Effects of Interpersonal Relationships on Shared Reminiscence

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Whose Memory is It?

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I declare that this book is my own original work. Any assistance or information I have received in developing the materials herein is duly acknowledged.

Candice E. Condon

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ABSTRACT

This book documents the results of a research project investigating the effects of interpersonal relationship factors on shared reminiscence. Although reminiscence and the factors that influence it have been researched more in recent years, there has been limited research measuring the specific interpersonal effects of familiarity, trust, confidence and memory esteem on memory distortion, specifically memory conformity and false memory. The research presented in this book sought to fill the void in the shared memory literature and propose the use of image recording technology for assessing the impact of dyadic memory conformity on memory recognition.

There are four empirical chapters (2–5) in this book. Within these four chapters are four separate and related studies that examine the effects of familiarity, trust, confidence and memory esteem on memory distortion for ordinary events and for flashbulb memory of the terrorist attacks of September 11th, 2001, along with the use of image recording technology (SenseCam TM) as an objective measure of memory distortion between dyadic members. In Chapter 2, it is hypothesized that familiarity and trust would interact with reminiscence type (discussion vs. revision) between dyadic members and result in an increase in memory conformity (both corrective and distortive) and false memory. The findings were consistent with the hypothesis. Chapter 3 follows by investigating interpersonal constructs on ordinary events using flashbulb memory of 9/11 as the stimulus and focusing on interpersonal familiarity, trust, confidence and memory esteem. It was expected that due to people being protective of their memories for meaningful and emotional flashbulb events, there would be low levels of memory conformity. However, with the social power of discussion, as evident in Chapter 2, people would possibly alter their memories in favour of another person they know. We proposed a new concept and termed it memory esteem, and predicted that this would negatively relate to memory conformity. The findings were consistent with the expectation. Chapter 4 investigates the impact of using visual record keeping for dyadic members undertaking everyday tasks and its subsequent effects on memory distortion. It was found that image diary technology and its interaction with interpersonal trust and memory esteem had effects on lowering memory conformity. Having investigated shared

reminiscence and the outcomes for memory conformity and false memory in the previous chapters, in Chapter 5 we examined individual recognition memory and found that memory esteem negatively predicted corrective and distortive memory conformity, leading to positive and negative outcomes for recognition memory.

In sum, the research presented in this book suggests that interpersonal relationship factors have important influences on shared reminiscence and subsequent memory distortion. Further, that the visual record keeping could be further used as a tool for investigating normal memory function and possibly for aiding conformity reduction. These findings fill a gap in the shared memory research and the important implications of these findings for everyday life and for the judicial system are discussed.

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CHAPTER ONE

INTRODUCTION

Memory is an important aspect of every person's life. Imagine one day you are reminiscing with your brother. He recounts his memory of how Misty the dog died. "I remember clearly when Misty was knocked down outside our house by a green truck and died instantly." I look at him in confusion as I vividly remember Misty being run over by a car outside my house (many streets away), being brought to the vet for surgery and living for many months before eventually dying from his injuries. I narrate my memory of the same event to my brother and then he too looks confused. These were such contrasting memories that I was intrigued; and I also felt protective that this memory, which I held dear, was the accurate one. This is not an uncommon experience for many people sharing reminiscences of past events with another person, often with very different memories. When I enquired how my brother had attained this memory, he then questioned whether it was how he actually remembered it or if it had been altered based on discussions with our parents and other individuals. It is quite possible that both our versions had been distorted and changed based on social interactions with other people.

You rely on your memories for who you are as a person, where you have been and what you have experienced in your life to date. But what if it turned out that these memories that you hold closely weren't your memories at all or what had occurred was completely different to how you remember it? What if they were someone else's memories? Without documented written or recorded evidence, how do we ever know whether our memory is ours or that we have altered our memory in favour of someone else's, possibly someone we know? The current research aims to address these questions.

Memory is fallible, malleable and vulnerable to alteration. Memory is not comparable to a photograph, unchanged by time (Schacter, 1999). It is constantly reconstructed, distorted and contaminated by our interactions with our environment and with others. It is commonly accepted that the social environment and our peers influence our memories of events, and this is arguably most evident in the smallest but most common of all

groups; the dyad (pair of individuals). We all engage and interact with another person in our daily lives and have interpersonal relationships with individuals such as siblings, romantic partners, friends, parents, work colleagues, teachers, etc. So how do these interpersonal relationships affect our reminiscence of past event details?

