AUTOBIOGRAPHICAL MEMORY VARIABILITY

INDIVIDUAL AND SOCIAL FACTORS

Australian Research Council (ARC) Centre of Excellence in Cognition and its Disorders (CCD) and Department of Cognitive Science

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This thesis is presented for the degree of PhD in Cognitive Science
Thesis Abstract

In the forensic setting, police, lawyers and juries often assume that true memories of the past should not change over time. Contradictions, as well as omissions or new additions, across retellings are often seen as either contamination from others or a sign of deception. In my project, I examined how memory accounts change across retellings under a range of conditions. Across a series of four chapters and five experiments, I examined and compared the role of social and individual factors in autobiographical memory variation in the absence and presence of contagion. I manipulated aspects of the social interaction and measured different personality and other individual characteristics. I was specifically interested in whether influences from the “self” differed to influences from “others.” I aimed to discern baselines and variation thresholds for changes across autobiographical memory retellings among individuals across different social settings. My goal was to better understand the pattern and nature of autobiographical memory variability across retellings and determine how many changes matter. I drew from multidisciplinary research in an attempt to clarify both conceptual and methodological issues about the meaning and the measurement of “contradictions” and other changes in forensic, cognitive and social psychology. This project is significant because it draws on and broadens current theoretical perspectives on memory, as well as considers side by side changes in retellings due to intrinsic variability and changes in retellings due to social contagion.
Statement of Candidate

I certify that the work in this thesis entitled “Autobiographical Memory Variability: Social and Individual Factors” has not previously been submitted for a degree nor has it been submitted as part of the requirements for a degree to any other university or institution other than Macquarie University.

I also certify that the thesis is an original piece of research and it has been written by me. Any help and assistance that I have received in my research work and the preparation of the thesis itself have been appropriately acknowledged.

In addition, I certify that all information sources and literature used are indicated in the thesis.

The research presented in this thesis was approved by Macquarie University Research Ethics Review Committee (Reference number: 201200245).

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Chapter 1

Autobiographical Memory Variation Across Retellings
The Drive For Reliable Recall

In the forensic setting there is a strong focus on reliable, complete and error-free recall that does not vary across retellings (Blinka, 2010; Read, 2007; Simon, 2012). Witness testimony is often one of the most influential pieces of evidence presented in legal proceedings, particularly when the witness claims to have personally experienced or witnessed the event in question (Howe, 2013). To be deemed admissible, evidence has to be considered reliable (NSW Australian Police Procedures for the Evidence Act, 1998). The reliability of the memory account a witness provides when giving evidence at trial, a suspect provides when confessing to a crime or when a victim provides when making allegations is therefore fundamental to the proceedings of most legal cases.

Judging Memory for Reliability

Assessing the reliability of autobiographical memory accounts is judged by two factors: completeness and accuracy (Simon, 2012). An account is complete if it contains “all the details necessary to provide a comprehensive account of the event” (Simon, p. 92) and is accurate “when those details are correct” (Simon, p. 92).

Witnesses and suspects are asked to truthfully recall information about their personal knowledge, experience or involvement in crimes or other legal matters (Federal Court of Australia, 2011). They can be requested to retell their accounts of what happened multiple times during investigations and can subsequently be asked to testify at trials about their memories of events sometimes months or years later (Neubauer & Fradella, 2011). Herlihy, Jobson and Turner (2012) reported that, in asylum-seeking cases, similar passages of time can pass between the original interviews and the appeals. Witnesses can be asked to provide written and/or oral statements on what happened
The method used to elicit testimony can also vary (Evidence Act, 1995 s 29). Witnesses can be asked to recall the specified event by free recall, an elicitation method in which individuals recall the event in their own words without intervention from the interviewer (Fisher & Geiselman, 1992). They also can be repeatedly pressed for fine details and precise answers to specific questions (Simon, 2012).

In many cases, the reported memory of a witness is the only evidence available, hence it becomes impossible to corroborate against other evidence. This makes identifying errors and assessing accuracy very difficult. The credibility of the witness and of his or her account of the specified event becomes particularly important and persuasive in these cases (Shermer, Rose, & Hoffman, 2011). In the adversarial system, lawyers are well aware that damaging the credibility of a memory account can undermine the witness. Opposing lawyers are known to attack witnesses on the reliability of their testimony of past experienced events (Barnier, Temler, & Sutton, 2014; Hoy, 2011; Read, 2007; Simon, 2012). There is an assumption that credible witnesses should be able to provide accounts that have a coherent narrative structure and that are detailed, unchanging and confidently recalled across retellings (Blinka, 2010; Dysart & Strange, 2012; Fisher, Vrij, & Leins, 2013; Simon, 2012). The absence of these characteristics is often seen as diagnostic of deception (Fisher et al., 2013; Read, 2007; Vredevelt, van Koppen, & Granhag 2014).

**Definitions.** Due to variability in the way that terms are used in various literatures on memory recall across retellings, I have defined the terms I used throughout this thesis, as follows:

*Account:* Narrative or report of an experienced event.
Testimony: A formal statement based on a memory account provided in a legal setting.

