An Examination of the Credibility of Witnesses who Recall a Repeated Event: Cognitive Competence, Honesty, and Perceived Credibility

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School of Psychology, The Faculty of Science
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Statement of Originality and Human Ethics Approval

I hereby certify that:

i) To the best of my knowledge, the content of this thesis is my own work. This thesis has not been submitted for any degree or other purposes.

ii) The intellectual content of this thesis is the product of my own work and that all the assistance received in preparing this thesis and sources have been acknowledged.

iii) Ethical Approval for all of the experiments included in this thesis was obtained through the University of Sydney Human Research Ethics Committee (Protocol Nos. 2017/601 and 2019/042).

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Author Attributions Statement

I, Sarah Deck, am the first author on the chapters which have been published (Chapters 3, 4, 6, and 8) and submitted for publication (Chapter 9) in this thesis. For each of these experiments, I conceptualised the research questions and experimental design. I created the research materials, managed the data collection process, and also analysed the data. I additionally wrote the primary and revised drafts of the manuscript.

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As supervisor for the candidature upon which this thesis is based, I can confirm that the authorship attribution statements above are correct.

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The materials for Experiments 1-6 are available on the Open Science Framework via the following link: https://osf.io/xwmfV/?view_only=e21ea1d6e7504fa9b31d641ce50fc633. The data that support the findings of these experiments are not publicly available due to ethical considerations, however they are available upon request. The stimuli of the speakers in Experiments 5 and 6 are not available due to ethical concerns.
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“Domestic Violence is never a single isolated incident. Rather, domestic violence is a pattern of behaviour, with each episode connected to the others” (Lee, 1998, p. 240)
Abstract

The credibility of an eyewitness can have a pivotal influence upon fact-finders’ determinations. This is particularly true for recurring events like domestic violence, wherein there is often limited evidence to corroborate the witness’ narrative. This thesis examined the credibility of adults who recall a repeated event. Witness credibility was examined along the dimensions of cognitive competence, honesty, and perceived credibility.

Section 1 examined the dimension of cognitive competence, via an assessment of memory accuracy. Experiments 1 and 2 examined adults’ ability to recall a single or repeated event that varied across occurrences. The results indicated that adults are likely to have difficulty recalling details about a specific occurrence of a repeated event.

Section 2 examined the credibility dimension of honesty. In this section, the utility of the content analysis technique, reality monitoring, was assessed when speakers recall a repeated event. In Experiments 3 and 4, undergraduate students recalled an event that had been experienced once, repeatedly, or was fabricated. In both experiments, reality monitoring reliably classified veracity when speakers recalled a single event, but not a repeated event.

In Section 3, the perceived credibility of repeated-event witnesses was examined. In Experiments 5 and 6, evaluators observed a video of a speaker who recalled a single, repeated, or fabricated event. In both experiments, event repetition had a detrimental effect upon the perceived credibility of speakers.

Along each dimension, evidence of deficits emerged in the credibility of repeated-event witnesses, relative to single- or fabricated-event witnesses. These results indicate that repeated-event witnesses are unlikely to be perceived as high in credibility. This thesis should encourage collaboration between legal professionals and experts in memory, to protect the credibility of genuine witnesses who recall a repeated event.
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Chapter 1
General Introduction

“You were also vague about the details. At your substantive interview, you admitted that you
do not know the dates or days of the week when he abused you. You said that he tried to
abuse you in Syria but were unable to say when or provide any details.

It is therefore not accepted that you were sexually abused.”

This remark illustrates the interplay between memory quality and perceived
credibility. In this written decision in the outcome to a claim for asylum, the applicant’s
inability to recall rich detail and temporal information, contributes to the perceived credibility
of her testimony. The implicit assumption is that if the applicant were genuinely recollecting
repeated sexual abuse, they would be able to accurately recall specific occurrences in detail.

Two constructs appear to influence the determination made in this case. First, the
applicant’s cognitive competence, or her ability to perceive, understand, and accurately recall
the abuse is appraised. Perceived deficits in the applicant’s ability to recall sufficient detail
subsequently influences her perceived honesty, an assessment of whether a truthful
recolletion of past events has been provided. Correspondingly, experimental research has
found that the perceived credibility of a child or adult eyewitness often loads onto the two
factors of cognitive competence and honesty (Allison, Brimacombe, Hunter, & Kadlec, 2006;
Moore, 2012; Ross, Jurden, Lindsay, & Keeney, 2003).

These constructs are important in the context of legal proceedings. At trial, both the cognitive competence and honesty of a witness are crucial to determining the overall value of their testimony and how much weight evaluators should assign to it\(^2\) (Connolly, Price, & Gordon, 2010). Standard judicial directions explicitly instruct jurors to assess the eyewitness’ veracity and their capacity to perceive and remember the event in question (Kane, 2007). The emergence of these credibility dimensions from subjective evaluations reflects the notion that evaluators require a speaker’s report to be both honest and accurate in order to trust their version of events. However, as the objective honesty and accuracy of an eyewitness cannot often be known with certainty in the field, subjective credibility evaluations are used as a proxy to measure these objective characteristics.

Credibility evaluations are often important in the context of repeated forensic events. Repeated events refer to a set of experiences which share a common underlying structure or meaning (Theunissen, Meyer, Memon, & Weinsheimer, 2017). Due to the commonalities inherent to these experiences, repeated events foster the expectation that future occurrences will be similar (Hudson, Fivush, & Kuebli, 1992; Theunissen et al., 2017). Although repeated events can be positive or neutral experiences (e.g., going to a restaurant, getting ready for work in the morning), they can also be highly negative (e.g., recurrent mistreatment or abuse). Unfortunately, repeated forensic events like these are common. It is estimated that globally, 30% of women have experienced intimate partner violence, and such abuse typically recurs over time (World Health Organisation [WHO], 2013; 2014). The adverse effects of this experience upon victims’ mental and physical health can be severe, with the most serious cases resulting in homicide (Coker et al., 2002; Plichta, 2004). Workplace

\(^2\) Within legal contexts, perceived cognitive competence and honesty are referred to by the terms reliability and credibility, respectively (Connolly et al., 2010).
bullying is also recurring in nature. It is characterised by repeated hostile behaviours directed towards an individual or group of people, and it typically continues for at least a year in duration (Einarsen, Hoel, Zapf, & Vartia, 2004). Moreover, asylum seekers have also often experienced recurring persecution, violence, or abuse (Cameron, 2010; Herlihy, Scragg, & Turner, 2002; UNHCR, 2013).

Unfortunately, there is often little corroborating evidence to support victims’ testimony for repeated events. This absence of corroborating evidence is particularly true for victims of intimate partner violence, as they are often the only witnesses to their abuse (Aiken & Murphy, 2000). It is also common for personal testimony to be the only source of evidence for asylum seekers when they apply for refugee status, since they typically don’t have documentation about their identity and history (UNHCR, 2013). Thus, credibility assessment often has a pivotal influence upon the outcome of cases that involve recurring abuse (e.g., UNHCR, 2013). Yet, little research has investigated the credibility of adults who recall a repeated event.

This thesis explores the credibility of repeated-event witnesses using the two-factor model of perceived credibility as a framework (Ross et al., 2003). According to the two-factor model, overall perceived credibility consists of both perceived cognitive competence and perceived honesty (Ross et al., 2003). As credibility evaluations are used as a proxy for the objective accuracy and honesty of an eyewitness’ account in the field, credibility is assessed using objective measures and subjective evaluations. This thesis consists of four sections. The credibility of repeated-event witnesses is examined along the dimensions of cognitive competence (Section 1), honesty (Section 2), and perceived overall credibility (Section 3). In Section 4, findings that emerged along each of these dimensions are discussed.

The aim of Section 1 was to investigate the cognitive competence of repeated-event witnesses via an assessment of the accuracy of adults’ recall of an occurrence of a repeated
event. In Chapter 2, relevant theoretical and empirical literature on children’s and adults’ memory for a repeated event is reviewed. Two experiments are subsequently described which investigate adults’ ability to recall unique aspects about one occurrence of a repeated event, relative to adults who recall a single event. In Experiment 1, the research design typically employed to examine children’s memory for a single or repeated event is adapted to an adult sample. Experiment 2 extends this investigation by examining adults’ memory for one or multiple videos of domestic violence. Experiment 2 additionally explores adults’ tendency to recall details which are common to all occurrences or a repeated event, relative to details which are unique to a particular episode.

Section 2 aimed to address the credibility dimension of honesty, and thus examined whether repeated experience would affect the validity of the content analysis technique, reality monitoring, in discriminating veracity. Following an overview of relevant literature, two experiments are described which investigate the effect of repeated experience upon the accuracy of reality monitoring in detecting veracity.

The aim of Section 3 was to investigate subjective credibility judgements of speakers who recall a repeated event. Chapter 7 provides an overview of relevant literature on evaluators’ perceptions of eyewitness credibility. Experiments 5 and 6 are subsequently described. These experiments investigate laypeople’s perceptions of speakers who recall a single, repeated, or fabricated event. Experiment 6 additionally explores whether expert testimony can ameliorate the negative effect of event frequency upon perceived credibility.

Section 4 concludes this thesis by integrating and discussing findings from the preceding sections. Limitations of these experiments are addressed, and implications of the findings are described.
Section 1
Cognitive Competence: Memory for a Repeated Event

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**Chapter 2.**
**Memory for a Repeated Event: Literature Review**
- To provide an overview of relevant theories that have been applied to repeated-event memory.
- To describe prior empirical research on children’s and adults’ memory for a repeated event.

**Chapter 3.**
**Experiment 1**
- To adapt the methodological paradigm used in the child repeated-event literature to an adult sample by investigating adults’ memory for a staged event that has been experienced once or on multiple similar occasions.
- To examine adults’ ability to recall one occurrence of a repeated event when critical details vary predictably across episodes.

**Chapter 4.**
**Experiment 2**
- To examine adults’ memory for a single or repeated event using more realistic stimuli (videos of domestic violence) and coding the accuracy of participants’ memory reports for all details recalled.
- To provide the first investigation into adults’ tendency to recall details unique to one occurrence of a repeated event, relative to details which are common across all occurrences.
Chapter 2
Memory for a Repeated Event: Literature Review

The nature of memory for a single and repeated event is qualitatively different (e.g., Brubacher & Powell, 2014). This assertion is based upon decades of research conducted on a child sample, with limited research conducted on adults. In the following chapter, I will provide an overview of empirical research that has investigated children’ and adults’ memory for a repeated event and describe theoretical conceptualisations of memory for a repeated event.

Empirical Research on Children’s Memory for a Repeated Event

Repeated-event memory can be investigated on two levels. First, memory for the general event structure or what typically occurs can be examined (e.g., DeMarie, Norman, & Abshier, 2000; Fivush, 1984; Price & Goodman, 1990). In such investigations, children are asked questions such as “What happens” during a familiar event (e.g., visiting the zoo; DeMarie et al., 2000). In response to questions like these, even pre-schoolers report many event details in the correct temporal sequence (Hudson, 1990; Hudson & Nelson, 1986). When reporting the event, children tend to use generalised language, including impersonal pronouns and the timeless present tense. For example when Hudson and Nelson (1986) asked children what happens at a birthday party, one 5-year-old responded “you play games” (p. 266).

Alternatively, memory for specific occurrences of an event can be assessed (e.g., Brubacher, Glisic, Roberts, & Powell, 2011; Powell & Thomson, 1996). This latter question is of particular forensic interest due to the legal requirements for prosecuting recurring abuse. To prosecute a recurring offence, most jurisdictions require individual episodes to be particularised (Powell, Roberts, & Guadagno, 2007; Woiwod & Connolly, 2017). That is, for each incidence of abuse alleged, complainants are required to recall the occurrence in
sufficient detail to discriminate multiple occurrences from one another, and relate them to contextual factors such as time period and location (Powell et al., 2007). Experiments that have investigated children’s memory for an occurrence of a repeated event have used a consistent methodological approach. Children experience one or multiple staged events (e.g., a play session, a magic show), in which they participate in a number of planned activities. For participants who experience multiple sessions, one session is typically designated as the target session, which is the only session that single-event children experience. For repeated-event children, the last session they experienced is typically the target session (although Brubacher and colleagues often ask repeated-event children to recall the time they ‘remember best’; e.g., Brubacher, Glisic, et al., 2011). In the final recall interview, all children are asked to recall what occurred during the target session.

The accuracy of children’s recall for a repeated event depends upon the way that details change across occurrences. Research has focused upon two main types of details: fixed and variable. Fixed details are always present in an identical form, whereas variable details differ predictably across occurrences. For example, in Powell, Roberts, Ceci, and Hembrooke (1999), the person (fixed) who chose the sticker was consistent, whereas the theme of the sticker (variable) changed across occurrences. The specific form of a variable detail on a given occurrence (e.g., animal sticker, car sticker), is referred to as a variable option.

Across decades of research, a consistent pattern of findings has emerged. Children who recall a repeated event tend to have greater recognition accuracy for fixed items and are more resistant to suggestions about them than children who recall a single event (Connolly & Lindsay, 2001; Powell et al., 1999; Price, Connolly, & Gordon, 2006; Roberts & Powell, 2007). Repeated-event children also recall more correct fixed details than single-event children (Powell et al., 1999). When detail-type is analysed as a within- rather than between-
subjects factor, children who recall a repeated event tend to report a higher proportion of correct fixed relative to variable details (Brubacher, Roberts, & Powell, 2011), and are more confident in their responses to fixed details (cf. variable; Brubacher, Roberts, & Powell, 2011; Roberts & Powell, 2005). They are additionally more resistant to suggestions about fixed compared to variable details (Connolly & Lindsay, 2001; Powell et al., 1999).

Although children who experience a repeated event typically have a good memory for fixed details, they often have difficulty accurately recalling variable details. When accuracy is narrowly defined as details correctly recalled from the target session, repeated-event participants tend to recall fewer correct variable details than single-event participants (Connolly, Gordon, Woiwod, & Price, 2016; Connolly & Price, 2006; Pearse, Powell, & Thomson, 2003; Powell & Roberts, 2002; Powell et al., 1999; Powell & Thomson, 1996; Price & Connolly, 2004; Price et al., 2006), even when the retention interval is one year after the occurrence (Price & Connolly, 2013). The most common error that children recalling a repeated event make is attributing details that were experienced during the event to an occurrence (i.e., source) during which they were not encountered (Brubacher, Peterson, La Rooy, Dickinson, & Poole, 2019). That is, they report a detail that they experienced, but attribute it to the wrong occurrence. This confusion regarding the source of variable options is termed internal intrusions. These errors are particularly pronounced when occurrences are highly similar (Danby, Sharman, Brubacher, & Powell, 2019; Lindsay, Johnson, & Kwon, 1991). However, a different pattern of results arise when the definition of accuracy is not dependent upon accurate source attribution. When details encountered on any event occurrence are considered correct (accuracy broadly defined), the accuracy of children who

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3 Whether accuracy is narrowly or broadly defined does not affect accuracy rates for fixed details which are the same on each occurrence.
recall a single or repeated event is comparable (Woiwod, Fitzgerald, Sheahan, Price, & Connolly, 2019).

A number of theoretical conceptualisations account for the effect that repeated experience has upon memory quality. In the following section three primary theories will be described, namely script theories, fuzzy-trace theory, and source-monitoring theory.

**Theoretical Perspectives on Repeated-Event Memory**

**Script Theories**

Script theories predict that as individuals experience an event, they develop cognitive representations of the typical sequence and structure of the event, as well as who and what are typically present (Hudson et al., 1992). These generalised event representations are hierarchically structured, comprising of a series of activities that consist of lower order actions that are typically performed upon objects and associated with additional actors (Abbott, Black, & Smith, 1985; Hudson et al., 1992; Price & Goodman, 1990). The representation of events through scripts is remarkably stable across developmental stages, and even children who are 3 years of age form scripts of familiar events, which shapes their expectations for future occurrences (Nelson & Gruendel, 1981). Although scripts can form after one experience, they are consolidated with repetition (Ahn, Brewer, & Mooney, 1992; Farrar & Boyer-Pennington, 1999; Slackman, Hudson, & Fivush, 1986). With exposure to multiple event episodes, individual occurrences are integrated into the script, accounting for predictable variation at any level of the hierarchy (Hudson et al., 1992).

Script theories posit that episodic representations of individual event instances can coexist with abstracted representations of the general event structure (Hudson et al., 1992). Consistent with this notion, when an occurrence is recalled immediately afterwards, the memory accuracy of those who recall a single or repeated event is similar (Hudson, 1990). However over a delay, episodic memories for individual occurrences decline in accessibility,
whilst simultaneously, schematic processing strengthens (Bartlett, 1932; Hudson et al., 1992; Rubínová, Blank, Koppel, & Ost, 2020). Consequently, recall of an occurrence after a delay is a reconstructive process, in which the general event script is used as a guide (Farrar & Boyer-Pennington, 1999; Hudson, 1990; Hudson & Mayhew, 2009; Slackman & Nelson, 1984). This reliance upon the general event representation is consistent with children’s tendency to report what typically occurs, rather than occurrence-specific details (Hudson & Nelson, 1986; Slackman et al., 1986). The way that specific details are represented within scripts depends upon the way that details change across occurrences. Exact details which are present on each occurrence (fixed) will be integrated into the script, whereas predictable variation at any level of the script hierarchy is stored as a list of alternative options (Fivush, Hudson, & Nelson, 1984; Hudson, 1990; Hudson et al., 1992). However the occurrence during which these options were experienced (i.e., detail source) is not retained by the script, resulting in internal intrusion errors (Hudson et al., 1992; Kuebli & Fivush, 1994). However script theories do not account for how children or adults will choose a particular option when reconstructing an occurrence.

**Fuzzy-Trace Theory**

Fuzzy-trace theory posits that an experience is encoded by two independent forms of memory traces. Verbatim traces encode exact inputs from an experience, whereas gist traces simultaneously encode abstracted patterns and meaning (Brainerd & Reyna, 1990; Reyna & Brainerd, 1995). In the context of repeated events, verbatim details encode the content and source of experienced details. Conversely, gist traces store abstracted meaning from an individual occurrence, as well as the commonalities across multiple occurrences (Brainerd, Reyna, & Forrest, 2002; Lampinen, Leding, Reed, & Odegard, 2006; Odegard, Cooper, Lampinen, Reyna, & Brainerd, 2009). Thus, in contrast to script theories, fuzzy-trace theory
posits that memories for instances are stored independently from the general event representation and can be accessed directly (Brainerd, Reyna, & Ceci, 2008).

As gist and verbatim memory traces are stored and retrieved independently, gist-based memories may be retrieved in the absence of relevant verbatim memories, and vice-versa (Brainerd & Reyna, 2004; Reyna & Brainerd, 1995). Particularly after a delay, gist traces tend to be more accessible than verbatim memories, as verbatim traces decay more rapidly (Reyna & Brainerd, 1995). Moreover, with each exposure to a familiar event, gist traces responsible for encoding commonalities across multiple event occurrences are activated and consolidated (Holliday, Douglas, & Hayes, 1999; Pezdek & Roe, 1995). Thus, when recalling an occurrence of a repeated event, fuzzy-trace theory predicts that commonalities across occurrences will be easily recalled, whereas details specific to individual episodes will be more difficult to access.

Fuzzy-trace theory describes the cognitive mechanisms underlying incorrect source attribution in greater detail than script theories. As source information is encoded by verbatim traces, source confusion may occur when the relevant verbatim trace is not accessible, or the incorrect verbatim trace is retrieved (Thierry, Spence, & Memon, 2000). Gist traces can also be used to reconstruct source. However when event occurrences are not distinct and have a similar pattern or meaning, this process is unlikely to result in high accuracy rates (Odegard et al., 2009; Thierry et al., 2000).

**Source-Monitoring Theory**

Script theories and fuzzy-trace theory detail how an event is represented in memory. However they provide limited information about how individuals attribute details to a particular event occurrence, particularly in the absence of relevant verbatim traces. This process is clearly articulated by source-monitoring theory. Central to source-monitoring theory is the notion that representations of an experience do not include an attached origin (as...
a label or tag) that can be directly retrieved (Johnson, Raye, Foley, & Foley, 1981). Rather, the source of a memory is determined by a decision process, in which individuals monitor their memory characteristics, and subsequently attribute the origin of the memory at retrieval (Johnson, Hashtroudi, & Lindsay, 1993). Notably, this conceptualisation of source attribution contrasts with fuzzy-trace theory, which posits that source is encoded by verbatim memory traces that can be directly retrieved (Brainerd, 1990).

The source-monitoring framework is an extension to reality monitoring theory which describes how individuals determine the origin of their memory along the internal-external dimension. Specifically, reality monitoring posits that individuals monitor the characteristics of their memories to decide whether their memory is of an externally perceived reality or an internally generated event (e.g., a dream; Johnson et al., 1993; Johnson & Raye, 1981). Memories of experienced events will typically contain a greater number of sensory details, more contextual information about timing and location, and more affective details that reference emotional states than internally generated memories (Johnson et al., 1993; Johnson & Raye, 1981). Conversely, internally generated memories will contain more cognitive operations, such as reasoning and inferences about what occurred. Source attribution is most often an automatic process, guided by the presence of these memory characteristics. Occasionally however, this process involves systematic route, in which individuals engage in a more effortful and conscious decision-making process to attribute the source of a memory (e.g., based upon how plausible it is that the event occurred; Johnson, 2006, Johnson et al., 1993).

Source-monitoring theory addresses how individuals determine the origin of a memory from multiple external sources (Johnson et al., 1993). During source-monitoring, the same memory characteristics employed in reality monitoring are used to determine which external source a memory is derived from. In the context of repeated events, external source
discrimination refers to the process through which individuals attribute a detail which varied across occurrences, to the occasion it was experienced on (Roberts, 2000). However when multiple sources are similar, it is particularly difficult to accurately determine the origin of an experienced detail (Lindsay et al., 1991; Roberts, 2002; Roberts & Blades, 1995). This influence of source similarity upon attribution accuracy poses a particular problem when recalling a repeated event, as occurrences of both forensic (e.g., abuse) and non-forensic recurring events (e.g., going to a restaurant) tend to be highly similar.

**Adult Memory for a Repeated Event**

**Theoretical Accounts on the Development of Repeated-Event Memory**

These theoretical accounts provide a framework for changes that arise in repeated-event memory across development. Script theories posit that the representation of events through scripts is stable across the lifespan. Accordingly, there is evidence that even infants can imitate familiar event sequences (Bauer & Shore, 1987), and that pre-schoolers often recall an event in its correct temporal order (Nelson & Gruendel, 1981). However, adults and older children form scripts more rapidly, and tend to hold more detailed and sophisticated information within them (DeMarie et al., 2000; Farrar & Boyer-Pennington, 1999; Hudson, 1990; Hudson et al., 1992; Hudson & Nelson, 1986; Kuebli & Fivush, 1994). Older children for example, tend to report more optionals and conditionals when recalling an event than younger children (DeMarie et al., 2000; Slackman et al., 1986), where optionals refer to an activity that may or may not occur (e.g., “Sometimes we have French” at school) and conditionals specify the necessary circumstances for an act to occur (e.g., “Then I do an art project if I have time”; Fivush, 1984, p. 1700).

Similar to script theories, fuzzy-trace theory posits that abstracted event representations, as well as memory for specific details, will be stronger in adults than children, on account of adults’ more developed gist and verbatim memory traces (Brainerd & Reyna, 2004). However, gist and verbatim memory have distinct developmental patterns.
Verbatim memory matures much faster than gist, with most developments complete by early adolescence (Reyna & Brainerd, 1995). Due to this rapid development of verbatim memory, young children tend to rely more upon verbatim representations than older children and adults (Reyna & Brainerd, 1995). Although younger children rely upon verbatim memory more than older children, these memory traces decay more rapidly in younger children. Consequently, older children are better at encoding and retaining verbatim information (Ackerman, 1992; Reyna, Mills, Estrada, & Brainerd, 2007). Gist traces mature much later in development than verbatim traces, so adults form gists more rapidly and based upon more sophisticated abstractions than younger children (Brainerd & Reyna, 2004). For example, although young children can often extract the gist of a single item, the ability to extract the relations across multiple items only emerges around 13 years of age (Brainerd & Reyna, 2004; Brainerd et al., 2008; Brainerd et al., 2002; Lampinen et al., 2006). Thus, fuzzy-trace theory predicts that adults are more likely to report patterns and meaning abstracted from multiple event occurrences than children.

There are also differences in source-monitoring ability across the lifespan, with a general trend that source-monitoring ability improves during development. Accordingly, there is evidence that adults outperform adolescents on some source-monitoring tasks (Ryan, 2010). However, this developmental trajectory is complex, with evidence that source monitoring ability declines again in older adulthood (Mitchell, Johnson, & Mather, 2003). Developmental differences also typically depend upon the type of source-monitoring task performed (Johnson et al., 1993; Lindsay et al., 1991). For example, young children have particular difficulty discriminating between imagined and performed activities (e.g., Sussman, 2001). Research also indicates that younger children are less accurate at monitoring the source of their memories for similar experiences than older children, likely due to inferior remembering and underutilisation of cognitive strategies at recall (Brubacher, Glisic, et al.,
2011; Connolly & Price, 2006; Odegard et al., 2009; Powell & Thomson, 1996; Roberts, 2002). These findings suggest that adults should generally exhibit superior source-monitoring capabilities when recalling an occurrence of a repeated event. Overall, these theoretical frameworks indicate that while there will be similarities in repeated-event memory across development, the quality of repeated-event memory will differ according to one’s developmental stage. As such, findings that arise from investigations into children’s repeated-event memory should not be generalised to adults. It is thus important to consider the quality of adults’ memory for a repeated event.

**Empirical Research on Adults’ Memory for Repeated Events**

Interest in adults’ memory for repeated events arose amongst autobiographical memory researchers in the late 20th century. Linton (1982) for example, systematically examined her personal memories for familiar events, noticing that the general structure of experiences was maintained over time, whereas specific details decayed. Similar observations were made by Wagenaar and Groeneweg (1990), who examined the consistency of ex-prisoner’s memories for their daily lives in a German-ruled Dutch prison during the second world war, and Neisser (1981) who examined John Dean’s memories of the Watergate scandal. Neisser (1981) additionally commented on Dean’s tendency to attribute experienced conversations with the president to the incorrect meeting. Furthermore, Means and Loftus (1991) compared laypeople’s memories for recurring, or non-recurring health visits with their medical records, finding that details from specific occurrences of recurring visits tended to be lost (see Cohen & Java, 1995; Means, Nigam, Zarrow, Loftus, & Donaldson, 1989; Wagenaar, 1986, for further examples).

Recently, interest in adults’ memory for repeated events has re-emerged, with a focus upon its forensic implications. Although the child repeated-event literature is categorised by a high degree of methodological homogeneity (i.e., staged activity sessions), this is not the case
for the adult literature. For adults, the various methodologies loosely fall into three main categories: naturalistic approaches, an adaptation of the child repeated-event paradigm, and adaptations of the eyewitness paradigm.

In repeated-event experiments that have employed the naturalistic paradigm, participants have been asked to recall recurring health care visits, meetings, and family gatherings (Leins, Fisher, Pludwinski, Rivard, & Robertson, 2014; Rivard, Fisher, Robertson, & Hirn Mueller, 2014; Willén, Granhag, & Strömwall, 2016; Willén, Granhag, Strömwall, & Fisher, 2015). In one experiment, community members who had made multiple dental visits were interviewed about their experiences (Willén et al., 2015). During the interview, they were given derived cues, which refer to cues based upon the recall of individuals who have had a similar experience. In this case, derived cues were generated from undergraduate students’ memories of their own dental visits. The effectiveness of derived cues was compared to cues commonly utilised in police interviews. Derived cues resulted in the recall of significantly more event occurrences and details than cues commonly used by police (Willén et al., 2015). Moreover, across conditions more dental visits were recalled when participants rated visiting the dentist as high in unpleasantness, and when participants had talked about the visits with someone (Willén et al., 2016). Rivard et al. (2014) similarly compared the effectiveness of two interview protocols on adults’ memories for one occurrence of an experienced recurring event, a training meeting. The study found that the cognitive interview elicited approximately 80% more episodic details relative to the five-step approach (a protocol commonly used in intelligence gathering interviews). Finally, in two experiments, Leins et al. (2014) explored the effectiveness of a set of memory mnemonics (which included derived cues and constructing a timeline) and the cognitive interview on undergraduate students’ recall of family gatherings. Gatherings recalled were corroborated by a family member. The memory mnemonics, which were preceded by free recall, resulted in
the recall of significantly more family events than free recall alone. Moreover, the cognitive interview elicited significantly more details about an occurrence of a family gathering than the control condition, which was a combination of free-recall and specific questions.

The use of a naturalistic paradigm has the advantage of high ecological validity, as participants recalled an autobiographical event. Moreover, that participants directly experienced the event likely affected subsequent memory. Previous research indicates that children’s memory for a neutral event that is experienced once or repeatedly, is stronger when they participate in the event recalled, relative to when they are observers (Baker-Ward, Hess, & Flannagan, 1990; Connolly & Gordon, 2014; Murachver, Pipe, Gordon, Owens, & Fivush, 1996; Roberts & Blades, 1998; Tobey & Goodman, 1992). Conversely, Hope et al. (2016) found that when police officers recalled a stressful augmented reality scenario, active participants recalled significantly fewer details than observers. Although the effect of involvement upon memory is unclear, these findings indicate that involvement influences subsequent recall. Thus, the methodology utilised in these naturalistic experiments, wherein participants recall an experienced (rather than passively observed) event, enhances the generalisability of the results.

The use of a naturalistic event however, does not enable a comprehensive examination of memory accuracy. Although these experiments utilised health records and other individuals’ recollections as proxy measures of accuracy, many details could not be verified. For example, in the case of Rivard et al. (2014), only about 10% of the reported details were corroborated. Additionally, the absence of a single-event control group in these experiments prevents an examination of the effect of event repetition upon memory quality, and a comparison with the child literature.

MacLean, Coburn, Chong, and Connolly (2018) adapted the child repeated-event methodological paradigm to examine adults’ memories. In two experiments, participants
experienced five tasting sessions, participating in a series of planned activities during each episode, with 11 details varying predictably across sessions. When a deviation (i.e., an unpredictable variation) occurred during an episode, memory was enhanced relative to when the deviation was absent. This methodological approach enables participants to recall an experienced event, whilst permitting a more objective assessment of memory accuracy than the naturalistic paradigm. However, the only details that were coded for accuracy were 11 critical variable details. Due to this partial coding practice, it is likely that adults recalled many details which were not analysed for accuracy (Goodman & Reed, 1986). Additionally, all event occurrences were experienced within a one-hour period, with three-minute intervals between them. This practice affects the generalisability of the results, as forensic repeated events typically have much longer intervals between occurrences, and the spacing between occurrences affects memory, with short spacing resulting in greater suggestibility and poorer source-monitoring than more distributed exposure (Price et al., 2006; Rand & Saltzman, 2003). A further limitation of this experiment, which is also true of most child-based repeated-event research, is that details were arbitrarily, rather than logically sequenced. For example, in the tasting sessions, participants ate a cookie and then ate cereal, which could logically be performed in any order (MacLean et al., 2018). The logical sequence of event constituents is an important consideration because many forensic repeated events have a logical structure (e.g., Walker, 2017) and whether an event is logically or arbitrarily sequenced has a strong effect upon memory. Indeed, research consistently indicates that logically structured events are better remembered than those which have an arbitrary sequence (e.g., Abelson, 1981; Fivush, Kuebli, & Clubb, 1992; Murachver et al., 1996).

A different subset of adult repeated-event investigations utilised an adaptation of the eyewitness paradigm, in which participants watched multiple videos, or read multiple stories or word lists (Rubinová, Blank, Koppel, & Ost., 2020; Rubínová, Blank, Ost, & Fitzgerald,
Although participants are not involved within the event recalled, this methodological approach enables all details recalled to be coded for accuracy. For example, in an investigation by Theunissen et al. (2017), adult participants watched one or multiple similar videos depicting the aftermath of a severe traffic accident. In their recall of the target video, repeated-event participants had significantly lower accuracy rates than single-event participants. Dilevski, Paterson, and van Golde (2020) similarly had participants read and imagine, one or four hypothetical scenarios. The scenarios depicted either domestic violence victimisation (high arousal) or matched neutral interactions with a romantic partner (low arousal). Repeated-event participants reported significantly fewer correct details about the target event than single-event participants, in both arousal conditions.