Shared Reminiscence

Remembering can be an inherently social process in that we often share our reminiscences in a group context, with people or another person (Barnier & Sutton, 2008). Shared reminiscence, in the current research, is defined as remembering (retrieving) past event details or items via interaction with another individual in a dyad. According to Roediger, Bergman, and Meade (2000: 129), "In many circumstances in society remembering is a social event." Most often, we remember events with one other person, which we do in a dyad, such as when siblings discuss the death of a beloved pet, friends reminisce about a concert they attended, romantic couples discuss a movie they watched together or work colleagues remember the events of an accident they witnessed. Wegner (1987) determined that individuals in dyads share memory storage, in what he termed transactive memory, and suggested that people have their own internal memory storage but when interacting with others have access to an external memory. This is the case specifically when dyadic members share a group mind for accessing memory of past events due to a cognitive interdependence on one another's memory for an event (Wegner, Giuliano & Hertel, 1985). According to Wegner, Erber, and Raymond (1991), pairs of romantic partners outperformed unacquainted impromptu partners in memory performance tasks due to a shared storage system from which each individual can retrieve their memory. Though the transactive memory theory of dyadic memory may highlight some benefits of shared reminiscence, it is widely accepted that the cognitive and social influences of one person's memory on another's have distortive effects for shared remembering, and these consequences have been recognised to a large extent in eyewitness testimony research (Brainerd, Reyna & Ceci, 2008; Lane & Zaragoza, 2007; Loftus, 2003; Memon, Zaragoza, Clifford & Kidd, 2010; Pezdek & Lam, 2007).

Eyewitness Testimony

The judicial system, law professionals and, in particular, members of a jury often assume eyewitness accounts from individuals are dependable

and reliable, and they are inclined to overestimate the trustworthiness of them (Loftus, 1996). Jurors have a particular tendency to accept that an eyewitness's memory of an event is accurate if this eyewitness is confident about the details and subsequent identification of a suspect (Cutler, Penrod & Dexter, 1990). Indeed, most of the innocent people exonerated by DNA evidence in recent years had been initially convicted mainly due to mistaken eyewitness testimony (Wells et al., 1998). Research has revealed that faulty eyewitness evidence is the most common reason for false convictions (Huff, Rattner & Sagarin, 1996; Scheck, Neufeld & Dwyer, 2003). Gross, Jacoby, Matheson, Montgomery and Patel (2005) found that eyewitness error was to blame in 50 percent of the wrongful homicide convictions and 90 percent of the wrongful rape convictions later vindicated by DNA evidence in the US between 1989 and 2003. Bearing in mind how much research has been done on ensuring that the implementation of other types of forensic evidence is accurate, it is paradoxical that the judicial system has not until recently paid attention to research regarding the reliability of eyewitness memory (Wells, Memon & Penrod, 2006).

Post-event Information

It has been suggested that problems in eyewitness testimony accuracy could be attributed to people encountering information after the event has occurred (post-event information), which has been found to distort memory of an event, and which is particularly influential when the post-event information is inaccurate, also known as misinformation (Loftus, 2003; Nourkova, Bernstein & Loftus, 2004; Semmler, Brewer & Wells, 2004; Wells & Bradfield, 1998). There are a number of ways that people can encounter post-event information and, specifically, misinformation regarding an event, such as through the media or the introduction of suggestive or leading information (Gabbert et al., 2003; Hirst & Echterhoff, 2012), what we refer to as purposeful post-event information in the current research. Possibly the most influential way to encounter post-event information is via social interaction with another person, through discussion or hearing another person's memory of an event (Roediger, Meade & Bergman, 2001; Wells, Memon & Penrod, 2006; Wright, Self & Justice, 2000). Wright and Stroud (1998) revealed that one of the most frequent ways individuals encounter misinformation that can distort their memory of an event is through media reports. In a study by Loftus (1978), it was demonstrated how misinformation can be adopted by another person, which can then distort their memories of the event.

Previous studies have revealed the effects of using post-event narratives for introducing misinformation and the outcome for memory distortion (Allen & Lindsay, 1998; Belli, Lindsay, Gales & McCarthy, 1994; Searcy, Bartlett & Memon, 2000; Sporer, Penrod, Read & Cutler, 1995).

Misleading and suggestive questions or statements are one of the main ways that post-event information is introduced into remembering and can subsequently result in the distorted memory retrieval of an event (Loftus, Miller & Burns, 1978; Loftus & Palmer, 1974). The research findings of Higham, Luna and Bloomfield (2011) showed that providing misleading information about the details of a crime scene resulted in an impairment of memory correctness but had no effect on metacognitive resolution. In one study which shows the effects of post-event information on reminiscence, participants were shown images of an accident, showing a stop sign at an intersection (Loftus, 1978). Half of the participants were subsequently presented with a leading question that intimated there was a yield (give way) sign at the scene of an accident while the other half were not exposed to misleading post-event information. During a memory recognition test, the participants who had receive the leading false information were more at risk for remembering that the yield sign was part of the original incident compared to those who had not received the suggestive misinformation.

The most common way and, arguably, the way that has the most powerful effects on shared reminiscence and subsequent memory distortion is encountering post-event information from another person in a pair (Coman, Manier & Hirst, 2009; Loftus, 2003; Luus & Wells, 1994; Gabbert et al., 2004; Paterson & Kemp, 2006, Hirst et al., 2009; Skagerberg & Wright, 2008). Research suggests that two of the main consequences of encountering post-event information and a reason for weaknesses and failings in eyewitness testimony and the outcomes for memory distortion are memory conformity (Wright, Self & Justice, 2000), also known as the social contagion of memory (Roediger, Meade & Bergman, 2001), and another form of memory distortion known as false memory (Loftus & Pickrell, 1995). We will examine the memory conformity literature then the closely related but conceptually different phenomenon of false memory and whether the social effects and consequences of memory distortion and illusions can have positive as well as negative outcomes for shared reminiscence, specifically memory conformity and false memory. We will then examine the factors that contribute to such a phenomenon of contamination. Before we review such literature, we will first provide a rationale for this research being based on recognition memory rather than recall memory.