Stability: Identical information provided across two recalls [e.g., at time 1 and at time 2].

Variation: An account exhibits variation if it is not identical across two recalls [e.g., time 1 and time 2]. Specifically, there is variation across accounts if different information is recalled at each retelling. Accounts exhibit variation across recalls if they contain omissions, additions and/or contradictions. In various work, an account that exhibits variation is often equated with ‘inconsistency’ (Fisher et al., 2013; Vredeveldt, et al., 2014).

Detail: Specific peripheral or central detail or response within an account.

Omissions: Details omitted or forgotten in a subsequent recall [e.g., at time 2] that were present in a previous recall [e.g., at time 1]. Comparing across various work, details omitted have been referred to as omissions and forgetting (Gilbert & Fisher, 2006; Schacter, 2001; Vredeveldt et al., 2014).

Additions: Details that are new in a subsequent recall [e.g., at time 2] that were not present in a prior recall [e.g., at time 1]. Additions also have been referred to as reminiscence and commissions (Fisher et al. 2013; Herlihy, Scragg, & Turner, 2002; Drivdahl & Hyman, 2014; La Rooy, Pipe, & Murray, 2005; Schacter, 2001; Vredeveldt et al., 2014).

Contradictions: Direct discrepancies in claims across earlier memory recalls [e.g., red shirt at time 1 and blue shirt at time 2] (Fisher et al., 2013; La Rooy et al., 2005).

Error: Inaccurate information provided at memory recall.
**Amount recalled.** There are a number of different characteristics that individuals rely on when assessing an account for credibility. The first is the amount recalled across retellings. Legal practitioners and potential jury candidates expect that credible witnesses should be able to provide memory accounts that are complete and detailed across retellings (Bell & Loftus, 1988, 1989; Blinka, 2010; Conway, Justice, & Morrison, 2014; Simon, 2012). People generally believe that the amount of detail in a memory and the clarity of recollection are indicators of accuracy. In one survey, 70% of respondents agreed with the statement “The more details a memory has, the more accurate it is”, and 68% of respondents agreed with “The more vivid a memory is the more accurate it is” (Conway et al., 2014). People tend to believe in the accuracy of a memory when it contains a depth of detail, such as what the person saw, heard, smelled, felt or touched or exact times that events took place (Johnson, Hashtroudi, & Lindsay, 1993; Johnson & Raye, 2000).

Hearing others recall their memories clearly and in detail strengthens the belief that their accounts must be true. For example, hearing a witness recall specific details such as type of clothing attire or specific details from the setting of the crime scene makes the evidence more compelling. Bell and Loftus (1988) found that when mock jurors read accounts that contained specific details such as the colour of socks, the type of shoes and the type of t-shirt the victim was wearing the accounts were judged as more credible than accounts that did not contain such specific details of what the person was wearing. Similarly, Bell and Loftus (1989) found that when mock jurors read accounts that contained details describing specific store items, such as items the accused bought at the crime scene, these accounts were judged as more credible than accounts containing less specific details. It is standard protocol for lawyers to closely question witnesses on the stand for specific details (Simon, 2012).
The assumption is that if a witness is able to provide more specific details then he or she must have paid close attention to the crime (Bell & Loftus, 1989) and that their clear and detailed information must be accurate (Conway et al., 2014; Keogh & Markham, 1998).

Variation across memory accounts. Providing false specific details can potentially have devastating consequences in a forensic context (Simon, 2012; also see section cases in The Innocence Project, 2010) Legal practitioners and potential jury candidates consequently expect that credible witnesses should be able to provide error-free memory accounts that do not vary across recalls. In an attempt to expose any errors across testimonies, details within accounts are diligently transcribed and then scrutinised for any variation (Pozner & Dodd, 1993, as cited in Fisher, Brewer, & Mitchel, 2009; Read, 2007). Omissions, additions and contradictions can damage the credibility of the witness and their account. Lawyers argue that when a witness recalls additional details in a subsequent testimonial account, such as in court, that were omitted in an initial account, such as during the police investigation, this should arouse suspicion (Read, 2007). Contradictions across memory accounts, such as discrepancies in exact times and dates, are even more damaging to the witness testimony as they are also used to undermine the credibility of the account (Hoy, 2011). Contradictions often are seen as a sign of deception and also are used to undermine the credibility of the witness or suspect (Hoy, 2011; Read, 2007). There is a general assumption that contradictions of specific concrete details are a sign of the general unreliability of the testimony account.

Berman and Cutler (1996), for example, discovered that changes in memory across two recalls (pre-trial and on the stand) had a strong effect on the rate of guilty verdicts. Laypeople and experts believe that when memory accounts change across
retellings this is a sign of untruthfulness. Police, prosecutors, defenders, federal judges, juries and members of the general public have been found to view witnesses who provide accounts that contain omissions, additions and particularly contradictions at subsequent recalls as less credible (Brewer & Hupfeld, 2004; Brewer, Potter, Fisher, Bond, & Luszc, 1999; Dysart & Strange, 2012; Potter & Brewer, 1999, Semmler & Brewer, 2002; Uviller, 1993). Courts frequently encourage jurors to assess witness credibility by paying attention to any changes in memory recall, predominantly contradictions, across witnesses’ accounts (Goodman-Delahunty & Tait, 2006).