Three additional experiments adapted the eyewitness paradigm without including a single-event comparison group, examining the effect of immediate recall (van Golde et al., 2017), and deviations upon event memory (Rubínová, Blank, Koppel, & Ost, 2020; Rubínová, Blank, Ost, & Fitzgerald, 2020). In an investigation into the effect of immediate recall upon repeated-event memory, participants watched four videos depicting an instance of workplace bullying, over a period of four weeks (van Golde et al., 2017). Half of the participants wrote an immediate recall account after watching each video, whilst the remaining participants did not engage in immediate recall (control condition). One week after watching the final video, participants were asked to recall each video. Although the number of correct details reported was similar in each condition, those who engaged in immediate recall reported significantly fewer confabulations than those in the control condition. Examining the effects of a deviation upon memory, Rubinová, Blank, Koppel, & Ost (2020) showed participants four videos of unfamiliar illustrated stories. In the final story, some participants received a deviation in the story’s content or order. Participants were asked to
recall the stories on four subsequent occasions. Both the content and order deviations impaired memory for the story in which they were present. However when word lists were used as stimuli, content deviations had a general effect, enhancing memory for all word lists, whereas order deviations had a generalised negative effect – impairing memory across word lists (Rubínová, Blank, Ost, & Fitzgerald, 2020).

A notable limitation in the adult literature is that most experiments have not defined the similarity of event occurrences. Yet the similarity between occurrences is likely to affect recall for both typical and unique details. Danby et al. (2019) examined differences in children’s memory for a repeated event which consisted of highly similar (i.e., more fixed relative to variable details), or dissimilar episodes (i.e., more variable than fixed details). Children who experienced similar event occurrences recalled significantly more fixed details than participants in the dissimilar condition. Conversely, children who had experienced occurrences which had low similarity were significantly more accurate attributing the source of experienced details than children who recalled a similar event. Although two adult-based investigations defined similarity by specifying variable details in the stimuli (MacLean et al., 2018; Rubínová, Blank, Koppel, & Ost, 2020), these experiments investigated the effect of a deviation upon repeated-event memory, and thus did not include a single-event comparison group.

The literature reviewed in this chapter highlights the disconnect in the methodologies employed in the extant child and adult repeated-event literature. Additionally, there is considerable variation in the methods that have been employed to examine adults’ repeated-event memory. This heterogeneity obscures our understanding of adults’ ability to particularise a repeated event. Thus, Experiment 1 and 2 aimed to extend our understanding of the credibility of adult repeated-event witnesses by examining their memory for an occurrence of a repeated event. These experiments were additionally designed to bridge the
diverse methodologies that have been employed in the repeated-event literature. In Experiment 1, the methodology typically employed in the child literature was adapted for adults. Undergraduate students experienced one or four healthy lifestyle sessions in which they participated in a number of planned activities. For repeated-event participants all details were variable, differing slightly across sessions. After a one-week delay, participants were interviewed about the last or only, healthy lifestyle session in which they participated. In Experiment 2, the eyewitness paradigm was adapted, such that participants watched one or four videos of domestic violence. These videos were designed to consist of fixed and variable details. After a one-week delay, participants were interviewed about the last video they observed, which was the only video single-event participants had viewed.
Chapter 3

Experiment 1: Adults also have difficulty recalling one instance of a repeated event

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Abstract

Some forms of abuse, such as domestic violence, tend to occur repeatedly. Although memory for repeated events has received considerable empirical attention, most of this research has used a child sample. Experiments that have examined adult repeated-event memory tend to use vastly different methodological paradigms to that used for children. To investigate whether the same pattern of findings emerge with young adults, we adapted the methodological paradigm used in child repeated-event experiments. In this experiment, 41 undergraduate students experienced one, or multiple similar events. All participants were then interviewed about the same event. Participants who had experienced a single event were more likely to report correct details than those who had experienced a repeated event. Repeated-event participants were more likely to report general details. These results have implications for the methodological paradigm which is used to examine adult memory for a recurring event.
Introduction

Some forms of abuse occur repeatedly. This is true for example of childhood sexual abuse, in which an offender tends to repeatedly abuse the same victim (Tidmarsh, Powell, & Darwinkel, 2012). Despite the societal myth that adults leave abusive situations, this is often not the case. In instances of domestic violence for example, it is difficult for victims to permanently leave their abusive partner, resulting in repeated violence (Sullivan, Basta, Tan, & Davidson, 1992).

Although the nature of both children and adults’ memory for a repeated event is of forensic interest, since the late 1990s, most of the repeated-event research has utilised a child sample. The current experiment adapts the methodological paradigm typically employed in the child literature and extends the research on adult repeated-event memory.

Memory for Repeated Events

Experiments that examine children’s memories for a repeated event tend to use a consistent methodological paradigm. Children typically experience one, or a series of sessions (e.g., a play session), in which they participate in numerous planned activities (e.g., Connolly & Lindsay, 2001). For children in the repeated-event condition, some of the details in these activities are present during each episode of the event (fixed details), whereas other details differ predictably across episodes (variable details). For participants who experience multiple sessions, the last session is often designated as the target episode (but not always), which is the only session that single-event children experience. In the final recall test, all children are asked about the target session and only details participants experienced on the target session are coded as accurate. The requirement that children recall details from only one episode parallels the legal requirement that repeated-event witnesses should recall at least one episode of the event in detail (Woiwod & Connolly, 2017).

Relative to children who experience a unique event, children who participate in multiple events typically have a superior memory for fixed details (Connolly & Lindsay,
Repeated-event children, however, tend to report fewer correct variable details about the target event (Price, Connolly, & Gordon, 2006) and more internal intrusions (i.e., recall of features that were experienced, but not during the episode they were questioned about; Woiwod et al., 2019). Recently, researchers have begun to redefine memory accuracy for repeated-events, considering details recalled from any episode as accurate (i.e., experienced details). When accuracy is defined in this way, the accuracy of single- and repeated-event participants is equivalent (Woiwod et al., 2019).

Multiple theories make predictions about the differences in memory for a single and repeated event. Script theories, for example, predict that as individuals experience an event, they develop cognitive representations of the typical sequence and structure of the event, as well as the individuals and objects that are present (Farrar & Goodman, 1992). These cognitive representations are strengthened with repeated experience. Recall of a specific episode is a constructive process that uses the general event script as a guide (Hudson & Nelson, 1986). Because children and adults represent events through scripts, there are elements of repeated-event memory that are consistent across developmental levels.

Both children and adults, for example, tend to report generic information about a repeated event. This tendency to generalise an event is reflected by the language used by even young children (Hudson et al., 1992). When reporting a repeated event, children tend to use impersonal pronouns such as “you”, suggesting that the event has been generalised (Hudson et al., 1992). Generic memory representations, however, are perhaps most clearly evidenced by findings which indicate that temporal structure is fundamental to how repeated events are represented in memory (Hudson & Mayhew, 2009). Across the lifespan, individuals tend to report details in the correct temporal sequence (Nelson & Gruendel, 1981), suggesting that both younger and older individuals form a generic cognitive representation of the event.
Notably however, the type and quantity of details held within a script differs across developmental levels. Adults, for example, can store information of greater complexity within their scripts than children, including a more sophisticated representation of the commonalities across episodes (Hudson & Mayhew, 2009). Furthermore, older children are more likely to confabulate details which are consistent with the theme of the event than younger children (Slackman & Nelson, 1984). Although repeated-event child experiments typically find floor effects in the number of general details that participants report, these floor effects may arise because young children have difficulty recognising commonalities across episodes (Brainerd et al., 2008; Powell & Thomson, 1996). As adults are more likely to generalise across episodes of a recurring event than children, a different effect may arise using adults, with repeated-event adult participants recalling more general details than single-event participants. This prediction is supported by the finding that older children are more likely to report general details than younger children (Brubacher, Roberts, & Powell, 2012).

In addition to encoding more generic details, older children and adults also tend to remember a greater quantity of episode-specific details than children. Indeed, older children tend to recall more details than younger children and are more accurate in attributing the detail to the target episode (Woiwod et al., 2019). Thus, adults can hold a greater number of details, and details of greater complexity within their scripts relative to children.

**Adults’ Memories for Repeated Events**

Although there are differences in repeated-event memory across development, most repeated-event research has utilised a child sample, with a comparatively small focus on adults. Experiments that have investigated adult repeated-event memory have used different methodological approaches to the child research. For example, although most child research has employed experienced play sessions as memory stimuli, the stimuli used in adult research has included films (Theunissen et al., 2017; van Golde et al., 2017), written accounts of abuse
(Dilevski et al., 2020), word lists (Rubínová, Blank, Ost, & Fitzgerald, 2020), and autobiographical events (Means & Loftus, 1991; Rivard et al., 2014).

In one such experiment, adult participants watched one or multiple similar videos depicting the aftermath of a traffic accident (Theunissen et al., 2017). In their recall of the target video which all participants viewed, repeated-event participants were less accurate than single-event participants. Although these findings are consistent with the child literature, the methodological differences between child- and adult-based experiments prevents continuity in the literature. For example, in child-based experiments, participants are typically actively involved within the events, whereas adults passively observed the events in Theunissen et al. (2017). Given that one’s level of involvement within an event can affect memory quality (Hope et al., 2016), a comparison between child- and adult-based experiments is obscured by these different methodological approaches. Additionally, Theunissen et al. (2017), did not define the similarity across repeated-event episodes (e.g., whether details were fixed, variable), as is true of the majority of adult repeated-event research. As episode similarity affects children’s memory accuracy, detail-type may affect adults’ memory for a repeated-event (Danby et al., 2019).

Only one prior study has adapted the child paradigm to examine adult repeated-event memory (MacLean et al., 2018). Participants experienced five food tasting sessions in which details varied predictably across sessions. However, all episodes of the event were experienced within a single participation session. The participation session lasted approximately one hour in total, with three-minute intervals between each event episode within the session. This short spacing prevents the generalisability of the results, as repeated-event episodes in a forensic context (e.g., domestic violence) are unlikely to wholly occur within a short period of time. Furthermore, research shows that interval spacing can affect repeated-event memory. For example, Price et al., (2006) found that child participants made
more internal intrusions, and reported fewer correct details when the spacing between episodes was short (four sessions within the same day) compared to when episodes had longer intervals between them (four sessions spaced over four days). An additional limitation of MacLean et al. (2018) is the absence of a single-event control condition, which prevents a comparison to child-based experiments that typically include a single-event comparison group.

To address the disconnect between investigations into children’s and adults’ memories for repeated events, the current study examined adult repeated-event memory by adapting the methodological paradigm typically used with children. In this experiment, adults experienced a single or repeated event in which all details varied predictably across episodes, to explore adults’ ability to extract the gist between episodes. To employ a more ecologically valid spacing between episodes, repeated-event participants experienced one healthy lifestyle session per week, for four weeks.

Given that script theory posits that both children and adults use scripts to represent events, in line with the child literature, it was predicted that single-event participants would report more correct variable details than repeated-event participants. We expected however, that repeated- and single-event participants would exhibit comparable accuracy when accuracy is broadly defined as experienced details. Finally, as the ability to form generic memory traces increases with age, we expected that repeated-event participants would have a superior memory for general details relative to single-event participants.

**Method**

**Participants**

Ethical approval for this experiment was obtained from the Human Research Ethics Committee at The University of Sydney. An a-priori power analysis was conducted using GPower 3.1 to determine the number of participants needed to detect an effect of event frequency given the assumed effect size (large; e.g., Powell et al., 1999). The power analysis
indicated that using an alpha of .05 with 90% power, 21 participants were required per cell. Although 65 undergraduate students were recruited, 12 students who were allocated to the repeated-event condition, and 6 students who were allocated to the single-event condition did not wish to participate. A further 6 individuals (4 single-event, 2 repeated-event) failed to return for one or more sessions. In total, 41 students (26 female) participated in this study in exchange for course credit. The analyses were based upon a set of interviews utilised by Deck and Paterson (in press). All participants from the truth-telling conditions in Deck and Paterson (Experiment 1: in press) were included in this experiment. Participants ranged in age from 18–34 years ($M = 19.89, SD = 3.26$). Participants identified as European (46.3%), East Asian (29.3%), African (4.9%), South Asian (2.4%), Southeast Asian (2.4%), Middle Eastern (4.9%), Mixed (4.9%), or other (2.4%).

**Design**

A one-way between-subjects design was employed, using event type (single, repeated) as the independent variable. Twenty-one participants were allocated to the single-event condition and 20 participants were allocated the repeated-event condition.

**Procedure and Materials**

The planned activities that participants experienced were referred to as “healthy lifestyle sessions”. These sessions were derived from the activities used by previous studies on children’s memory for repeated events and were adapted to be suitable for an adult sample (see Table 1 for activities). The materials for all of the experiments described in this thesis, including the script for the healthy lifestyle sessions, are available on the Open Science Framework via the following link: https://osf.io/xwmfv/?view_only=e21ea1d6e7504fa9b31d641ce50fc633.

Before beginning the experiment, participants were informed that they would experience one/four healthy lifestyle session(s) and would be interviewed about their
experience on the final session. All participants were tested individually. The healthy lifestyle sessions were conducted by the same female experimenter, and participants were interviewed during the final session by a different experimenter. Each lifestyle session included 10 critical details relating to a healthy lifestyle and lasted approximately 15 minutes in duration. Repeated-event participants experienced four healthy lifestyle sessions that were spaced one week apart. Although the order of activities was always the same, each critical detail had four options which varied across sessions for repeated-event participants.

Participants completed a non-intensive physical exercise and then listened to music (see Table 1 for variable options). Afterwards, participants tasted a fruit and smelt an herb. Following these activities, participants completed a puzzle and read a non-fiction article. Finally, participants practiced fine motor movements by threading a needle with coloured thread and precisely drawing a shape. Each critical detail was highlighted by the experimenter during the session. Participants only experienced each variable option once regardless of how many sessions they experienced.

The session orders were partially counterbalanced to control for order effects. Participants were randomly allocated to one of two order streams. The session order for set A was 1, 2, 3, 4, whereas the order for Set B was 3, 4, 2, 1 (see Table 1 for options associated with each session number). Repeated-event participants experienced all four sessions, whereas single-event participants experienced only the last event in the set, according to the counterbalancing stream they had been assigned to (i.e., session four or one). The target session was always the final session for repeated-event participants, and the only session for single-event participants. To distinguish the sessions, each session was given a different title of a famous athlete, and a photograph of the relevant athlete was placed at the front of the room. The target session was always labelled the Roger Federer session. Before completing
the target session, participants were reminded that they would be interviewed in one week’s
time.

Table 1

*Variable options for each critical detail in the healthy lifestyle sessions*

<table>
<thead>
<tr>
<th>Critical Detail</th>
<th>Session Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>Arm stretches</td>
</tr>
<tr>
<td>Musical Instrument</td>
<td>Cello</td>
</tr>
<tr>
<td>Fruit Eaten</td>
<td>Banana</td>
</tr>
<tr>
<td>Herb Smelt</td>
<td>Basil</td>
</tr>
<tr>
<td>Colouring in</td>
<td>Rhinoceros</td>
</tr>
<tr>
<td>Plant</td>
<td>Fern</td>
</tr>
<tr>
<td>Puzzle Played</td>
<td>Anagrams</td>
</tr>
<tr>
<td>Non-fiction Topic</td>
<td>Aztecs</td>
</tr>
<tr>
<td>Thread Colour</td>
<td>Red</td>
</tr>
<tr>
<td>Shape Drawn</td>
<td>Circle</td>
</tr>
</tbody>
</table>

*Note.* Single-event participants experienced only one variable option for each critical detail, whereas repeated-event participants experienced all variable options across their four healthy lifestyle sessions.

**Interview.** Rapport was established by asking participants about their experience of the current university semester. Participants were subsequently given one minute to shut their
eyes and think back to the day that they completed the Roger Federer session. They were asked to think about their surrounding environment and how they were feeling at the time they completed the session. All participants were subsequently asked to describe the poster at the front of the room displayed in the Roger Federer session. Once it was clear the participant understood which session they were to report from, an initial open-ended question asked them to report everything that they could remember about the Roger Federer session. Additional open-ended breadth prompts were asked to facilitate recall (e.g., “What else happened in the Roger Federer session?”). If a participant claimed to remember no further information in response to a prompt, additional prompts were not asked. Participants were asked an average of 2.81 prompts ($SD = 0.75$). The number of prompts asked did not differ between conditions, $t(39) = 0.04, p = .97$, Cohen’s $d = 0.01$. Participants were then asked specific cued invitations that assessed memory for each of the 10 critical details. Participants were told that if they were asked a question about a detail that they had mentioned earlier, they should not assume their prior response was incorrect. All interviews were filmed.

The interview was conducted by one of six experimenters and lasted an average of 19.15 minutes ($SD = 7.65$), ranging in length from 6.52 to 45.07 minutes. There were no significant differences in length according to interviewer, $F(1,34) = 1.54, p = .20$, $\eta^2_p = .21$, or condition, $t(39) = -0.28, p = .78$, Cohen’s $d = -0.09$. Participants completed a final questionnaire that collected basic demographic information.

**Coding**

The coding scheme was modelled from previous child repeated-event experiments, and only critical details were coded. Interviews were transcribed verbatim and coded using the following categories:

*Accurate:* A detail was coded as accurate if it was present in the target occurrence.
Internal Intrusion: A detail that was present in one of the three non-target occurrences.  

External intrusion: A detail that was not present in any of the event occurrences.  

Experienced: A detail which was experienced during the target session, or a non-target occurrence.  

General Detail: The general category, but not specific detail was mentioned.  

Uncertain: Participant claims to not know or not to remember the correct detail.  

Inter-rater reliability. A second rater coded 25% of the transcripts (N = 11). Inter-rater reliability was calculated using Pearson correlation coefficients, which ranged from .81-.99 for each detail type (all p’s < .001).  

Results  

The data for this experiment are available upon request from the corresponding author. The data are not publicly available due to ethical considerations. Data was screened for outliers and assumption testing. A series of independent samples t-tests were conducted to examine differences in recall between single- and repeated-event participants. When the assumption of homogeneity of variance was violated, Satterwaite’s test was used. Memory performance for free and cued recall was examined separately.  

Free Recall  

Single-event participants reported significantly more correct details than repeated-event participants, t(39) = 4.27, p < .001, Cohen’s d = 1.36, 95% CI[1.11, 3.11]. See Table 2

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4 If single-event participants report an internal intrusion, it represents the likelihood of recalling a detail present in one of the three non-target episodes due to chance, rather than a source confusion.  
5 In free recall, 4 participants reported external intrusions and 3 participants reported uncertain details. Due to the low number of responses, interrater reliability was low. These results will not be reported.  
6 Internal intrusions in free recall and internal intrusions, correct, and uncertain details in cued recall violated the assumption of homogeneity of variance.
for group means. Repeated-event participants however, reported significantly more general details than single-event participants, $t(39) = -3.02, p = .004$, Cohen’s $d = -0.94$, 95% CI[-2.57,-0.51]. Moreover, repeated-event participants reported significantly more internal intrusion errors than single-event participants, $t(20.66) = -4.68, p < .001$, Cohen’s $d = -1.50$, 95% CI[-2.90,-1.12]. Recall of experienced details did not differ significantly between single- and repeated-event participants, $t(39) = -1.16, p = .88$, Cohen’s $d = -0.05$, 95% CI[-1.26, 1.08].

**Cued Recall**

A similar pattern of results arose in cued recall. Single-event participants answered significantly more questions correctly than repeated-event participants, $t(27.32) = 6.22, p < .001$, Cohen’s $d = 1.97$, 95% CI[2.85, 5.66]. Repeated-event participants however, made more internal intrusion errors than single-event participants, $t(21.02) = -6.10, p < .001$, Cohen’s $d = -1.95$, 95% CI[-5.40, -2.65]. The number of general details participants responded with did not differ between conditions, $t(39) = 1.24, p = .22$, Cohen’s $d = 0.39$, 95% CI[-0.25, 1.04], nor did the number of uncertain details, $t(21.03) = -1.91, p = .07$, Cohen’s $d = -0.61$, 95% CI[-1.16, 0.05]. Single- and repeated-event participants responded with an equivalent number of experienced details, $t(39) = -0.48, p = .63$, Cohen’s $d = -0.15$, 95% CI[-1.27, 0.78], and made a comparable number of external intrusion errors, $t(39) = -0.06, p = .95$, Cohen’s $d = -0.02$, 95% CI[-0.24, 0.22].
Table 2

*Group means for the number of details reported by participants recalling a single or repeated event*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Event Type</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Single Event</td>
<td>Repeated Event</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Free Recall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct Details**</td>
<td>3.81</td>
<td>1.40</td>
<td>1.70</td>
</tr>
<tr>
<td>General Details*</td>
<td>1.81</td>
<td>1.54</td>
<td>3.35</td>
</tr>
<tr>
<td>Internal Intrusion Errors**</td>
<td>0.19</td>
<td>0.40</td>
<td>2.20</td>
</tr>
<tr>
<td>Experienced Details</td>
<td>3.81</td>
<td>1.40</td>
<td>3.90</td>
</tr>
<tr>
<td>Cued Recall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct Details**</td>
<td>7.86</td>
<td>1.35</td>
<td>3.60</td>
</tr>
<tr>
<td>General Details</td>
<td>1.14</td>
<td>1.11</td>
<td>.75</td>
</tr>
<tr>
<td>Internal Intrusion Errors**</td>
<td>0.48</td>
<td>0.68</td>
<td>4.50</td>
</tr>
<tr>
<td>Experienced Details</td>
<td>7.86</td>
<td>.35</td>
<td>8.10</td>
</tr>
<tr>
<td>Uncertain Details</td>
<td>0.10</td>
<td>0.30</td>
<td>0.65</td>
</tr>
<tr>
<td>External Intrusion Errors</td>
<td>0.14</td>
<td>0.36</td>
<td>0.15</td>
</tr>
</tbody>
</table>

*Note.* Significant differences between means are indicated with *p < .01 **p < .001.

**Discussion**

The current experiment adapted the methodological paradigm typically used for a child sample to investigate adult memory for a recurring event. The results were largely consistent with the child literature. In line with hypotheses, repeated-event participants tended to report more general details than single-event participants. When accuracy was
defined as recall of details from the target session, repeated-event witnesses were less accurate than single-event witnesses. However, when accuracy was broadly defined as experienced details, single- and repeated-event witnesses were equivalent in accuracy.

The finding that repeated-event participants were more likely to report general details contrasts to the results of child experiments which have found floor effects in the number of general details that participants report (Powell & Thomson, 1996). Repeated-event adult participants likely reported more general details than single-event participants because older children and adults can recognise more sophisticated commonalities across occurrences of an event than children (Brainerd et al., 2008). This finding however, is concerning given that detailed witnesses tend to be perceived as more credible than less detailed witnesses, and evaluators are more likely to believe that a statement is genuine if it is high in detail (Bell & Loftus, 1989; Johnson, Bush, & Mitchell, 1998).

In the current experiment, repeated-event participants were less accurate than single-event participants when accuracy was narrowly defined as details recalled from the target session, a result that is consistent with the findings of a large number of child studies (Woiwod et al., 2019). When accuracy was broadly defined as experienced details however, single- and repeated-event participants were equivalent in accuracy. This finding contributes to a small body of research which shows that child (Connolly et al., 2016) and adult (Dilevski et al., 2020) repeated-event witnesses do not report fewer correct details when accuracy is broadly defined. Despite the consistency of this finding across developmental levels, there are different legal expectations for children and adults. Previously, children who testified about childhood sexual abuse were required to particularise their allegation and recall specific details about individual abuse episodes. In recent years, some jurisdictions (in Australia, Canada, and the United States) have adopted continuous child sexual abuse statutes, which permit complainants to report what typically happened during abuse, with reduced
requirements to recall individual incidents (Woiwod & Connolly, 2017). Such laws, however, typically only apply to child complainants. That these laws do not extend to adult witnesses is concerning given that adults also struggle to accurately recall a single occurrence of a recurring event. It is important that research continues to investigate adult memory for repeated events to inform legal practices.

A common methodological approach used to investigate adult repeated-event memory in recent years has been an adaptation of the eyewitness paradigm, in which participants view one or multiple films (Theunissen et al., 2017; van Golde et al., 2017), or read a single or multiple accounts of a victim’s perspective of abuse (Dilevski et al., 2020). Consistent with the results of the current experiment, these experiments have found that repeated-event participants are less accurate when recalling details from the target occurrence than single-event participants. These experiments however, unlike the present experiment, did not define the similarity across the videos, such as whether details were fixed or variable. It is important that future repeated-event research defines the similarity across repeated-event occurrences, as occurrence similarity is likely to affect memory quality, and may explain different results in the literature. Van Golde et al. (2017), for example, exposed participants to four similar videos of workplace bullying and varied whether they engaged in immediate recall or not. There were low levels of internal intrusion errors in both conditions which may be attributable to a low level of similarity between the videos, which prevented participants from forming a strong script of the event (Danby et al., 2019). As the level of similarity between the videos was not defined however, the mechanism behind this result is unknown.

There are, however, distinct advantages of the eyewitness paradigm that has been adapted for adult samples. The use of videos of a forensic event, or descriptions of abuse are clearly higher in external validity than the play sessions typically used in child samples (e.g., Connolly et al., 2016) or the healthy lifestyle or tasting sessions that have been used
(MacLean et al., 2018) when the child paradigm has been adapted for adults. A primary difference between these two methodologies is the emotional valence of the stimuli. Although the effect of stress upon single- and repeated-event memory is unclear (Dilevski et al., 2020), the eyewitness paradigm enables stressful stimuli to be employed more easily, as an analogue for repeated forensic events (although see Price & Connolly, 2007, for an example of stressful repeated-event stimuli used within the child paradigm).

A final limitation of the child paradigm is that typically only a small proportion of the total memory reports generated by participants is coded. For example, in the current experiment, the accuracy of only 10 critical details was coded. Participants however, tended to produce comprehensive recall accounts and recalled many details that were not coded to maintain consistency with the literature investigating children’s memory for recurring events. Such experiments typically only analyse the accuracy of a small number of critical details (e.g., Price et al., 2006). The design of experiments which utilise the methodological paradigm typically used to investigate children’s memory for repeated events does not allow the accuracy of non-critical details to be coded. For example, if the experimenter’s clothing is not designated as a critical detail, their clothes would be different on different testing sessions. As such, recall about the experimenter’s clothing could not be coded. Analysing the accuracy of only a few details may result in an incomplete picture of the nature of memory for a repeated event. This consideration is particularly important for adults, given that script theory predicts that adults’ recall of a repeated-event occurrence will contain more detail than children’s accounts (DeMarie et al., 2000). The eyewitness paradigm, wherein participants watch multiple similar videos (or read descriptions) bears the advantage that all details about the event can be coded for accuracy. Thus, a promising direction for future research is to use a variation of the eyewitness paradigm, which uses multiple similar videos and defines their similarity.
The current experiment adapted the methodological paradigm typically utilised in children to examine adult memory for a recurring event. A similar pattern of results emerged in adults to what is typically found in children. Although it is important for future research to explore repeated-event memory using novel methodologies to improve external validity, occurrence similarity should be defined. The results of such experiments should be used to educate individuals involved in the investigative and legal process about memory for repeated events.
Chapter 4

Experiment 2: Adults’ ability to particularise an occurrence of a repeated event

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Abstract

Domestic violence typically recurs over time, involving the same victim and perpetrator. When complainants make an allegation about abuse, they are required to particularise the offence and recall details unique to specific occurrences. This experiment investigated adults’ ability to particularise an occurrence after experiencing a single or repeated event. Participants watched one or multiple videos of domestic violence and were interviewed about the last or only video they had observed. For repeated-event participants, some details were present in all videos (fixed), whereas others differed predictably (variable). Repeated-event participants recalled a significantly lower proportion of correct details about the target video relative to single-event participants, although they reported similar proportions of correct experienced details. Repeated-event participants also reported a significantly higher proportion of correct fixed, relative to correct variable details about the target video. These findings indicate that adults are likely to have difficulty fulfilling the particularisation requirement.
Introduction

Sometimes eyewitnesses are asked to recall an event that they have experienced repeatedly over time. Such is the case for complainants of childhood sexual abuse who have typically been subject to recurring abuse perpetrated by a single offender. Similarly, adults who have been subject to intimate partner violence are often faced with the task of recalling an event that did not occur just once but on multiple occasions (WHO, 2012). Given that there is typically an absence of corroborating evidence for these forms of abuse, the victim’s testimony can have a pivotal role on the outcome of the case (Australian Law Reform Commission [ALRC] & New South Wales Law Reform Commission [NSWLRC], 2010).

When individuals make an allegation about abuse, it is important that they recall distinctive information about one or more occurrences. This recall of information that is specific to individual occurrences is important because many jurisdictions require offenses to be particularised. That is, complainants must report details unique to individual occurrences of abuse for a suspect to be convicted (Powell et al., 2007). However this requirement is likely to be especially difficult for individuals who recall a repeated event.

As individuals experience an event, they develop cognitive representations (i.e., scripts) of the typical sequence and structure of the event, as well as who (actors) and what (objects) are usually present (Schank & Abelson, 1977). With exposure to multiple similar occurrences of an event, memory for each occurrence is merged into this overarching memory representation (Hudson & Mayhew, 2009). Consequently, individual occurrences are difficult to recall (Hudson et al., 1992).

Most forensic research on memory for repeated events has utilised a child sample, with a limited focus upon adult repeated-event memory. These child-based experiments typically employ a methodological paradigm in which children participate in one, or multiple similar staged activity sessions (e.g., play sessions; Brubacher, Glisic, et al., 2011, magic shows; Connolly & Gordon, 2014). After a delay, all children are typically interviewed about
one occurrence of the event that they experienced (the target occurrence), which is the only activity session that single-event participants experienced. For those who participate in multiple sessions, some details are typically present in an identical form in all sessions (fixed details), whereas other details differ slightly across sessions (variable details). For example, in Powell, Roberts, Ceci, and Hembrooke (1999), children were given a sticker by the same person (fixed) during each play session, but the type of sticker they were given changed each time (variable). These predetermined fixed and/or variable details in repeated-event experiments are termed critical details and are typically the only details that are coded for accuracy in participants’ recall accounts.

The use of a consistent methodological paradigm across decades of research has revealed a series of robust findings. Repeated-event children tend to accurately report more fixed than variable details (Brubacher, Glisic, et al., 2011). However as fixed items are present during each occurrence, they do not help particularise the event (Danby, Sharman, Brubacher, Powell, & Roberts, 2017). Thus, it is important to consider how accurately individuals can recall details which differ slightly across occurrences. Although children often recall many details that varied across occurrences, they commonly attribute these details to the incorrect source (i.e., to the incorrect occurrence; Price et al., 2006). This error, termed internal intrusions, is the most common error made by repeated-event children (Brubacher et al., 2019). Thus, accuracy rates for variable details depend upon how accuracy is defined. When accuracy is narrowly defined as correct details recalled about the target occurrence, repeated-event participants tend to be less accurate than those who experienced the event once (Woiwod et al., 2019). However a different pattern of results arises when accuracy is broadly defined as details experienced on any occurrence, as this definition does not depend upon correct source attributions. Indeed, children who recall a single or repeated event report an equivalent number of experienced details (Woiwod et al., 2019).
Although this methodological approach has been employed to examine children’s memory for decades, a comparatively small body of research has examined adults’ memory for a repeated event. Most adult repeated-event research has employed naturalistic designs wherein participants recall autobiographical experiences such as recurring health visits, in which objective recall accuracy cannot be examined (e.g., Means & Loftus, 1991; Willén et al., 2015). Other experiments have adapted the child repeated-event paradigm to an adult sample (Deck & Paterson, 2021; MacLean et al., 2018), or adapted the eyewitness paradigm wherein participants observe multiple videos (e.g., Theunissen et al., 2017), or read multiple narratives (e.g., Dilevski et al., 2020). To date, only three experimental investigations have employed a single-event comparison group, enabling an exploration into the effect of event frequency and thus script consolidation, upon the ability to particularise an event occurrence (Deck & Paterson, 2021; Dilevski et al., 2020; Theunissen et al., 2017). These experiments provide preliminary evidence that adults have particularisation difficulties, each finding that adults who recalled a single event were less accurate (narrowly defined), than those who recalled a repeated event. Moreover, repeated-event participants reported many internal intrusions, and an equivalent proportion of experienced details to single-event participants (Deck & Paterson, 2021; Dilevski et al., 2020; whereas Theunissen et al., 2017, did not report these details). However the methodologies employed in these experiments limit a thorough understanding of adults’ ability to particularise an event. In the following section we will explain these experiments and their limitations in greater detail.

First, Deck and Paterson (2021) examined adults’ memory for a healthy lifestyle session that had been experienced once or repeatedly. Ten critical details were experienced, which varied slightly across occurrences for repeated-event participants. After a delay, participants were interviewed about the last or only session they had experienced. Although the results were consistent with the child literature, the accuracy of only critical details was
coded. This partial coding practise likely means that participants recalled many details which were not coded and analysed, resulting in an incomplete understanding of the nature of participants’ recall. This consideration is particularly relevant for adults who tend to recall more details than children (e.g., Poole & White, 1993).