Recognition Memory

In the current research, we decided to focus on recognition memory as opposed to recall memory. The rationale for this was that as the present research is based on remembering in the presence of another person and investigating resulting memory distortion as the effect of interpersonal constructs between these individuals, a recognition-based design would give a wider pool of data whilst also being specific to what we wanted to focus on and investigate. Memory recognition tests are used in memory research when you want to minimize the cognitive resources spent by the participants and maximize data in a relatively short time during an experimental study (Busey, Tunnicliff, Loftus & Loftus, 2000; Glucksberg & McCloskey, 1981). Recognition memory is beneficial when you want to acquire a specific insight into participants' choices other than what they usually recall freely from memory (Mecklinger, Brunnemann & Kipp, 2011; Nourkova et al., 2004), which was the case in the present studies.

Using recall models can result in more items and event details remembered; however, it can subsequently relate to higher levels of falsehoods and lower accuracy (Kintsch, 1968; Koriat, Goldsmith & Pansky, 2000). On the other hand, recognition memory provides participants with items to respond to and therefore reduces the number remembered but also lowers possible levels of false memory occurrence and often leads to more accurate remembering (Loftus, 2003). A further rationale for investigating recognition memory is that it has been somewhat preferred specifically in previous experimental designs of memory conformity and false memory studies that relate to the current research (Wright et al., 2000), though cued recall has also been used in experimental design to elicit memory conformity (Gabbert, Memon & Allan, 2003). Old/new recognition tests have been more commonly used in conformity experiments and they make scoring and measurement of memory conformity outcomes easier to examine.

There are also models that incorporate both memory recognition and recall (e.g. Wright, Gabbert, Memon & London, 2008). Wright et al. (2008) carried out two experiments testing memory conformity, with one using free recall and one utilizing recognition stimulus, and found that memory conformity was present in both studies. In a forensic context, it has been found that, specifically in police interrogations, memory conformity occurs for both recognition and free recall when one person hears the memory of another person though in varying contexts of remembering (Searcy, Bartlett & Memon, 2000). Though the cognitive interview has been utilized in interrogational contexts as a tool to increase accurate witness reports and reduce memory falsehoods, by its nature it

involves memory recall by encouraging witnesses to report everything witnessed, which can encourage vast details, both accurate and inaccurate, being remembered (Memon, Meissner & Fraser, 2010). Recognition tasks afford memory cues that enable searching through memory, making it less problematic to recognize elements than recalling them from memory without such cues (Shiffrin & Steyvers, 1997).

In everyday life, there is an emphasis on minimizing the need to freely recall information from memory, for example, auto-complete suggestion forms and visual imagery support, to make common decisions easier. As much of our research is designed to reflect interactions between individuals and shared remembering in everyday life and publicly experienced events, our main reason for using memory recognition is that it gives us a clearer picture of what is occurring, specifically relating to memory distortion. However, it must be recognized and noted that a perilous issue of prolonged standing in the study of memory is concerned with the relation between recognition and recall in that it remains to be determined in what sense they are similar to each other in terms of memory function and outcome and in what sense they differ (Tulving & Watkins, 1973). Future research should strive to incorporate a design that is relevant to investigating such shared remembering in interpersonal contexts using both recognition and recall in order for the findings to be applicable to the wider memory literature.

Memory Conformity

Memory conformity occurs when a person alters their original memory of an event or item in favour of another person's memory (Gabbert, Memon & Allan, 2003; Wright et al., 2000). Though it has been extensively found in research that social interactions affect memory conformity, there has been little research recognizing that there are two possible specific outcomes for memory conformity – positive and negative. In the present research, when one person alters their memorial response in favour of another person's, and this memory was originally inaccurate but is subsequently accurate, this is termed corrective memory conformity. Alternatively, when a person changes their memorial response in favour of another person's response and it is subsequently inaccurate, this is termed distortive memory conformity. Memory conformity (positive and negative) is possibly most prevalent during social exchanges where one individual's memory of an event often influences that of another individual's in a pair (Gabbert, Memon, Allan & Wright, 2004; Roediger et al., 2001; Hirst & Echterhoff, 2012; Paterson & Kemp, 2006).

In this research, we refer to two types of social reminiscence between individuals in a pair – discussion (verbal exchange of information) and revision (non-verbal exchange of information) – and address the varying effects that these types of reminiscence have on memory conformity, both positive and negative. It is common to term all changes from an original response as memory conformity rather than specifically addressing two separate end products as a result of memory distortion. However, the somewhat related research findings on the positive and negative outcomes for memory conformity as a result of varying reminiscence types (discussion vs. revision) will be reviewed.