Variation across memory accounts likewise plays an important role in the asylum-seeking process. Decision makers rely on the stability of autobiographical memory reports across retellings to assess the credibility of the claimant and the truth of his or her memory account (Coffey, 2003; Herlihy, Gleeson, & Turner, 2010; Herlihy et al., 2012; Herlihy & Turner, 2006; Herlihy & Turner, 2013). Refugee accounts that contain omissions, additions and specifically contradictions are viewed with suspicion and are considered less valid. Researchers have found that assumptions of immigration judges are that if asylum seekers make specific contradictions in details across retellings then they are falsifying their entire account (Herlihy et al, 2012; Herlihy & Turner, 2006; Herlihy & Turner, 2013). Herlihy and Turner (2006) stated that contradictions across asylum seekers’ memory accounts are the most influential pieces of evidence cited by the United Kingdom’s Home Office in denying asylum applications.

Confidence. Finally, legal practitioners and potential jury members expect that credible witnesses are confident of the accuracy of the details they provide about personally experienced events across retellings (e.g., “I am certain the man was
wearing a blue shirt."). People believe that if witnesses are confident of the accuracy of their memory accounts, this must indicate that the reported memory is true (Brewer & Burke, 2002; Goodman-Delahunty & Tait, 2006; Penrod & Cutler, 1995). Courts encourage jurors to take into consideration the confidence levels of witnesses (Goodman-Delahunty & Tait, 2006) and confidence in the accuracy of memories has been found to be a crucial factor in jurors’ beliefs of the credibility of the witness (Brewer & Burke, 2002; Penrod & Cutler, 1995). Brewer and Burke (2002) examined the effect of eyewitness confidence on mock-jurors’ judgments of probability that the defendant committed the crime and resultant verdicts. They found that witness confidence was one of the strongest influences on judgments of guilt.

This expectation that witnesses should be able to confidently recall error-free stable memory accounts across retellings may not seem unreasonable to most people based on general beliefs about how memory works. Simons and Chabris (2011) surveyed 1000 jury-eligible American citizens on their beliefs about memory. They found that the majority of the population agreed with the assertion that our memory works like a video camera, recording events so we can review and inspect them later. The belief that memory works like a camera illustrates the perception of most people that all memory is encoded and therefore available in its entirety for future viewing and referral. Although people recognise that they forget some details over time (Hyman & Loftus, 1998), they also believe that if they forget they are just not trying hard enough to remember. It is generally assumed that people will be particularly motivated to recall accurate details across memory accounts in a forensic setting, as the potential consequences are so severe (Kassam, Gilbert, Swencionis, & Wilson, 2009).

In light of the beliefs and expectations of the legal system and general public
that witnesses should be able to recall detailed, error-free memory accounts that do not vary across retellings, the aim of this thesis chapter and my research program is to consider the following questions: First, how may remembering in an everyday social setting differ from recalling in a forensic setting? Second, what sources of error can lead people to provide inaccurate details across accounts? Third, what influences omissions, additions and contradictions across retellings and should these three types of changes be equated with untruthfulness? Finally, what factors besides veracity can influence confidence in the accuracy and complete detailed recall of accounts across retellings?

In order to consider these questions, in the next section I will examine the differences in remembering in an everyday setting as compared to the forensic setting.

**Memory Recall in an Everyday Setting**

The expectations and experience of recalling an event to others in an everyday setting are quite different from recalling an event in a forensic setting. First, monitoring for truth of specific details recalled by others in these social situations is not as pertinent. The details that are paramount in a forensic context are generally disregarded in an everyday conversational context (Simon, 2012). Similar to the forensic setting, memory retellings may aim to be detailed and complete, but attending to vividly rich details is often more important in assessing a good storyline and an interesting narrative rather than judging for accuracy (Misztal, 2003). The threshold for inaccuracy is higher in day to day life because the goal of memory in a social setting is not only to convey information but also to reinforce a sense of self, to build and maintain relationships and to teach and to manage emotion (Alea & Bluck, 2003; Bluck, Alea, Habermas, & Rubin, 2005; Harris, Rasmussen, & Berntsen, 2014;
Pillemer, 1992). There is a general trust in everyday conversation that what is being said is true (Gilbert, 1991; Grice, 1975). This is not to say that accuracy is not important, but listeners tend to monitor for fluency (ability of the person to articulate the content) and coherence (logical and orderly relationship in content of memory accounts) rather than for accuracy of specific details (Cuc, Koppel, & Hirst, 2007).

