysis (Arndt et al., 2004; Higgs et al., 2017; Stefanska et al., 2015). In other words, researchers using emotional cool-off periods to base the categorisation of serial versus non-serial cases have approximately a 50 percent chance of agreeing on whether a cool-off period is present across cases; or 'poor' agreement. Although the number of such cases is low in a given sample (Stefanska, Beech et al., 2017), this still suggests that caution should be used when including these cases in their studies. The results can be extended to a newer term of a 'separate event' given that a qualitative rather than a quantitative approach to its definition has been suggested (Douglas et al., 2013). At this time, there is no existing research that has attempted to empirically distinguish between serial and non-serial crimes using emotional cool-off periods as a defining factor in an effort to understand what would constitute 'two separate events'. Indeed, regardless of labelling name, the manual continues to define single, i.e. non-serial homicide as killing of one victim or one homicidal event. Two victims killed in the same criminal event are defined as double homicide, but what constitutes a single event is not specified (Douglas et al., 2013). This study represents a starting point for addressing a void in the existing literature on understanding of what constitutes non-serial sexual homicide when two victims are involved.

Importance factors

It is important to note that again, experts were forced to make a categorical choice when rating how important each feature was when making their decision. Interestingly, the results suggest that (except for one) the experts did not appear to apply these criteria very systematically when making their decisions. A similar response pattern has been found by Marshall et al. (2002).

Arousal

A perpetrator's ongoing state of arousal seems to be a consistent element involved in distinguishing between serial and non-serial homicides. Previous literature notes that perpetrators' arousal is one of the significant motivational driving forces behind the offence. In fact, Carter and Hollin (2014) argued that assessing arousal (based on crime scene indicators) in relation to the act of killing is crucial for the assessment and case formulation of sexually related killing. Anger in sexual killings, on the other hand, has been criticised because it only describes a characteristic of the perpetrator at or around the time of the offence and does not adequately explain the nature of the sexual element within the criminal event (Carter & Hollin, 2014). Offenders might prefer to portray themselves as anger-driven rather than as a sexual deviant for safeguarding reasons (Carter & Perkins, 2018; Perkins, 2008).

Cognitive state

Experts deciding whether an emotional cool-off period did take place in a scenario was heavily based upon the perpetrator's cognitive state; predominantly whether or not the perpetrator slept (this has sometimes been also used in conjunction with other non-offence-related behaviours, e.g. slept and attended to household chores or slept and socialised with friends). Despite its apparent influence, various elements of cognitive state have not yet been researched in the field of serial sexual homicide (e.g. routine between homicides). Sleep was found to be the important factor in cognitive state and was also found to be far more influential in the decision for the presence of an emotional cool-off rather than its absence. The reason is unclear, as no previous research has studied the effect of sleep in serial and non-serial homicide, other than homicide by somnambulists (Ohayon, 2000); i.e. sleep-walkers. A possible reason could be related to the effect of sleep on decision-making and impulsivity. Anderson and Platten (2011) found that sleep deprivation, even from one night of sleep loss, led to an increase in impulsivity and significantly lowered inhibitions to negative stimuli. This was found to be due to heightened neural and autonomic responses. When applying these findings to sexual homicide, sleep ultimately implies that the perpetrator experiences less impulsivity and has higher inhibitions to negative stimuli. With this knowledge, committing a second homicide after sleeping appears to be a more conscious decision and a less impetuous act than cases where a perpetrator has not slept – indicative of a cool-off period. This could also explain why returning to routine activities was judged as important.

However, it is interesting that experts judged cognitive state to be of the highest importance in the classification of cool-off presence but not absence, as assessing someone else's cognitive state is not only problematic but also subjective. It also often requires reliance on the perpetrator's disclosure which may not be accurate within

forensic settings, especially when the person committed a violent attack. This issue has been highlighted in relation to determining sadism as the main source of sexual excitement (Nitschke et al., 2013) as well as assessing perpetrator's other emotional states, for example, anger (Stefanska et al., 2020). Marshall et al. (2002) showed that imprecise diagnostic criteria, which allow for subjective assessment, impact on diagnostic reliability. Indeed, Kingston et al. (2010) were able to establish that behavioural indicators were better at predicting violent and sexual recidivism and Nitschke et al. (2009) found that indexing offence-related behaviours available from the crime scene is more valuable when operationalising sexual sadism. Taking into account these findings, it appears that operationalising emotional cool-off (and by extension defining a separate event in a killing of two victims) should also rely on indexing perpetrator's behaviours through crime scene actions. Such an approach will facilitate a better definitional reliability. Having said that, whether or not the perpetrator went to sleep can be considered as one of such behaviours without the need of assessing more subjective cognitive states. The studies on brain functioning in homicide perpetrators have looked at various brain mechanisms. Episodic dyscontrol syndrome, for example, is characterised by neurologically mediated aggression where the act of aggression is triggered by a minor frustration which leads to out of proportion aggressive behaviour. Following sleep however, individual tends to exhibit remorse (Alderman et al., 2018). Both dopamine and serotonin in midbrain and limbic system are involved in number of drives, including sleep and sex (Grubin, 2018). Sleep supports reliving emotional distress and helps to separate emotions from their context (Farrell, 2018).