Verbal Discussion and Memory Conformity

Discussion between individuals, particularly in a dyad, is one of the main ways of naturally introducing post-event misinformation, which often results in one person distorting their original memory and adopting the memory of the other person, due to accepting the post-event information supplied by that person (Hewitt, Kane & Garry, 2013). It has come to be accepted that discussion between individuals in a pair or co-witnesses can improve but also contaminate memory of items and events (Barber, Rajaram & Fox, 2012; Allan & Gabbert, 2008; Hirst & Echterhoff, 2008; Paterson & Kemp, 2006; Wright et al., 2000). Jack, Zydervelt and Zajac (2013) found that misinformation presented by a co-witness in a pair did not decrease accuracy, in contrast to the findings of Garry, French, Kinzett and Mori (2008). Reysen (2007) highlighted the effects of social pressure on memory alteration for shared memory retrieval by demonstrating that when participants had conformed in their memorial responses to incorrect confederate memories in a group test, they were subsequently more likely to make recognition mistakes when responding on their own in the final recognition test. Other research revealed that group memory does not often measure up to the accuracy of combined individual memory performance scores (Basden, Basden, Bryner & Thomas, 1997; Lamm & Trommsdorf, 1973; Weldon & Bellinger, 1997).

Rajaram (2011) claims that collaborating on memory tasks with another person both helps and impairs memory performance. According to Sarwar, Allwood and Innes-Ker (2011), verbal conversation between individuals of an experienced event can diminish some aspects of favourable memory and metamemory outcomes caused by simple retelling, but may have no substantial negative influence compared to a control group. Marsh (2007) suggests that people retell events rather than

remember them, and the outcome is dependent on the social context of the reminiscence. There is a body of research demonstrating that reference to inaccurate details during these discussions can lead to significant memory alteration of an event (Candel, Memon & Al-Harazi, 2007; Dalton & Daneman, 2006; Gabbert, Memon & Wright, 2007; Garry, French, Kinzett & Mori, 2008; Hope, Ost, Gabbert, Healey & Lenton, 2008; Paterson & Kemp, 2006). Using a method called the MORI (manipulation of overlapping rivalrous images) technique, it was revealed that participants often modify their memory of an occurrence after conversing about the event with someone who had seen a different version of the video (Kanematsu, Mori & Mori, 2003). According to Kanematsu et al. (2003), this was particularly evident when they were asked to come to an agreement about what happened. A significant number of studies have attested to the negative effect of suggestive or misleading questioning on eyewitness accuracy (Bekerian & Bowers, 1983; Cole & Loftus, 1979; Loftus, Levidow & Duensing, 1992; Strange, Hayne & Garry, 2008; Sutherland & Hayne, 2001; Wagenaar & Boer, 1987).

However, the research that suggests that discussing accurate post-event information can lead to improvements in memory following shared memory retrieval is growing (Basden, Basden & Henry, 2000; Howe, 2011; Maki, Weigold & Arrellano, 2008; Marsh, Tversky & Hutson, 2005; Takahashi, 2007; Wegner et al., 1991). Particularly in interpersonal relationships, memory conformity can result in more accurate memories of an event compared to accuracy rates when a person does not change their original memorial response (Wright & Villalba, 2012). Koriat and Goldsmith (1996) claim that as evidence shows that what people free recall about an event tends to be accurate, it can be reasoned that even if the effect of memory conformity was the same for correct and incorrect information, memory conformity would tend to increase accuracy in most contexts. Roediger et al. (2001) established that memory conformity can result in improved accuracy for reminiscence after a discussion between a person with a consistent memory and one with a poor memory. Inaccurate memories have been found to be more susceptible to memory conformity than accurate memories (Wright & Villalba 2012). According to Hollin and Clifford (1983), people who discuss an event in groups have less accurate memories than people who did not discuss their memories of the event.

Crutchfield (1955) found that when virtual confederates were used in place of real accomplices, participants often conformed in their responses to both accurate and inaccurate memories in a group test. In a study by Wright and Carlucci (2011), it was determined that memory conformity is

not only influenced by verbal discussion between individuals but also to the speaking order of those involved in the discussion. Hirst and Echterhoff (2012) attested to the power of conversation between dyadic partners due to a shared cognitive interdependence and reliance on one another's memory of an event. Hence, memory conformity is encouraged and promoted by this social power of conversation (Brown, Coman & Hirst, 2009). It is therefore clear that discussion with another person in a pair is a powerful contaminator of memory, but what about other social interaction which does not involve verbal conversation but rather the non-verbal exchange of one another's memories? Now, the outcome for non-verbal revision of one another's memories in a dyad will be reviewed.