Conversely, Theunissen et al. (2017) and Dilevski et al. (2020) coded the accuracy of memory reports in full. In Theunissen et al. (2017) participants observed one, or multiple videos depicting the aftermath of a car crash, whereas in Dilevski et al. (2020) participants read one or multiple narratives of domestic violence. After a delay, participants recalled the target occurrence which was experienced by all participants. However, these experiments did not define the types of details present, such as whether certain details were identical (fixed) or varied across occurrences (variable). This is problematic because prior research indicates that the similarity between occurrences affects the types of correct details that are reported about one occurrence. Specifically, when episodes of a repeated event are high in similarity, children report more correct details that are identical (fixed) across occurrences, but less correct details that vary across occurrences, than children who experience event occurrences that are low in similarity (Danby et al., 2019). Although Theunissen et al. (2017) and Dilevski et al. (2020) reported correct details about the target instance, because detail-type was not defined, they did not report the types of correct details participants reported. Thus it is unknown what proportion of correct details reported were unique to the target episode (variable) or were true of all event episodes (fixed), obscuring an understanding of the ability of adults to particularise an event occurrence.

In a recurring forensic event, it is likely that some details may be identical across occurrences (e.g., the perpetrator and the setting of the abuse may be consistent), and other details are likely to vary. However extant research has not explored the tendency of adults to report correct fixed relative to variable details. To address these limitations, we designed an
experiment to examine the effect of event frequency upon adults’ ability to particularise a single and repeated event, using a modification of the eyewitness paradigm. Participants watched one, or four similar videos of domestic violence that were designed to consist of variable and fixed details. After a one-week delay, all participants were interviewed about the last video of domestic violence that they viewed. Participant’s memory for all details recalled were coded for accuracy.

We hypothesized that repeated-event participants would report a lower proportion of correct details and a higher proportion of incorrect details about the target video than participants who only observed one video (e.g., Dilevski et al., 2020). However we predicted that the proportion of experienced details reported by single- and repeated-event participants would be equivalent (e.g., Deck & Paterson, 2021). Finally, in line with the findings of child-based research (Brubacher, Glisic, et al., 2011), we expected repeated-event participants to recall a higher proportion of correct fixed relative to variable details.

**Method**

**Participants**

An a-priori power analysis indicated that 26 participants were required per cell to achieve a large effect size with 80% power, based upon Deck and Paterson (2021). Due to the high attrition rates inherent in repeated-event experiments, 68 participants initially consented to participate in the experiment but 10 failed to attend their subsequent session(s). In total, 58 undergraduate students (40 female) participated in this study in exchange for course credit. The mean age was 20.34 years ($SD = 4.05$), ranging from 17-42 years. The analyses were conducted upon a subset of interviews utilised by Deck and Paterson (in press). All participants in the truth-telling conditions from Deck and Paterson (Experiment 2: in press) were included in this experiment.

**Design**
This experiment utilised a one-way between-subjects design, with event frequency as the independent variable and memory accuracy as the dependent variable. Participants were allocated to the single-event \((n = 29)\) or repeated-event \((n = 29)\) condition.

**Materials**

Four videos depicting domestic violence were created. The videos were designed to be high in similarity to each other, based upon the definition provided by Danby et al., 2019. All videos followed the same sequence, and were designed so that the video formed a logical sequence, as each component of the event enabled the next (Bauer, 2008). There were 7 overarching themes which varied predictably across the videos, such as the reason for the conflict between the couple. These variable event themes are outlined in Table 3. The same protagonists (played by the same actors) were depicted in each of the four events.

At the beginning of each video, the time and day that the scene took place was displayed. The opening scene depicted a female (Emma) in the kitchen preparing dinner. A male (Sam) subsequently entered the kitchen and greeted his wife (Emma). Upon greeting his wife, the couple engaged in a conversation about their day. At some point during this conversation, Sam became angry at Emma because of something she had done. As the conversation escalated, Sam became physically violent. The scene concluded with Sam walking angrily out of the room and slamming the door. Each video was approximately two minutes long.
### Table 3

*Variable event components and options assigned to the events depicted in each video*

<table>
<thead>
<tr>
<th>Variable Theme</th>
<th>Event Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Event 1</td>
</tr>
<tr>
<td>Time of Event</td>
<td>Wednesday</td>
</tr>
<tr>
<td></td>
<td>6pm</td>
</tr>
<tr>
<td>Colour of Sam’s shirt</td>
<td>Dark blue</td>
</tr>
<tr>
<td>Colour of Emma’s shirt</td>
<td>Pink</td>
</tr>
<tr>
<td>Dinner</td>
<td>Salad</td>
</tr>
<tr>
<td>Reason for Violence</td>
<td>Emma didn’t</td>
</tr>
<tr>
<td></td>
<td>pay electricity</td>
</tr>
<tr>
<td></td>
<td>bill</td>
</tr>
<tr>
<td>Type of violence</td>
<td>Sam pulls</td>
</tr>
<tr>
<td></td>
<td>Emma by the</td>
</tr>
<tr>
<td></td>
<td>wrist.</td>
</tr>
</tbody>
</table>

### Procedure

Participants were randomly allocated to one of the two conditions. All sessions were completed individually in the laboratory. Participants in the repeated-event condition viewed all four videos, whilst participants in the single-event condition viewed only one video. The number of sessions participants completed depended upon whether they had been allocated to the single or repeated-event condition. Participants in the single-event condition experienced two sessions, conducted one week apart. In the first session, single-event participants
observed a video and they were interviewed in their second session. Conversely, repeated-event participants experienced 5 sessions, conducted over five weeks. In the first four sessions, participants observed one video each session and they were interviewed on their fifth session. On their last (or only) video session, participants were informed that on the final session they would be interviewed by a different experimenter about the event they had observed. They were told that the interviewer would not know if they had actually observed a video of the event they recalled. To heighten motivation to recall, participants were told that those who could convince the interviewer that they watched the event would win a $50 gift card.

**Counterbalancing.** To account for order effects, the order that the events were given to participants was counterbalanced, with two item orders created. An equivalent number of participants in the single- and repeated-event condition were assigned to each item order, either order A or order B. The order of events in item order A was 1, 2, 3 and 4, with event 4 serving as the target event. The order of events in item order B was 3, 1, 4 and 2, with event 2 serving as the target event. Participants in the repeated-event condition watched all four videos in the relevant order (either order A or order B, according to the counterbalancing stream they had been assigned to). Conversely, participants in the single-event condition watched only the last video in the set, which was the target video. That is, single-event participants assigned to item order A only observed event four, and single-event participants in item order B only observed event two. The last video in the set (i.e., event four or two) was the target event which all participants were asked about in the interview.

**Interview.** The interview was conducted one week after the target session by a different experimenter than the one who ran the initial sessions. The experimenter who conducted the interviews was blind to the condition to which each participant had been allocated. Thus all participants were asked to recall the last video of domestic violence they
had observed, which referred to the only video that single-event participants had watched. After establishing rapport, participants were asked an initial open-ended invitation (“Can you please tell me what happened during the last occurrence of domestic violence that you observed”). Participants were asked to report everything they could remember, even if they didn’t think that the details were important. Additional open-ended breadth prompts were asked to facilitate recall (e.g., “what else happened during the last occurrence of domestic violence that you observed?”). Participants were then asked six cued recall questions, consisting of one focused question about the time of the event (“When did the event occur?”), followed by five cued invitations which assessed memory for each of the remaining variable event themes (e.g., “Tell me about the dinner that was being made”). Participants were told that if they were asked a question about a detail that they had mentioned earlier, they should not assume their prior response was incorrect. Interviews lasted an average of 484.70 seconds ($SD = 172.88$) and were video-recoded. Following the interview, participants completed a final questionnaire assessing basic demographic information and then participants were debriefed about the aims of the study.

**Coding**

Interviews were transcribed verbatim and all units of information were coded for detail-type and accuracy. For example, the phrase that “Sam was wearing a suit and had brown hair” contains four units of information: ”Sam”, “suit”, ”brown” and “hair”. If a participant provided multiple responses (e.g., she was cooking salad or burgers) and could not decide which option was viewed in the target video, all alternative responses (i.e., “salad” and “burgers”) were coded (Connolly & Gordon, 2014; Connolly et al., 2016). Each report was coded using the following categories:

*Correct:* Details that were present in the target video. Correct details were further coded as either fixed correct, or variable correct.
**Fixed Correct:** A unit of information was coded as fixed correct if the detail was present in both the target and non-target videos. The setting and appearance of the actors were always fixed, with exceptions outlined in Table 3. Moreover, the actions of Sam entering the scene, and leaving the scene (slamming the door) were also identical in each video (and thus regarded as fixed).

**Variable Correct:** The videos were designed to be identical to one another, with planned exceptions that differed predictably across the four videos. Thus, any detail which was present in the target video, that was not present in a non-target video, was coded as variable correct. Details differed across videos in two main ways. First, details that were associated with a variable event theme varied. For example, the meal being prepared for dinner was regarded as a variable event theme, and as such, the ingredients that were present for the meal being prepared for dinner (e.g., hamburger patties) varied across videos. Second, all conversation and actions were also variable, as they changed slightly across the videos.

**Incorrect:** Details that were not present in the target video. Incorrect details were also coded as either an internal intrusion or a confabulation.

*Internal Intrusions:* Information which referred to a detail that was present in a non-target video, but not the target video, was coded as an internal intrusion.\(^7\)

*Confabulations:* A detail that was not present in the target or non-target videos was coded as a confabulation.

**General Details:** If a variable detail was referred to without providing details about a particular option (i.e., it was true of the target and non-target events) it was coded as a ____________

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\(^7\) For participants in the single-event condition, an internal intrusion represents the likelihood of recalling a detail depicted in a non-target video by chance.
general detail (Powell & Thomson, 1996). For example, if a participant recalled that Sam
was violent towards Emma without specifying the type of violence, it was coded as
general.

Uncertain: If a participant claimed to not recall a particular item, it was coded as
uncertain.

Inter-rater reliability. Transcripts were coded by one researcher. A second person,
who was not involved in the experiment, also coded 25% of the transcripts ($N = 15$). Pearson
correlation coefficients were calculated for each detail type in free recall and cued recall
respectively and disagreements were discussed and resolved. Pearson’s correlation
coefficients ranged from .80-.98 (all $p$’s < .001).

Results

The data that support the findings of this study are available on request from the
corresponding author. The data are not publicly available due to ethical considerations. For
each participant, proportion scores were calculated by dividing the number of details reported
in each category, by the total number of details recalled (Connolly et al., 2016). Separate
proportion scores were created for responses to free- and cued-recall questions. Group means
in raw scores are available in the supplementary materials for this thesis.

Preliminary Analyses

To determine if counterbalancing stream affected the results, a series of 2 (event
frequency: single, repeated) x 2 (counterbalancing stream: item order A, item order B)
between-subjects ANOVAs were run on each category proportion score in free- and cued-
recall, respectively. As no interaction effects were significant (all $ps \geq .06$), subsequent
analyses were collapsed across counterbalancing stream. Thus, for all further analyses,
independent t-tests were conducted to examine the effect of event frequency (single,
repeated) upon each proportion score for free and cued recall, respectively. Satterwaite’s test
was employed when the assumption of homogeneity of variance was violated.
Main Analyses

**Free recall.** Single-event participants reported a significantly higher proportion of correct details about the target video than repeated-event participants, $t(56) = 4.80, p < .001$, Cohen’s $d = 1.26$, 95% CI[0.07, 0.17]. See Table 4 for group means. Moreover, repeated-event participants reported a significantly higher proportion of incorrect details compared to single-event participants, $t(49.66) = -4.40, p < .001$, Cohen’s $d = -1.16$, 95% CI[-0.15, -0.06]. Of the errors made, repeated-event participants reported a significantly higher proportion of internal intrusions than single-event participants, $t(30.16) = -6.89, p < .001$, Cohen’s $d = -1.80$, 95% CI[-0.17, -0.09]. However the proportion of confabulations reported were similar when participants recalled a single or repeated event, $t(56) = 1.50 , p = .14$, Cohen’s $d = 0.39$, 95% CI[-0.01, 0.06]. Repeated-event participants also reported a significantly higher proportion of general details than single-event participants, $t(38.72) = -2.16, p = .04$, Cohen’s $d = -0.57$, 95% CI[-0.03, 0.00]. The proportion of uncertain utterances was similar across conditions, $t(56) = -0.82, p = .41$, Cohen’s $d = -0.22$, 95% CI[-0.05, 0.02]. Finally, a new variable was created to represent the proportion of experienced details reported in free recall. The experienced details score was created by adding together 1) the proportion of correct details recalled about the target video and 2) the proportion of internal intrusions that repeated-event participants reported (as they were experienced, but not on the particular occurrence of interest). The proportion of experienced details reported did not differ according to event frequency, $t(56) = -0.82, p = .41$, Cohen’s $d = -0.22$, 95% CI[-0.06, 0.02].

**Cued recall.** Single-event participants responded with a significantly higher proportion of correct information about the target video than repeated-event participants, $t(56) = 4.04, p < .001$, Cohen’s $d = 1.06$, 95% CI[0.08, 0.24]. Repeated-event participants recalled a significantly higher proportion of incorrect details relative to single-event participants, $t(56) = -5.12, p < .001$, Cohen’s $d = -1.34$, 95% CI[-0.26, -0.11]. Further
analyses indicated that repeated-event participants responded with a higher proportion of internal intrusion errors compared to participants who recalled a single event, \( t(32.70) = -6.86, p < .001 \), Cohen’s \( d = -1.80 \), 95% CI[-0.25, -0.13]. As in free recall, responses contained a similar proportion of confabulations when participants recalled a single or repeated event, \( t(56) = 0.08, p = .94 \), Cohen’s \( d = 0.02 \), 95% CI[0.03, -0.06]. Participants also responded with a similar proportion of general details in each condition, \( t(56) = -0.89, p = .38 \), Cohen’s \( d = -0.24 \), 95% CI[-0.04, 0.02]. Finally, single- and repeated-event participants also responded with a similar proportion of uncertain utterances, \( t(56) = 2.03, p = .05 \), Cohen’s \( d = 0.53 \), 95% CI[0.00, 0.07]. The proportion of experienced details reported was not significantly different across conditions, \( t(56) = -1.69, p = .10 \), Cohen’s \( d = -0.44 \), 95% CI[-0.13, 0.01].
Table 4

Mean proportion of details reported by participants recalling a single or repeated event

<table>
<thead>
<tr>
<th>Detail Type</th>
<th>Event Type</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Single Event</td>
<td>Repeated Event</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Free Recall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct Details**</td>
<td>.86</td>
<td>.08</td>
<td>.74</td>
</tr>
<tr>
<td>Incorrect Details**</td>
<td>.12</td>
<td>.07</td>
<td>.23</td>
</tr>
<tr>
<td>Internal Intrusions**</td>
<td>.01</td>
<td>.02</td>
<td>.14</td>
</tr>
<tr>
<td>Confabulations</td>
<td>.11</td>
<td>.07</td>
<td>.09</td>
</tr>
<tr>
<td>General Details*</td>
<td>.01</td>
<td>.02</td>
<td>.03</td>
</tr>
<tr>
<td>Uncertain Details</td>
<td>&lt;.01</td>
<td>.01</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Experienced Details</td>
<td>.86</td>
<td>.08</td>
<td>.88</td>
</tr>
<tr>
<td>Cued Recall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct Details**</td>
<td>.65</td>
<td>.13</td>
<td>.49</td>
</tr>
<tr>
<td>Incorrect Details**</td>
<td>.19</td>
<td>.12</td>
<td>.38</td>
</tr>
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<td>Internal Intrusions**</td>
<td>.03</td>
<td>.04</td>
<td>.22</td>
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* p < .01, ** p < .001

Type of information reported. To analyse the types of details that repeated-event participants spontaneously reported in their free-recall narrative, we calculated proportions
scores, dividing the number of correct fixed and variable details that participants reported respectively, by the total possible number of details that participants could report in that category (Danby et al., 2019). A paired-samples t-test was conducted to analyse the proportion of correct fixed to variable details that repeated-event participants reported about the target video. Repeated-event participants reported a significantly higher proportion of the total possible correct fixed details \( (M = 0.04, SD = 0.02) \) relative to variable options \( (M = 0.02, SD = 0.01) \), \( t(28) = 5.66, p < .001, \) Cohen’s \( d = 1.05, 95\% CI[0.01, 0.02] \). As we could not counterbalance fixed and variable details in the current design, we conducted an analysis to explore whether items which were assigned as fixed or variable for repeated-event participants, were naturally more memorable in the target video. Thus, we examined single-event participants’ relative recall of these details. The proportion of the total possible fixed \( (M = 0.04, SD = 0.02) \) and variable details \( (M = 0.04, SD = 0.02) \) reported by single-event participants was not significantly different, \( t(28) = 0.09, p = .93, \) Cohen’s \( d = 0.02, 95\% CI[0.00, 0.00] \).

**Discussion**

This experiment examined adults’ ability to particularise a video of domestic violence, after observing one or multiple similar videos. As expected, repeated-event participants reported a significantly lower proportion of correct details than single-event participants. Moreover as hypothesized, repeated-event participants reported a significantly higher proportion of correct fixed details relative to variable options. These results will be discussed in turn.

Single-event participants reported a higher proportion of correct details, and a lower proportion incorrect details about the target occurrence compared to repeated-event participants. However, when accuracy was broadly defined, the proportion of correct experienced details reported did not differ according to event frequency. These results are consistent with a handful of studies conducted on an adult sample (Deck & Paterson, 2021;
Dilevski et al., 2020; Theunissen et al., 2017) and the findings of a recent meta-analysis of 31 experiments which examined children’s memory for variable details from a repeated event (Woiwod et al., 2019). However unlike previous adult repeated-event experiments (Dilevski et al., 2020; Theunissen et al., 2017), detail-type was clearly operationalised. This is an important consideration because episode similarity can affect the types of correct details participants report (Danby et al., 2019). Moreover, the types of details present during an event can affect memory for a single occurrence. For example, the presence of atypical (i.e., deviation) details, can enhance memory for all occurrences (MacLean et al., 2018; Rubinová, Blank, Ost, & Fitzgerald, 2020). However because detail-type was not defined in previous experiments, it is unclear whether deviation details were present in these experiments and affected recall. It is important that future repeated-event research defines the types of details present to clarify the nature of the effects obtained.

The current experiment was the first to investigate the tendency of adults to recall correct fixed and variable details about an occurrence of a repeated event. Adults who recalled a repeated event reported a significantly higher proportion of correct fixed relative to variable details, which is consistent with the results of a number of experiments that have examined children’s memory for multiple play sessions (Connolly & Lindsay, 2001; Powell et al., 1999). This finding emerged in adults when their entire recall account was coded for accuracy, rather than critical details alone. This methodological practice provides a more complete picture of recall quality. It is also notable that these findings emerged when participants recalled a narrative of abuse, which operationalised more realistic fixed (e.g., the perpetrator, setting) and variable details (e.g., catalyst for abuse, form of physical violence) than previous child experiments which have defined detail-type using play sessions as event stimuli (e.g., fixed hat colour and variable magic trick; Connolly & Lindsay, 2001).
Legally, it is important that complainants provide unique details about specific occurrences of a recurring forensic event. However when questioned about one occurrence, repeated-event participants reported a higher proportion of correct details that were common across event occurrences, compared to details which were unique. These results have important implications for the legal system in which there are different requirements for children and adults. In recent years, many jurisdictions have relaxed the particularisation requirements for children who allege repeated childhood sexual abuse (Woiwod & Connolly, 2017). These jurisdictions have instead adopted continuous childhood sexual abuse statutes, which enable children to report what typically occurred in a specified period of time, with a reduced focus upon their recall of individual occurrences (Woiwod & Connolly, 2017). However, this legislation does not apply to adults who allege repeated abuse. That these statutes do not extend to adults is problematic given the findings of the current experiment, wherein adults could correctly recall details that were common across occurrences as well as unique details that were experienced, but had difficulty accurately attributing these details to the correct occurrence. It should be considered whether continuous statutes can be extended to adults who allege recurring abuse. Alternatively, future research should investigate means to improve source monitoring. Although interviewing techniques have been investigated to improve children’s recall and source-monitoring for a repeated event (see Brubacher, Powell, & Roberts, 2014), limited research has been conducted on an adult sample (e.g., Willén et al., 2015). Moreover, as the ability to accurately attribute the source of details improves with age (Roberts, 2000), it is possible that such practices would result in greater memory improvements in adults. For example, though we nominated the occurrence for repeated-event participants to report (i.e., the last video), accuracy rates may be higher when witnesses choose the occurrence they remember best to recall (Danby, Brubacher, Sharman, Powell, & Roberts, 2017; Dilevski et al., 2019).
There are some limitations of the current experiment. First, students were warned that participation would involve watching family conflict and were thus advised not to participate if they believed that the content would be personally distressing. Although this warning was an important ethical consideration, it may have heightened participants’ attention, resulting in intentional rather than incidental encoding. Given that participants were not informed that they would be interviewed about the event until after they observed the last (or only) video however, it is unlikely that the inclusion of a warning greatly affected results. An additional limitation of this experiment is that the event employed is unlikely to have elicited a high degree of stress. Unfortunately, this limitation is true of the majority of repeated-event research, which has typically employed neutral staged events as stimuli (e.g., play sessions; Powell et al., 1999). Although a recent experiment found that stress did not affect adults’ memory for a repeated event (Dilevski et al., 2020), in another experiment children who recalled a stressful event were less suggestible than those who recalled a non-stressful event (Price & Connolly, 2007). Further investigation into memory for repeated stressful events is an important direction for future research. Another limitation of this experiment is that participants passively observed the event, whereas in forensic contexts, witnesses often recall experienced events. Although script theory posits that individuals form scripts for events that are both actively experienced and observed, prior research indicates that involvement affects repeated-event memory. Individuals who recall an experienced event tend to form stronger scripts and report more internal intrusions than those who observe the event (Murachver et al., 1996; Roberts & Blades, 1998). The effect of participation upon memory highlights the importance of using different methodological approaches to examine repeated-event memory. Finally, the sample size employed in this experiment was small as data collection was resource intensive. To increase the generalisability of results, sessions were conducted individually, spaced one week apart, and memory data was collected via an interview. It is
important to complement the results obtained in smaller experiments which employ designs that maximise external validity, with the results of experiments that facilitate data collection from larger samples, such as studies that include all event occurrences within a single participation session and those that administer recall tests online (MacLean et al., 2018; Rubinová, Blank, Ost, & Fitzgerald, 2020).

In conclusion, the findings of current experiment indicate that genuine adult witnesses may be unable to fulfill the legal requirement to recall information unique to individual occurrences of recurring abuse. These results highlight the need for collaboration between proponents of science and the law, to balance the needs of the legal system with the memory constraints of witnesses who recall a repeated event.
Section 2
Honesty: Event Repetition and Deception Detection

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Chapter 5

Literature Review: The Effect of Event Repetition upon Deception Detection

The first two experiments complemented the extant repeated-event memory literature, indicating that repeated experience affects the accuracy of memory for a particular occurrence. The notion that memory for a single and repeated event is qualitatively different has implications for the assessment of another dimension of witness credibility: honesty (Ross et al., 2003).

Deception detection has a long history. In Ancient China, suspects were required to chew grains of rice (Ford, 2006). If the rice was dry after questioning, it was assumed that the stress from lying had reduced their salivation, meaning that they were guilty (Ford, 2006). Although methods believed to detect deceit have been employed since ancient times, our understanding of the validity of deception detection techniques has advanced considerably in the past few decades. Deception research has traditionally focused upon nonverbal cues to deceit and subjective judgements. However, these approaches have been shown to have poor validity. Large-scale meta-analyses indicate that most behavioural and para-verbal cues to deceit (e.g., gaze aversion) have either no, or only a weak relationship with speaker veracity (DePaulo et al., 2003). Moreover, subjective veracity judgements are accurate approximately 54% of the time, which is unimpressive considering that chance-rates are 50% (Bond & DePaulo, 2006). Despite having higher confidence levels in their decisions, professionals (e.g., investigative professionals, psychiatrists) have similar accuracy rates (Bond & DePaulo, 2006; Vrij, 2008).

Deception research has subsequently focused upon a more promising approach: analysing the verbal content of reports. This approach typically yields higher accuracy rates than nonverbal cues to deceit and subjective judgements (Vrij, 2019). Content analysis techniques share the underlying assumption that the speech of liars will contain different
types of utterances to that of truth-tellers. Different methods specify different mechanisms behind this hypothesis, as well as distinct criteria that are likely to be present in truthful and deceptive accounts (Masip, Sporer, Garrido, & Herrero, 2005). The two most widely researched methods are criterion-based content analysis (CBCA) and reality monitoring. The former of these, CBCA, was developed by practitioners to assess the credibility of children’s allegations about sexual abuse (Undeutsch, 1989). CBCA is typically regarded as a truth-verifying tool, as it assumes truthful accounts are more likely to contain particular criteria such as unusual details, a logical structure, and spontaneous corrections (Vrij, 2005).

Conversely, reality monitoring is derived from reality monitoring memory theory, which was briefly discussed in Chapter 2. This theory posits that memories of an experienced event tend to have different characteristics to internally generated memories (e.g., a daydream; Johnson & Raye, 1981). Accordingly, individuals can monitor the characteristics of their memories to determine their origin (Johnson & Raye, 1981). This theory has been extended to the deception detection context, in which it is proposed that the same characteristics can be adapted and used by observers to determine whether an account is intentionally fabricated, or a truthful recollection of an experience (Alonso-Quecuty, 1992; Sporer, 1997). Specifically, reality monitoring assumes that liars will produce reports that contain more thoughts and reasoning such as inferences about the event, a characteristic referred to as cognitive operations. Conversely, truth-tellers’ accounts will contain more sensory details (i.e., utterances describing what was seen, heard, tasted, and smelt), more temporal information (i.e., descriptions of the event sequence and duration, as well as when the event occurred), more spatial information (e.g., the location of the event, the relative position of objects in the event location), and more affective details (i.e., references to one’s emotions during the event). Truthful accounts will also tend to be more vivid and realistic, reflected in the criteria: clarity, narrative reconstructability, and realism (Sporer, 1997). Given these criteria, reality
monitoring is commonly referred to as an assessment of richness in detail (e.g., Nahari, 2018). Notably, richness in detail is also central to CBCA, and is assessed by four of the 19 criteria (Nahari & Vrij, 2015).

Which specific reality monitoring criteria are employed typically depends upon the coding method utilised. Two methods have been developed to operationalise and rate the criteria: scale and frequency ratings. In the scale-rating method, raters use a Likert-scale to score the intensity of criteria (e.g., Nahari, 2017), whereas in the frequency method, the presence of each criterion is tallied (e.g., Memon, 2010). The criteria of clarity, realism, and reconstructability cannot be coded in the frequency method, as these criteria refer to general characteristics of the account rather than specific utterances that can be counted (Nahari, 2016). Despite this limitation, the frequency rating method has higher interrater and test-retest reliability, and is more accurate in distinguishing truth-tellers and liars than the scale rating method (Nahari, 2016).

A recent meta-analysis conducted on CBCA and reality monitoring found that these methods had comparable validity, both yielding accuracy rates of approximately 70% (Oberlader et al., 2016). However, reality monitoring has a theoretical basis (Masip et al., 2005), is easier to code (Vrij, 2008), and often yields higher interrater reliability than CBCA criteria (e.g., Vrij, Edward, Roberts, & Bull, 2000; Strömwall, Bengstsson, Leander, & Granhag, 2004). Reality monitoring may also be more appropriate for an adult sample and more applicable across forensic contexts, given that CBCA was developed to determine the veracity of children’s allegations about sexual abuse (Vrij, Akehurst, Soukara, & Bull, 2004a).

Despite the extensive empirical research on deception detection, truth-tellers in these experiments have almost exclusively recalled an event that occurred on a single occasion. Yet Experiments 1 and 2 indicated that adults’ memory for a single and repeated event is
qualitatively different. Consequently, the accuracy of deception detection techniques are likely to depend upon the frequency of the event that is recalled, particularly when techniques which analyse the verbal content of reports are employed.

**Event Repetition and Richness in Detail**

Event repetition may adversely affect richness in detail. Script theories and fuzzy-trace theory similarly posit that when an event is experienced, a generalised cognitive representation is formed (as outlined in Chapter 2). The nature of this representation is nuanced according to each theory, in that scripts represent the typical sequence and structure of the event (e.g., Schank & Abelson, 1977), whereas gist traces represent patterns and meaning across episodes, such as inferences generated from multiple occurrences (e.g., Odegard et al., 2009). Despite this subtle difference in the nature of the generalised event representation, these theories similarly posit that memories for typical event details will be consolidated with repeated experience and that memories for variable surface details will decrease in accessibility with repeated exposure. Specifically, script theories posit that when occurrences vary predictably, general details that are true of multiple episodes will be represented by the script, whereas variable options will be stored as an associated list (Connolly & Lavoie, 2015). As these specific details are not integrated within the script and decay more rapidly, they are less likely to be retrieved than generalised script information (Baker-Ward, Tyler, Coffman, Merritt, & Ornstein, 2020; Hudson & Mayhew, 2009).

Conversely, fuzzy-trace theory posits that gist traces will be activated and strengthened with exposure to each event occurrence, whereas new verbatim traces will be laid to encode specific variable options (e.g., Pezdek & Roe, 1995). Gist traces are additionally more stable over a delay than verbatim traces (e.g., Brainerd & Reyna, 1995). Thus, after exposure to multiple similar occurrences, script theories and fuzzy-trace theory posit that the generalised event representation is likely to be stronger than memory for episodic details. Consequently,
repeated experience may lead to the recall of more general and less specific information about an event compared to reports generated by individuals who recall an event which occurred on a single occasion.

In accordance with these theoretical predictions, when adults were interviewed about an event occurrence in Experiments 1 and 2, repeated-event participants recalled more general details, and a higher proportion of general details than single-event participants. Although children’s generic event representations are less sophisticated than adults’, children similarly form abstracted representations of recurring events (see Chapter 2). Hence, when children are asked generic questions about a repeated event, they tend to volunteer more information about the general event structure than details specific to individual episodes (Hudson & Nelson, 1986; Slackman et al., 1986). Despite this tendency to report generic details, information about specific occurrences of a recurring event can be retrieved. Indeed, adults recalled many specific details in Experiments 1 and 2, with a comparable number of experienced details recalled by single- and repeated-event participants (see also Dilevski et al., 2020). Notably, repeated-event participants reported many internal intrusions, likely because the temporal source of details decays more rapidly than detail content (Powell & Thomson, 1997a). Thus, the pattern of results obtained in Experiments 1 and 2 indicate that adults who recall a repeated event report many general details, whilst maintaining some degree of access to the content of specific occurrences. Given that script theories and fuzzy-trace theory predict that adults will rely more upon generalised event representations than episodic memories, it is important to consider whether event repetition adversely affects richness in detail.

Most experiments that have investigated the effect of event repetition upon report quality have measured memory accuracy. Although reality monitoring is not sensitive to memory accuracy, it is a more sensitive assessment of richness in detail, as it assesses the
presence of details which are not typically coded for accuracy. For example, reality monitoring codes details which describe how the respondent was feeling during the event and subjective sensory information (e.g., what the environment smelt like to the respondent). Reality monitoring is also more sensitive to temporal details (such as when the event occurred and the relative sequence of details) than the coding schemes that are typically employed to assess memory accuracy (e.g., the number of correct/incorrect details recalled about a film, narrative). Moreover, reality monitoring codes memory reports in full rather than merely coding critical details, unlike Experiment 1 and repeated-event memory experiments conducted on a child sample. As such, reality monitoring is a more complete assessment of richness in detail than memory accuracy. It is important to consider whether event frequency affects the presence of reality monitoring criteria when speakers recall a particular occurrence.

**The Effect of Event Repetition upon Children’s Content Analysis Scores**

To date, no prior experiment has investigated the effect of event repetition upon adults’ content analysis scores. However, a number of experiments have investigated this question using a child sample (Blandon-Gitlin, Pezdek, Rogers, & Brodie, 2005; Connolly & Lavoie, 2015; Pezdek et al., 2004; Strömwall et al., 2004). The first of these was conducted by Pezdek et al. (2004), who used CBCA to analyse children’s reports of an invasive genital medical procedure. Children had either experienced the procedure once, or on multiple occasions (at least twice) and were interviewed about their experience following a delay. The CBCA scores of children who had experienced the procedure on multiple occasions were higher than those who had only experienced the procedure once. In another experiment, children recalled or fabricated the event of sewing a button onto a shirt during a play session (Blandon-Gitlin et al., 2005). Across veracity conditions, children were either familiarised with the event by observing the procedure in a training session the day before or were not
familiarised with the event. When children’s reports of the play session were coded using CBCA, children who had been familiarised with the event had significantly higher scores than those who had not, and this effect did not depend upon speaker veracity. Similar results were found by Strömwall et al. (2004), who coded children’s reports of a mock-health examination that was imagined or experienced once or repeatedly, using CBCA and reality monitoring. On average, repeated-event children had higher CBCA and reality monitoring scores than those in the single-event condition, regardless of veracity.