Second, memory accuracy also is more difficult to measure in an everyday setting. Specific details are not transcribed and diligently scrutinised for each event we recount as they are in the legal system. We assume that details in our own memory are accurate because we have relied on our memories in the past and they generally have served us well (Boyer, 2009). However, it is important to recognise that noticing and recalling specific details of every event experienced is frequently not a priority in everyday life (Simons, 2007). On the contrary, recalling every minute detail would constrain our ability to draw conclusions, to rationalise, to interpret events and to extract meaning from the experience and to provide a coherent narrative (Michaelian, 2011). Although a generally accurate portrayal of the past is important, for the sake of optimal functioning quality takes precedence over quantity. It is the coherence of relevant details of the past and the corresponding link to the future that is paramount and is what gives us a narrative to organise our thoughts (Barclay, 1996; Conway, Singer, & Tagini, 2004). It is the use of past experiences and general interpretation that allows us to draw meanings from events and to relate and empathise with others. Cognitive systems therefore often take shortcuts in memory processes to focus on the gist, which is usually the most important aspect in situations and consequently many experienced details are forgotten (Roediger & Marsh, 2009).
Although details are forgotten due to the otherwise detrimental cost of remembering every past detail, elaborative recall remains important for social remembering. Complete narratives allow us to better connect and converse with others (Fivush, Habermas, Waters, & Zaman, 2011; Habermas & de Silveira, 2008; Nelson & Fivush, 2004).

The nature of remembering in everyday settings thus has a powerful shaping effect on how we remember our past. When we remember with others in social settings the people we remember with help to fill in gaps in our memory. Conversing with others serves to update our memories to keep our narratives complete. When remembering a past shared experience, updating during conversation is distributed among those participating in discussing the recalled event (Muller & Hirst, 2014). Although this process can be beneficial and frequently stimulates us to remember more, it also can lead to changes in individual memory (Basden, Basden, & Henry, 2000; Harris, Keil, Sutton, Barnier, & McIlwain, 2011; Harris, Paterson, & Kemp, 2008). We may omit, add or change details across retellings. This is often because hearing others discuss details of an experienced event can influence how we recall the event (Schacter, 2001). Memory accounts of events are continually updated as we come across new information.

In many situations people do not even notice that they or their conversational partners are misremembering the past. Errors in peripheral details frequently go unnoticed or are considered too trivial to correct (Skowronski & Walker, 2004). When misremembered peripheral details of an event are noticed, a higher threshold for inaccuracy is often tolerated (Harris et al., 2011): Who really cares if the man was wearing a blue shirt or red shirt? Complications arise, however, when the accuracy of a memory of an event is held to more stringent standards, such as in a forensic
context. Details considered trivial in an everyday setting may become crucial in a forensic setting. For example, a witness reporting that a suspect ran a red light instead of a green light in a fatal car accident can prove fundamental to the outcome of the case.

In the forensic context with its high demand for accuracy, errors in details across retellings can result in serious consequences such as innocent people being convicted. The recent exonerations made possible through organisations such as the Innocence Project have highlighted the serious consequences of misremembering details in a forensic setting (The Innocence Project, 2009).

**Implications of misremembering in the forensic context.** The Innocence Project in the United States has helped overturn 318 false convictions through DNA testing. Approximately 72% of these exonerations were due to false eyewitness testimonies and 25% were due to false confessions. For the first 250 exonerees it was calculated a total of approximately 3,160 years in prison were served by innocent people (The Innocence Project, 2010). The fact that eyewitnesses provide accounts with inaccurate details that they believe are genuine is worrisome as large number of convictions have been based primarily on eyewitness testimonial accounts (Grisham, 2006; Porter, Campbell, Birt & Woodworth, 2003; Wells, Memon, & Penrod, 2006). The Innocence Project has speculated that between 2.5% and 5% of convicted prisoners in the United States are innocent. A recent study estimated that approximately 4.1% of all death row prisoners in the United States are innocent and that the percentage in the normal prison population could be even higher (Gross, O’Brien, Hu, & Kennedy, 2014).

Similar rates of mistaken eyewitness testimony resulting in wrongful conviction have been estimated in Australia, although the estimation has been more
difficult as the “one appeal only policy” of the Australian legal system has possibly prevented potentially innocent people from being freed through re-examination of the original evidence presented at the trial and DNA exoneration (Sangha & Moles, 2012a, 2012b; Weathered, 2012). These findings that eyewitness memory can be wrong has led to the consideration of different sources of error.

**Social influences on eyewitness testimony.** One source of error that has been identified as changing eyewitness testimony is exposure to incorrect post–event information from external social factors (e.g., from media, police, other witnesses) after the event has taken place (Loftus & Palmer, 1974; Paterson & Kemp, 2006b; Wright, Memon, Skagerberg, & Gabbert, 2009). A particular concern in the forensic setting is the effects of social influence on memory in co-witness discussion (Paterson & Kemp, 2006a, 2006b; Wright et al., 2009). Well known cases have demonstrated that when a group of bystanders witness an event they can report incorrect details as to what happened.