Non-Verbal Revision and Memory Conformity

Recounting a memorial event through the non-verbal transfer of information with another person, such as reading a narrative, has also been found to encourage memory conformity between dyadic partners (Tousignant, Hall & Loftus, 1986). Paterson and Kemp (2006) referred to constructs like the ones we examined (discussion vs. revision) in the current research when they examined the effects of direct versus indirect transfer of information between dyadic members. Wright and Stroud (1998) illustrated how participants who read a brief summary of a crime provided by another person, which included inaccuracies, subsequently incorporated incorrect event details into their own remembering of the occurrence. According to Thorley and Rushton-Woods (2013), over one-third of participants who read a written leading statement afterwards accused the same person as the eyewitness did in their memory report. Witnesses who hear a co-witness choose from a line-up before it is their turn are more likely to identify the same suspect as a result of social pressure, even without direct one-on- one interaction (Levett, 2013; Wright & Schwartz, 2010). Interestingly, Bodner, Musch and Azad (2009) suggested that the dyad group involved in social interaction was not more likely to report inaccurate and non-witnessed incidences than was a group that obtained another person's report of the event by reading their written report.

Previous co-witness research has demonstrated that using suggestive line-up instructions or a concurrent line-up can decrease an individual's decision criterion, which in turn fosters more instances of guessing behaviour (Flowe & Ebbesen, 2007; Greathouse & Kovera, 2009; Meissner, Tredoux, Parker & MacLin, 2005). Goodwin, Kukucha and Hawks (2013) determined that accomplices who engaged in memory

retrieval before participants affected both their private and public memory reports for correct information but only impacted public reports for incorrect information. Recognition memory was affected by memory conformity when people were asked about their memories after being presented with another individual's written report, therefore social effects between dyadic members are evident even when the exchange is non-verbal and non-interactive (Schneider & Watkins, 1996; Skagerberg & Wright, 2008; Wright, Mathews & Skagerberg, 2005). In a study by Douglass, Smith and Fraser-Thill (2005), co-witness information influenced witness identification reports without interaction with a co-witness via the memory of someone else, which was provided through a line-up administrator (Douglass et al., 2005).

In an interesting finding, Merckelbach, Roermund and Candel (2007) showed that a co-witness denying accurate information can have just as powerful an influence on memory retrieval as a co-witness providing inaccurate reports. Participants who heard a co-witness choose from the line-up were more likely to also choose a suspect from the line-up than those who heard no co-witness selection or who heard the co-witness state that the suspect was not in the line-up (Carol, Carlucci, Eaton & Wright, 2013; Levett, 2013). The findings of a study by Schneider and Watkins (1996) showed that what the first person remembered and reported affected what the second person reported, resulting in conformity to the first person's memory and, further, the chance of memory conformity was reduced when a presented item was rejected by the affiliate. This finding is like that of Wright et al. (2005), who determined that the effect of memory conformity is particularly great when one individual in a pair suggests before the other individual that a non-witnessed item has been seen as opposed to when it is suggested that a witnessed item has not been seen.

Shaw, Garven and Wood (1997) undertook studies exploring the effect of memory conformity when witnesses are given accurate or inaccurate information about what other witnesses have said but without the witnesses interacting with each other. The information was provided by the researcher rather than a co-witness directly and findings showed that many inaccuracies were reported due to conforming to the other person's memory. That being said, overall, non-verbal interaction has been found to be a less social process than dyadic discussion; hence, such communication results in lower levels of memory conformity than a discussion between individuals in a pair (Gabbert et al., 2003; Paterson & Kemp, 2006). The reason for conversation having a more influential effect on memory conformity could possibly be due to a cognitive interdependence on one another in pair (Brown et al., 2009; Hirst &

Echterhoff, 2012) though revising one's memory of an event has also been found to have effects, albeit diminished, for memory change (Coman et al., 2009; Schneider & Watkins, 1996). In the current research, we were interested in further pursuing the difference between discussion and revision (reminiscence) of one another's memories as there is a lack of empirical findings relating to comparing them. Most research compares discussion between group members versus no discussion and comparing with grouped individual scores. Further, there is limited research that addresses discussion vs. revision in the context of distortive versus corrective memory conformity in shared memory retrieval research.

False Memory

A further consequence of shared reminiscence between individuals in a dyad that is often evident is false memory of events and items (Roediger & Gallo, 2004). Through providing suggestive statements and asking leading questions, Stark, Okado and Loftus (2010) showed that individuals, under varying social influences, regularly remember false and non-witnessed details of an event. In fact, the powerful nature of leading questions and suggestibility are elements that frequently enhance memory distortion, particularly when provided as misinformation, during shared retrieval (Gallo, 2013; Higham et al., 2011; Loftus, Miller & Burns, 1978; Roediger, Bergman & Meade, 2001). According to the research findings of Hyman and Kleinknecht (1999), there are three fundamental conditions that encourage people to retrieve false memories of an event or item. At the outset, an individual has to accept and have no doubt that the incident occurred, they will construct a memory of the event and, finally, a source-monitoring inaccuracy must occur in which a person perceives the false memory as their own original memory (Hyman & Kleinknecht, 1999). Research has established that in the context of memory reconstruction, post-event information and misinformation in particular can contaminate the memory a person retrieves, and can in turn have consequences for the false reporting of remembered items (Higham et al., 2011; Nourkova et al., 2004; Roediger & Gallo, 2004). Specifically, events that are comparable and have occurred in related contexts can become entangled and subsequently the particular event details can be disordered and muddled and include falsehoods due to misattributing memories to events that occurred previous to the event of interest (Jack et al., 2013; Loftus, 2003; Stark et al., 2010; Zaragoza, Mitchell, Payment & Drivdahl, 2011).