These experiments employed event occurrences which were highly similar and consisted of many fixed details (Connolly & Lavoie, 2015). Thus, it is likely that repeated exposure to the event consolidated memory for fixed details, and subsequently raised their content analysis scores (Brubacher, Glisic, et al., 2011; Connolly & Lindsay, 2001; Powell & Thomson, 1996). In applied forensic scenarios, event occurrences are likely to vary predictably. To date, only one investigation has explored the effect of event repetition on content analysis scores using a repeated event that varied across occurrences (Connolly & Lavoie, 2015). In this experiment, children participated in a target play session, with some children experiencing three additional similar (non-target) sessions. For children who experienced a repeated event, details varied predictably. A third group of children were shown illustrations of the target session and were asked to generate a story of themselves participating in the event. All children were subsequently interviewed about the target session. Although the CBCA scores of truth-tellers who recalled a single event were significantly higher than children who fabricated the event, the CBCA scores of repeated-event children were equivalent to event-fabricators. These results provide preliminary evidence that event repetition negatively affects truth-tellers’ content analysis scores when episodes vary predictably. However, given that there were only 26 participants in this
experiment, with 8-10 participants in each condition, this experiment is heavily underpowered and as such, the results are unreliable (Button et al., 2013).

Event repetition may also affect content analysis scores differently when an adult, rather than a child sample is employed. Previous research has found that when participants recall/fabricate a single event, reality monitoring scores typically increase across development until early adulthood, with young adults having significantly higher scores than children (Santtila, Roppola, & Niemi, 1998; Vrij et al., 2004a; Vrij, Akehurst, Soukara, & Bull, 2004b). Another factor limiting the generalisability of child-based experiments to adults, is that adults rely upon generalised event representations more than children (e.g., Reyna & Brainerd, 1995; Hudson et al., 1992). As such, the effect of event repetition upon richness in detail may be more marked in adults than children.

Thus, repeated exposure to similar episodes is likely to consolidate memory for the general event, but not specific details that vary across occurrences. As a central component of reality monitoring is coding richness in detail, its validity in distinguishing veracity may be lower when adult truth-tellers recall a repeated relative to a single event. However, no prior experiment has explored the effect of event repetition upon adults’ reality monitoring scores. Two experiments were conducted to investigate this question. In Experiment 3, undergraduate students participated in one or multiple healthy lifestyle sessions. Critical details varied predictably across occurrences for repeated-event participants. A third group of participants received a description of the target occurrence, which all truth-tellers experienced, and were asked to fabricate an account of participating in the session. After a delay, all participants were interviewed about the target occurrence. Experiment 4 employed the same methodology with a few exceptions. Rather than a healthy lifestyle session, the stimuli employed were video(s) of domestic violence, which included both fixed and variable themes to increase external validity. For example, both perpetrator and victim identity were
fixed, whereas what they wore varied. Experiment 4 also included a condition in which some participants repeatedly fabricated the event.
Chapter 6
Experiments 3 and 4: Assessing the Credibility of Adults who Recall a Repeated Event using Reality Monitoring

This chapter is reformatted from the published manuscript:


**Abstract**

Evaluators are often sceptical about the veracity of allegations for repeated events such as domestic violence. However, previous research has not examined the effect of event repetition upon verbal cues to deception using an adult sample. We conducted two experiments investigating the effect of event frequency upon adults’ reality monitoring scores. In Experiment 3, truth-tellers experienced a single or repeated event, and a third group fabricated the event on a single occasion. In Experiment 4, participants observed or fabricated a domestic violence video on one or multiple occasions. All interview responses were coded using reality monitoring. In both experiments, reality monitoring criteria reliably classified single-event speakers, but not repeated-events speakers. There were also some differences in individual reality monitoring criteria as a function of event-type. Although future research is needed, reality monitoring does not appear to be a valid tool to assess the credibility of repeated-event speakers.
Introduction

Despite the extensive research on deception detection, most investigations have compared liars to truth-tellers who recall an event which occurred once. However, crimes like intimate partner violence and workplace bullying occur repeatedly (WHO, 2014). There is evidence that evaluators often doubt the genuineness of allegations for events such as these. Indeed, up to 50% of laypeople believe that claims of domestic violence are often fabricated or exaggerated to improve the outcome of custody disputes (VicHealth, 2014). Moreover, laboratory studies have found that laypeople perceive witnesses who truthfully recall a repeated event as less credible than those who recall a single event (Connolly, Price, Lavoie, & Gordon, 2008; Weinsheimer, Coburn, MacLean, & Connolly, 2017), and even less credible than liars (Deck & Paterson, 2020). Although the rates of false allegations for events like domestic violence appear to be low (Melville & Hunter, 2001), false allegations can occur, with devastating consequences for the accused. There is a clear need for a valid approach to determine the credibility of individuals who recall a repeated event.

Content analysis techniques assume that the quality of a speaker’s account will depend upon their veracity (Vrij, 2008). The two most frequently researched content analysis methods are criterion-based content analysis (CBCA: Undeutsch, 1989) and reality monitoring (Alonso-Quecuty, 1992; Johnson & Raye, 1981). Although the accuracy of these techniques in discriminating truth-tellers and liars is equivalent (Oberlader et al., 2016), reality monitoring has a number of advantages. It is theoretically based, easier to code, and often yields higher interrater reliability than CBCA (Masip et al., 2005; Strömwall et al., 2004; Vrij et al., 2000).

Reality monitoring theory was developed to address how individuals determine the origin of their memories - whether their memory is of an externally perceived reality, or an internally generated event (e.g., a dream; Johnson & Raye, 1981). The theory was extended to deception detection, with the assumption that liars’ accounts would contain more cognitive
operations, whereas memories of experienced events would contain more visual, auditory, temporal, spatial, and affective details (Alonso-Quecuty, 1992). In past research, reality monitoring has discriminated veracity with an accuracy rate of about 70% (Oberlader et al., 2016). This accuracy rate, however, is based upon a meta-analysis of 10 experiments, in which all truth-tellers recalled a single event. Little is known about the efficacy of reality monitoring when speakers recall a repeated event.

Event frequency can affect report quality. When individuals experience an event, an abstracted cognitive representation (i.e., a script) of the experience is formed (Schank & Abelson, 1977). Although repeated exposure consolidates memory for details that are consistent across episodes, memories for individual episodes decrease in accessibility (Hudson & Nelson, 1986). Indeed, when recalling details that are true of multiple episodes, repeated-event children tend to recall more correct details than children who experienced one occurrence (Connolly & Lindsay, 2001; Danby et al., 2019). However, when details vary predictably across episodes, repeated-event children tend to recall less correct details about an episode than single-event children, as they tend to attribute details that were experienced, to the incorrect occurrence (Woiwod et al., 2019). Although most repeated-event research has been conducted on a child sample, preliminary research indicates that these findings generalise to adults (Deck & Paterson, 2021; Dilevski et al., 2020; Theunissen et al., 2017).

To date, a handful of studies have used content analysis techniques to examine the reports of children who report a single or repeated event (Blandon-Gitlin et al., 2005; Connolly & Lavoie, 2015; Pezdek et al., 2004; Strömwall et al., 2004). Of these, only one experiment examined the effect of event repetition upon reality monitoring scores. Strömwall et al. (2004) had children experience or imagine one or multiple mock-health examinations. After a one-week delay, participants were interviewed about the last session they had imagined/experienced. Reality monitoring scores were significantly higher for truthful than
fabricated accounts, and when the event was experienced/imagined multiple times relative to once. Similarly, other experiments have found that repeated-event children have higher CBCA scores than those who recall a single event (Blandon-Gitlin et al., 2005; Pezdek et al., 2004). However, the events that participants repeatedly experienced or imagined in these experiments were highly similar on each episode. This repeated exposure to the same details likely consolidated repeated-event participants’ memory for surface details and raised their CBCA scores relative to single-event participants (Connolly & Lavoie, 2015; Connolly & Lindsay, 2001).

Recurring forensic events are likely to vary across episodes, which may hinder the specificity of details recalled about a particular episode (Connolly & Lavoie, 2015). When predictable variation occurs, it is represented within scripts at a general level, with specific details stored as a list of associated options (Nelson & Gruendel, 1981). For example, that the abuser *apologises* for his behaviour is stored at a general level, whereas how he apologised, such as buying flowers, or taking his partner out for dinner, is stored as an associated list. As general details are more integrated within the script, and the specific options are not strongly connected to particular occasions, witnesses who recall a variable repeated event may report more general details than single-event speakers, which is likely to negatively affect their content analysis scores (Connolly & Lavoie, 2015). Indeed, when children participated in a repeated event that varied across episodes, the CBCA scores of repeated-event children and liars were equivalent, whereas single-event children had higher scores than liars (Connolly & Lavoie, 2015).

To date, prior experiments have not examined the effect of event frequency upon adults’ reality monitoring scores. However, event repetition differentially affects children and adults’ report quality, as adults can store more details about a repeated event, and information of greater complexity (Deck & Paterson, 2021). Moreover, adults are capable of a more
sophisticated understanding of the commonalities between instances than children, and may be more likely to report general details (Deck & Paterson, 2021).

Therefore, we conducted two experiments investigating the impact of event frequency on the content of adults’ reports. In Experiment 3, undergraduate students experienced one or four similar events (healthy lifestyle sessions), and a third group of students were given a description of the event that truth-tellers experienced. Based upon the description, they were asked to generate a convincing account of the event. Participants were interviewed about the last event they had experienced, and their responses were coded using reality monitoring. Experiment 4 employed the same methodology as Experiment 3 using films of domestic violence as event stimuli. An additional condition, in which participants fabricated an account of the event on multiple occasions was also included.

**Experiment 3**

Consistent with reality monitoring literature, it was predicted that relative to event-fabricators single-event truth-tellers would report more reality monitoring details, except for cognitive operations, and that reality monitoring would effectively discriminate veracity amongst single-event participants and fabricators. Conversely, we expected repeated-event participants to rely upon their general representation of the event, and report fewer details about a specific episode. Thus, we hypothesized that the number of reality monitoring details reported by repeated-event truth-tellers and fabricators would be comparable and that reality monitoring criteria would not reliably classify speaker veracity when truth-tellers recalled a repeated event.

**Method**

**Participants.** An a priori power analysis, based upon the results of Connolly and Lavoie (2015) and Strömwall et al. (2004) indicated that to detect a large effect size through a MANOVA with 80% power, 22 participants were required per cell. After approval was obtained from the university’s ethics committee (approval #2017/601), 70 undergraduate
students consented to participate. Of these, eight did not attend at least one subsequent session. In total, 62 undergraduate students (22 male, 40 female, $M_{age} = 19.89, SD = 3.26$) participated in exchange for course credit.

**Design.** This experiment utilised a one-way between-subjects design with event-type as the independent variable and reality monitoring score as the dependent variable. Participants experienced a single ($n = 21$), repeated ($n = 20$), or fabricated event ($n = 21$). Assignment to conditions could not be completely random as the different conditions involved substantially different time commitments (i.e., five or two weeks of participation), which participants needed to be aware of to provide informed consent. Thus, participants signed up to participate in a study that required participation across either two or five weeks.

**Materials and procedure.**

**Healthy lifestyle sessions.** Single-event participants experienced one healthy lifestyle session, whereas repeated-event participants experienced four similar sessions. Each healthy lifestyle session was conducted individually and lasted approximately 20 minutes. Participants in the repeated-event condition experienced one healthy lifestyle session per week, over four consecutive weeks. The sessions were designed to involve participant’s five senses and relate to different aspects of a well-balanced lifestyle. Each session consisted of 10 variable details that were experienced in the same order. For each variable detail, one option was experienced per session (see Table 5). To enable repeated-event participants to distinguish between the four sessions, each healthy lifestyle session was given the title of a famous athlete, and a photograph of the relevant athlete was placed at the front of the room. For repeated-event participants, sessions one to four were respectively labelled the David Beckham, Usain Bolt, Michael Jordan, and Roger Federer session. The target session was the only session experienced by single-event participants and the last session experienced by repeated-event participants. Although the target session was always labelled the Roger
Federer session, the variable options experienced during this session differed according to the counterbalancing stream to which participants were assigned. During the Roger Federer session, all participants were told that they would be interviewed the following week.

Table 5

*Variable options assigned to each critical detail in Experiment 3*

<table>
<thead>
<tr>
<th>Variable Detail</th>
<th>Session Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Physical Activity</strong></td>
<td>Arm stretches</td>
</tr>
<tr>
<td></td>
<td>on the desk</td>
</tr>
<tr>
<td><strong>Musical Instrument</strong></td>
<td>Cello</td>
</tr>
<tr>
<td><strong>Fruit Eaten</strong></td>
<td>Banana</td>
</tr>
<tr>
<td><strong>Herb Smelt</strong></td>
<td>Basil</td>
</tr>
<tr>
<td><strong>Colouring in</strong></td>
<td>Rhinoceros</td>
</tr>
<tr>
<td><strong>Plant</strong></td>
<td>Fern</td>
</tr>
<tr>
<td><strong>Puzzle Played</strong></td>
<td>Anagrams</td>
</tr>
<tr>
<td><strong>Non-fiction Topic</strong></td>
<td>Aztecs</td>
</tr>
<tr>
<td><strong>Thread Colour</strong></td>
<td>Red</td>
</tr>
<tr>
<td><strong>Shape Drawn</strong></td>
<td>Circle</td>
</tr>
</tbody>
</table>

*Note.* Single-event participants experienced only one variable option for each critical detail, whereas repeated-event participants experienced all variable options across their four healthy lifestyle sessions.

*Event description.* To standardise the accounts of liars and truth-tellers, we used the storytelling paradigm (e.g., Memon, Fraser, Colwell, Odinot, & Mastroberardino, 2010) in which participants in the fabricated-event condition were given a brief written description of
the target session. They were asked to use the event description as a base to create a convincing account of the session. Participants were told that they would be interviewed the following week by a different experimenter who would not know whether they had participated in the activities or not, and the most convincing speakers would win a gift voucher. All participants went into the draw to win a gift voucher. The description was written in second person and outlined the 10 variable details that participants in the single- and repeated-event conditions experienced. It also stated that a poster of Roger Federer was displayed during the session. Two event descriptions were created which were identical, except for label assigned to the variable options. The description participants received depended upon their counterbalancing stream. For example, in counterbalancing stream A, the written description included the statement “You listen to classical music played by a violin”, whereas the stream B description stated “You listen to classical music played by a harp”. The descriptions were 584 and 603 words long. After reading the description, participants practised telling the story to the experimenter twice to ensure that they were engaging in the task. Any misinterpretations of key details were clarified (Connolly & Lavoie, 2015). The sessions were approximately 15 minutes in length and were conducted individually.

**Counterbalancing.** Two item orders (stream: A, B) were created to control for order effects. Across conditions, approximately half of the participants were assigned to each order stream. The session orders in stream A and B were 1, 2, 3, 4, and 3, 4, 2, 1, respectively. Although repeated-event participants experienced all sessions in the order specified by their counterbalancing stream, single- and fabricated-event participants only experienced/fabricated the target session, which was the last session in each stream.

**Interview.** The interview was conducted one week after the target session by an experimenter who did not conduct the healthy lifestyle/fabrication session(s) and was blind to
the participant’s experimental condition. After establishing rapport, participants were asked to shut their eyes and think back to the day that they completed the Roger Federer session. After one minute had passed, participants were asked to describe the poster that was displayed during the Roger Federer session to ensure that they understood which session to report. Subsequently, participants were given an open-ended invitation to report all they could recall about the Roger Federer session. Additional open-ended prompts were asked to facilitate recall (e.g., “What else happened during the Roger Federer session?”). After participants provided no further information, the interviewer proceeded to ask cued invitations which assessed memory for each of the variable details (e.g., “Please describe, in as much detail as you can remember, the physical activity you completed during the Roger Federer session”). Participants were told that if they were asked about a detail they had mentioned earlier, they should not assume that their prior response was incorrect. Interviews lasted approximately 10 minutes and were video-recorded. Following the interview, participants completed a questionnaire which collected basic demographic information.

**Coding.** Interviews were transcribed and coded for reality monitoring criteria by a primary rater. The frequency coding method was employed, in which the presence of each detail that can be categorised by the reality monitoring criteria is counted (Colwell, Hiscock-Anisman, Memon, Taylor, & Prewett, 2007; Suckle-Nelson et al., 2010). Prior research has also used scale-ratings to code reality monitoring (e.g., Sporer, 1997), in which coders use a Likert-type scale to rate the extent to which each criterion is present. We chose the frequency method because it yields higher accuracy rates, and has higher interrater and test-retest reliability (Nahari, 2016). Specifically, the number of visual, auditory, taste, smell, spatial, temporal, affective details, and cognitive details that each participant stated were coded (Based upon Vrij, 2015; Vrij et al., 2000). If a participant mentioned an identical detail at multiple points in the interview, the detail was only coded the first time it was mentioned.
(Colwell et al., 2007; Suckle-Nelson et al., 2010). When multiple options were provided, only the first option was coded (e.g., “I ate an apple or banana” contains one visual detail).

Definitions of the reality monitoring criteria are provided below:

*Visual*: Details that were seen (e.g., “I ate a red apple” contains two visual details)

*Auditory*: Details which were heard (e.g., “We heard music played by a piano” contains two auditory details).

*Smells*: Descriptions of smells encountered (e.g., “It had a floral scent” contains one smell detail).

*Taste*: Descriptions of tastes encountered (e.g., “It was sweet” contains one taste detail).

*Spatial*: Information about the location of the event and the location or movement of objects and people during the event (e.g., “the plant was on my right” contains one spatial detail).

*Temporal*: Details about the timing of the session. Temporal details include information about the duration of the session, when the session took place, and the temporal sequence of activities (e.g., “we started off the session by performing some arm stretches” contains one temporal detail).

*Affective*: References to one’s emotions during the session (e.g., “I was happy putting together the puzzle” contains one affective detail).

*Cognitive Details*: Thoughts and reasoning about the event, made at the time of observing the event or at recall. Details which were inferred did not count towards the other reality monitoring criteria (e.g., “I remember that it was sweet so it must have been a strawberry” contains one cognitive detail and no visual details).

**Interrater reliability.** A second coder scored 25% of the transcripts (N = 15) and systematic differences in coding were discussed and resolved. Inter-rater reliability was
calculated separately for each reality monitoring criterion. Pearson’s correlation coefficients ranged from .87 to .98 ($p < .001$).

**Results and Discussion**

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to ethical considerations.

**Preliminary analyses.** All analyses were collapsed across question type. Data were screened for assumptions and outliers. To determine whether event order had a systematic effect upon reality monitoring scores, a 3 (event-type) x 2 (counterbalancing stream) between-subjects MANOVA was conducted using the reality monitoring criteria scores as dependent variables, excluding cognitive operations. Cognitive operations were excluded from this analysis as reality monitoring theory predicts that this criterion will appear more frequently when individuals recall non-experienced events, whereas the other criteria will be more frequent in recollections of experienced events (Johnson & Raye, 1981). There were no multivariate effects for counterbalancing stream (all $p > .25$). A 3 (event-type) x 2 (counterbalancing stream) between-subjects ANOVA was conducted with the cognitive operation score as the dependent variable, and there were no significant main or interaction effects of counterbalancing stream ($p \geq .58$). Subsequent analyses were collapsed across counterbalancing stream.

The length of participants’ responses ranged from 486-4082 words ($M = 1537.69$, $SD = 847.37$). A one-way ANOVA was conducted with word count as the dependent variable, and event-type (single, repeated, or fabricated) as the independent variable. There were no effects of event-type upon word count, $F(2,59) = 0.28$, $p = .76$, $\eta^2_p = .01$.

**Main analyses.** To assess for the presence of multicollinearity, the correlations between the reality monitoring criteria were calculated using Pearson correlation coefficients. As the strongest correlation was between visual and spatial details, $r(60)= .78$ $p < .001$, 
multicollinearity was not present (Tabachnik & Fidell, 2014). A MANOVA was conducted using the reality monitoring criteria as the dependent variables and event-type as the independent variable. Data screening indicated that the error variances for the frequency of auditory details were not normally distributed, $F(2, 59) = 3.45, p = .04$. The reality monitoring criteria frequency scores were transformed using the square root transformation and Levene’s test became non-significant, $F(2, 59) = 1.83, p = .17$. The MANOVA was conducted on the transformed variables.

There was a significant multivariate effect of event type, $Wilks' \lambda = .56, F(14,106) = 2.08, p = .03, \eta^2_p = .21$. Univariate analyses revealed a main effect of auditory details, $F(2,59) = 5.32, p = .008, \eta^2_p = .15$. Follow-up Tukey comparisons indicated that repeated-event participants reported significantly fewer auditory details ($M = 4.30, SD = 2.49$) than participants who recalled a single event ($M = 7.05, SD = 3.79, p = .04, 95\% CI[-1.08, -.02]$) and a fabricated event ($M = 7.76, SD = 4.22, p = .009, 95\% CI[-1.21, -0.15]$). The number of auditory details reported by participants who recalled a single- and fabricated-event were equivalent, $p = .82, 95\% CI[-0.39, 0.65]$.

A one-way between-subjects ANOVA was performed on number of cognitive operations reported. There was no effect of event type upon the number of cognitive operations reported, $F(2, 59) = 0.70, p = .35, \eta^2_p = .02$.

Summative reality monitoring scores were calculated by adding sensory, auditory, affective, temporal, and spatial details, with cognitive operations subtracted (Elntib, Wagstaff, & Wheatcroft, 2015). A one-way between-subjects ANOVA was performed on the sum score, with event-type as the independent variable. There was no significant effect of event-type on sum scores, $F(2,59) = 0.70, p = .50, \eta^2_p = .02$.

Two multiple discriminant analyses were run comparing single-event truth-tellers and liars, and then repeated-event truth-tellers and liars with the square root transformed reality
monitoring criteria as the predictor variables. These analyses were run to investigate the relative classification accuracy of the reality monitoring criteria according to the frequency of the event that truth-tellers recalled. For the discriminant analysis which compared liars to single-event truth-tellers, the overall model was significant, Wilks’ $\lambda = .54, \chi^2 (8) = 22.28, p = .004$. As discriminant analyses can overestimate classification accuracy rates, the leave-one-out method was used (Memon et al., 2010; Oberlader et al., 2016). The cross-validated classification rates were 76.2% for liars and 66.7% for single-event truth-tellers. The discriminant function which compared repeated-event truth-tellers to liars was not significant, Wilks’ $\lambda = .66, \chi^2 (8) = 14.73, p = .07$. The cross-validated classification accuracy was 66.7% for liars and 80% for repeated-event truth-tellers.

We found partial support for the hypothesis that reality monitoring scores would discriminate between single-event truth-tellers and liars. Although there were no significant differences on the individual criteria and sum scores, reality monitoring reliably discriminated single-event truth-tellers and liars. The second hypothesis, that reality monitoring would not discriminate liars and repeated-event truth-tellers was supported. There were no differences in reality monitoring scores, and scores did not reliably classify repeated-event truth-tellers and liars.

There were, however, a number of limitations to Experiment 3. First, although we followed the methodology of Connolly and Lavoie (2015), we were concerned that liars were given more information about the interview as they were told that they would be interviewed about the healthy lifestyle session they had received a description of, whereas truth-tellers were only told that they would receive an interview. Despite these instructions, liars still underperformed relative to truth-tellers. For example, reality monitoring reliably classified the veracity of single-event truth-tellers and liars, and liars reported fewer auditory details than repeated-event truth-tellers. However, this additional knowledge may have given liars an
advantage and led to an underestimation of the relative reality monitoring scores of truth-tellers and liars. Experiment 3 also lacked a repeated-fabrication condition. Although event frequency may negatively affect the presence of episodic detail when the event is experienced, repeated-fabrication may have the opposite effect. Indeed, when people repeatedly imagine an event, they often increase in confidence that the event occurred (Garry, Manning, Loftus, & Sherman, 1996). This effect seems to arise because recurrent imagination can increase the presence of sensory details in the internally generated memory (Thomas, Bulevich, & Loftus, 2003). Experiment 4 was conducted to address these limitations and replicate the results of Experiment 3.

**Experiment 4**

In Experiment 4, participants observed or imagined a video of domestic violence, on one or multiple occasions. In Experiment 3, reality monitoring could not discriminate repeated-event truth-tellers and liars who had fabricated the event once. Because repeated imagination can facilitate the generation of detail-rich accounts, we expected reality monitoring criteria to classify veracity amongst repeated-event speakers in Experiment 4, but in the opposite direction predicted by reality monitoring theory. Specifically, we hypothesized that there would be an interaction between event-frequency and veracity, such that while truth-tellers would have higher reality monitoring scores than event-fabricators when recalling a single event, fabricators would have higher scores than truth-tellers when speakers recalled a repeated event.

**Method**

**Participants.** Based upon the results of Experiment 3, we conducted an a priori power analysis to calculate the number of participants required to detect a medium effect size through a MANOVA with 80% power. The power analysis indicated that 27 participants were required per cell. Although 134 individuals were recruited, 19 did not attend their first session, three did not attend a subsequent session, and one interview was not recorded due to
technical issues. In total, 111 participants (77 females, 34 males, $M_{age} = 20.39$, $SD = 4.49$) participated in the current experiment in exchange for course credit.

**Design.** This experiment utilised a 2 (veracity: truth, lie) x 2 (event-frequency: single, repeat) between-subjects design with reality monitoring scores as the dependent variable. See Table 6 for the number of participants allocated to each cell.

Table 6

<table>
<thead>
<tr>
<th>Veracity</th>
<th>Event Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single</td>
</tr>
<tr>
<td>Truth</td>
<td>29</td>
</tr>
<tr>
<td>Lie</td>
<td>28</td>
</tr>
</tbody>
</table>

**Materials.** Four similar videos depicting domestic violence were used. In the videos, the time and day of the scene is displayed, and the female protagonist (Emma) is subsequently seen preparing dinner. When her husband arrives home from work, the couple greet each other and converse about their days. However, during this conversation, an issue of tension arises which results in an argument. The verbal conflict eventually escalates into physical violence, with the husband abusing Emma. Each video ends with her husband angrily exiting the scene. There were 7 variable themes which predictably changed across the four videos (see Table 7). Each video was approximately 2 minutes in length.

Four short (64-66 word) written descriptions were created that corresponded to each of the four videos. The four event descriptions were identical to each other, except for the description of variable themes. For example, the phrase “A female (Emma) is cooking dinner in the kitchen (burgers)” was present in each event description, however “burgers” is replaced with either “pasta”, “salad”, or “stir-fry” in the other three event descriptions.
The event order was counterbalanced using the same method as Experiment 3. The event orders were 1, 2, 3, 4, and 3, 1, 4, 2 in stream A and B respectively.

Table 7

*Variable themes assigned to the events depicted in each video in Experiment 4*

<table>
<thead>
<tr>
<th>Variable Theme</th>
<th>Event 1</th>
<th>Event 2</th>
<th>Event 3</th>
<th>Event 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of Event</td>
<td>Wednesday</td>
<td>Thursday</td>
<td>Monday</td>
<td>Friday</td>
</tr>
<tr>
<td></td>
<td>6pm</td>
<td>7:30pm</td>
<td>7pm</td>
<td>6:30pm</td>
</tr>
<tr>
<td>Colour of Sam’s shirt</td>
<td>Dark blue</td>
<td>White</td>
<td>Checked</td>
<td>Aqua</td>
</tr>
<tr>
<td>Colour of Emma’s shirt</td>
<td>Pink</td>
<td>Yellow</td>
<td>Grey</td>
<td>Black</td>
</tr>
<tr>
<td>Dinner</td>
<td>Salad</td>
<td>Stir Fry</td>
<td>Pasta</td>
<td>Burgers</td>
</tr>
<tr>
<td>Reason for Violence</td>
<td>Emma didn’t pay electricity</td>
<td>An appliance was broken by</td>
<td>Sam was angry the house</td>
<td>Emma asks Sam to mow the lawn.</td>
</tr>
<tr>
<td></td>
<td>pay bill</td>
<td>Emma</td>
<td>wasn’t tidy</td>
<td></td>
</tr>
<tr>
<td>Type of violence</td>
<td>Sam pulls</td>
<td>Sam pushes</td>
<td>Sam pulls her</td>
<td>Sam pushes</td>
</tr>
<tr>
<td></td>
<td>Emma by the</td>
<td>Emma against</td>
<td>by the hair.</td>
<td>Emma onto the</td>
</tr>
<tr>
<td></td>
<td>wrist.</td>
<td>the wall.</td>
<td></td>
<td>floor.</td>
</tr>
</tbody>
</table>

**Procedure.** Participants signed up to participate in a family conflict experiment that required participation across either two or five weeks. Participants in the single-event condition observed/imagined one video, whereas participants in repeated-event condition observed/imagined four videos. Only one video was imagined/observed per session, and
sessions were spaced one week apart. Participants in the fabricated-event conditions were given an event description to use as a base to imagine the scene. To ensure they were imagining the scene, participants were instructed to think out loud during the task. Participants were given two minutes to imagine the scene unfold. On the final (or only) video or fabrication session, participants were told that in one week they would be interviewed about an event that they had observed (or fabricated). Participants were informed that the experimenter interviewing them would not know whether they had observed, or imagined the scene, and that participants who were the most effective in convincing the interviewer that they had observed the video would receive a $50 gift voucher. All participants went into the draw to win a gift voucher.

The interview followed the same format as that in Experiment 3. After establishing rapport, participants were asked a series of free-recall questions about the last (or only) video that had been observed (e.g., “Tell me what happened during the last episode of domestic violence that you observed?”). Subsequently, participants were asked one focused question about the time of the event (“When did the event occur?”) followed by five cued invitations to elicit details about the remaining variable event themes (e.g., “Tell me about the violence that you saw in the video?”). Interviews were coded using the method outlined in Experiment 3.

**Interrater reliability.** A second coder scored 25% of the transcripts ($N = 28$). Interrater reliability was calculated using Pearson’s correlation coefficients for each reality monitoring criteria. Correlation coefficients ranged from .74 to .92 ($ps < .001$). Due to the low
number of affective details reported, correlation coefficients could not be reliably calculated. Affective details were subsequently excluded from further analysis.

Results and Discussion

Preliminary analyses. Data were screened for assumptions and outliers. A 2 (veracity) x 2 (event-frequency) x 2 (counterbalancing stream) between-subjects MANOVA was conducted using the reality monitoring criteria as dependent variables, excluding cognitive operations. There were no multivariate effects for counterbalancing stream ($p_s \geq .26$). A 2 (veracity) x 2 (event-frequency) x 2 (counterbalancing stream) between-subjects ANOVA was conducted with cognitive operations as the dependent variable. The effects of counterbalancing stream were not significant ($p_s \geq .08$). Subsequent analyses were collapsed across counterbalancing stream.

Main analyses. As per Experiment 3, all analyses were collapsed across invitation type. Pearson’s correlation coefficients, conducted on the reality monitoring criteria scores ranged from $r(109) < .07, p = .50$ to $r(109) = .73, p < .001$, indicating that multicollinearity was absent. A 2 (frequency) x 2 (veracity) between-subjects MANOVA was conducted with the set of reality monitoring criteria as the dependent variables. The error variances for the number of spatial details reported were not normally distributed $F(3,107) = 3.92, p = .01$. Thus, reality monitoring criterion scores were transformed using the square-root transformation, which corrected the error-variance distribution, $F(3,107) = 0.83, p = .48$. The MANOVA was performed on these transformed scores.

There was a significant multivariate effect for veracity, Wilks’ $\lambda = .87, F(4,104) = 3.68, p = .008, \eta^2_p = .12$. Univariate analyses indicated that there were main effects for visual

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8 Three affective details were reported by participants.
details, $F(1,107) = 5.65, p = .02, \eta^2_p = .06$, auditory details, $F(1,107) = 6.11, p = .02, \eta^2_p = .03$, and spatial details, $F(1,107) = 9.45, p = .003, \eta^2_p = .08$. On average, truth-tellers tended to report more visual, auditory, and spatial details than liars, see Table 8 for group means. Although there was a significant multivariate effect for event-frequency, Wilks’ $\lambda = .84$, $F(4,104) = 4.38, p = .003, \eta^2_p = .14$, no univariate effects were significant (all $p$s > .08). The multivariate interaction between veracity and event-frequency was also non-significant, Wilks’ $\lambda = .95, F(4,104) = 1.21, p = .31, \eta^2_p = .04$.