One well known case where eyewitnesses remembered incorrect details was the Ferguson Case in the United States. In 2014, riots broke out in Ferguson, Missouri, over the shooting of Michael Brown. Dozens of bystanders witnessed a white police officer shooting the black teenager. Although witnesses agreed on the gist of what happened (that the teenager was chased by the police officer), the critical details of what happened next varied across witnesses. Some witnesses said that Brown turned and aggressively charged the police officer; others reported that Brown turned around in an act of surrender, with his hands held high in the air. Some witnesses agreed that his hands were in the air but disagreed on whether the gesture was aggressive or peaceful surrender. Still other witnesses denied seeing Brown raise his arms and reported he had his hands threateningly in his pockets. Not only did
witnesses provide reports that were contradictory, but upon subsequent interviews, after discussing the event with others, witnesses provided conflicting details across retellings. The resulting consequence of the wide array of conflicting eyewitness testimonies was that the grand jury decision was to not indict the officer who shot Michael Brown (Ferguson Grand Jury Transcripts, 2014).

Another example is the case of Anna Lindh the Swedish Foreign Affairs Minister who was attacked and stabbed in broad daylight in a Stockholm department store in 2003. Witnesses were gathered nearby and allowed to discuss what they saw and to hear each other’s police statements. One witness confidently reported that the attacker was wearing a camouflage jacket. Other witnesses heard, believed and reported this detail as well. CCTV footage, however, revealed that the attacker was wearing a grey hooded Nike sweatshirt. A subsequent study examining the statements provided by different witnesses found that a total of 41.5% of the details describing the offender were incorrect (Granhag, Ask, Rebelius, Öhman, & Giolla, 2013).

Research has demonstrated that witnesses can unknowingly contaminate each others’ memories of an event when they discuss the details of a crime with each other (Gabbert, Wright, Memon, Skagerberg, & Jamieson, 2012; Paterson & Kemp, 2006b, Skagerberg & Wright, 2008a). After witnessing a criminal event, it is common for eyewitnesses to talk to one another (Paterson & Kemp, 2006a, Skagerberg & Wright, 2008a). Paterson and Kemp (2006a) revealed how often co-witness discussion takes place. In their study, Paterson and Kemp asked individuals who had experienced a serious legally relevant event, for which there was more than one witness present, to complete a survey on eyewitness discussion. They found that 86% of the respondents admitted they had discussed the details of the event in question with a
co-witness before talking to the police.

Paterson and Kemp (2006b) argued that people remembering together may be one of the strongest factors that contribute to subsequent memory change. They argued that the reason why witnesses can change each other’s accounts of what has happened is because they are likely to introduce incorrect post event information to one another. Recognition of the effects of such misinformation and social influences on memory has successfully led to some reforms within the legal system.

For instance, in order to protect individual memory from contamination, police officers attempt to separate eyewitnesses and discourage eyewitnesses from talking with each other about the event (Paterson & Kemp 2005).

Police, lawyers and juries often assume that our memories of the past generally are accurate, and only occasionally are misleading or purposefully contaminated and that as long as we can control these external factors, such as misinformation through social influence, our individual memories of experiences remain in essence accurate (Bartol & Bartol, 2004). The general consensus is that memory is a form of important evidence and must be handled as carefully as the crime scene itself to avoid permanent changes to it (The Innocence Project, 2009).

In light of the significant consequences of misremembering in the forensic context, cognitive psychologists have tried to capture, measure and explain sources of contamination from social influence using a range of experimental memory paradigms.

**The Misinformation Paradigm**

One influential laboratory paradigm is the misinformation paradigm (Loftus & Palmer, 1974; Loftus, Miller, & Burns, 1978), which measures the accuracy of memory recall after exposure to incorrect post event information, otherwise known as
misinformation. In the classic misinformation study, Loftus et al. (1978) showed participants a series of pictures, one of which showed a car stopping in front of a yield sign. Participants then read verbal accounts of what happened in the pictures. Some participants were exposed to misleading misinformation, such as reading an account stating that the car stopped in front of a stop sign instead of a yield sign. Finally, they recalled what they saw. Loftus et al. (1978) found that participants who had been exposed to misinformation were more likely to report the misinformation, such as seeing a stop sign than participants who had not been exposed to misinformation. Loftus et al. concluded that false information suggested by others can lead people to falsely believe that they saw the details that were merely suggested to them.

Misinformation studies have been replicated countless times with different types of suggested misinformation and controlling for different variables (see Loftus, 2005, for review). For instance participants reported higher driving speeds after hearing the question “how fast was the car going when it smashed into the other car?” than when asked “how fast was the car going when it bumped into the other car?” (Loftus & Palmer, 1974). Participants have reported seeing a barn, although no barn was ever shown, when asked “to estimate the speed of a car when it passed a barn” (Loftus, 1975). These standard types of misinformation studies have been shown to be more effective in changing memory for peripheral details that are plausible than peripheral details that are blatantly contradictory (Loftus, 1979a, 1979b; Wright & Stroud, 1998).