Previous research distinguished between two paradigms for false memory construction: The misinformation paradigm (Loftus 2003) and the

Deese-Roediger-McDermott paradigm (DRM) (Roediger & McDermott, 1995). Although both are related to false memory creation, the former is based on providing people with misinformation whereas the latter is focused on providing word lists associated with critical non-presented words. These paradigms may be similar in theory but they function under varying conditions and contexts (Gallo, 2010). Initially, the misinformation paradigm for enhancing false memory will be reviewed, followed by research that utilized the DRM in the formation of false memories as a consequence of shared reminiscence. Loftus (2003) established that the misinformation effect is generated most often when individuals are provided with inaccurate, non-witnessed post-event details, which in turn leads to the incursion of false details in people's memory reports. As a consequence of this misinformation effect, non-presented items and event details have been reported; for instance, wounded animals that weren't there (Nourkova et al., 2004) and broken glass at the scene of a crash when there was no broken glass present (Loftus, 2003). It has been found that due to the fallibility and reconstructive power of human nature, it is relatively easy to implant entire false events that were not part of the original incident (Bjorklund, 2000; Loftus & Pickrell, 1995; Reyna & Brainerd, 1998; Thomas & Loftus, 2002; Wade, Garry, Read & Lindsay, 2002). It has been suggested that recognition memory items are even more susceptible to false remembering than events that are recalled freely (Wright, Loftus & Hall, 2001). Research findings have suggested that there are two dominant types of false memory – rich false memories that are consistent and confident memory accounts, and more temporary, doubtful and changeable temporary false memories (Loftus & Bernstein, 2005).

The DRM paradigm is based on creating false memories by encouraging people to report non-present critical words through the use of associated word lists, which can reflect how post-event information influences everyday social remembering (Cann, Rae & Katz, 2011; Meade, Watson, Balota & Roediger, 2007; Sugrue & Hayne, 2006; Watson, McDermott & Balota, 2004). In the DRM false memory paradigm, false memory is measured by individuals reporting non-studied and non-presented critical words that were not part of an original word list but which they have later been exposed to as post-event information. An example of such critical words is man, which may illicit the false reporting of associated words like woman, husband, person, male and handsome. The critical words most often used out of a possible 55-word list are the ones with the highest backward associative strength (BAS) and forward associative strength (FAS), and gist-based remembering (Cann et al.,

2011; Parker & Dagnall, 2007; Roediger et al., 2001; Roediger & McDermott, 1995; Gallo, 2010). This approach based on BAS and FAS has been found to provide the clearest operational definition of a variable known to influence false memory construction during memory retrieval (Gallo, 2013; Roediger et al., 2001). In his earlier false memory research relating to the DRM, Roediger (1996) coined the term "memory illusions" to attempt to convey the variety and assortment of possible false memories, proposing that false memories are rarely similar to one another on any two separate occasions. Research has found that internal and external post-event encounters in the form of misinformation have been shown to affect memory retrieval correctness by maintaining and fortifying elements of false memory (Bergman & Roediger 1999; Higham et al., 2011; Macrae, Schloerscheidt, Bodenhausen & Milne, 2002).

Lately, researchers have questioned and argued over the relatedness of both false memory paradigms, with the consequence that both measure the same thing in the form of false memory production, though in reality this may not be the case (Ost et al., 2013; Wade et al., 2007; Zhu et al., 2010). Gallo (2010) advocated that there are often numerous disparate psychological processes in operation during false memory formation within the two false memory paradigms. Zhu et al. (2013) suggested that the paradigms measure various outcomes for false memory and advised that there is a limited relationship between the misinformation and DRM paradigm, and have further questioned the relevance of using the DRM to create false memories for events. False memory formation, in the context of the present research, is based on both the misinformation paradigm for inducing false memories through the introduction of post-event information (Chapters 2 and 3) and the DRM paradigm for inducing false memories using associated critical word lists (Chapter 5).

Factors That Affect Memory Distortion

It is important to consider which factors influence such memory alteration, specifically memory conformity and false memory, as a result of shared reminiscence. I will review in detail the factors the present research is focused on, such as interpersonal familiarity, interpersonal trust, confidence and memory esteem.

Interpersonal Familiarity

The issue of interpersonal familiarity and its relation to shared memory retrieval and memory distortion has failed to receive the consideration it

deserves (but see Hirst & Manier, 2008; Hope et al., 2008; French et al., 2008; Roediger et al., 2001). According to Johansson, Andersson and Rönnberg (2005), shared collaborative reminiscence between partners in a romantic relationship is quite complicated and rates of conformity to another person's memory appear to be reliant on the division of responsibility and rate of concurrence between the pair. According to Saczynski, Margrett and Willis (2004), collaborating dyads that were familiar with each other outperformed individuals on all tasks when compared to unacquainted, impromptu dyads. However, research has found that generally dyad memory performance rarely reaches the high performance scores of collective individual memory task scores (Andersson & Rönnberg, 1996). Johansson, Andersson and Rönnberg (2000) determined that low rates of agreement between individuals in a couple and high levels of responsibility appear to encourage the lowest rates of negative effects of shared retrieval.