A 2 (veracity) x 2 (event-frequency) ANOVA was conducted on cognitive operations score. There was no main effect of veracity, $F(1,107) = 0.04, p = .84, \eta^2_p < .001$, and no main effect of event-frequency $F(1,107) = 1.47, p = .23, \eta^2_p = .01$. Additionally, there was no significant interaction between veracity and event-frequency, $F(1,107) = 0.01, p = .92, \eta^2_p < .001$.

As per Experiment 3, a summative reality monitoring score was created, and a 2 (veracity) x 2 (frequency) ANOVA was conducted on the sum score. There was a significant main effect of veracity, $F(1,107) = 7.41, p = .008, \eta^2_p = .07$. On average truth-tellers had higher reality monitoring scores ($M = 38.00, SD = 17.62$) than liars ($M = 29.49, SD = 14.18$). However there was no main effect of event-frequency, $F(1,107) < 0.001, p = .98, \eta^2_p < .001$, and no significant interaction between veracity and event-frequency, $F(1,107) = 0.72, p = .40, \eta^2_p = .01$.

A multiple discriminant analysis was performed using the reality monitoring criteria scores as predictor variables, and speaker veracity as the dependent variable. The analyses were run using the square root transformed scores for the reality monitoring criteria. The prediction model was significant, Wilks’ $\lambda = .87, \chi^2(5) = 14.89, p = .01$. The cross-validated classification accuracy was 64.2% for liars, and 62.1% for truth-tellers overall.
We additionally ran two further discriminant analyses to investigate the relative accuracy of the reality monitoring criteria in classifying veracity amongst single-event speakers, and then repeated-event speakers. The first discriminant analyses investigated the accuracy of reality monitoring criteria in classifying speakers as truth-tellers or liars, when single-event speakers were included in the analysis. The prediction model was statistically significant, Wilks’ $\lambda = .76$, $\chi^2(5) = 13.67$, $p = .02$. The cross-validated classification accuracy rates were 48.3% for single-event truth-tellers, 79.2% for single-event liars. The second discriminant analysis investigated how effective the individual reality monitoring criteria were at classifying veracity when only repeated-event speakers were included in the analysis. The prediction model was not statistically significant, Wilks’ $\lambda = .88$, $\chi^2(5) = 6.28$, $p = .28$. The cross-validated classification accuracy rates were 41.4% for repeated-fabricators, and 75.9% for repeated-event truth-tellers.

As predicted, reality monitoring criteria reliably classified the veracity of single-event, but not repeated-event speakers. The second hypothesis, that the frequency of reality monitoring criteria would depend upon event frequency was not supported.
Table 8

**Mean reality monitoring scores of truth-tellers and liars in Experiment 4, by event-frequency**

<table>
<thead>
<tr>
<th>Veracity</th>
<th>Reality monitoring criterion scores and sum score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Visual</td>
</tr>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Truth-tellers</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>28.62</td>
</tr>
<tr>
<td>Repeat</td>
<td>28.90</td>
</tr>
<tr>
<td>Overall</td>
<td>28.76</td>
</tr>
<tr>
<td>Liars</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>21.31</td>
</tr>
<tr>
<td>Repeat</td>
<td>25.50</td>
</tr>
<tr>
<td>Overall</td>
<td>23.21</td>
</tr>
</tbody>
</table>

Discussion for Experiments 3 and 4

We conducted two experiments examining the effect of event frequency upon adults’ reality monitoring scores. In both experiments, reality monitoring reliably classified single-event truth-tellers and liars but not repeated-event truth-tellers and liars. These results suggest that repeated experience negatively affects the presence of sensory and contextual details in one’s account. When individuals experience an event that primarily consists of details that differ predictably across episodes, their memory for these details at a general level is consolidated and integrated within their event script, whereas specific details are stored as an associated list (Nelson & Gruendel, 1981). Thus, when recalling an episode of a repeated event, witnesses often report generic details (Hudson et al., 1992). This organisation of
repeated-event memory affects the validity of reality monitoring in discriminating veracity, which is primarily a measure of richness in detail (Nahari, 2018).

The finding that reality monitoring reliably classified the veracity of single-event truth-tellers and liars, but not repeated-event truth-tellers and liars appears to be robust. Indeed, these findings arose across two experiments that employed different event stimuli. However, in both experiments, the negative effect of event frequency upon the efficacy of reality monitoring was weaker than anticipated, with few differences detected by the MANOVA and analysis of sum scores. That these effects were weaker than anticipated indicates that repeated-event truth-tellers still recalled a considerable number of episode-specific details. This was likely facilitated by the optimal interviewing protocol employed. In both experiments, interviewers used episodic prompts that instructed participants to report from a particular episode (i.e., the Roger Federer session, or the last video they observed). Research consistently indicates that the language used by interviewers affects the specificity of repeated-event witnesses’ responses. Interviewees tend to respond with episodic details when asked about a specific event occurrence and generic details when asked what usually occurred (Brubacher, Roberts, & Powell, 2011, 2012; Danby, Sharman et al., 2017; Hudson, 1990). Thus, the interview protocol likely facilitated the recollection of episodic details, and minimised potential differences in the reality monitoring scores of repeated-event truth-tellers and liars. Given that interviewers in the field often ask generic questions to victims of recurring abuse (Brubacher, Malloy, Lamb, & Roberts, 2013; Schneider, Price, Roberts, & Hedrick, 2011), the current studies may even overestimate the ability of reality monitoring to discriminate between repeated-event liars and truth-tellers. Unfortunately, it is likely that many of the episodic details repeated-event truth-tellers recalled in these experiments were experienced during the event, but incorrectly attributed to the target episode (Woiwod et al., 2019). Although these inaccuracies are not reflected in reality monitoring scores, they could
impede perceived witness credibility if they are revealed at trial (Leippe & Romanczyk, 1989).

In Experiment 4 we also expected reality monitoring criteria to classify veracity in the opposite direction to that predicted by reality monitoring theory. However this effect did not arise, suggesting that the effects of repeated experience/imagination were weaker than anticipated. The instructions fabricated-event participants received may have constrained the generation of rich imagined experiences. Although previous research has found that repeated imagination can increase the presence of episodic details in internally generated memories (Thomas et al., 2003), these experiments typically use descriptions that are written in second-person, which encourage participants to imagine themselves experiencing the event (Garry et al., 1996). Comparatively in Experiment 4, participants were given a description that was written from a third-person perspective - the perspective of an observer. Repeated fabrication may cause a greater increase in detail when the description is written in second person. This is an important direction for future research.

Reality monitoring discriminated single-event truth-tellers and fabricated-event participants in both experiments. This effect did seem to be weaker in Experiment 3 than previous experiments (e.g., Memon et al., 2010), as there were no univariate differences in reality monitoring criteria, or summative reality monitoring scores between single-event truth-tellers and fabricators. This weaker effect may be due to the imagination paradigm employed which encouraged rich detail generation. Unlike Experiment 4, the event description used in Experiment 3 was written in second person. Moreover, to match the length of the healthy lifestyle session (15 minutes), fabricators were given a long amount of time to imagine the event. Thus, participants likely recalled the imagined event multiple times during the session. Previous research indicates that repeatedly recalling an imagined event can increase the reality monitoring details in one’s account (Granhag, Strömwall, &
Landström, 2006). Thus, it may be because rich internal memories were generated that these differences did not arise in Experiment 3. Indeed, the number of visual, auditory, and spatial details differed according to speaker veracity in Experiment 4, in which participants were given a third-person perspective description, and a shorter amount of time to imagine the event.

In both experiments, the frequency of cognitive details did not depend upon speaker veracity. This finding is consistent with prior experiments which have found similar null effects, or that more cognitive operations are reported by truth-tellers than liars (e.g., Alonso-Quecuty, 1992; Sporer, 1997). Scholars have speculated that recalling/fabricating a film does not enable the generation of cognitive details because participants are not recounting a personal experience, and are thus unlikely to allude to their own thoughts (Vrij et al., 2004b). Although the event stimulus was a film in Experiment 4, cognitive details did not discriminate veracity when participants recalled an experienced event in Experiment 3, suggesting that cognitive operations are not a reliable indicator of veracity.

There are some limitations to these experiments. First, the non-significant difference in reality monitoring details uttered by repeated-event truth-tellers and liars cannot be interpreted as evidence of statistical equivalence (e.g., Tryon & Lewis, 2008). It is possible that given additional power, a significant effect may have emerged. In saying this, the notion that the discriminability of truth-tellers and liars is lower when a repeated-event is recalled is consistent with prior theory (Nelson & Gruendel, 1981), and previous research conducted on a child sample (Schneider et al., 2011). An additional limitation of these experiments is that repeated-event participants effectively had less knowledge about the nature of the task relative to the other conditions as they were not told which session they would be interviewed about. It is unlikely that this practice greatly affected results, as reality monitoring reliably classified single-event truth-tellers and liars, but not repeated-event truth-tellers and liars in
both experiments, though all truth-tellers were not told the content of the interview in Experiment 3. This practice, wherein single-event participants had more knowledge of the interview, may also mirror what occurs when real witnesses are interviewed about recurring abuse. For example, when adults allege being subjected to domestic violence, they may be asked about a specific occurrence that is nominated by the interviewer (e.g., Willén, et al., 2015). Prior research has not investigated whether knowledge about the upcoming task affects recall for a repeated-event. This is an important direction for further research. A second limitation of this experiment is that speakers recalled events that are not comparable to the lived experience of repeated abuse. As emotional memories and memories of abuse tend to be more vivid than neutral memories (e.g., Ward & Carroll, 1997), it is important that future research investigates the effectiveness of reality monitoring when repeated-event speakers recall a stressful event.

In two experiments, we assessed the credibility of adults who recalled a repeated event using reality monitoring. As the results of both experiments indicate that reality monitoring cannot effectively distinguish the veracity of repeated-event speakers, we remain reliant upon evaluators’ subjective credibility assessments. This reliance is concerning given that repeated-event witnesses are unlikely to be perceived as high in credibility (e.g., Deck & Paterson, 2020).
Section 3.

The Perceived Credibility of Repeated-Event Witnesses

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Chapter 7

Literature Review: Subjective Credibility Assessments

Experiments 1-4 used objective analytic techniques to measure the credibility dimensions of cognitive competence and honesty, assessing mock-witnesses’ reports for memory accuracy and the presence of reality monitoring criteria. It is important to additionally consider subjective credibility judgements, as these can have a pivotal influence upon decisions about repeated-event witnesses in real world scenarios, such as the outcome of domestic violence cases, and whether asylum seekers are granted refugee status (e.g., UNHCR, 2013).

To date, most experiments exploring perceived eyewitness credibility have examined perceptions of speakers who recall a single event. These investigations have typically focused upon either judgements of the eyewitness’ memory accuracy or their veracity, rather than overall credibility, which consists of an evaluation of both of these dimensions (Ross et al., 2003). Two primary methodological paradigms have been employed to examine subjective credibility judgements: multi-phase experiments and jury simulation studies.

In multi-phase experiments, evaluators observe a video of a mock-witness who recalls an event. In deception detection experiments, the speaker either presents a genuine or fabricated narrative of past events, and evaluators are asked to assess the speaker’s honesty. Conversely, in memory-focused experiments, phase one mock-witnesses observe a staged or videotaped crime, make an identification attempt of the perpetrator from a line-up, and are subsequently filmed being questioned about the witnessed event. Phase two evaluators observe one of these filmed testimonies and are asked to evaluate the eyewitness’ identification accuracy. The results of these multi-phase experiments indicate that evaluators’ judgemental accuracy is poor for both deception- and memory-based credibility decisions. As outlined in Chapter 5, the accuracy of subjective veracity judgements are typically only
slightly better than chance rates, and a truth-bias tends to emerge such that laypeople often believe that the speaker is presenting a genuine recollection of past events (Bond & DePaulo, 2006). Similarly, accuracy-focused credibility experiments consistently find that evaluators are poor at identifying whether an eyewitness who recalls a single event is accurate, with a tendency to overbelieve inaccurate witnesses (Brigham & Bothwell, 1983; Leippe, Manion, & Romanczyk, 1992; Lindsay, Wells, & O'Connor, 1989; Martire & Kemp, 2009). Such evaluations of identification accuracy tend to be mediated by the eyewitness’ confidence and consistency, such that individuals who are more confident and consistent are perceived as more accurate (Leippe et al., 1992; Martire & Kemp, 2009).

The jury simulation paradigm has also been employed to examine subjective credibility judgements. In these investigations, participants read a transcript, observe a video, or listen to an audio recording of a mock-trial or case vignette, and are asked to rate the eyewitness’ credibility and render a verdict. Typically, eyewitness factors such as witnessing conditions (e.g., weapon visibility; Cutler, Penrod, & Dexter, 1989), or the quality of the eyewitness’ report (e.g., consistency; Berman & Cutler, 1996) are varied across conditions. The results of these experiments consistently indicate that mock-jurors’ decisions are influenced by a variety of factors that have a weak relationship with memory accuracy (e.g., Semmler, Brewer, & Douglas, 2012). One such example is eyewitness confidence. Although eyewitness confidence can be a reliable indicator of memory accuracy under optimal conditions, the strength of this relationship is context dependent (Wixted & Wells, 2017). Particularly at trial, an eyewitness’ confidence is a poor predictor of memory accuracy (e.g., Luus & Wells, 1994). Yet jury simulation experiments consistently find that confidence at trial has a powerful influence upon perceived credibility, with highly confident witnesses perceived as more credible than those who are low in confidence (Brewer & Burke, 2002; Brewer & Hupfeld, 2004; Cutler et al., 1989; Jones & Strange, 2019; Lindsay, Lim, Marando,
& Cully, 1986). These findings are consistent with the results of surveys which indicate that laypeople and legal professionals are typically unaware of the way in which many eyewitness characteristics are related to memory accuracy (Benton, Ross, Bradshaw, Thomas, & Bradshaw, 2006; Kassin, Tubb, Hosch, & Memon, 2001; Magnussen, Melinder, Stridbeck, & Raja, 2010; McConkey & Roche, 1989; Wise & Safer, 2010).

In most mock-jury experiments, the cognitive competence dimension of credibility is salient to evaluators due to the event that the witness recalls. That is, the eyewitness typically recalls an event like a robbery (e.g., Berman, Narby, & Cutler, 1995) or a traffic accident (e.g., Paterson, Anderson, & Kemp, 2013), in which there appears to be little motivation for the witness to lie. Instead, the witness will often make an identification of the perpetrator or recall details central to the perpetrator’s identity or the crime itself, making their cognitive competence salient. Yet for other forensic events, there is a greater perceived motivation for the witness to fabricate an allegation. Perceived eyewitness honesty is often particularly salient when there is a pre-existing relationship between victim and defendant, which is typical of child sexual abuse (e.g., Bottoms & Goodman, 1994), and intimate partner violence (e.g., Landström, Ask, & Sommar, 2019).

Credibility judgements can be influenced by the relative salience of cognitive competence or honesty. This notion is illustrated by research which has investigated the effects of eyewitness age upon credibility judgements. When an eyewitness’ cognitive competence is salient, older children tend to be perceived as more credible than younger children, due to a belief that older children have a superior ability to perceive, remember, and recall the event (Antrobus, McKimmie, & Newcombe, 2012; Leippe et al., 1992; Wright, Hanoteau, Parkinson, & Tatham, 2010). Conversely when honesty is salient, younger children tend to be perceived as more credible than older children or adults because younger children are perceived as less likely to fabricate their account than older children (Antrobus et
al., 2012; Cooper, Quas, & Cleveland, 2014; Davies & Rogers, 2009; Esnard & Dumas, 2013; Hatton & Duff, 2016; Tabak & Klettke, 2014). This pattern of results indicates that the relative salience of honesty or cognitive competence can influence perceived credibility.

In summary, previous research indicates that evaluators typically have poor judgemental accuracy when identifying the memory accuracy or honesty of an eyewitness. Moreover, a trend tends to emerge wherein evaluators overestimate eyewitness credibility, as multi-phase experiments have found that evaluators often exhibit a truth-bias in their veracity judgements, and overestimate eyewitness identification accuracy. The results of jury simulation experiments additionally indicate that the perceived credibility of an eyewitness is often influenced by factors that are not reliable indicators of memory accuracy. Yet in these experiments, mock-witnesses recalled a single occurrence. Given the apparent lack of knowledge that laypeople and legal professionals possess about many eyewitness factors, it is likely that they do not intuitively understand the effect of event repetition upon memory quality. Thus, although evaluators often overbelieve eyewitnesses who recall a single event, they may underestimate the credibility of witnesses who recall a repeated event, on account of the witness’ memory quality. Three main aspects of an eyewitness’ account have been shown to influence subjective credibility judgements: report consistency, richness in detail, and speaker confidence (Semmler et al., 2012). Yet these characteristics are likely to differ according to the frequency of the event that the witness recalls, and their veracity.

The Effect of Consistency, Detail and Confidence Upon Perceived Credibility

Evaluators believe that consistency is indicative of an accurate and honest testimony, whereas inconsistency is characteristic of inaccuracy and/or deception (Fisher, Vrij, & Leins, 2013). Mock-jury experiments repeatedly find that laypeople perceive consistent witnesses as more accurate than inconsistent witnesses (Berman & Cutler, 1996; Berman et al., 1995; Deck & Paterson, 2017; Fisher, Brewer, & Mitchell, 2009; Landström et al., 2019; Pozzulo &
O'Neill, 2012; Semmler & Brewer, 2002; Semmler & Hurst, 2017) and surveys indicate that community members, as well as experienced police officers and attorneys, believe that inconsistency is indicative of deception (Bogaard, Meijer, Vrij, & Merckelbach, 2016; Strömwall & Granhag, 2003). Moreover, evaluators often justify their veracity judgements by commenting on speaker consistency (Strömwall, Granhag, & Jonsson, 2003) and experimental research indicates that perceived speaker consistency positively influences evaluators’ belief that the speaker is telling the truth (Hudson, Vrij, Akehurst, Hope, & Satchell, 2020).

The assumption that a credible witness will always produce a highly consistent statement is flawed (Fisher et al., 2009). When a standard interview is employed, the consistency of liars is often comparable or slightly higher than truth-tellers who recall a single event (Fisher et al., 2013; Vredeveldt, van Koppen, & Granhag, 2014). These consistency levels may be attributable to the respective strategies that truth-tellers and liars employ. The repeat versus reconstruct hypothesis proposes that liars try to repeat details they have previously stated to facilitate testimonial consistency (Granhag & Strömwall, 1999). Conversely, truth-tellers reconstruct the relevant event from memory, which is likely to result in inconsistent recall (Granhag & Strömwall, 1999). Truth-tellers who recall a repeated event are likely to be particularly inconsistent when reconstructing an occurrence, as they are required to discriminate between multiple competing experienced options (e.g., whether they ate an apple or orange during the last healthy lifestyle session they experienced). This task is particularly difficult because memory traces that encode the source of variable options decay rapidly, and it is difficult to accurately attribute source when event occurrences are highly similar (Powell & Thomson, 1997a; Roberts, 2002). Thus, witnesses may inconsistently attribute experienced variable options to an occurrence of a repeated event. Indeed, research indicates that participants who recall a repeated event tend to be less consistent within
(Connolly et al., 2008; Powell & Thomson, 1996) and across interviews, than those who recall a single event (Powell & Thomson, 1997b; Price, Connolly, & Gordon, 2016; although see Theunissen et al., 2017, for an exception). As such, the consistency of truth-tellers who recall a repeated event may be lower than liars.

Another aspect of a witness’ statement that is considered indicative of credibility is richness in detail. Jury simulation experiments typically find that detailed witnesses are perceived as more credible than witnesses whose testimony is lower in detail, because evaluators believe that the memory of highly detailed witnesses is more reliable (Bell & Loftus, 1988; Bell & Loftus, 1989; Jones, 1997). Richness in detail is additionally regarded as a cue to veracity, with detailed witnesses more likely to be perceived as truthful (cf. less detailed witnesses; Hudson et al., 2020; Strömwall & Granhag, 2003). Although truth-tellers who recall a single event typically report more details than liars (Bond & DePaulo, 2006), truth-tellers who recall a repeated event may report lower levels of detail than single-event speakers and liars. As outlined in Chapters 5-6, repeated-event speakers typically have a stronger memory for general event information than episodic details. Accordingly, Experiments 3 and 4 found that reality monitoring criteria, which measures richness in detail, could not distinguish adult repeated-event truth-tellers and liars. In line with this notion, experimental research has found that children who recall a repeated event recall fewer episodic details than children who recall a single occurrence (Brubacher, Roberts, & Powell, 2011; Danby, Sharman et al., 2017). These findings have been replicated in field investigations. For example, Schneider et al. (2011) analysed the transcripts of 117 investigative interviews conducted on alleged victims of child abuse and found that children who alleged repeated abuse reported more generic details, and fewer episodic details than those who alleged a single occasion.
Finally, evaluators often use the cue of confidence when evaluating the credibility of an eyewitness. Although confidence is positively related to perceived credibility (Brewer & Burke, 2002; Cutler et al., 1989; Jones & Strange, 2019; Luus & Wells, 1994; Wells, Lindsay, & Ferguson, 1979), repeated-event witnesses are unlikely to appear highly confident. As outlined in Chapters 2-4, repeated-event witnesses typically have trouble accurately attributing the source of experienced variable options. This difficulty recalling specific occurrences may cause repeated-event witnesses to be perceived as uncertain. In accordance with this notion, Roberts and Powell (2005) found that children who recalled a repeated event expressed significantly less confidence in their memory for variable than fixed details. Notably, this experiment also found that when confidence for variable details was analysed across conditions, children who recalled a single or repeated event expressed comparable confidence in their memory. Greater differences in confidence for variable details may emerge in adults than children, on account of adults’ more developed metacognitive abilities (Dunlosky & Metcalfe, 2009). Thus, adult repeated-event witnesses may appear less confident than single-event witnesses. Although previous research has not investigated the relative perceived confidence of truth-tellers and liars, liars try to appear credible (Hartwig, Granhag, & Strömwall, 2007), and it is thus unlikely that they will exhibit low levels of confidence.

The Perceived Credibility of Witnesses who Recall a Repeated Event

The research reviewed thus far indicates that repeated-event witnesses are likely to have low levels of consistency, detail, and confidence, and thus may appear less credible than single-event witnesses and liars. To date, two experiments have investigated perceptions of repeated-events speakers, both finding that repeated-event speakers were perceived as less credible than speakers who recalled a single event. In the first experiment, Connolly et al. (2008), used a two-phase methodology, wherein adult participants judged the credibility of
children who had experienced a single or repeated event. In the first phase, children experienced one or four play sessions. After a two-week delay, all children were videorecorded being interviewed about the final or only session they had experienced. In the second phase, jury eligible students (Experiment 1) and community members (Experiment 2) watched a phase one interview and rated the child’s credibility. In both experiments, repeated-event mock-witnesses were perceived as significantly less credible than those who recalled a single event. Moreover, both student and community evaluators perceived single-event children as more consistent and less suggestible than repeated-event children. Students additionally perceived single-event children as more likeable and confident than repeated-event speakers.

Similar results were found by Weinsheimer et al. (2017), who examined the perceived credibility of adults who recalled a single or repeated event. In this experiment, undergraduate students participated in a single session in which they tasted various food menus. Single-event participants experienced only the target menu, whereas repeated-event participants tasted five menus, with the target menu experienced third. After a two-day delay, participants were interviewed about the target food tasting menu, which was filmed. A new sample of undergraduate participants subsequently watched a phase one interview and rated the mock-witness’ credibility. Single-event speakers were perceived as more cognitively competent and credible than repeated-event speakers. Moreover, perceived confidence fully mediated the relationship between event frequency and credibility, and perceived consistency partly mediated the relationship between event frequency and credibility. Single-event speakers were perceived as more confident and consistent than repeated-event speakers, and thus more credible.

In both of these investigations, evaluators received no contextual information that indicated the witness had a motive to lie. Connolly et al. (2008) even informed participants
that some children were highly accurate in recall whilst the accuracy of others was low, making speakers’ cognitive competence particularly salient. However in many recurring forensic events, the speakers’ honesty is questioned, such as when an allegation about a domestic violence is made (VicHealth, 2014), or when an asylum seeker retells their experience (UNHCR, 2013). If evaluators have cause to question speaker honesty, different results may arise compared to when the speaker’s cognitive competence is salient (e.g., Wright et al., 2010). An additional limitation of these experiments is that they did not include a condition in which evaluators viewed a speaker who was lying about the event. As such, the relative perceived credibility of repeated-event speakers and liars is unknown.

Two experiments were conducted to examine evaluators’ perception of speakers who recalled a single, repeated, or fabricated event. These speakers were mock-witnesses from Experiments 3 and 4 who provided informed consent for the use of their videorecorded interview in follow-up research. In Experiments 5 and 6, a new sample of participants observed one of these filmed interviews, and subsequently rated the speaker’s credibility. Participants were informed that the speaker may be falsifying the event recalled. The stimulus that speakers recalled differed in the two experiments, such that speakers recalled a healthy lifestyle session (Experiment 5) or a video of domestic violence (Experiment 6). Experiment 6 extended Experiment 5 by including an additional condition in which evaluators rated the credibility of a speaker who had repeatedly fabricated the event. Experiment 6 also investigated whether education about repeated-event memory, in the form of an expert statement, would enhance the perceived credibility of repeated-event speakers.
Chapter 8

Experiment 5: Liars are perceived as more credible than truth-tellers who recall a repeated event

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Abstract

Recurring forms of abuse like domestic violence are unfortunately common. When an individual makes an allegation about their experience however, there is rarely additional evidence to corroborate their claim. The veracity of the allegation is thus likely to be a central concern in subsequent proceedings. This experiment explored evaluator’s perceptions of adults who were lying, or truthfully recalling a repeated event. In the experiment, participants observed a filmed interview of a speaker recalling an event they had experienced once, or a speaker recalling one instance of an event that they had experienced multiple times. Alternatively, some participants viewed an interview of a speaker who was lying about the event. Repeated-event speakers were perceived as less credible than both single-event speakers and liars. It is important that future research investigates ways to reduce the negative effect that the nature of memory for a repeated event has upon speakers’ perceived credibility.
Introduction

In recent years, social media campaigns have resulted in an unprecedented number of people sharing their personal stories of abuse. The #MeToo campaign for example, resulted in the sharing of thousands of narratives of sexual harassment and abuse (Epstein & Goodman, 2018). A few years prior, the #WhyIStayed campaign raised awareness about domestic violence as victims shared stories about why they stayed with their abusive partner (Epstein & Goodman, 2018). Many individuals in these circumstances experience abuse repeatedly, as domestic violence and sexual harassment are typically ongoing offences, involving multiple incidences of differing severity (Fitzgerald, Swan, & Magley, 1997; WHO, 2012). Indeed, a recent survey found that 50% of reported workplace sexual harassment was repeated (Australian Human Rights Commission, 2008). Similarly, repeated events are also present in other domains of forensic relevance. Workplace bullying, for example, is defined by repeated harmful behaviour which elicits distress (Jennifer, Cowie, & Ananiadou, 2003). Even asylum seekers are often required to recall an instance from a series of recurring experiences of persecution when applying for refugee status (Cameron, 2010; Herlihy et al., 2002; UNHCR, 2013).

When individuals make an allegation about a repeated event, evaluators may be suspicious that their account is false. One survey conducted on community members indicated that 54% of respondents believed that claims of domestic violence are often fabricated or exaggerated to improve the outcome of custody disputes (VicHealth, 2013). Even custody evaluators are suspicious that claims of domestic violence are false (LaFortune & Carpenter, 1998; Saunders, Tolman, & Faller, 2013). The veracity of asylum seekers recalling a repeated experience is also likely to be questioned. When an application for refugee status is assessed, adjudicators of asylum cases are required to decide whether the applicants’ condition meets the criteria necessary to be classified as a refugee (Cameron, 2010; Granhag, Strömwall, & Hartwig, 2005; Herlihy, Gleeson, & Turner, 2010).
Adjudicators of asylum cases are required to decide whether the applicant’s narrative of persecution is genuine (Herlihy et al., 2010; UNHCR, 2013).

This tendency to question the veracity of repeated-event speakers is particularly problematic given that individuals often lack corroborative evidence to support their claim. Domestic violence for example, occurs in the privacy of the victims’ own home, and there are rarely third-party witnesses who observe the event (ALRC & NSWLRC, 2010). Moreover, often the only source of evidence about the asylum seekers’ history is their testimony about personal experiences, due to an absence of documentation about the applicant’s identity and experiences (UNHCR, 2013). Thus, in instances of recurring abuse, credibility assessment of the victim often has a pivotal influence on the outcome of the case (UNHCR, 2013).

Despite its applied importance, research on credibility assessment provides little insight into the ability of evaluators to determine the veracity of a repeated-event truth-teller. An extensive body of literature has now explored professionals’ (e.g., Gongola, Scurich, & Quas, 2017) and laypersons’ (e.g., Bond & DePaulo, 2006) ability to detect deception. A large scale meta-analysis of such research found that the accuracy rates of veracity decisions are only about 54% (Bond & DePaulo, 2006). Considering that chance accuracy rates are 50%, this finding is unimpressive. In these experiments however, truth-tellers recalled a single event. That truth-tellers only recalled a single event is problematic because the content of truth-tellers’ testimony will likely differ according to whether speakers recall a single or repeated event (e.g., Theunissen et al., 2017).

**Truth-tellers’ Memory for a Single and Repeated Event**

Numerous theories such as fuzzy-trace theory, predict that the quality of memory reports will be different when individuals recall a single and repeated event (for a more extensive overview of such theoretical predictions see Brubacher, Glisic, et al., 2011). Fuzzy-trace theory proposes that an experience is encoded by two forms of memory traces
simultaneously and independently: gist and verbatim traces (Brainerd et al., 2008). Whilst verbatim traces encode the specific surface features of an experience, the underlying structure and pattern of an event is stored by gist traces (Brainerd & Reyna, 2012). The accessibility of each memory trace however, is affected by various factors, including frequency of exposure to a stimulus. With repeated exposure to a recurring similar experience, gist traces are activated and strengthened each time, whereas new verbatim traces are laid to encode episode-specific surface details (Brainerd & Reyna, 2004). As such, fuzzy-trace theory predicts that repeated-event truth-tellers will have a relatively strong memory for general details about a repeated event, and a weaker memory for specific details about individual episodes.

Such theoretical predictions have been supported by empirical findings. To date, research on repeated-event memory has typically utilised a child sample due to its applied relevance to recurring childhood sexual abuse. Experiments which examine children’s memory for repeated events employ a methodological paradigm which is designed to be an ethically analogous experience for recurring abuse (see Woiwood et al., 2019 for a review). In these experiments, children typically experience one or multiple structured play sessions. All children experience the “target” session, which they are later asked to recall. For children in the single-event condition, the target session is the only structured play session that they participate in. Prior to completing the target session however, children in the repeated-event condition also participate in multiple non-target play sessions. These repeated play sessions contain details that are present on each episode of the repeated event (i.e., fixed details) and/or details that change predictably across sessions (variable details). All participants are subsequently interviewed about the target session, which is typically the last session that all participants experienced. Participants are asked to recall one session in detail to parallel the legal requirement that repeated-event complainants recall at least one episode of the event in
considerable detail (Connolly & Lavoie, 2015). Notably however, some jurisdictions have relaxed this requirement for child complainants, allowing them to provide a more general description of episodes that occurred within a specified range of time (see Woiwod & Connolly, 2017).

Typically these memory experiments find that repeated-event children have a superior memory for fixed details and an impaired memory for variable details relative to single-event children (Connolly & Lindsay, 2001; Price et al., 2006). Whilst most of these experiments have been conducted using a child sample, a growing body of research suggests these findings generalise to adults.

Adapting the methodological paradigm which is typically used in the child literature to an adult sample, Deck and Paterson (2019) found that adults who experienced a single event recalled significantly more correct details from the target session than adults who had experienced a repeated event. This finding that adults recalling a single event also report more correct details from the target session than those recalling a repeated event has been found in multiple experiments (Dilevski et al., 2020; Theunissen et al., 2017). The tendency for both children and adults who recall a repeated event to have lower recall accuracy for variable details seems to be attributable to the fact that repeated-event participants recall variable options which were experienced during one episode of the repeated event, but not the target episode (Connolly & Price, 2006; Deck & Paterson, 2019; Powell, Roberts, Ceci, & Hembrooke, 1999).

**Perceptions of Repeated-Event Speakers**

To date, two experiments have directly investigated perceptions of individuals recalling a repeated event. These experiments used a two-phase methodology wherein adult evaluators assessed the credibility of child (Connolly et al., 2008) and adult speakers (Weinsheimer et al., 2017). In the first phase of these experiments, participants experienced a
single event (a play session and tasting session respectively) or a repeated event in which most details varied predictably across episodes. After a delay, all participants were interviewed about the target session that both single-event and repeated-event participants experienced. This interview was filmed. In the second phase of the experiment, a new sample of participants watched a phase one interview and rated the speaker’s credibility. Whilst the videos of single-event and repeated-event speakers were matched to be equivalent in objective accuracy, in both experiments, evaluators perceived individuals who recalled a repeated event as less credible than those who recalled a single event.