The misinformation effect has been demonstrated to be stronger under certain conditions. For example, misinformation effects are stronger after a delay between the witnessed event and exposure to misinformation (Loftus, 1979a, 1979b; Loftus, 2005); they are stronger if the information comes from a high credible instead of low
credible source or a firm interviewer instead of a friendly interviewer (Baxter, Boon, & Marley, 2006; Underwood & Pezdek, 1998). The misinformation effect is also stronger when the source misinformation provides confirmatory feedback when the questions are closed rather than open and when the participant is repeatedly questioned by the interviewer (Fiedler, Walther, Armbruster, Fay, & Naumann, 1996; Roediger, Jacoby, & McDermott, 1996; Zaragoza, Payment, Ackil, Drivdahl, & Beck, 2001).

Not only do different experimental conditions influence the misinformation effect, but it appears that individual differences among participants also influence the effect. There is considerable variation as to who is susceptible to false memories within studies and between studies. Approximately 25% of participants appear to exhibit memory distortion (Loftus, 2003). This variability has been attributed to differences among participants. Research has shown that young children and elderly adults are most susceptible to misinformation (Loftus, 2005; Wiley, Patihis, McCuller, Davis, Brank, Loftus, & Bornstein, 2014) Personality and cognitive abilities also play a role in susceptibility to misinformation. Specifically, people with higher hypnotisabilty, absorption, dissociation, empathy, suggestibility, and compliance scores, and people with lower IQ and perception scores have been found to be more susceptible to misinformation effects (e.g., Barnier & McConkey, 1992, 1999; Gudjonsson, 1986; Loftus, 2005; Meyersburg, Bogdan, Gallo, & McNally, 2009; Porter, Birt, Yuille, & Lehman, 2000; Wright & Livingston-Raper, 2002; Zhu, Chen, Loftus, Lin, He, Chen, Li, et al., 2010).

Overall, when people are exposed to incorrect information after experiencing an event, they can misremember details of the original event. This is thought to happen because they clearly recall the recent misinformation and attribute it to the original event (Belli, Lindsay, Gales, & McCarthy, 1994). Misinformation studies were and have
continued to be very relevant to the real-life forensic scenario where misinformation is introduced through suggestive interviewing and leading questions in investigations and false confessions. However, although the misinformation paradigm is a reliable methodology it is often difficult to distinguish the role of social influence from the role of specific misinformation. Specifically, it is unclear what influences social factors have on the development of false memories from misinformation.

First although, the element of social influence in external factors is implied in the misinformation studies, the way people are exposed to false details varies and does not necessarily come from social influence. The false details can come from written sources or directly from the person (Loftus & Palmer, 1974, Loftus et al., 1978; Loftus, 2005). Second, although it is assumed that false memories are formed, participants may be replying with false information for other reasons other than a change in memory. There are a number of reasons why people may be motivated to supply false information. For instance, people may be motivated to supply information that is not true because of the need for social acceptance and the pressure to conform (Asch, 1956).

To better understand the mechanisms of social influence and its effects on contaminating individual memory, Roediger, Meade, and Bergman (2001) developed the social contagion paradigm to investigate the effect of social influence and specific false information on the development of false memory.

In this thesis I adapted the social contagion paradigm to focus on the likelihood, nature and sources of errors in reports of past experiences. I review the paradigm and findings in some detail in the next section. I argue that a range of factors, both social and individual, contribute to changes in memory recall in the social contagion paradigm.

**Social Contagion Paradigm**

The social contagion paradigm is viewed as a model of the real world experience
of co-witness discussion. In the social contagion paradigm, Roediger et al. (2001) combined the techniques used in Asch’s (1956) memory conformity studies from social psychology and Loftus’ misinformation experiments from cognitive psychology to examine the effects of social influence on memory. Similar to the misinformation paradigm, the social contagion paradigm measures the accuracy or recall of information after exposure to incorrect post event information. The social contagion paradigm, however, differs from the misinformation paradigm in two important ways (Roediger et al., 2001).

First, the paradigm addresses potential reasons for supplying information known to be false. Much conformity takes place in a public setting where people feel social pressure to respond a certain way in front of others (Bond & Smith, 1996; Cialdini & Goldstein, 2004). In the social contagion paradigm participants are tested individually in a private setting to minimise conformity effects. Individual testing has been found to decrease conformity effects (Deffenbacher, Bornstein, & Penrod, 2006).

Second, in the social contagion paradigm there is no high credibility source. The social contagion paradigm uses a confederate, who poses as a peer university student, to introduce false information. The use of a confederate mimics real world situations, such as a forensic context, where co-witnesses to a crime are assumed to have the same expertise with regard to the information.