There is evidence of increased memory retrieval performance for friend dyads versus non-friend dyads, though dyadic retrieval deteriorated compared to groups of individual collective scores (Andersson & Rönnberg, 1997). The underlying reasoning behind such findings for collaboration is that a friend may provide more directed retrieval cues to other familiar members in a group or dyad than an unfamiliar person would (Basden et al., 1997). It has also been suggested that this could be due to friends, who have access to each other's memories and are familiar with each other's cognitive resources, share a transactive memory system (Wegner et al., 1991). Research has been consistent in determining that friends opposed to non-friends reduced the negative effect of shared retrieval (Andersson & Rönnberg, 1996). Thompson (2008) suggested that the negative effects of shared retrieval such as collaborative inhibition (in which group members remember less when remembering in a group) can possibly be reduced when group members are familiar with each other.

Recently, Takahashi (2007) compared the negative outcomes of collaborative inhibition among familiar friend and non-friend groups by utilizing the DRM paradigm for formation of false memory, and in contrast to similar research, collaborative inhibition was evident among friends as well as non-friends. Research by Hope et al. (2008) established that familiar friend dyads were more at risk for reporting inaccurate post-event information acquired from their dyadic partner for events they had not experienced themselves. This results in reduced memory correctness as a result of shared memory retrieval. Andersson (2001) determined that friend group members cue one another during collaboration in order to support retrieval performance, particularly evident in the performance of

friend group members compared to unfamiliar spontaneous group members for associated word recognition. Research findings have determined that partners in a romantic relationship were more likely to incorporate non-experienced event details in their memory account than dyadic partners who were unfamiliar.

Research supports the idea that familiar shared dyadic retrieval can indeed result in beneficial outcomes for couples, particularly in instances such as humming the tune of a song together (Lewis, 2003). Betz, Skowronski and Ostrom (1996) found that participants altered their responses to fit with the memorial responses they believed other people they were familiar with had provided. Jaeger, Selmeczy, O'Connor, Diaz and Dobbins (2012) determined that people who viewed memory sources as reliable due to an interpersonal relationship led to improvements in memory performance. Similarly, it has been revealed that a reason for familiar dyads depending on each other's account of an event is probably due to cognitive interdependence and shared cognitive resources (Agnew, Van Lange, Rusbult & Langston, 1998). However, most of the research findings to date are based on an unmeasured familiarity, such as one which automatically exists between friends, family members, romantic partners, etc. We argue that this familiarity level differs between dyadic members and between individuals, and needs to be measured in order to claim with confidence that the effect on shared retrieval and memory distortion is a true one. It remains unknown how interpersonal familiarity influences conformity to another individual's memory for specific meaningful and emotional events.

Interpersonal Trust

In a dyadic interpersonal relationship, the trustworthiness or untrustworthiness of the source of information can have effects on shared memory retrieval and the resulting occurrences of memory conformity (Wheeler, Allan, Tsivilis, Martin & Gabbert, 2013). Findings have signified that a lack of trust can result in fewer instances of one dyadic members conforming to the memory of their dyadic partner (Neuschatz et al., 2007, Semmler, Brewer & Wells, 2004; Skagerberg & Wright, 2009). In some of the earliest early interpersonal trust research, Giffin (1967) showed that individuals can often rely on another person they trust as a reliable source of information. Research carried out by Lindner, Schain, Kopietz and Echterhoff (2011) demonstrated that the increased social influence originating from in-group members' memory can result in source confusion when it comes to self versus other in the context of who

remembered which event details and who experienced or performed specific actions. Such source-monitoring problems, which stem from source confusion, can affect shared memory retrieval and encourage memory distortion, and increase when memory encoding is performed in an in-group, which has an implied collective trust, as opposed to an out-group (Lindner et al., 2011).

According to Frith and Frith (2012), thinking about and comparing another person's knowledge of events relative to one's own when in a trusting pair can affect social learning, especially when we feel the other offers enhanced knowledge, in turn improving the precision of our own interpretation of reality and past events. Findings have highlighted that untrustworthiness and suspicion, in particular, can lead to the eradication of the post-identification feedback in memory retrieval (Douglass & Steblay, 2006; Hafstad, Memon & Logie, 2004; Wells, Olson & Charman, 2003). Wheeler et al. (2013) determined that trust fosters teamwork, specifically between in-group versus out-group individuals, which encourages memory conformity, albeit an adaptive and beneficial form. Previous research has established that informational influences can encourage memory conformity between dyadic members when individuals are insecure about their own memory correctness and they trust another person more than they trust their own memory of an event (Carlucci et al., 2011; Gabbert, Memon & Wright, 2007).