In both studies evaluators received no contextual information indicating that the speaker may be lying. Weinsheimer et al. (2017) informed participants that the speaker was recalling an event they had previously experienced. Connolly et al. (2008) also told evaluators the speaker was recalling a past event, and that some speakers were highly accurate in recall whilst the accuracy of others was low.

As previously stated, this absence of suspicion differs to the context in which repeated-event speakers are likely evaluated in the field. In real world scenarios, repeated-event speakers’ honesty may be questioned. Given the suspicion evaluators may have about the veracity of repeated-event reports, it is problematic that experiments investigating the perceived credibility of repeated-event speakers have focused upon their perceived accuracy.

Perceived accuracy should not be confused with perceived honesty, as they may be distinct constructs. The perceived credibility of a speaker typically loads onto two factors: cognitive competence (or accuracy) and honesty (Ross et al., 2003). This model of perceived credibility loading onto two factors of perceived cognitive competence and honesty is supported by literature indicating that evaluators rely on different cues when assessing the honesty and accuracy of a speaker. Perceived confidence, for example, is typically related to credibility when perceived accuracy is salient, rather than veracity (Brewer & Burke, 2002;
Indeed, Weinsheimer et al. (2017) found that perceived confidence of the speaker fully mediated the relationship between event frequency and credibility, and Connolly et al. (2008) found that repeated-event speakers were perceived as less confident than single-event speakers. It is thus possible that different results may arise when the honesty of a speaker is salient, rather than veracity as perceived confidence may not mediate the relationship between speaker-type and credibility when veracity is salient.

Additionally, these two-phase studies did not include a condition in which participants watched an interview of a speaker who was lying (Connolly et al., 2008; Weinsheimer et al., 2017). The absence of a condition in which participants rated the perceived credibility a speaker who was lying about an event is problematic because the perceived credibility of a repeated-event speaker may contrast to the perceived credibility of a speaker who is lying about the event. That repeated-event speakers would be perceived differently to liars is based on evidence which indicates that liars plan their verbal accounts in an effort to be perceived as credible. A recent study, for example, found that whilst honest and deceptive participants regulated their demeanour to the same degree, liars were more likely to plan their verbal content in an effort to appear credible (Hartwig, Granhag, Strömwall, & Doering, 2010). In contrast to the tendency of liars to plan the content of their reports, truth-tellers tend to believe that their honesty will be plain to evaluators if they simply recall what they remember (Hartwig et al., 2007; Strömwall, Hartwig, & Granhag, 2006; Vrij, Mann, Leal, & Granhag, 2010). This difference in these strategies used by truth-tellers and liars may be particularly problematic for repeated-event speakers who typically have difficulty accurately recalling details about one instance of a recurring event.

**Cues Affecting Perceived Credibility**

The difficulty that repeated-event speakers have particularising one instance of a repeated event tends to be reflected in the quality and delivery of their memory report.
Repeated-event speakers tend to have accounts that are marked by inconsistencies, low detail, and delivered with low levels of confidence (e.g., Connolly & Price, 2013). Unfortunately, these markers are cues which tend to negatively affect evaluators’ perceptions of a speaker’s credibility. Each of these will be considered in turn.

First, repeated-event speakers tend to be less consistent than single-event speakers when recalling an instance of a repeated event (Connolly & Price, 2013; Connolly et al., 2008). Weinsheimer et al. (2017) even found that the perceived consistency of adult speakers mediated the relationship between event frequency and perceived credibility, such that single-event speakers were perceived as more consistent than repeated-event speakers, and in turn more credible. There is also reason to believe that repeated-event speakers may be less consistent than liars as liars use try to produce highly consistent reports in an effort to convince evaluators that they are providing an honest account of the past (Fisher et al., 2013; Hartwig et al., 2007). Given that evaluators use consistency as a primary indicator of speaker credibility (Fisher et al., 2009), the relative inconsistency of repeated-event speakers may lead them to be perceived as less credible than single-event speakers and liars.

Another factor which tends to influence perceived credibility is the level of detail in one’s report, with accounts higher in detail perceived as more credible (Akehurst, Köhnken, Vrij, & Bull, 1996; Granhag, Vrij, & Verschuere, 2015; Nahari, 2012). It is a well-replicated finding that single-event truth-tellers tend to report more detail than liars. Concerningly however, repeated-event speakers may produce accounts which are relatively low in detail. This finding is predicted by fuzzy-trace theory which posits that with increasing exposure to episodes of a repeated event, gist memory traces will be increasingly activated and strengthened, whereas new verbatim traces will be laid (Brainerd & Reyna, 1990). The relative strength of such gist traces may lead repeated-event speakers to report details about the pattern and structure typical across episodes of the event rather than episode-specific
details (Brainerd & Reyna, 1990; Lampinen et al., 2006). In line with these predictions, Connolly et al. (2008) found that single-event children reported significantly more details than liars, whereas the detail reported by repeated-event children and liars was equivalent.

Repeated-event speakers also tend to display lower levels of confidence in their reports than single-event speakers (Connolly et al., 2008; Weinsheimer et al., 2017). As previously stated, confidence is typically used as a cue to perceived credibility, rather than veracity, when the cognitive competence of the speaker is salient (Wells et al., 1979). It is unknown whether the perceived confidence of a speaker will affect credibility when speakers’ veracity is salient.

The current experiment is the first to explore evaluator’s perceptions of adult repeated-events speakers when their honesty is questioned. Moreover, this experiment is the first to explore evaluators’ perceptions of repeated-event speakers relative to liars. As the majority of research in repeated-event memory has focused upon children’s reports, and recent research has begun to replicate these findings using an adult sample, hypotheses were primarily derived from the child literature.

To achieve these aims, participants watched a filmed interview of speaker who was recalling an event that they had participated in once, repeatedly, or were lying about experiencing the event. The perceived veracity and credibility of the speaker they viewed was rated. Perceived credibility was measured in accordance with the two-factor model of perceived credibility, assessing the perceived cognitive competence, honesty, and overall credibility of the speaker (Ross et al., 2003; Weinsheimer et al., 2017). Participants also rated the perceived consistency, level of detail, logical structure, confidence, and suggestibility of the speaker.

Past research has indicated that repeated-event speakers are perceived as less credible than single-event speakers when cognitive competence is salient to evaluators (Connolly et
al., 2008; Weinsheimer et al., 2017). This pattern of results was tentatively expected in the current experiment, although it was unclear whether this result would be found when speaker honesty, rather than accuracy was salient (Ross et al., 2003). It was also predicted that liars would be perceived as more credible than repeated-event speakers who tend to have difficulty recalling one instance of a repeated event, as liars prepare their account and are motivated to present themselves as credible. Finally, since Weinsheimer et al. (2017) and Connolly et al. (2008) found that the effect of recalling a single or repeated event had a similar effect upon all dimensions of credibility, it was consequently expected that the type of speaker that participants viewed would have a similar effect upon their ratings of the cognitive competence, honesty, and the overall credibility of the speaker.

A number of predictions were also made of the secondary variables. Previous research suggests that repeated-event speakers may be less consistent and less detailed than truth-tellers and liars (Connolly & Lavoie, 2015; Fisher et al., 2013; Weinsheimer et al., 2017). It was thus predicted that the perceived consistency and detail of repeated-event speakers would be lower than that of single-event speakers and liars, and that these factors would mediate the relationship between speaker-type and perceived credibility. Given that the relationship between perceived confidence and credibility has only been established when the cognitive competence of a speaker is salient (Brewer & Burke, 2002), it was unknown whether confidence would mediate the relationship between speaker-type and perceived credibility. Two exploratory mediators were also included. Perceived suggestibility was assessed in accordance with evidence that perceived suggestibility is a mediator of credibility (Connolly et al., 2008). Perceived logical structure of the report was also explored as a potential mediator. With increasing exposure to a repeated-event, individuals are likely to develop a generic memory representation of the typical structure of each episode of the recurring event. When recalling one episode of a repeated event, speakers are thus likely to report an account
which is more logically structured than those recalling a single event which may positively affect their perceived credibility (Pezdek et al., 2004; Schank & Abelson, 1977). It was thus included as a potential mediator. As attractiveness can enhance perceived credibility, perceived speaker attractiveness was also included as a potential covariate (Wuensch & Moore, 2004).

Method

Participants

An a priori GPower analysis indicated that to detect a small to medium effect size with 95% power, 130 participants were required per cell. In exchange for course credit or a small financial incentive, 397 individuals (254 female) participated in this experiment. Participants were recruited via an undergraduate volunteer portal (231 people), Mechanical Turk (142) and Facebook advertising (24) and were randomly allocated to conditions. The mean age was 26.28 years ($SD = 11.10$, ranging from 17 – 71 years). Participants were recruited from multiple portals to ensure the generalisability of results across the community. Different responses between these samples were not expected in light of previous research which indicated that perceptions of single-event and repeated-event truth-tellers was similar in an undergraduate and community sample (Connolly et al., 2008). Participants identified with the following cultural backgrounds: European or Caucasian (53.6%), Asian (30.6%), Middle Eastern (2.3%), Hispanic (1.5%), mixed cultural heritage (6.6%), and other/prefer not to say (5.4%).

Design

A three-way between-subjects design was employed, using speaker-type as the independent variable. Participants observed a speaker who recalled a single ($n = 131$), repeated ($n = 132$) or fabricated event ($n = 134$). The dependent variables were veracity decision (truth/lie) and perceived speaker credibility.

Materials
**Stimuli.** Participants watched a video of a speaker being interviewed in a previous experiment (Deck, Paterson, & Howie, 2018). In this previous experiment, the speakers were 62 undergraduate students (52 female) who received course credit for participating in the experiment. Speakers were randomly allocated to experience a single or repeated event (a healthy lifestyle session) or were asked to lie about experiencing this event. Speakers completed the experiment individually.

In each healthy lifestyle session, speakers completed activities relating to physical activity, a healthy diet, mental well-being, keeping their mind active, and executing fine movements. In total, participants experienced 10 variable details during the healthy lifestyle session. Whilst there were four variable options associated with each of 10 variable details, on each healthy lifestyle session, speakers only experienced (or received a description of) one variable option associated with each variable detail (see Table 9).
To ensure that a particular order of variable options was not influencing results, the options were partially counterbalanced with two orders of variable options created (e.g., Brubacher, Glisic, et al., 2011). Approximately half of the speakers in each condition experienced one of the two variable option orders. All healthy lifestyle sessions were conducted individually and lasted approximately 20 minutes in duration.

Speakers in the single-event condition experienced only one healthy lifestyle session, whilst those in the repeated-event condition experienced four healthy lifestyle sessions.
Repeated-event speakers completed each healthy lifestyle session one week apart. The target session, which speakers were interviewed about, was the last session that all single-event and repeated-event speakers experienced. Conversely, speakers who were asked to lie were given a written description of the activities involved in the target session and spent the initial session reading this description and practicing their account. Speakers in this condition were told that they would be interviewed about these activities and were asked to convince the interviewer that they participated in those activities. They were told that the most convincing speakers would win a gift voucher.

One week after the target session, all speakers were interviewed. They were asked free recall questions about the target session followed by specific cued recall questions that assessed memory for each of the 10 critical details. All interviews were videorecorded. These interviews served as stimuli for the present experiment.

Videos from all participants who spoke fluent English and provided informed consent for the future use of their videos served as stimuli. There were 37 videos that met these criteria (14 single-event speakers, 10 repeated-event speakers and 13 fabricated-event speakers). The mean age of speakers was 19.89 years ($SD = 3.28$) and 22 were female (15 male). Chi-square analyses indicated that gender of speaker was equally distributed between condition $\chi^2(2) = 0.93$, $p = .63$. The average time of the videos was 17.72 minutes ($SD = 7.64$). A one-way ANOVA indicated that there were no significant differences in the duration of videos across conditions $F(2, 34) = 1.27$, $p = .29$. Individuals who participated in this first phase of the experiment were ineligible to participate in the present study.

Credibility questionnaire. The perceived credibility of the speaker was assessed by a series of items used by both Weinsheimer et al. (2017) and Connolly et al. (2008). Specifically, participants were asked questions assessing three dimensions of credibility: perceived speaker honesty (honesty, truthfulness, fabrication), cognitive competence
(intelligence, accuracy, understanding) and overall credibility (credibility, likeability, believability). We removed an item assessing perceptions of how many correct items the speaker reported as pilot testing indicated that participants did not understand this item. The three items assessing overall credibility (likeability, believability, overall credibility) were found to have high internal consistency (Cronbach’s $\alpha = .85$), as did the three items assessing honesty (Honesty, truthfulness, likelihood of fabrication; Cronbach’s $\alpha = .83$). The three items assessing cognitive competence had moderate reliability (Cronbach’s $\alpha = .73$). Each dimension was treated as a dependent variable.

Participants were additionally asked about the perceived consistency of the speaker, their confidence, attractiveness, suggestibility, detail of account, as well as how logically structured their testimony was. Participants responded to each item on a scale of one (not at all) to six (very).

**Procedure**

Participants completed the experiment individually. Undergraduate students completed the experiment in groups of up to 12 on campus. Community members recruited through Facebook and MTurk completed the experiment online.

The instructions stated that in the experiment, they would watch a video of a speaker being interviewed. Participants were informed that whilst the speaker they would view may have experienced the event they were recalling, the speaker may also be lying about their involvement in the session. Participants were asked to evaluate the speakers’ honesty whilst watching the video. After observing the interview, participants were asked to make a dichotomous decision pertaining to whether the speaker was telling the truth or lying, followed by the measures assessing perceived speaker credibility. Participants were asked basic demographic questions about their age, gender, cultural background, whether they knew
the speaker they viewed, and their perception of what the study was about. Cultural background was coded based on categories used by Butler and Moran (2007).

**Results**

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to ethical considerations.

**Preliminary Analyses**

To ensure that a particular video was not yielding a significantly different effect to other videos within the same condition, a series of ANOVAs were run to examine the effect of video (within each condition and sample) on the dependent variables. The results indicated that there was a significant effect of video upon overall credibility \(F(12,66) = 3.56, p < .001, \eta^2_p = .15\) and honesty \(F(12,66) = 1.96, p = .04, \eta^2_p = .14\) in the fabrication condition in the undergraduate sample. This effect seemed to be driven by one particular video. When this video was investigated, the speaker was mumbling and not taking the interview seriously (e.g., laughing). When the video was excluded these effects became non-significant \((ps \geq .07)\). This video was subsequently removed from the dataset. No other effects of video on the dependent variables within each cell were significant \((ps \geq .15)\).

To ensure that a particular sample was not responding in a systematically different way, a two-way ANOVA using sample (undergraduate, Mechanical Turk, Facebook) and speaker-type (single, repeated, fabricated) was conducted to explore the effect of sample upon each measure. As no interaction effects between the condition and speaker type were significant \((ps \geq .06)\) and there was no theoretical reason to expect an interaction, results are presented collapsed across sample.

**Main Analyses**

The distribution of truth-teller/liar binary decisions across speaker-type by sample were analysed using a Chi-square analysis. The results indicated that the distribution of truth-
teller/liar decisions did not differ significantly according to speaker-type, χ²(2) = 4.27, p = .12. See Table 10 for the distribution of responses.

Table 10

*Distribution of truth-teller/liar decisions across conditions*

<table>
<thead>
<tr>
<th>Honesty Decision</th>
<th>Speaker-Type</th>
<th>Single Event</th>
<th>Repeated Event</th>
<th>Liars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truth-teller</td>
<td>88</td>
<td>73</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>Liar</td>
<td>43</td>
<td>59</td>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>

A follow-up analysis on truth-teller/liar binary decisions was carried out by coding whether participants’ truth-teller/liar binary decisions were accurate (Vrij & Baxter, 1999). A Chi-square analysis indicated that the number of correct veracity decisions differed significantly according to speaker type χ²(2) = 26.68, p < .01. The distributions of responses indicated that participants were more likely to correctly identify the speaker’s veracity when they were telling the truth, relative to when they were lying.

All remaining dependent variables were analysed using a series of one-way between-subjects ANOVAs with follow-up pairwise comparisons using the Tukey HSD procedure at the .05 level.

**Overall credibility.** There was a significant effect of speaker-type upon perceptions of overall credibility, F(2,394) = 7.86, p < .001, η²p = .04. Follow up pairwise comparisons using the Tukey HSD procedure indicated that participants who recalled a repeated event (M = 3.76, SD = 1.15) were perceived as significantly less credible than both those who were lying about the event (M = 4.28, SD = 1.01, p < .001, 95% CI[-0.84, -0.21], Cohen’s d = 0.48) and those who recalled a single event (M = 4.12, SD = 1.09, p = .02, 95% CI[0.05, 0.69], Cohen’s d = 0.33).
Perceived honesty. There was a main effect of speaker-type upon perceived honesty $F(2,394) = 4.28, p = .01, \eta^2_p = .02$. Repeated-event speakers ($M = 3.68, SD = 0.98$) were perceived as less honest than single-event speakers ($M = 3.74, SD = 1.06, p = .04, 95\% CI[-0.68,-0.02]$, Cohen’s $d = 0.06$) and speakers who were lying about the event ($M = 3.89, SD = 1.14, p = .03, 95\% CI[-0.70, -0.04]$, Cohen’s $d = 0.20$).

Cognitive competence. Additionally, there was a main effect of speaker-type upon perceived cognitive competence $F(2,394) = 3.76, p = .02, \eta^2_p = .02$. Follow-up pairwise comparisons using the Tukey HSD procedure indicated that repeated-event speakers ($M = 3.74, SD = 1.00$) were perceived as significantly less cognitively competent than liars ($M = 4.07, SD = 0.95, p = .02, 95\% CI[-0.62, -0.05]$, Cohen’s $d = 0.34$). No other comparisons were significant ($ps \geq .26$).

Secondary Analyses

All potential mediators were included in a parallel multiple mediator model. As the perceived attractiveness of speakers did not differ significantly across conditions it was not included as a covariate, $F(2, 394) = 0.77, p = .46, \eta^2_p = .004$.

The PROCESS macro (v 3.4) for SPSS (v 24.0) was used, with speaker-type as the independent variable, and the dependent variable was the average score on all three dimensions of credibility (Weinsheimer et al., 2017). As the predictor (speaker-type) was multicategorical, two indicator variables were created – examining the relative effects of viewing a single-event speaker to a repeated-event speaker ($D_1$), and the relative effect of viewing a speaker who was lying to a repeated-event speaker respectively ($D_2$). Each of the 5 secondary ratings (perceived suggestibility, confidence, consistency, logical structure, and detail) were explored as potential mediators. The overall model accounted for 63.44% of the variance in perceived credibility, $F(7,389) = 96.42, R = .80, p < .001$ (refer to Figure 1).
Figure 1. Results of the parallel mediation model examining the relative effect of speaker-type through the secondary ratings (perceived consistency, confidence, logical structure, detail, and suggestibility) on perceived credibility, *p < .05; **p < .001.

We tested the significance of the relative indirect effects of each potential mediator upon perceived credibility. Following the recommendations of Preacher and Hayes (2004) and Hayes and Preacher (2014), the significance of the relative indirect effects of each mediator was estimated from confidence intervals based on 5,000 bootstrapped samples.

The 95% bias-corrected confidence intervals for perceived consistency did not include zero for both D1 and D2 (see Table 11). Thus, the relative indirect effect of perceived consistency was statistically significant. Relative to those who viewed a repeated-event
speaker (reference group), participants who viewed a single-event speaker viewed the speaker as significantly more consistent. Similarly, participants who viewed a speaker who was lying, perceived the speaker as significantly more consistent than those who viewed a repeated-event speaker. In turn, higher ratings of speaker consistency predicted increased ratings of the speaker’s credibility.

Table 11

Mediation with indicator codes for viewing a single-event speaker vs. a repeated-event speaker (D1) and viewing a liar vs. a repeated-event speaker (D2), using a bootstrap procedure based upon 5,000 iterations, *p < .05.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Mediator</th>
<th>Estimated Relative Indirect Effect</th>
<th>SE</th>
<th>Bias corrected 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>lower</td>
</tr>
<tr>
<td>D1</td>
<td>Consistency*</td>
<td>.14</td>
<td>.04</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Confidence</td>
<td>.07</td>
<td>.04</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Logical</td>
<td>.02</td>
<td>.03</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>Detail</td>
<td>.03</td>
<td>.02</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Suggestibility</td>
<td>.02</td>
<td>.01</td>
<td>0.00</td>
</tr>
<tr>
<td>D2</td>
<td>Consistency*</td>
<td>.20</td>
<td>.04</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Confidence*</td>
<td>.14</td>
<td>.04</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Logical*</td>
<td>.10</td>
<td>.04</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>Detail*</td>
<td>.05</td>
<td>.02</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Suggestibility*</td>
<td>.04</td>
<td>.02</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Four potential mediators (perceived confidence, logical structure, detail and suggestibility) were significant mediators for the relationship between D2 and perceived credibility, but not for the D1 contrast. It seems that ratings of the speaker’s confidence, logical structure, detail and suggestibility were not significantly different between
participants who evaluated a single-event speaker and repeated-event speaker. However, participants who viewed a speaker who was lying, perceived the speaker as significantly more confident, detailed and logically structured than those who viewed a repeated-event speaker. In turn, higher ratings of confidence, logical structure and detail predicted increased ratings of perceived credibility. Additionally, participants who rated a speaker who was lying, perceived them as less suggestible than those who viewed a repeated-event speaker. Lower ratings of the speaker’s suggestibility predicted increased ratings of perceived credibility.

**Discussion**

This experiment was the first to investigate the perceived credibility of repeated-event speakers, single-event speakers, and liars. In line with hypotheses, repeated-event speakers were perceived as significantly less credible and honest than liars and single-event speakers. Liars were also perceived as significantly more cognitively competent than repeated-event speakers.

The higher perceived overall credibility and honesty of single-event speakers relative to repeated-event speakers is consistent with the results of previous similar experiments (Connolly et al., 2008; Weinsheimer et al., 2017). Notably however, the perceived cognitive competence of speakers recalling a single and repeated event was equivalent in the current experiment. This finding differs to the results of Weinsheimer et al. (2017) and Connolly et al. (2008) who found that the perceived cognitive competence of single-event speakers was significantly higher than repeated-event speakers. This difference in findings may be due to the different instructions that participants were given that made different dimensions of the speaker’s credibility salient (Ross et al., 2003).

Previous studies have made the cognitive competence dimension of perceived credibility salient through instructions which indicated that the speaker would be recalling a previous event, and may be low or high in accuracy (Connolly et al., 2008; Weinsheimer et
al., 2017). Under such conditions, single-event speakers were perceived as more cognitively competent than repeated-event speakers. Conversely in the present experiment, participants were informed that the speaker may be lying about the event that they were interviewed about. When the speaker’s perceived honesty was made salient to evaluators through these instructions, the perceived cognitive competence of speakers recalling a single and repeated event was equivalent. This instruction to evaluate speaker honesty has important implications in the field, as evaluators are often faced with the task of evaluating whether the narrative of repeated-event speakers is truthful (Hartwig, Dawson, Wrede, & Ask, 2012).

In accordance with the results of Weinsheimer et al. (2017), perceived consistency mediated the relationship between the relative effect of viewing a single-event and repeated-event speaker upon perceived credibility. These findings are consistent with research which indicates that repeated-event speakers are less consistent than single-event speakers, and that evaluators regard consistency as one of the most important indicators of speaker credibility (Connolly & Price, 2013; Connolly et al., 2008; Fisher et al., 2013).

Interestingly however, perceived confidence was not a significant mediator of the relative effect of observing a single-event and repeated-event speaker upon perceived credibility. This finding contrasts to Weinsheimer et al. (2017), who found that perceived confidence did mediate the relative effect of observing a speaker recall a single and repeated event in a context which the speakers’ cognitive competence was salient to evaluators. In the current experiment, perceived confidence did mediate the relative effect of observing a speaker recall a repeated event and a speaker who was lying. To date, prior research has only explored whether perceived confidence is a cue to credibility in contexts that accuracy is of primary concern, such as when the speaker is an eyewitness to an armed robbery and has identified the alleged perpetrator from a line-up (Brewer & Burke, 2002). The present results
suggest that confidence may be relied upon less as a cue to credibility when the speakers’ honesty rather than cognitive competence is salient.

The current experiment extends the results of prior research on perceptions of repeated-event speakers by including a condition in which perceptions of a speaker who was lying were assessed. This experiment thus contributes to deception research which has near exclusively used truth-tellers who recall a single event. Deception research that utilises truth-tellers who recall a single event cannot be generalised to truth-tellers who recall a repeated event, as the content of verbal reports will likely differ according to the frequency of the event that the speaker recalls (e.g., Theunissen et al., 2017).

In the current experiment, repeated-event speakers were perceived as less credible than liars on all three dimensions of credibility. This relationship was mediated by perceived consistency, confidence, detail, logical structure, and suggestibility, suggesting that the lower perceived credibility of repeated-event speakers relative to liars is attributable to the different quality of their verbal reports. This interpretation is consistent with research which indicates that truth-tellers and liars use different strategies when preparing their account (Hartwig et al., 2007). Liars intentionally construct a verbal report in an effort to be perceived as a credible and genuine speaker (Hartwig et al., 2010). Conversely, truth-tellers attempt to retrieve prior memories which is problematic for individuals recalling a repeated event, as they tend to have particular difficulty retrieving memories for one instance of the event (e.g., Brubacher, Glisic, et al., 2011). The intentionally constructed reports of liars likely led them to be perceived more consistent, confident, detailed, logically structured, and less suggestible than repeated-event speakers, and in turn more credible.

That liars were perceived as more credible than repeated-event speakers is concerning. It seems that the structure of memory reports for a speaker recalling a repeated event is less convincing than the structure of a false narrative about that event. Clearly, the
requirement for adult complainants of a repeated event to recall one specific instance in considerable detail is problematic for their perceived credibility. Historically, child complainants of repeated sexual abuse were similarly required to particularise their account and recall details about individual episodes of abuse (Woiwod & Connolly, 2017). In recent years however, there has been a reduction in the requirement for children to recall one episode of recurring sexual abuse in detail (Woiwod & Connolly, 2017). Instead, many jurisdictions in Australia and the United states have adopted continuous child sexual abuse statutes, which allow victims to testify about what happened more generally when they were abused within a specified period of time, with a reduced focus on eliciting details about individual occasions of abuse (Woiwod & Connolly, 2017). As adult speakers of a repeated event tend to develop strong gist representations of the event, and are good at extracting commonalities across episodes (i.e., reporting what typically occurred on an instance of a repeated event; Deck & Paterson, 2019), it is possible that the deficit in perceived credibility of repeated-event speakers would not arise if speakers recalled what typically occurred, rather than particularising one occasion of the event. It is important that future research explores perceptions of repeated-event speakers when they recall their typical experience (rather than one specific episode) as this is a promising means to improve perceptions of repeated-event speakers.

Whilst repeated-event speakers were perceived as less credible than liars on all three dimensions of credibility, participants’ binary decision as to whether the speaker was a truth-teller or liar was not significantly influenced by speaker-type. It is possible that the effect of speaker-type upon perceived credibility is not large enough to significantly affect binary truth/lie decisions. This interpretation is consistent with jury research which often finds a significant effects of manipulations upon continuous, but not dichotomous verdict ratings (Maeder, Yamamoto, & Saliba, 2015).
Unsurprisingly, participants were more likely to accurately discern the speaker’s veracity when they were a truth-teller than liar, reflecting an underlying truth-bias (Vrij & Baxter, 1999). The tendency for evaluators to believe that a speaker is telling the truth is a robust finding within the deception literature (e.g., Bond & DePaulo, 2006). Under contexts of high suspicion however, such truth-biases do not tend to be observed, such as when respondents evaluate salespersons pitching their products (DePaulo & DePaulo, 1989; Vrij, 2008). Clearly the instruction that participants received in the current experiment, which drew attention to the speaker’s possible dishonesty was only a subtle manipulation to raise suspicion about the speaker’s veracity. In contexts that a repeated-event speaker is disclosing an allegation, there is likely to be much higher suspicion about the veracity of their claim. For example, when an instance of domestic violence is alleged, defence attorneys often argue that the complainant falsified their allegation to get revenge for an infidelity, or to gain sole custody of their children (Erez & King, 2000). In contexts in which there is a higher perceived motive for the speaker to lie, truth-biases may disappear (Vrij, 2008). Under such circumstances, it is possible that the quality of the speaker’s narrative may have a stronger effect upon dichotomous veracity decisions. It is important that future research explores the effect of speaker narrative upon perceived credibility when the perceived motivation to lie is higher.

Although this experiment has many strengths, there are also several limitations. First, attention check measures were not included, which is an important consideration to ensure that participants followed the instructions given and paid attention during the experiment (Cullen & Monds, 2020). The inclusion of attention check measures is a particularly important consideration for the online sample. Given that the experimental effects did not differ according to whether the experiment was completed in-person or online however, it is unlikely that exclusions based upon attention check measures would have greatly affected
results. A second limitation is that the quality of repeated-event speaker’s accounts within the field, such as allegations about domestic violence, are likely to be affected by factors which were not accounted for in the current experiment, including stress at the time of encoding. The emotionally neutral healthy lifestyle session that speakers recalled in the current experiment differs from the trauma and victimisation that individuals recalling events like domestic violence have experienced. There has been little research into the effect that stress has upon memory for a repeated event, perhaps because it is difficult to create appropriate stimuli due to ethical considerations. This question however, is clearly an important direction for future research (Price & Connolly, 2007, 2008). The healthy lifestyle stimuli that speakers recalled in the current experiment is an adult analogue for the structured play session that has been used for decades to examine children’s memory for a repeated event. Such research has been continually used to state implications for victim’s memory for recurring forms of childhood abuse (e.g., Powell, Thomson, and Ceci, 2003; Powell et al., 1999; Zhang, Roberts, and Teoh, 2019). As the current experiment was the first to examine the relative perceptions of repeated-event speakers and liars, a well-established methodological paradigm was utilised to enable comparison with previous research (e.g., Connolly et al., 2008).

A further limitation of the current experiment is that in the field, the context in which evaluators observe repeated-event speakers’ narrative may interact with how their narrative quality is perceived. A sizeable body of research indicates that context exerts a strong influence upon individuals’ perceptions of stimuli and their decisions, including credibility decisions (e.g., Street & Richardson, 2015). Thus, whilst individuals who recall a repeated event may display similar memory products such as inconsistencies, when recalling an artificial event like a healthy lifestyle session and a genuine experience like domestic violence, these memory products may be perceived differently according to the subject matter. In line with this notion, Johnson et al. (1998) found that in a low suspicion context,
detail was judged as an indicator of speaker credibility, but in a high suspicion context it was perceived as an indicator of deception. Thus, it is important that future research uses a more realistic analogue for a repeated event.

When an allegation about an event like domestic violence or sexual harassment is alleged, evaluators are often suspicious about the veracity of the claim (Vichealth, 2013). Concerningly, the results of the current experiment indicate that the narrative provided by genuine speakers recalling a repeated event may be perceived as less credible than that of both single-event speakers and liars. It is important that future research investigates means to enhance the perceived credibility of repeated-event speaker’s reports, so that those who are making a genuine allegation about a repeated experience are not impacted by the negative effect that the quality of their reports has upon their perceived credibility.
Chapter 9

Experiment 6: The perceived credibility of repeated-event witnesses depends upon their veracity

This chapter has been submitted for publication.

Abstract

For repeated crimes like domestic violence and workplace bullying, the primary evidence is often the alleged victim’s testimony. Consequently, the perceived credibility of repeated-event speakers can have a pivotal role in legal proceedings. The current experiment investigated perceptions of truthful and deceptive repeated-event speakers. Undergraduate students observed an interview of a speaker who recalled an event that was either experienced or fabricated, on one or multiple occasions. Some participants additionally read an expert statement on repeated-event memory. The effect of repetition upon perceived credibility depended on the speaker’s veracity, enhancing the credibility of fabricators but diminishing that of truth-tellers. Expert testimony however, raised the perceived honesty and cognitive competence of repeated-event speakers. The results suggest that expert testimony could be a promising mechanism to enhance the perceived credibility of speakers who recall a repeated event.
**Introduction**

Although there has been considerable research into factors that can influence a person’s perceived credibility, these experiments typically employ speakers who recall (or fabricate) an event that occurred on only one occasion (e.g., a theft). However, many forensic events, including domestic violence and workplace bullying, occur on multiple occasions (WHO, 2014). Even asylum seekers are often asked to recall a repeated event during their application process (UNHCR, 2013). The perceived credibility of repeated-event speakers can have a fundamental influence on the outcome of these cases, due to an absence of strong evidence to corroborate one’s testimony. Migration board professionals, for example, are required to decide whether the narrative of an asylum seeker is a genuine retelling of past experiences, as applicants frequently lack documentation regarding their identity and background (Herlihy et al., 2010; UNHCR, 2013). Credibility assessment consequently has a powerful influence on the outcome of applications for refugee status (UNHCR, 2013).