Using their social contagion paradigm, Roediger et al. (2001) set out to determine if participants would accept false information into their own memory from another “apparent” peer participant. The social contagion paradigm is conducted over three phases. Phase one is the learning phase. In this phase, a participant is paired with a confederate and they both consecutively study six household scenes. Each household scene has high and low expectancy items. A high expectancy item is an item that is
expected in the scene, such as a plate in a kitchen. A low expectancy item is an item that is less expected in a scene such as a hammer in a kitchen. Phase two is the collaborative recall phase. In this phase, the participant and confederate alternate recalling items from each scene. For some of the scenes, the confederate recalls items that were not present in the scene. These are the contagion items. Phase three is the individual recall phase. This is the last phase. In this phase, after a short break, the experimenter asks the participant to individually recall as accurately as possible the items from each scene.

Using this paradigm, Roediger et al. (2001) discovered that social contagion does create false memories. They measured the mean proportion of items that were falsely recalled and found a robust social contagion effect. Specifically, they found that participants falsely recalled contagion items suggested by the confederate ($M = 0.22$) compared to contagion items that had not been suggested by the confederate ($M = .06$) and that this effect was greater for high expectancy than for low expectancy items. Roediger et al. (2001) reported that the social contagion effect was greater for scenes that were studied for 15 seconds than scenes that were studied for 60 seconds, indicating that participants were more prone to accepting suggested items if they had less time to study the scenes. Most interestingly, participants commonly credited the source of contagion items to the scenes and not to the confederate, suggesting that recall was due to the development of false memory (Meade & Roediger, 2002; Roediger et al., 2001).

Roediger et al. (2001) explained the social contagion effect in terms of the social monitoring framework (Johnson et al., 1993; Mitchell & Johnson, 2000; 2009). According to the source monitoring framework, memories from different sources differ in features that can be used to judge the origin of the memory. Each memory for an event contains sets of unique features and characteristics specific to that event. Individuals make judgments on the characteristics of memory that were established
when the memory was first formed. Some of the most important characteristics that identify memories are: perceptual information (such as sensory impressions of sound and sight), contextual information (such as spatial orientation of location and temporal details), semantic information, affective information (emotional reactions) and cognitive operations (thought processes) (Johnson et al., 1993; Mitchell & Johnson, 2000). Johnson et al. (1993) proposed that there are two main decision-making processes used to monitor and verify the source of memories. The first is heuristic decision making. This type of decision making involves rapid and non-deliberate decisions on the basis of qualitative characteristics of memory. The second is systematic decision making. This type of decision making involves slow deliberate decisions. In this process, all memory-relevant information is retrieved and assessed deliberately to determine whether a memory is likely to have come from a specific source. In order for a memory to be meaningful it has to be attributable to a source. Source monitoring is continually affected by the person's ongoing goals and agendas that influence these two decision-making strategies.

Misremembering details happens when there is a failure in source monitoring. Failures in source monitoring can lead to source confusion, which may cause a name or other detail to become familiar from a different exposure. This can happen when individuals misattribute the source of one memory to another. A real-life example of a source-monitoring error would be a witness misidentifying a store clerk as the perpetrator of a crime. This may happen because the witness recognises the store clerk but misattributes him to the incorrect source of the crime scene. When people are exposed to post-event information they can misremember details of the original event. Source monitoring failures have been used to explain social contagion as well as misinformation effects (Drivdahl & Zaragoza, 2001; Simon, 2012; Roediger et al.,
Individuals recall the vividness of the recent post-event information (e.g., a subsequent similar event, newspaper article or conversation) and confuse its source with the original event.

The conclusions that have been drawn from the social contagion paradigm are that when people talk with each other they can contaminate each other’s memories for events that they shared or experienced together. Roediger et al. (2001) noted that social contagion may be adaptive and effective in some circumstances. For example, in everyday remembering if one person had a poor memory and the second has an excellent memory it would be adaptive for the person with the poor memory to take in details from the person with the excellent memory.

**Comparison with the Misinformation Paradigm**

The findings of the social contagion paradigm are consistent with past studies using the misinformation paradigm (Loftus, 1979a, Loftus and Palmer, 1974). Just as in misinformation studies, participants exposed to social contagion adopted and reported the false information. Also similarly to misinformation studies participants in social contagion studies are less likely to report items that were less expected or plausible (Loftus, 1979a, 1979b; Loftus & Palmer, 1978). In both the social contagion and misinformation paradigms there is large variation in susceptibility to false memories within studies and between studies. Similar to the misinformation paradigm, social contagion has been demonstrated to be influenced by the social interaction and characteristics of the source of the contagion. Specifically, social contagion has been shown to have the strongest effect when the source of contagion is seen as credible, trustworthy, likeable, confident and perceived to have a better memory for the event (Allan, Midjord, Martin, & Gabbert, 2012; Gabbert, Memon, & Wright, 2007; Hope, Ost, Gabbert, Healey, & Lenton, 2008; Koppel, Wohl, Meksin, & Hirst, 2014; Numbers, Meade,
Moreover, as in the misinformation studies, individual factors affect the social contagion effect. For instance young children and elderly adults have been identified as being more susceptible to social contagion (Baddley, Eysenk, & Anderson, 2009; Bright-Paul, Jarrold, Wright & Guillaume, 2012) and in terms of individual differences and personality, studies using the social contagion paradigm have demonstrated people who are compliant and who fear negative evaluation are more susceptible to social contagion (Merckelbach, Roermund, & Candel, 2007; Wright, London, & Waechter, 2010).