Baron, Vendelelo and Brunsman (1996) utilized two corresponding approaches to examine how conformity covaries with the comparative correctness of memory in self versus that of another acquaintance. These methods entail either manipulating one's own memory accuracy or influencing what participants trust about the condition of their partners' memory. Utilizing this approach has revealed that instances of memory conformity are amplified when the accuracy of an individual's own memory is reduced, and vice versa (Baron et al., 1996). The findings of Wheeler et al. (2013) add to the limited studies of such influence of interpersonal relationships, which have found that a close personal relationship enhances the tendency to conform to the memorial report of another person (Brown et al., 2009; Skagerberg & Wright, 2009; Hope et al., 2008; French et al., 2008). However, like familiarity and memory distortion research, this area also remains under-researched in the context of specifically measuring interpersonal trust and its subsequent effects on memory distortion. In the current research, we manipulated trust and included self-reported measures of it to investigate the outcome for shared reminiscence between pairs of individuals. Previous research has focused on an implied built-in trust for the most part and has not specifically

measured this interpersonal construct, which is present to different extents between individuals in a dyad who know each other. Again, similar to interpersonal familiarity research, when studies examined the effects of memory distortion as a result of retrieval between a pair of individuals, they did not focus on measuring the specific levels of interpersonal trust or manipulating interpersonal trust in the lab.

Confidence

Research has revealed that the relationship between confidence and eyewitness accuracy is weak, with many studies demonstrating that confidence in one's memory does not reliably denote memory accuracy (Leippe, Eisenstadt, Rauch & Stambush 2006; Lindsay, Read & Sharma, 1998; Penrod & Cutler, 1995; Read, Lindsay & Nicholls, 1998; Shaw, McClure & Dykstra, 2007). Brewer and Day (2005) established that confidence is not a consistent indicator of correct memory details, and this is particularly the case in children's memory of events. According to Wright and Villalba (2012), memory distortion is reliant on original memory confidence, with indecisive memories being more fallible than confident memories. Research suggests that confidence is, more likely, comparatively unrelated to the accuracy of individuals, and that they are highly susceptible to memory reconstruction (Leippe et al., 2006; Neuschatz et al, 2007). In research carried out by Higham et al. (2011), evidence of accuracy-confidence dissociation was found, and the influence of the effect of supplying misinformation was predominantly evident in fine-grained memorial responses, intimating that participants' responses were based on remembered crime scene details.

As described by Leippe et al. (2006), if individuals, particularly during shared reminiscence, are not very confident in their own account of events, they are more vulnerable to suggestive influences and hence rely on their dyadic partner's or co-witness's remembering of the details. According to Carlucci et al. (2011), social influences can enhance how often one person conforms to the memory of another person as a result of low confidence levels in their own accuracy levels. Davis and Loftus (2007) found that verbal feedback from a co-witness can promote memory distortion and influence a person's confidence and subsequent memorial accuracy in a testimony. Stephenson, Brandstatter and Wagner (1983: 188) established that collaborative retrieval increased confidence, wholeness and memory accuracy, and revealed that, "Social recall is an improvement on individual performance." Nevertheless, the researchers stated that while collaborative groups were collectively more confident in their accurate responses than

individuals remembering on their own, they were also more confident in their inaccurate memory accounts (Stephenson et al., 1983). It has been determined that when an experimental accomplice reported their confidence in their memory and, further, answered before the other individual in a pair, the results indicated that the initial response from the first person subsequently altered the memory of the second person, and the higher levels of confidence enhanced the incidence of memory conformity (Schneider & Watkins, 1996). Research by Stephenson, Abrams, Wagner and Wade (1986) found that people who completed recall tasks on their own, followed by collective group recall, had more confidence in inaccurate responses than people who undertook the tasks in the reverse order, but no significant difference was found in relation to accurate memories for event recall.

An issue relating to confidence, memory distortion and the use of confederates in experimental memory research is that compared to real co-witnesses or partners, affiliates may have an increased aura of heightened confidence, which may encourage a false effect for memory distortion because confederates are rehearsed in the information they must provide to participants (Paterson & Kemp, 2006). Therefore, such research findings may not be entirely applicable to real-life dyadic remembering and the effects of one person's memory confidence on another. In post-identification research, it has been shown that confidence and assurance in one's memory accuracy for crime and eyewitness-related incidences increase following approval as opposed to studies on the post-identification feedback effect showing that certainty and confidence in the accuracy of crime-related judgements are higher following confirming as opposed to refuting post-identification feedback from another person, though this effect depends on an individual's original memory confidence (Skagerberg, 2007; Wells & Bradfield, 1998).

Memory Esteem

As we have seen above, there is a substantial body of research dedicated to investigating the role of confidence in shared memory distortion, but what about a construct that relates to esteem in one's memory? We propose such a construct, which we term *memory esteem*. In the present research, we define memory esteem as that which encompasses one's worthiness in relation to their ability to remember past occurrences. Though this is a new concept relating to remembering, I will briefly review research that is somewhat similar in concept to memory esteem and what effects have been found in relation to memory distortion.