Despite the importance of credibility assessment in forensic contexts such as these, there has been limited research into perceptions of repeated-event speakers, and no investigation has employed speakers who have fabricated multiple occurrences of the event.

A growing body of research, however, indicates that genuine repeated-event speakers are unlikely to be perceived as credible. These experiments employed a two-phase paradigm wherein child (Connolly et al., 2008) or adult mock-witnesses (Deck & Paterson, 2020; Weinsheimer et al., 2017) experienced a single or repeated event. The events (operationalised as play sessions, healthy lifestyle sessions or tasting sessions) required mock-witnesses to participate in a variety of activities. After a delay, all mock-witnesses were interviewed about the last (or only) event they had experienced. This interview was video-recorded and in phase two of the experiments, a new sample of adult participants watched a recorded interview and rated the speaker’s credibility. A consistent pattern of findings has emerged. In each experiment, speakers who recalled a repeated event were perceived as less credible than those
who recalled a single event. Moreover, Deck and Paterson (2020) included a condition in which the speaker had been asked to fabricate a single event, based on a simple written description of the occurrence that other participants experienced. During the interview, the speaker lied about experiencing the event. Unfortunately, repeated-event speakers were perceived as significantly less credible than speakers who fabricated the event.

This deficit in the perceived credibility of repeated-event speakers is likely due to the organisation of repeated-event memory. Events are represented in memory through *scripts* which encompass what typically occurs during an event (Schank & Abelson, 1977). When an event is experienced repeatedly, details which are present on each occurrence are integrated into the script, whereas variation across occurrences is stored as an associated list, without maintaining information about when the variation was experienced (i.e., the source of the variation; Hudson et al., 1992). Thus, some aspects of a repeated event are well remembered. Indeed, even pre-schoolers can report what usually occurs during a repeated event, and both children and adults can recall specific details which were unique to a particular event occurrence (Deck & Paterson, 2021; Nelson & Gruendel, 1981; Woiwod et al., 2019). However, children and adults have difficulty attributing these occurrence-specific details to the occasion on which they were experienced (Deck & Paterson, 2021; Woiwod et al., 2019). As a result, repeated-event speakers tend to be perceived as less confident and consistent than single-event speakers, and therefore less credible (Deck & Paterson, 2020; Weinsheimer et al., 2017).

It is important that research considers mechanisms to improve the perceived credibility of repeated-event speakers. Evaluators’ misunderstanding of how repeated

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9 However this is not the case when the variation is atypical, see Rubínová, Blank, Ost, & Fitzgerald (2020)
experience affects memory may contribute to this perceived credibility deficit. Although no investigation has directly assessed laypeople’s understanding of the effect of event repetition upon memory quality, research repeatedly indicates that laypeople lack an intuitive understanding of the effect that various factors have on eyewitness memory, such as the effect of post-event information (e.g., Benton et al., 2006).

**Expert Testimony**

Expert testimony is one approach that has been advocated as a means to improve juror knowledge of eyewitness factors (Kassin & Barndollar, 1992). The desired outcome of expert testimony is juror sensitisation. That is, the expert’s testimony should educate jurors about trial-relevant eyewitness factors, and jurors should subsequently use this knowledge to make decisions about the case (Cutler et al., 1989). Consequently, expert testimony should have a selective effect upon jurors’ perception of eyewitnesses, only affecting their belief in eyewitnesses whom the information is relevant to (see Matire & Kemp, 2011). Considerable research has examined whether the provision of expert testimony can sensitise jurors to eyewitness factors. Most of this research has aimed to investigate whether expert testimony can correct jurors’ overbelief in eyewitnesses who have been influenced by factors known to impair identification accuracy. However the effect of expert testimony on juror decision-making has been mixed. In some experiments expert testimony has sensitised jurors to eyewitness factors (e.g., Cutler et al., 1989; Geiselman & Mendez, 2005), whereas other experiments have found limited effects (e.g., Devenport, Stinson, Cutler, & Kravitz, 2002; Maeder & Ewanation, 2018; Stobbs & Kebbell, 2003), or failed sensitisation (e.g., Devenport, & Cutler, 2004; Jones, Bergold, Dillon, & Penrod, 2017). Determining the conditions in which expert testimony is effective, and the mechanism behind this effect has remained elusive (Leippe & Eisenstadt, 2009). Given the heterogeneity in findings, it is possible that the effect of expert testimony is influenced by contextual factors such as the
topic on which the expert testifies. Notably, extant research has primarily investigated whether expert testimony can correct jurors’ over-belief in an eyewitness who made an identification under poor witnessing conditions. However in the context of a repeated event, the effect of event repetition upon memory quality causes witnesses to be perceived as low in credibility, even under good witnessing conditions (e.g., after relatively short retention intervals, in the absence of suggestive influences; Deck & Paterson, 2020; Weinsheimer et al., 2017). Hence, evaluators tend to under-believe repeated-event witnesses. Evidence of sensitisation would thus emerge if the credibility of repeated-event speakers was equivalent to speakers who recalled a single event when expert testimony is present.

**Repeated Fabrication**

The negative effect of event repetition upon perceived credibility may not arise when the speaker is fabricating the event. Despite the extensive literature on deception detection, prior research has not examined evaluators’ perceptions of speakers who have fabricated multiple occurrences of an event. However if a complainant makes a false allegation about a recurring forensic event like domestic violence, they may fabricate multiple incidences of the offence (e.g., physical violence that occurred three months, and a week prior). Like truth-tellers, liars are likely to rely upon script memory to represent the event they have fabricated (Nelson & Gruendel, 1981). However these speakers are likely to have different motivations, as truth-tellers typically believe that their authenticity will be apparent if they retrieve information from memory, whereas liars try to convince evaluators that they are recalling a genuine event, and monitor their verbal content accordingly (Hartwig et al., 2010). Given these different strategies, liars and truth-tellers are likely to address source confusions differently. For example, truth-tellers reconstruct events from memory during questioning, whereas liars repeat previously stated information to remain consistent (Granhag & Strömwall, 1999). The strategy of reconstructing occurrences is likely to lead to inconsistent
recall for truth-tellers, as genuine repeated-event witnesses tend to inconsistently recall variable details (Connolly et al., 2008; Powell & Thomson, 1996). Conversely, liars are likely to maintain a high degree of internal consistency, due to their strategy of repeating source attributions they have made throughout the interview (Gran Hag & Strömwall, 1999). Repeated fabrication may even enhance credibility, as previous research has found that preparation time can increase the amount of detail present in a fabricated account (Alonso-Quecuty, 1992; Manzanero & Diges, 1995), and that repeatedly recalling a fabricated event increases children’s credibility, as measured by their content analysis scores (Gran Hag et al., 2006). However, it is unclear if similar effects will arise if multiple occurrences of an event are fabricated.

We conducted the current experiment to investigate the perceived credibility of speakers who recalled an event that was either experienced or fabricated once, or on multiple occasions. In phase one, adult speakers viewed or imagined, one or four variable videos depicting domestic violence. One week later all participants were videorecorded whilst being interviewed about the last (or only) video they had watched or imagined. In phase two, a new sample of participants watched a phase one interview and evaluated the speaker’s credibility. Half of the phase two participants additionally received an expert statement on repeated-event memory. The following predictions were made.

In accordance with previous research, we expected the effect of event repetition on perceived credibility to depend upon speaker veracity. Specifically, we expected repetition to have a negative effect on the perceived credibility of truth-tellers, but not fabricators as we expected liars to monitor their accounts. However, it was unclear whether fabricating multiple occurrences would have a beneficial effect on their perceived credibility due to the lack of prior research in this area. Although the effects of expert testimony are mixed, in accordance with the legal expectation that expert testimony can improve juror knowledge and
decision-making (Wise, Sartori, Magnussen, & Safer, 2014), we hypothesized that expert testimony would enhance the perceived credibility of repeated-event speakers. Given the robust finding that laypeople are unable to reliably discriminate truth-tellers and liars (Bond & DePaulo, 2006), we predicted that this effect would occur regardless of speaker veracity.

Method
Participants

An a priori GPower analysis indicated that to detect a medium effect size with 95% power, 45 participants were required per cell (based on Deck & Paterson, 2020; Weinsheimer et al., 2017). Although 471 individuals consented to participate, three indicated that they knew the speaker they had observed, and 62 answered at least one attention check item incorrectly. These participants were removed from subsequent analyses (Cullen & Monds, 2020). The final sample consisted of 406 undergraduate students who participated in exchange for course credit (113 males, 293 female, $M_{age} = 19.77$ years, $SD = 2.94$). Participants were European or other Caucasian (53.7%), Asian (29.8%), from mixed cultural backgrounds (10.6%), Middle Eastern (3.4%), African (0.7%), Pacific Islander (0.7%), Hispanic (0.5%), Aboriginal or Torres Strait Islander (0.2%), or other (0.2%)

Design

A 2 (Veracity: truth, fabricated) x 2 (Event Frequency: single, repeat) x 2 (Expert Testimony: present, absent) between-subjects design was employed. The dependent variables were perceived veracity and credibility. See Table 12 for the number of participants allocated to each cell.
Table 12

*Number of Participants allocated to each cell in Experiment 6*

<table>
<thead>
<tr>
<th>Speaker-Type</th>
<th>Expert Testimony</th>
<th>Absent</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Truth-teller</td>
<td></td>
<td>53</td>
<td>48</td>
</tr>
<tr>
<td>Fabricator</td>
<td></td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>Repeated Event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Truth-teller</td>
<td></td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>Fabricator</td>
<td></td>
<td>54</td>
<td>49</td>
</tr>
</tbody>
</table>

**Materials**

**Stimuli.** The speakers were mock-witnesses from a previous experiment who recalled a single or repeated event, that was experienced or fabricated (Deck & Paterson: Experiment 2, in press). All participation sessions were conducted in the laboratory individually. Single-event truth-tellers observed one video. Conversely, repeated-event truth-tellers observed four videos, watching one video a week for four consecutive weeks. The four videos followed a logical sequence and were designed to be high in similarity to each other. Each video depicted a household scenario in which the male protagonist comes home after work, eventually grows angry at his wife and lashes out in physical violence. The male subsequently leaves the room and slams the door. Seven themes varied predictably across each of the videos, such as what meal the female protagonist was cooking for dinner and the catalyst for violence. The videos were about two minutes in length. One week after their final/only viewing session, participants were interviewed about the last (or only) video they had observed.

Speakers in the fabricated-event condition were given an event description and asked to imagine the scene unfolding before them. The story-telling paradigm (e.g., Logue, Book, Frosina, Huizina, & Amos, 2015) was employed to standardise the content of truth-tellers’
and fabricators’ accounts. The event descriptions were a 64-66 word summary of the general structure of a video that participants in the truth-telling conditions observed. For example, in the event description, participants were told to imagine, “A female is cooking dinner in the kitchen (pasta)”. The phrase “pasta” varied across the four event descriptions in line with the meals depicted in the videos (i.e., “pasta” was substituted for “salad”, “stir-fry”, or “burgers”). Whilst imagining the scene, participants were asked to think aloud to ensure that they remained on-task. Participants completed one or four imagination sessions depending on whether they were assigned to the single or repeated-event condition. Repeated-event fabricators had one imagination session per week for four weeks.

On repeated-event speakers’ final session, and single-event speakers’ only session of watching the video, or imagining the scenario, all participants were told that in one weeks’ time they would be interviewed about an event they had watched (or imagined). They were told that the interviewer would not know whether they had imagined or observed a video depicting the event. If they could convince the interviewer that they observed a video depicting the scene, participants were informed that they could win a $50 gift voucher.

In the interview, participants were asked open-ended questions about the last/only video they had supposedly observed (e.g., “What else happened during the last episode of domestic violence that you observed?”). Participants were then asked one focused question about the time of the event (“When did the event occur?”), followed by five cued invitations which assessed memory for each of the remaining variable themes (e.g., “Tell me about what the wife was making for dinner that night?”). The interviewer was blind to the participant’s experimental condition.

Videos of all participants who provided informed consent served as stimuli in the current experiment ($N = 58$). On average, speakers were 20.14 years in age ($SD = 4.32$) and 38 were female (20 male). A Chi-square analysis indicated that gender of speaker did not
significantly differ across the veracity and frequency conditions $\chi^2(1) = 0.13, p = .72$. The average time of the videos was 445.90 seconds ($SD = 139.94$, ranging from 223-847 seconds). A two-way ANOVA indicated video duration did not depend on event frequency $F(1, 55) = 0.13, p = .72$ or speaker veracity $F(1, 55) = 1.21, p = .28$. Speakers were not eligible to participate as evaluators in the current experiment.

**Expert statement.** The expert statement was modelled on the format employed by previous similar experiments (e.g., Salerno, Bottoms, & Peter-Hagene, 2017). The expert’s credentials were stated, and general findings from repeated-event memory research were summarised. These findings were a summary of adult (e.g., Theunissen et al., 2017) and child (e.g., Woiwod et al., 2019) research on memory for repeated events. The statement also summarised research on perceptions of repeated events witnesses (e.g., Connolly et al., 2008). The complete expert statement is included below:

“In relationships involving domestic violence, abuse tends occur repeatedly over time, and not just on one occasion. Research shows us that memory for a series of similar events that that has been witnessed tends to be quite different to memory for an event that has occurred only once. When individuals experience multiple similar events, they tend to remember what typically occurs (e.g., when they are abused by their intimate partner), but they often have difficulty accurately recalling details about one specific episode that they experienced. For example, a witness may describe what typically occurs when they are assaulted but may struggle to remember specific details about what occurred when they were abused last Thursday. Due to this difficulty recalling details about specific episodes, repeated-event witnesses are often more inconsistent than witnesses who recall an event that they have experienced only once. There is also evidence than repeated event witnesses may appear less
confident when recalling a past experience when compared to witnesses who are recalling an event that they have experienced only once”.

Dr Anderson, PhD.

**Dependent variables.**

**Credibility questionnaire.** A dichotomous veracity judgement was included, asking participants to decide whether the speaker was telling the truth or lying. Subsequently, the speaker’s perceived credibility was assessed using a series of items adapted from Connolly et al. (2008). Participants were asked Likert-scale questions assessing the perceived honesty of the witness (likelihood of fabrication, honesty, truthfulness), perceived cognitive competence (accuracy, understanding of the event and intelligence), as well as the witness’ overall credibility (credibility, believability, likeability). The likelihood that the witness fabricated the events was reverse coded. The internal consistency for items assessing each of these dimensions was demonstrated to be moderate for cognitive competence (Cronbach’s α = .67) and high for overall credibility (Cronbach’s α = .80) and perceived honesty (Cronbach’s α = .87). Due to their stable internal consistency, the items measuring each dimension of credibility were averaged to create a single measure for overall credibility, honesty and cognitive competence. Participants were also asked how detailed, consistent and confident the speaker was, responding on a scale of 1 (not at all) to 6 (very). Three attention check measures were interspersed amongst the items which asked participants to select a particular response option. For example, participants were asked “Please select the option very credible” where the options were “not at all credible” to “very credible” on a 6-point Likert scale.

**Procedure**

The experiment was completed online. After providing informed consent, participants were informed that they would watch an interview of a speaker who had observed one or
multiple videos depicting domestic violence. They were additionally informed that the
speaker may be lying about viewing the video(s). All participants were asked to evaluate the
witness’ honesty whilst watching the video. Prior to observing the video, participants in the
expert-testimony present condition were also given the expert statement to read. After
observing the interview, participants completed the credibility questionnaire and a basic
demographics questionnaire.

Results
The data for this experiment are available upon request from the corresponding
author. Chi-Square analyses indicated that the distribution of truth/lie decisions did not
depend on the speaker’s veracity, event frequency, or the presence of expert testimony, \(\chi^2(1)\)
ranged from 0.00 to 3.04, all \(p \geq .08\). Next, a series of 2 (Frequency) x 2 (Veracity) x 2
(Expert Testimony) between-subjects ANOVAs were performed on each dimension of
perceived credibility (overall credibility, honesty, and cognitive competence), and the
perceived detail, consistency and confidence of the speaker. Significant interactions were
followed up with simple main effects analyses.

Overall Credibility
There was a significant interaction between veracity and event frequency on overall
credibility, \(F(1, 398) = 4.34, p = .04, \eta^2_p = .01\). On average, single-event truth-tellers were
perceived as more credible than repeated-event truth-tellers, whereas single-event fabricators
were perceived as less credible than repeated-event fabricators (see Table 13 for group
means). There was no significant difference in the overall credibility of single- and repeated-
event truth-tellers, \(F(1, 398) = 2.67, p = .10, \eta^2_p = .007, 95\% \text{ CI}[0.05, 0.50]\). Similarly, there
was no difference in the overall credibility of single- and repeated-event fabricators, \(F(1,
398) = 1.70, p = .19, \eta^2_p = .004, 95\% \text{ CI}[-0.46, 0.09]\). No other effects on perceived overall
credibility were significant (all \(p \geq .07\)).

Perceived Honesty
There was also a significant interaction between veracity and event frequency on perceived honesty, $F(1, 398) = 6.24, p = .01, \eta^2_p = .02$. Single-event truth-tellers were perceived as more honest than repeated-event truth-tellers. However, single-event fabricators were perceived as less honest than repeated-event fabricators. The effect of event frequency amongst truth-tellers was non-significant, $F(1, 398) = 3.51, p = .06, \eta^2_p = .009, 95\% CI[-.01, .57]$, as was the effect of event frequency amongst fabricators, $F(1, 398) = 2.75, p = .10, \eta^2_p = .007, 95\% CI[-0.54, 0.05]$. Additionally, a significant interaction between event frequency and expert testimony emerged, $F(1, 398) = 7.82, p = .005, \eta^2_p = .02$. Single-event speakers were perceived as more honest than repeated-event speakers when expert testimony was absent. However, this difference was reversed when expert testimony was present. Single-event speakers were perceived as significantly more honest than repeated-event speakers when expert testimony was present, $F(1, 398) = 4.52, p = .03, \eta^2_p = .01, 95\% CI [0.02, 0.59]$, but there was no difference between single- and repeated-event speakers when expert testimony was present, $F(1, 398) = 3.27, p = .07, \eta^2_p = .008, 95\% CI [-0.57, 0.02]$. All other effects on perceived honesty were non-significant, all $ps \geq .74$.

**Cognitive Competence**

There was a main effect of speaker veracity on perceived cognitive competence, with truth-tellers perceived as more cognitively competent than liars, $F(1, 398) = 6.50, p = .01, \eta^2_p = .02$. This effect did not depend upon event frequency, $F(1, 398) = 0.53, p = .47, \eta^2_p = 001$. Yet a significant interaction between event frequency and expert testimony on cognitive competence emerged, $F(1, 398) = 7.34, p = .007, \eta^2_p = .02$. Single-event speakers were perceived as more cognitively competent than repeated-event speakers when expert testimony was absent. This difference was reversed when expert testimony was present. The effect of event frequency when expert testimony was absent was non-significant, $F(1, 398) = 3.49, p = .06, \eta^2_p = .009, 95\% CI [-0.01, 0.44]$, as was the effect of event frequency when expert
testimony was present, $F(1, 398) = 3.86, p = .05, \eta^2_p = .01$, 95% CI [-0.47, 0.00]. No other effects on cognitive competence were significant, all $ps \geq .16$.

Table 13

*Perceived credibility of speakers according to event frequency, expert testimony and speaker veracity*

<table>
<thead>
<tr>
<th>Speaker-Type</th>
<th>Overall Credibility</th>
<th>Perceived Honesty</th>
<th>Cognitive Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Single Event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Truth-Teller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expert Absent</td>
<td>4.33</td>
<td>0.98</td>
<td>4.39</td>
</tr>
<tr>
<td>Expert Present</td>
<td>4.23</td>
<td>1.06</td>
<td>4.11</td>
</tr>
<tr>
<td>Fabricator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expert Absent</td>
<td>4.05</td>
<td>0.88</td>
<td>4.09</td>
</tr>
<tr>
<td>Expert Present</td>
<td>3.81</td>
<td>0.95</td>
<td>3.82</td>
</tr>
<tr>
<td>Repeated Event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Truth-Teller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expert Absent</td>
<td>4.03</td>
<td>1.05</td>
<td>3.86</td>
</tr>
<tr>
<td>Expert Present</td>
<td>4.07</td>
<td>1.14</td>
<td>4.09</td>
</tr>
<tr>
<td>Fabricator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expert Absent</td>
<td>3.94</td>
<td>0.88</td>
<td>4.01</td>
</tr>
<tr>
<td>Expert Present</td>
<td>4.28</td>
<td>0.99</td>
<td>4.39</td>
</tr>
</tbody>
</table>

**Perceived Detail, Consistency and Confidence**

There was a main effect of veracity on the perceived detail of the speaker’s account, $F(1,398) = 9.40, p = .002, \eta^2_p = .02$. On average, truth-tellers were perceived as more detailed than liars (see Table 14 for group means). There was also a significant interaction between expert testimony and frequency on perceived speaker consistency, $F(1,398) = 5.27, p = .02, \eta^2_p = .01$. Single-event speakers were perceived as more consistent than repeated-event
speakers when expert testimony was absent. This effect was reversed when expert testimony was present. The perceived consistency of single and repeated-event speakers was not significantly different when expert testimony was absent, $F(1, 398) = 3.59, p = .06, \eta^2_p = .009, 95\% CI [-0.01, 0.65]$ and when expert testimony was present, $F(1, 398) = 1.86, p = .17, \eta^2_p = .005, 95\% CI [-0.58, 0.11]$. An interaction between veracity and frequency on perceived consistency was also significant, $F(1,398) = 3.79, p = .05, \eta^2_p = .01$. Single-event truth-tellers were perceived as more consistent than repeated-event truth-tellers, whereas repeated-event fabricators were perceived as more consistent than single-event fabricators. The effect of frequency amongst truth-tellers was non-significant, $F(1, 398) = 2.60, p = .11, \eta^2_p = .11, 95\% CI [-0.06, 0.61]$, as was the effect of event frequency amongst fabricators, $F(1, 398) = 1.31, p = .25, \eta^2_p = .003, 95\% CI [-0.53, 0.14]$. All other effects on these variables were not significant, $ps > .12$. 
Table 14

Perceived detail, confidence, and consistency according to event frequency, expert testimony, and speaker veracity

<table>
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Discussion

This experiment investigated the effect of event frequency, speaker veracity, and expert testimony upon perceived credibility. In partial support of our hypotheses, the effects of event frequency on perceived overall credibility and honesty depended on the speaker’s veracity. Moreover, the effect of expert testimony on perceived speaker honesty and cognitive competence depended upon the number of times they had experienced/fabricated the event. These results will be discussed in turn.

As hypothesized, there was a significant interaction between event frequency and speaker veracity on perceived overall credibility and honesty. Repeated-event truth-tellers were perceived as less credible and honest than single-event truth-tellers, whereas repeated-event fabricators were perceived as more credible and honest than single-event fabricators. However the simple effects analysis indicated that single-event truth-tellers were not perceived as significantly more credible than repeated-event truth-tellers. This finding is encouraging, given that previous research has found deficits in the perceived credibility of repeated-event truth-tellers, relative to truth-tellers who recall a single event (Deck & Paterson, 2020; Connolly et al., 2008; Weinsheimer et al., 2017). Additionally, event repetition did not impair the perceived cognitive competence of truth-tellers, although this effect has been found in previous experiments. Thus, the effect of event repetition on perceived credibility seems to be weaker in the current experiment. This weaker effect may be attributable to the stimulus that speakers recalled. In previous experiments, speakers recalled events that had an arbitrary structure. For example, Weinsheimer et al. (2017) used a tasting session that consisted of 11 different activities such as eating a cookie, drinking juice, and writing. In the current experiment however, the event employed was a logically structured narrative of domestic violence. That speakers recalled an event with a narrative structure is important because occurrences of repeated abuse tend to follow a story framework (Snow, Powell, & Murfett, 2009). As accounts that have a coherent structure are
more likely to be rated as credible (Newman & McGregor, 2006), the coherence of the speaker’s testimony may have had a protective effect on the salience of source confusions in their testimony. This is an important direction for future research. Scholars and legal professionals have also claimed that the coherence of a complainant’s testimony is important in legal proceedings as it enables evaluators to adequately assess the completeness, plausibility, and consistency of the complainant’s testimony, and thus their credibility (Guadagno, Powell, & Wright, 2006; Westcott & Kynan, 2004). Therefore, it is important that repeated-event research employs stimuli which has an inherent narrative structure to improve the external validity of results.

The current experiment was the first to investigate the effect of fabricating multiple occurrences on perceived credibility. The perceived credibility of speakers who fabricated multiple occurrences was not different to those who fabricated the event once, and there was no evidence to support the notion that recurrent fabrication can enhance perceived credibility. However, the finding that the effect of event repetition on perceived honesty and credibility depended on the speaker’s veracity suggests that truth-tellers and liars were using different strategies. Specifically, it is likely that truth-tellers retrieved information from memory, whereas liars monitored their speech in an effort to appear convincing to evaluators (Hartwig et al., 2007). During questioning for example, truth-tellers likely reconstructed the occurrence from memory, leading to inconsistent recall (Connolly et al., 2008). Conversely, liars likely monitored the information they provided about the event occurrence during the interview, and repeated these details to remain internally consistent (Granhaig & Strömwall, 1999). In accordance with this notion, the effect of event frequency on perceived speaker consistency depended on speaker veracity. Although event repetition resulted in lower consistency ratings amongst truth-tellers, this effect was reversed when the event was fabricated.
The current experiment was also the first to examine the effect of expert testimony upon the perceived credibility of repeated-event speakers. There was a significant interaction between event frequency and expert testimony on perceived honesty, cognitive competence, and consistency. When an expert did not testify, single-event speakers were perceived as more honest, cognitively competent, and consistent than repeated-event speakers. However, the opposite effect arose when an expert testified. Notably, the expert’s testimony did not raise the perceived honesty, cognitive competence, or consistency beyond that of single-event speakers. These findings suggest that the expert’s statement sensitised participants to event repetition (Cutler et al., 1989). Although sensitisation is the desired result of expert testimony, previous experiments that have investigated whether expert testimony can sensitise evaluators to other eyewitness factors have yielded inconsistent results (e.g., weapon presence: Wells, Lindsay, & Tousignant, 1980). Notably however, the effect of expert testimony and event frequency on perceived honesty and cognitive competence did not depend upon speaker veracity. This finding is in accordance with the notion that laypeople and professionals are poor at detecting truth-tellers and liars (Bond & DePaulo, 2006). Ideally, expert testimony would selectively enhance the perceived credibility of repeated-event truth-tellers, and not liars. However, current research has not examined mechanisms to discriminate repeated-event truth-tellers and liars. This is an important direction for future research.

There are several limitations to the current experiment. First, the interview was viewed by evaluators in the absence of a broader context. However in forensic contexts, a speaker’s testimony is heard within a broader court trial. Whilst hearing a trial, the story model posits that jurors construct a story to arrange trial evidence and make a decision about the case (Hastie, Penrod, & Pennington, 2002). Due to the organisation of trial evidence into an overarching narrative, evaluations of speaker credibility may be different if the account is
viewed in isolation relative to if it is heard within a broader trial narrative (Pennington & Hastie, 1992). Consistent with notion, a wealth of psychological research indicates that stimulus evaluation is affected by context (e.g., Dror, Charlton, & Péron, 2006). It is thus important that future research examines perceptions of repeated-event speakers when their account is heard within a broader context. Moreover, although speakers recalled a video of domestic violence, this stimulus is not comparable to the distress experienced by domestic violence victims. Although preliminary research suggests that stress does not affect adults’ memory for a repeated event (Dilevski et al., 2020), there has been limited research into this question, and it is an important direction for further research.

This experiment was the first to explore evaluators’ perceptions of speakers who experienced or fabricated multiple occurrences of an event. The results indicate that the effect of event repetition differs according to speaker veracity, enhancing that of fabricators but reducing that of truth-tellers. Although previous research has found that repeated-event truth-tellers are perceived as less credible than single-event truth-tellers, this effect was not replicated when a more realistic event stimulus was employed. It is important that future research uses realistic event stimuli in repeated-event research to improve the generalisability of findings.
## Section 4

### General Discussion

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<td>• To integrate and discuss findings from sections 1-3, with reference to previous research and memory theory.</td>
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<tr>
<td>• To discuss the limitations of the research presented in this thesis, implications, and directions for future research.</td>
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Chapter 10
General Discussion

When a witness reports a recurring forensic event like intimate partner violence or persecution, there is often an absence of corroborating evidence to support the authenticity and reliability of their narrative (Aiken & Murphy, 2000; Herlihy et al., 2010). As such, the victim’s credibility can have a pivotal influence upon the outcome of their case (ALRC & NSWLRC, 2010; UNHCR, 2013).

The primary aim of this thesis was to explore the credibility of individuals who recall an occurrence of a repeated event. Using the two-factor model of perceived credibility as a framework (Ross et al., 2003), the cognitive competence, honesty, and overall perceived credibility of repeated-event witnesses was examined. Accordingly, Experiments 1 and 2 examined the objective accuracy of adults’ recall of a single or repeated event. Experiments 3 and 4 investigated the efficacy of the content analysis technique, reality monitoring, in classifying the veracity of speakers who recalled a single, repeated, or fabricated event. These results were complemented with an investigation into laypeople’s subjective evaluations of the perceived credibility of speakers who recalled an occurrence of a repeated event. In Experiment 5, the perceived credibility of speakers who recalled a single, repeated, or fabricated event was assessed. Experiments 6 additionally explored evaluators’ perceptions of speakers who had fabricated multiple occurrences of the event, and the effect of expert testimony upon the perceived credibility of repeated-event speakers. This chapter will summarise and discuss findings that emerged along these dimensions of cognitive competence, honesty, and overall perceived credibility. Subsequently, limitations of these experiments, and implications of these findings for practice and future research will be discussed.

Cognitive Competence: Adults’ Memory for an Instance of a Repeated Event
Eyewitnesses are tasked with recollecting details about a forensic event, often providing a primary source of evidence for the criminal justice system (Wells & Olson, 2003). The fallibility of eyewitness memory for a single event is now well documented, with an array of factors shown to impede memory accuracy (see Wells, Memon, & Penrod, 2006, for a review). However witnesses to a repeated event have the additional difficulty of distinguishing between multiple event occurrences. Indeed, many jurisdictions require complainants to particularise the offence(s) alleged for successful prosecution. That is, complainants are required to recall details specific to individual occurrences, to support each element of the charge (Powell et al., 2007).

Children’s memory for a repeated event has been investigated using a consistent research design for decades (see Chapter 2 for a review). However, limited research has examined adults’ memory for repeated events. In two experiments, the ability of adults to particularise an occurrence of a repeated event was investigated. In Experiment 1, the research design utilised to examine children’s repeated-event memory was adapted to an adult sample. Undergraduate students experienced one or multiple healthy lifestyle sessions in which 10 critical details varied predictably across episodes. After a one-week delay, participants received a mock-investigative interview about the last or only session they had experienced. Experiment 2 was designed as an extension to Experiment 1. To increase the generalisability of results, event stimuli depicting episodes of domestic violence were used. Moreover, by coding the accuracy of all details recalled, rather than critical details alone, a more complete examination of memory quality was provided. Experiment 2 additionally explored adults’ tendency to report details common to the event, relative to details unique to one occurrence.

Adults who recalled a repeated event were reliable in a number of ways in these experiments. They rarely reported details they did not experience, with floor effects in the
frequency of external intrusion errors committed when participants recalled a single or repeated event. Prior research conducted on a child sample indicates that repeated-event witnesses typically report fewer external intrusions than those who recall a single event (Woiwod et al., 2019). This effect was not observed in Experiments 1 and 2, likely because adults’ verbatim memory traces decay more slowly than children’s (e.g., Brainerd & Reyna, 2004; Poole & White, 1993). Yet after longer delays, when verbatim memories have decayed to a greater extent, a similar effect may emerge in adults. It is also notable that participants who recalled a repeated event recalled many specific details they had experienced during the event. Indeed, when accuracy was broadly defined as details that were encountered on any event occurrence, the accuracy of single- and repeated-event participants was similar in both experiments.