Time

Previous research that analyses differences in pre-crime, post-crime, and modus operandi variables between serial and non-serial homicide offenders mention no differences in time intervals (Campos & Cusson, 2007; Chan et al., 2015; Kraemer et al., 2004). This contrasts with this study's results, as findings show the temporal element of the scenarios were perceived to be of great importance for why a cool-off was considered to have occurred or have been absent. This may be due to the continuing assumption that emotional cool-off periods are fundamentally defined by time intervals between homicides rather than what occurs within the duration of that time.

While Osborne and Salfati (2015) found time to be the most crucial aspect of cool-off periods to investigate, the current results show time is not as influential as clinical factors in the cooling-off process as researchers suggested. Given the opportunity to include time in their reasoning, experts agreed most highly on the influence of 'Cognitive State' factors (emotional cool-off present) and 'Arousal' factors (emotional cool-off absent) as most the important reason, with time holding third and second places, respectively. Furthermore, previous research has determined at least 30 days must have lapsed between homicides in order for the perpetrator to have experienced a 'significant cooling-off period' and therefore, for the perpetrator to be considered serial (Holmes & Holmes, 1998; Osborne & Salfati, 2015), although more recently, Yaksic et al. (2021) noted that intervals between the kills can be as short as one day. Present findings challenge this ideology, as multiple scenarios ranged from 24 to 48 h and experts still perceived time to be influential in cool-off having occurred. Jenkins (2013) postulated that the National Institute for Justice considers killing to be serial if two victims are killed over a period of time that can

range from hours to years. In that case, however, where is the difference between double homicide and serial killing? The misconception of emotional cool-off periods being solely defined temporally may have predisposed expert responses in favour of time's influence; however, this study's findings exemplify the notion that other factors may lessen the influence of time and its effect on the reflective processes of an offender.

Premeditation

Whether or not the crime was premeditated remains a feature of research on sexual homicide (Beauregard & Proulx, 2002; Chan et al., 2015). Although many researchers believe that premeditation is a prerequisite for defining serial homicide (Leistedt & Linkowski, 2010; Miller, 2014; Morton & McNamara, 2005), experts in the present study did not rely on this feature as much. This could be because both intent and planning are difficult to prove (Stefanska et al., 2020). Premeditation may vary from extensive pre-planning of the intended crime scene, to as little as directly prior to the offence. The evidence might be unequivocal but, in some cases, it can also cast doubt if the perpetrators did in fact premediate their crime or if premeditation meant they intended to kill their victim (as opposed to carrying out a sexually assault). Parallel to problems with operationalising emotional cool-off periods, these subjective discrepancies may influence the way in which premeditation is perceived to describe serial and non-serial homicide offenders and their behaviours.

Limitations

Due to the investigative nature of this research, various limitations were evident. First and foremost, the scenarios were brief and as a result, experts were provided with limited case information. The scenarios in the study could also carry various inherent limitations. For instance, experts may have subconsciously chosen the factor that was more obvious in the scenario, rather than choosing an element that most reflected the cool-off process. Furthermore, the final sample size was relatively small. It is also difficult to determine whether the stereotype of time being the determining factor in a cool-off period has affected the agreement of that variable; i.e. if experts were biased towards the influence of time. As 'period' refers to a length of time, clinical factors may seem secondary to the length of time elapsed between homicides, as demonstrated by Osborne and Salfati's (2015) research on cool-off periods. Finally, following Marshall et al. (2002) design, the current study forced experts to make a categorical choice. However, a more qualitative approach would allow them to explain how they defined a cooling-off period and how this was operationalised.

Implications

While cool-off periods have been disregarded by some researchers, it is still a heavily used baseline for defining serial and non-serial sexual homicide in the literature. The decline in use seems to stem from being under-researched rather than lacking a basis in the field. The new FBI definition of serial homicide has re-defined the phenomenon as two or more homicides by the same offender(s) in separate events (Morton, 2005); replacing the term emotional cool-off. This term 'separate events' is equally as ambiguous and

un-operationalised as their previous definition utilising emotional cool-off periods. Exemplified within the previously discussed literature, there is a great deal of ambiguity, confusion, and lack of definitive knowledge surrounding most cases in serial sexual homicide. Parallel to cool-off periods, a separate event is not necessarily defined by external or situational events. Separate events may be defined by the same influential factors investigated within the current study (i.e. the perpetrator's cognitive state; state of arousal; premeditation; etc.). Disregarding the term emotional cool-off period and replacing it with another uncertain term carries parallel limitations; thus, it is essential that this construct be operationalised, regardless of the title it is given.

While it is too early to derive at a meaningful definition, the current research suggests that operationalising of emotional cool-off (and a separate event) should rely on assessing perpetrator's behaviours available from the crime scene. The same behavioural indicators should be used to assess whether or not the cool-off (separate event) had occurred or not. Practitioners should apply these criteria systematically when making their decisions. Although time appeared to be important for experts in their decision-making process, research has not yet found evidence supporting meaningful time interval that would enable to indicate if killings took place in the same or separate event. It is also equally difficult to assess perpetrator's ongoing emotional arousal. Behavioural indicator of sleep could be a promising criteria as evidence from neuroscience suggest that sleep helps to separate emotions from their context.

Note

1. A number of murders (Four or more) occurring during the same incident, with no distinctive time period between the murders (Douglas et al., 2013).

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