Primarily, adults who recalled a repeated event had difficulty recalling a specific occurrence. Repeated-event participants reported fewer correct details (Experiment 1) and a lower proportion of correct details (Experiment 2)\(^{10}\) about the target episode relative to single-event participants. Furthermore, repeated-event participants tended to report many internal intrusion errors, recalling details they had experienced during the event but not on the occurrence they were asked to recall. The findings from Experiment 1 and Experiment 2 are consistent with the results of previous research. Children who recall a repeated event typically recall many experienced details but have difficulty attributing them to the correct occurrence (see Woiwod et al., 2019, for a review). Recent experimental investigations conducted on an adult sample have also found that adults who recall a repeated event tend to

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\(^{10}\) Proportion scores, rather than the raw number of details, were analysed in Experiment 2 in response to an anonymous reviewers’ recommendation.
report fewer correct details about the target instance, but a similar number of experienced
details to adults who recall a single event (Dilevski et al., 2020; Theunissen et al., 2017).

Previous experiments that have examined repeated-event memory in adults have
employed heterogenous research designs, and obscured our understanding of whether the
quality of repeated-event memory is similar in children and adults (see Chapters 2 and 3 for
an overview). Experiment 1 replicated the pattern of results that consistently emerge in
children, with an adult sample. That a similar pattern of results emerge when children and
adults recall a repeated event is consistent with script theories, which posit that the
representation of events through scripts is stable across the lifespan (Hudson et al., 1992).
However in accordance with the child literature, the accuracy of only 10 predetermined
critical details were coded in Experiment 1. Non-critical details that participants recalled
about the session(s) could not be verified for accuracy because the participation sessions were
not filmed. For example, the experimenter’s clothing was not designated as a critical detail,
so what the experimenter wore during the event sessions was not documented. Consequently,
if participants recalled details about the experimenter’s clothing, this information could not
be verified for accuracy. Although this partial coding practise is in accordance with the child
literature, it may result in an incomplete understanding of the quality of adults’ recall,
especially since adults tend to produce much more comprehensive reports than children
(Goodman & Reed, 1986). Experiment 2 addressed this limitation and replicated the results
of Experiment 1 using event stimuli that enabled the accuracy coding of all details recalled
rather than critical details alone.

The finding that adults who recall a repeated event tend to connect experienced details
to the wrong occurrence has implications for their perceived credibility. Defence attorneys
often highlight discrepancies between the testimony of an eyewitness and other evidence
(e.g., objective evidence, the testimony of other witnesses) in order to undermine the
witnesses’ credibility (Pichler et al., 2020). Such discrepancies often pertain to peripheral
details about the offence, but are used to undermine the credibility of the witnesses’
testimony as a whole (Fisher et al., 2009). For example, an alleged victim may claim to have
been subjected to intimate partner violence after returning from a date at a local restaurant
with their partner. The defence may find that the couple did not have a reservation on the date
alleged, but on a different occasion, and use this discrepancy to raise questions about the
credibility of the alleged victim’s entire statement. Mock-jury research has found that
discrepancies between an eyewitness’ statement and facts revealed in court negatively affect
mock-jurors’ perception of eyewitnesses’ credibility, as well as the strength of the
prosecution’s evidence (Leippe & Romanczyk, 1989). A more common technique employed
by the defence to undermine a witnesses’ testimony is highlighting and eliciting within-witness inconsistencies (Pichler et al., 2020; Zajac, Westera & Kaladefos, 2017). The
tendency for repeated-event witnesses to make internal intrusions indicates their poor
memory for the temporal source of details that have changed across occurrences (Powell &
Thomson, 1999). Thus, when recalling an occurrence, witnesses are likely to inconsistently attribute experienced details (see Chapters 7 and 8), undermining their credibility.

In addition to examining the frequency of source monitoring errors, Experiments 1
and 2 examined adults’ ability to particularise a repeated event by investigating their
tendency to recall details unique to one occurrence. Experiments 1 and 2 were the first
investigations to operationalise detail-type across occurrences when investigating adults’ recall of a single or repeated event. It is important to define detail-type (e.g., fixed, variable) because the way that details change across occurrences affects the strength of script and episodic memories, as well as the type of details that participants recall about one occurrence (Connolly et al., 2016; Danby et al., 2019). In Experiment 1, all critical details varied predictably across occurrences. However in applied settings, some details are likely to remain
consistent across episodes, such as the perpetrator’s identity. Thus, both fixed and variable
details were operationalised in Experiment 2, providing the first investigation into adults’
tendency to report correct details which were unique to the target episode, relative to correct
details which were true of all repeated-event episodes. Repeated-event participants reported a
significantly higher proportion of correct details which were true of all episodes (i.e., fixed)
than details which were unique to the target episode (i.e., variable details). Thus, many of the
correct details repeated-event adults recalled would not aid particularisation. Similarly,
children who recall a staged repeated event tend to have a superior memory for fixed relative
to variable details (Brubacher, Roberts, & Powell, 2011; Powell et al., 1999; Roberts &
Powell, 2005). These findings are consistent with the predictions made by theoretical
accounts outlined in Chapter 2. For example, script theories posit that although fixed details
are integrated into one’s event script, variable details are stored within the script at a general
level (e.g., what was being cooked for dinner that night), with specific options (e.g., pasta,
burgers) stored as an associated list of options that can be slotted in at retrieval (Hudson et
al., 1992). Consistent with this notion, repeated-event participants tended to report a
significantly higher number (Experiment 1), and a greater proportion (Experiment 2) of
general details in response to free recall questions than single-event participants.

This organisation of memory for a repeated event wherein general details are more
tightly integrated into the script than specific variable options, has implications for another
dimension of credibility - honesty. Verbal content analysis is one of the most effective
techniques used to determine speaker veracity (Vrij, 2019). However, richness in detail is a
central component of content analysis techniques (Nahari, 2018). Thus, Experiments 3 and 4
examined the efficacy of reality monitoring when adults recalled a repeated event.

**Honesty: The Validity of Reality Monitoring in Determining the Veracity of Reports for a Repeated Event**
Experiments 1 and 2 replicated and extended previous research, indicating that there are qualitative differences in adults’ memory for a single and repeated event. Given that recall quality depends upon event frequency, the results of experiments which examine the efficacy of verbal content analysis techniques using single-event speakers, cannot be generalised to contexts wherein adults recall an event that occurs repeatedly. Experiments 3 and 4 were the first investigation into the validity of the content analysis technique, reality monitoring, in distinguishing the veracity of adults who recall a single, repeated, or fabricated event.

Experiment 3 investigated the presence of reality monitoring criteria in adults reports of a healthy lifestyle session that had been experienced once, repeatedly, or had not been experienced (i.e., participants fabricated their account). Experiment 4 extended this investigation by using the same design, except that films of domestic violence were used as stimuli, and a repeated fabrication condition was also included. In both experiments, reality monitoring criteria reliably classified the veracity of single-event truth-tellers and fabricators, but not repeated-event truth-tellers and fabricators. These findings are consistent with script theories, as described in Chapter 6, as well as fuzzy-trace theory. Fuzzy-trace theory posits that gist traces, which represent patterns across repeated-event occurrences, will be strengthened with increasing exposure to the event, whereas new verbatim traces will be laid to encode specific variable options (Brainerd et al., 2002; Odegard et al., 2009). Because of the relative strength of these gist traces, and the rapid decay of verbatim details (Reyna & Brainerd, 1995), adults who recall a repeated event are likely to have a strong memory for general event patterns but not episode-specific information.

It seems that this organisation of repeated-event memory affects the accuracy of content analysis techniques in discerning veracity. Although prior research had employed a child sample to investigate this question (Blandon-Gitlin et al., 2005; Pezdek et al., 2004;
Strömwall et al., 2004), these previous experiments found that repeated-event truth-tellers had higher content analysis scores than those who recalled a single event. However, the repeated event in these experiments was highly similar on each episode, which likely consolidated participants’ verbatim memory for surface details and subsequently increased their content analysis scores (Connolly & Lavoie, 2015). The validity of content analysis techniques in classifying the veracity of repeated-event speakers is also likely to be lower in adults than children, as adults can extract patterns across occurrences more rapidly, and based upon more sophisticated details than children (Brainerd & Reyna, 2004). Moreover, adults rely more on gist memory than younger children (Reyna et al., 2007).

The finding that reality monitoring did not distinguish the veracity of repeated-event speakers has implications for the perceived credibility of repeated-event witnesses, as a central component of reality monitoring is measuring richness in detail (Nahari, 2018). Indeed, mock-jury research has found that the level of detail present in an eyewitness’ testimony positively influences their perceived credibility (Bell & Loftus, 1988, 1989; Jones, 1997; although see Pickel, 1993, for an exception). Field documents additionally indicate that evaluators assess speakers’ credibility by evaluating the level of detail present in their account. For example, the credibility of applicants who apply for asylum is often measured by the sufficiency of details that they provide (UNHCR, 2013). Providing vague details about particular occurrences can be used as reason to reject the authenticity of the applicant’s narrative (UNHCR, 2013).

There were no effects of event frequency or speaker veracity upon the analysis of overall reality monitoring scores in Experiments 3 and 4. Although it is common practice to use reality monitoring sum scores as a dependent variable (e.g., Nahari, 2011), that no effects emerged upon this measure is consistent with the results from a recent meta-analysis, which found that discriminant analyses are a more sensitive measure of speaker veracity than
analyses conducted upon sum means (Oberlader et al., 2016). In contrast to sum means, the MANOVA conducted upon the reality monitoring criteria found multivariate effects for event-type in Experiment 3 and univariate differences emerged on the number of auditory details reported in this experiment (with repeated-event participants reporting significantly fewer auditory details than the other conditions). In Experiment 4, a multivariate effect for event frequency arose, however no univariate effects were significant. It is possible that stronger effects would have emerged with additional power. Although we had based our power analyses for Experiment 3 and 4 upon results from previous experiments, these experiments also did not test large samples (e.g., Strömwall et al., 2004, included approximately 21-22 participants per cell). Consequently, these experiments on which we based our power analyses may have been underpowered, resulting in an overestimation of effect sizes (Button et al., 2013). Thus the power analysis conducted for Experiments 3 and 4 may have understated the number of participants required.

It was difficult to obtain larger samples in Experiments 1-4 due to the rigorous testing procedure that was employed to maximise the external validity of results. Given that conducting repeated-event research is resource-intensive, many adult-based experiments have developed methodologies to reduce the intensity of the testing protocol. For example, a number of recent experiments have shown groups of participants all episodes of the repeated event within a single participation session, with minutes separating each event episode (MacLean et al., 2018; Rubínová, Blank, Koppel, & Ost, 2020; Rubínová, Blank, Ost, & Fitzgerald, 2020). This procedure likely affects the generalisability of the results, given that episode spacing affects repeated-event memory (Price et al., 2006). Another methodological approach taken to reduce the intensity of repeated-event research has been to administer recall tests via online links for participants to complete out of the laboratory (Rubinová, Blank, Koppel, & Ost., 2020; Rubinová, Blank, Ost, & Fitzgerald, 2020; Theunissen et al.,
Experiments 1-4, such as spacing all sessions one week apart, conducting the sessions in-person (rather than online) and individually, as well as collecting memory data via an interview, supports the internal and external validity of our results.

Experiments 1-4 indicated that event repetition had a detrimental effect upon the objective credibility measures of memory accuracy and reality monitoring criteria. However in the field, the objective accuracy and veracity of repeated-event witnesses is unknown. Rather, credibility is measured via evaluators’ subjective assessments.

**Subjective Credibility Evaluations of Witnesses who Recall a Repeated Event**

Experiments 5 and 6 examined laypeople’s perceptions of repeated-event witnesses. These mock-witnesses were speakers from Experiment 3 and 4 respectively, who consented to the use of their filmed interviews. In Experiment 5, evaluators observed a video of a speaker who was interviewed about a healthy lifestyle session that they had experienced once, repeatedly, or had fabricated. Participants subsequently rated the speaker’s credibility.

Experiment 6 employed the same methodology with the following exceptions. First, speakers recalled or fabricated videos of domestic violence rather than healthy lifestyle sessions, and an additional condition, in which speakers had fabricated multiple occurrences of the event was also included. Experiment 6 also investigated whether expert testimony could correct evaluators’ under-belief in repeated-event speakers.

In Experiment 5, single-event truth-tellers were perceived as significantly more credible and honest than repeated-event speakers. This finding is in accordance with the results of previous experiments that have investigated laypeople’s perceptions of children who recalled a play session (Connolly et al., 2008) and adults who recalled a tasting session (Weinsheimer et al., 2017) that had been experienced once or repeatedly. However in Experiment 6, the perceived credibility and honesty of single- and repeated-event truth-tellers
was not significantly different. It is possible that Experiment 6 did not replicate the results of previous experiments due to the stimulus that speakers recalled. Experiment 5 and previous experiments employed arbitrarily sequenced events (Connolly et al., 2008; Weinsheimer et al., 2017). For example, in Weinsheimer et al. (2017) participants ate a chip and drank juice, which could logically be performed in any order. Conversely in Experiment 6, speakers recalled a causally sequenced narrative event of domestic violence. In the videos, a trigger for tension emerged (e.g., an appliance broke) during an initial conversation about the protagonists’ days. This trigger resulted in anger from the male protagonist and catalysed physical violence. The use of an event that follows a narrative structure has implications for the criteria that evaluators will use to assess the credibility of a speaker’s account, as it enables evaluators to assess the coherence of their testimony (Snow et al., 2009).

One framework that has been used to operationalise narrative coherence is story grammar, which posits that complete accounts contain key story elements, described in a logically sequenced manner (Stein & Glenn, 1975). These story elements include information about the initiating act (e.g., what led to the occurrence of abuse) and the event resolution (e.g., the outcome of abuse). The story-model of juror decision making predicts that narrative coherence will affect credibility judgements (Pennington & Hastie, 1992). Specifically, this model proposes that jurors impose a narrative structure upon trial information, and consequently, testimonial coherence is likely to positively influence perceived credibility (Pennington & Hastie, 1992). In accordance with this notion, narratives high in story grammar tend to be rated as more credible than those low in story grammar (Newman & McGregor, 2006).

Previous research indicates that event repetition affects narrative coherence. Indeed, Feltis, Powell, and Roberts (2011) found that children who recalled a repeated event included more story grammar detail than children who had experienced a single event. The beneficial
effect of event repetition upon narrative coherence may be even more pronounced in adults, as the utilisation of story grammar elements tends to increase across development (Snow et al., 2009). Thus in Experiment 6, it is likely that repeated-event truth-tellers produced event narratives that were high in story grammar (relative to single-event participants, and speakers in Experiment 5 who recalled an event that was arbitrarily sequenced). Such coherently structured accounts may have reduced the negative effect that observed source-monitoring difficulties (e.g., inconsistencies) had upon speakers’ perceived credibility, leveling the credibility of single- and repeated-event truth-tellers in Experiment 6. This is an interesting question for future research.

In both Experiment 5 and 6, event frequency did not affect perceived cognitive competence. The cognitive competence of single- and repeated-event truth-tellers was similar in Experiment 5. Additionally, there was no interaction between event frequency and veracity upon cognitive competence in Experiment 6, although this effect was observed on overall credibility and honesty. These findings contrast with the results of prior experiments, which found that repeated-event speakers were perceived as less cognitively competent than single-event truth-tellers (Connolly et al., 2008; Weinsheimer et al., 2017). These differing findings may be explained by the context in which evaluators viewed the speaker’s account. In Connolly et al. (2008) and Weinsheimer et al. (2017), participants were instructed to attend to the witness’ accuracy, whereas participants were instructed to evaluate the witness’ honesty in Experiments 5 and 6. It is a robust finding across different fields of psychology that our perceptions and decisions are affected by context in which stimuli are encountered (e.g., Bogaard, Meijer, Vrij, Broers, & Merckelbach, 2014; Dror et al., 2017). Thus, the different instructions that participants received across experiments likely resulted in different effects of event frequency upon perceived cognitive competence.
In real-world scenarios, there are likely to be much stronger contextual influences upon evaluators’ perceptions of repeated-event witnesses. During divorce proceedings for example, there may be a strong perceived motivation for the witness to fabricate abuse in order to gain sole custody of their children (Connolly, Coburn, & Yiu, 2015; Erez & King, 2000). In contexts of high suspicion such as these, evaluators are more likely to interpret aspects of the witness’ account as indicative of deception (Johnson et al., 1998). Moreover at trial, defence attorneys often draw attention to the quality of an eyewitness’ testimony to undermine their veracity and reliability. One of the most common techniques utilised is highlighting and manufacturing testimonial inconsistencies during cross-examination (Brewer, Potter, Fisher, Bond, & Luszcz, 1999; Fisher et al., 2009; Fisher, Vrij, & Leins, 2013; Pichler et al., 2020). This technique is likely to be especially problematic for repeated-event witnesses, who tend to report many more testimonial inconsistencies than witnesses to a single event, even in the absence of complex and misleading cross-examination style questions (Connolly et al., 2008; Powell & Thomson, 1996; Powell & Thomson, 1997b; Price et al., 2016; Zajac, Gross, & Hayne, 2003). Thus, although event repetition did not negatively affect the perceived credibility of truth-tellers in Experiment 6, this effect may be observed in forensic contexts, in which there are stronger contextual influences to undermine their credibility and raise suspicion regarding aspects of their testimony.

Experiment 6 was the first to investigate the effect of expert testimony upon perceptions of repeated-event witnesses. Prior research on expert testimony has predominantly explored whether an expert can reduce jurors’ belief in identifications that have been made under poor witnessing or retrieval conditions (see Matire & Kemp, 2011, for a review), and limited research has explored whether expert testimony can enhance evaluators’ belief in an eyewitness’ testimony (e.g., Goodman-Delahunty, Cossins, & O’Brien, 2010). Experiment 6 provided preliminary evidence that expert testimony may
enhance the perceived credibility of repeated-event witnesses, as the effect of event frequency upon perceived honesty, cognitive competence, and consistency depended upon the presence of expert testimony. Single-event speakers were perceived more positively on these measures than repeated-event speakers when an expert was absent. However the opposite effect arose when an expert testified. Notably, the presence of an expert had a focused effect. There were no main effects of expert testimony, indicating that an expert did not globally enhance the perceived honesty and cognitive competence of speakers. Moreover, in the presence of an expert, the perceived credibility of repeated-event speakers did not exceed that of single-event speakers. This pattern of results suggests that expert testimony sensitised evaluators to the effect of event repetition upon memory quality (Cutler, Penrod, & Dexter, 1989). Notably, this effect did not depend upon witness veracity, consistent with the robust finding that the accuracy of evaluators’ deception judgements are only slightly higher than chance rates (Bond & DePaulo, 2006). Previous research indicates that such low accuracy rates are attributable to limited objective differences emerging between truth-tellers and liars’ accounts (Hartwig & Bond, 2011). Thus, interventions which enhance the behavioural and verbal cues that differentiate truth-tellers and liars are the most promising means to improve the accuracy of deception judgements (Hartwig & Bond, 2011; Vrij & Granhag, 2012). Although this is a burgeoning field of research (e.g., Hartwig, Granhag, & Luke, 2014; Vrij, Fisher, & Blank, 2017), these investigations have only employed truth-tellers who recall a single event. Interventions which aim to enhance differences in verbal content (e.g., Colwell et al., 2007) cannot be generalised to repeated event truth-tellers. This is an important direction for future research.

Experiments 5 and 6 were also the first investigations to explore perceptions of repeated-event speakers relative to event-fabricators. Although there were no effects upon binary truth-lie decisions in both experiments, differences emerged on ratings of witness
credibility. Perceptions of eyewitness credibility are likely to be particularly influential on the outcome of evaluators’ decisions when there is limited additional evidence about a case, which is often true of recurring forensic events like domestic violence (ALRC & NSWLRC, 2010; Voogt, Klettke, & Crossman, 2019). In Experiment 5, liars were perceived as more honest and credible than repeated-event witnesses. In Experiment 6, the effect of event frequency upon perceived credibility depended upon speaker veracity, enhancing that of liars and reducing that of truth-tellers. These results may have arisen because the strategy that speakers employed differed according to their veracity. Truth-tellers typically recall the event from memory, whereas liars monitor their presentation and verbal content more heavily in order to appear credible (Granhag & Strömwall, 1999; Hartwig et al., 2010; Strömwall et al., 2006). The strategy of simply recalling an event from memory is particularly problematic for the relative perceived credibility of repeated-event witnesses, who rely upon event scripts to reconstruct occurrences, leading to source-monitoring errors (Experiments 1-2), and lower amounts of detail relative to liars (Experiments 3-4). Notably, speakers were interviewed using questions that could be anticipated (i.e., open-ended free-recall questions and cued-invitations about central aspects of the event). As liars typically prepare responses to questions that they expect to be asked, these questions likely assisted liars in generating a convincing account (Hartwig et al., 2007; Vrij et al., 2009). This advantage was likely enhanced in Experiment 5, as fabricators were given a long amount of time to imagine the event (to match the length of the healthy lifestyle session) and practiced retelling the event (as per Connolly & Lavoie, 2015). Prior research indicates that verbal differences in liars’ and truth-tellers’ reports tend to be enhanced when unexpected questions are asked. In response to unexpected questions, liars give shorter and less detailed responses than truth-tellers, although this effect tends to be absent or weaker when questions that can be anticipated are asked (Lancaster, Vrij, Hope, & Waller, 2013; Sooniste, Granhag, Kneips, &
Vrij, 2013; Warmelink, Vrij, Mann, Jundi, & Granhag, 2012; although see Parkhouse & Ormerod, 2018). The perceived credibility of event-fabricators relative to repeated-event truth-tellers when unanticipated questions are asked is an interesting direction for future research.

Limitations

There are a number of limitations to the research presented in this thesis. First, Experiment 1 utilised a subset of the interviews analysed in Experiment 3, and Experiment 2 utilised a subset of the interviews analysed in Experiment 4. This practice is acceptable because the respective experiments do not overlap in the research questions posed or the data analysed, however this practice does affect the generalisability of results (Drotar, 2010; Kirkman & Chen, 2011).

There are also limitations to the external validity of the research described in this thesis. For example, only undergraduate students were interviewed about the relevant events in Experiments 1-4. Further research is needed into how repeated events are recalled by participants from more diverse backgrounds, such as older adults. Previous research has found that older adults tend to rely more upon script memory than younger adults, and thus tend to recall fewer details which are not typical of the event script (cf. younger adults; García-Bajos, Migueles & Aizpurua, 2012). Moreover, older adults tend to have lower source monitoring accuracy than younger adults, especially when the sources are highly similar (Hashtroudi, Johnson & Chrosniak, 1989). These findings indicate that older adults are likely to have particular difficulty recalling occurrences of a repeated event. Recent research also indicates that vulnerable adults’ recall of a repeated event is poor. For example, when minimally verbal adults were interviewed about a staged repeated event, a third of participants responded incorrectly to a question about whether the abuse had occurred one time or more than one time (Bearman, Brubacher, Timms & Powell, 2019). Yet previous
research has found that young children rarely answer this question incorrectly (Bearman et al., 2019; Roberts et al., 2015). It is important that future research investigates interviewing techniques to improve recall amongst diverse samples, as they may benefit from a tailored interview structure. For example, Bearman et al. (2019) found that minimally verbal adults recalled more correct details when the interview was highly structured (through the use of visual aids or intermixing open and cued recall questions) than when the interview consisted of open-ended questions followed by cued recall, although this latter interview structure is typically recommended for non-vulnerable populations.

An additional limitation of Experiments 1-4 is that repeated-event participants only experienced four occurrences in Experiments 1-4, and all participants recalled the final (or only) occurrence after a one-week delay. However, witnesses to repeated forensic events such as domestic violence are likely to experience the event on many more occasions and may be required to recall specific occurrences after a much longer delay (Birdsey & Snowball, 2013; UNHCR, 2013). Unfortunately, these factors are likely to further impair credibility. Additional experience with an event consolidates one’s general memory representation and reduces the accessibility of episodic memories (Brainerd & Reyna, 2004; Connolly & Gordon, 2014). Moreover, single- and repeated-event witnesses typically report less information after a delay (Powell, Thomson, & Dietze, 1997; Price & Connolly, 2013; although not always, see La Rooy, Lamb, & Pipe, 2009, for a review). For memories of a repeated event, certain types of information decay more rapidly than others, with memories for the temporal source of experienced details (i.e., during which occurrence they were experienced) decaying more rapidly than the content of the details themselves (Powell & Thomson, 1997a). Thus, the source-monitoring errors committed by children who recall a repeated event increase over a delay (Powell & Thomson 1997b, Slackman & Nelson, 1984). As episodic memories decay, scripts are increasingly relied upon to reconstruct occurrences
(Hudson & Mayhew, 2009). Due to this increasing reliance upon general event representations after longer delays, individuals often incorrectly attribute specific details that were typically present during the event, to the occurrence they recall (Powell & Thomson, 1996). For example in one experiment, children who had experienced multiple health examinations tended to mistakenly attribute typically occurring details, to the examination they were questioned about (e.g., that their heart was checked by the physician using a stethoscope; Baker-Ward et al., 2020). The attenuation of memory for event occurrences over a delay also has implications for deception detection. Although repeated-event witnesses are likely to have more generic accounts after longer delays, liars tend to report equivalent amounts of detail about a fabricated event over a delay (Harvey, Vrij, Hope, Leal, & Mann, 2017; Harvey, Vrij, Leal, Hope, & Mann, 2017; Harvey, Vrij, Leal, Hope, & Mann, 2019). Thus, the effectiveness of content analysis techniques in discriminating veracity when speakers recall a repeated event may be even weaker after a delay.

**Implications and Directions for Future Research**

The experiments presented in this thesis examined the perceived credibility of repeated-event witnesses along the dimensions of cognitive competence, honesty, and overall perceived credibility. Overwhelmingly, the results indicate that on many of these measures, genuine repeated-event witnesses are less credible than witnesses who recall a single event, and even liars. Thus, the results suggest that the expectations for repeated-event witnesses, imposed by current legislation and policy, are incongruent with the intrinsic quality of memory. Specifically, the expectation for adults to accurately recall specific occurrences of a repeated event in detail is likely to harm the credibility of genuine witnesses. These findings have implications for legal practice and further research, which will be discussed in turn.

The legal expectations for adult repeated-event witnesses should be informed by research on the scientific structure of memory quality. In response to the growing awareness
that children have difficulty recalling specific occurrences of repeated abuse, a number of jurisdictions in Western countries have adopted continuous child sexual abuse statutes which relax particularisation requirements (Woiwod & Connolly, 2017). This legislation does not extend to non-vulnerable adults who allege recurring abuse (Woiwod & Connolly, 2017). However in recent years, numerous jurisdictions in the United Kingdom have introduced legislation to criminalise the ongoing non-physical abuse that is common to intimate partner violence (see McMahon & McGorrery, 2020, for a review). Such legislation departs from the traditional framework of prosecuting domestic violence by proving individual incidents of physical violence (Wangmann, 2020). Although this legislation has the potential to reduce particularisation requirements, there is limited evidence that it has changed practice and there are concerns that it may effectively require complainants to particularise multiple incidents to prove that the abuse was recurring (Walklate, Fitz-Gibbon, & McCulloch, 2018; Wangmann, 2020). Similar problems have been encountered enacting continuous child sexual abuse statutes. This legislation is often underutilised due to a variety of factors including statute complexity and concerns that the accused cannot defend themselves against a more general charge (Woiwod & Connolly, 2017). Thus, legislation alone seems inadequate to effect change. It is also noteworthy that adults could recall many unique details about occurrences of a repeated event in Experiments 1 and 2. Primarily, they had difficulty attributing these details to the occurrence on which they were experienced. Ideally, legal practice and policy should account for repeated-event witness’ strong memory of what typically occurred and accommodate their tendency to experience source confusions when recalling unique details. However, the most effective means to achieve this in practice is clearly a complex issue, and the subject of continuing debate (Wangmann, 2020; Woiwod & Connolly, 2017).

Alongside practice which takes the frequency of source-monitoring errors into account, memory mnemonics should be employed to facilitate accurate recall. Unfortunately,
particularly in adults, there has been limited research on this topic (see Brubacher et al., 2014, for a review of research on interviewing child repeated-event witnesses). The mnemonics which have been investigated in adults have primarily used naturalistic designs in which neither baseline accuracy, nor the types of details recalled (e.g., whether they were true of all event occurrences) can be examined (Rivard et al., 2014; Willén, et al., 2016; Willén et al., 2015). There are a number a promising avenues for future research.

The order of generic and episodic invitations has been found to affect children’s recall of a repeated event. When invitations that probe what typically occurred during an event are asked prior to questions about specific episodes, children recall more details relative to when these invitations are asked in the reverse order (Brubacher, Earhart, Roberts, & Powell, 2018; Brubacher et al., 2012; Connolly & Gordon, 2014). As this technique is especially effective in eliciting accurate and complete recall from older children, it may be a particularly valuable intervention for adults (Brubacher et al., 2018; Brubacher et al., 2012). This technique may additionally enhance perceived credibility, as recalling a generic script facilitates narrative coherence, which is likely to positively influence perceived credibility (Feltis et al., 2011; Newman & McGregor, 2006).

Another potential means to enhance particularisation and accurate source monitoring is through immediate recall. Previous research conducted on memory for a single event has found that adults who engage in high quality immediate recall tend to have more accurate and complete recall after a delay than adults who did not engage in immediate recall, or completed a low quality account (Gabbert, Hope, & Fisher, 2009; Hope, Gabbert, Fisher, & Jamieson, 2014; Horry, Hughes, Sharma, Gabbert, & Hope, 2020; Krix, Sauerland, Lorei, & Rispens, 2015; Paterson, Eijkemans, & Kemp, 2015). Preliminary evidence suggests that immediate recall may strengthen episodic memory for repeated-event occurrences. Hudson (1990) found that when children were questioned about one event occurrence after a four-
week delay, children who had been interviewed immediately afterwards recalled more information than those who did not receive an early interview. Moreover, 5-year-old children who engaged in immediate recall reported fewer internal intrusions than those who did not, though this effect was not observed amongst children who were 3 years of age. These findings are consistent with similar research, which has found that the benefit of repeated recall upon children’s memory for a single event is stronger amongst older than younger children (Fivush & Schwarzmueller, 1995). Moreover, Poole and White (1991) found that immediate recall after a single event enhanced the amount of accurate information that adults, but not children, reported one week later. Thus, the benefits of immediate recall upon repeated-event memory may be more marked in adults than children. As outlined in Chapter 2, one prior experiment has investigated the effect of immediate recall upon adults’ repeated-event memory (van Golde et al., 2017). In this experiment, participants observed four videos of domestic violence over four weeks, and either composed a guided free recall account after observing each video or did not (control). All participants recalled the videos one week after observing the fourth video. The number of correct details reported by participants did not differ according to whether they had engaged in immediate recall, however the number of confabulations was lower in the immediate recall condition. Although this result is promising, it is unclear whether immediate recall reduced source confusions, as the authors did not distinguish between internal and external intrusions. In previous experiments that explored the effect of immediate recall upon memory for a repeated event (Hudson, 1990; van Golde et al., 2017), recall was guided by generic questions. It is possible that the benefits of immediate recall upon source-monitoring accuracy may be more marked if questions that elicit details about unique aspects of the occurrence are asked, such as how the episode differed from previous occurrences. These questions may consolidate verbatim memory traces which encode the source of unique details, reducing source confusions (Brainerd & Reyna, 1990).
As immediate recall accounts of repeated-event episodes can be quite accurate and complete (Fivush et al., 1992; Hudson, 1990), this technique has the added benefit of providing contemporaneous evidence to corroborate the complainant’s testimony, supporting their credibility (van Golde et al., 2018). One means through which this could be achieved in practice is through the smartphone application iWitnessed, which employs a guided recall procedure to collect high quality immediate recall accounts from eyewitnesses (Paterson, van Golde, Devery, Cowdery & Kemp, 2018; van Golde, Dilevski, Deck, Cullen, & Paterson, 2018). This immediate recall tool is readily accessible for witnesses in Australia, and can be used to record details about occurrences of a repeated event.

**Final Conclusions**

The research presented in this thesis provides a unique contribution to our understanding of the credibility of adult repeated-event witnesses. Experiments 1 and 2 extended previous research by using controlled methodologies to elucidate adults’ ability to recall unique aspects about one occurrence of a repeated event. Subsequent experiments examined novel research directions. Experiments 3 and 4 were the first investigations into the efficacy of the content analysis technique, reality monitoring, in discriminating veracity when adults recall a repeated event. Moreover, Experiments 5 and 6 investigated relative perceptions of repeated-event speakers and fabricators. Overwhelmingly these experiments indicate that even under relatively optimal conditions, including short retention intervals (1 week) and the absence of post-event misinformation, repeated-event witnesses are unlikely to be perceived as highly credible. However, these witnesses were reliable in many ways – reporting many details they encountered during the event and rarely reporting details they did not experience. Future research should investigate means to enhance the credibility of repeated-event witnesses, such interventions to improve adults’ source-monitoring accuracy. It is hoped that this thesis promotes further collaboration between experts in memory and the
law, to enhance the congruity between legal processes and the quality of memory for a repeated event.
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