In summary, social contagion effects have been consistent with the misinformation effect. In both the misinformation and social contagion paradigms, the manipulated social conditions and a range of internal individual factors appear to impact variability for the acceptance of false information.

**Simple Versus Complicated Memory Material**

The social contagion paradigm is viewed as an important contribution to cognitive and forensic psychology as it offers insights into the applied situations in which co-witnesses may influence one another in the development of false memories. However, although the original social contagion paradigm has yielded reliable results, research has focused on contagion errors for controlled laboratory stimuli, such as slide shows of kitchen scenes (Huff, Davis, & Meade, 2013; Meade & Roediger, 2002; Numbers et al., 2014). Although a robust methodological approach, the low significance of stimuli used in social contagion studies renders it low in ecological validity. The social contagion paradigm also does not consider differences that may arise due to encoding and retrieving differences for more complicated memory stimuli. When experiencing or witnessing a criminal event there are several variables that impact how one remembers the incident (Harris et al., 2008). A witnessed event
is embedded in one’s own autobiographical knowledge. Autobiographical memories differ from controlled laboratory stimuli because they are personal and authored by the individual. Additionally, not all autobiographical memories are shared experiences.

If we consider how best to extend social contagion in ways applicable to the forensic setting then extending the paradigm to autobiographical memory appears to be most relevant since all eyewitness memory is autobiographical in nature. But would the social contagion paradigm work for autobiographical memory? Would the effects be as robust? The initial aim of this thesis was to extend the social contagion paradigm to autobiographical memory. The purpose in this extension was to investigate the effect of social contagion on the kinds of memories most relevant to the forensic setting. Eyewitness testimony is based on reports of genuine past experiences, therefore, reports of genuine past experiences are arguably most applicable to a forensic setting. In the next section I will first consider the nature and functions of autobiographical memory, the differences in shared versus unshared remembering, and previous studies that provide evidence that autobiographical memory can be changed by social influence.

Social Contagion for Autobiographical Memory

Autobiographical Memory

Autobiographical memory is defined as an “explicit memory of an event that occurred in a specific time and place in one’s personal past” (Nelson & Fivush, 2004, p. 486). Autobiographical memories have been recognised as different to other types of memory (Conway & Pleydell-Pearce, 2000; Fivush et al., 2011; Rubin, 1999). First, autobiographical memories are often better remembered than other types of memory (Rubin & Wenzel, 1996). Recalling personal events is different from simple memory
material as it is self-relevant. It has been found that information that we judge to be relevant is generally recalled better than information judged not relevant (Symons & Johnson, 1997). Autobiographical memory is personal. It is often highly significant with high levels of personal involvement and often embedded in a wide array of emotion (Harris et al., 2008). Research has illustrated that emotional and meaningful memories, in particular, have been reported to be recalled over long periods of time (Conway, 1995; Rubin & Kozin, 1984; Pasupathi, 2001).

Second, although autobiographical memory is well remembered compared to other types of memory, a paradox is that it is highly malleable (Conway & Pleydell-Pearce, 2000; Rubin, 1999). Rubin noted that autobiographical memory “is one of the most complex areas of psychological inquiry” (Rubin, 1999, p. 1). Recalling emotional personally experienced autobiographical memories involves active participation as one experiences and then reconstructs the remembered event based on individual factors that colour interpretation. Autobiographical memories include not only factual information but also feelings and impressions that can alter our memories each time we remember (Conway, 2005). Autobiographical memories are malleable and they are continually updated as our goals shift (Conway & Pleydell-Pearce, 2000).

Narratives are a defining feature of autobiographical memory (Fivush et al., 2011; Habermas & de Silveira, 2008; Nelson & Fivush, 2004). Autobiographical memories are much like storytelling. Unlike recalling simple memory material, autobiographical memories often have distinct plots: they have a beginning, a conflict or a series of complications and a subsequent end or resolution (McLean, Pasupathi, & Pals, 2007). Our narratives serve as a highly important mode of organising the recollection of our past (Fivush et al., 2011) as they align our past with the present (Conway & Pleydell-Pearce, 2000).
**Self-memory system.** Conway and Pleydell-Pearce (2000) proposed an influential account of the nature of autobiographical memory in their Self-Memory System (SMS) model. Their model suggests that autobiographical memories are distinctively encoded and retrieved later in ways that serve the individual’s current goals. The authors proposed that individuals form future goals that are reasonably in line with encoded information of their past lifetime periods, general events, event-specific knowledge and self-identity (Conway & Pleydell-Pearce, 2000; Conway et al., 2004). Autobiographical memories are regulated by control processes termed the “working self” to maintain an ongoing balance with changing individual goals. The working self can facilitate or inhibit retrieval of certain memories depending on current goals. Autobiographical memories that are consistent with the goals and values of the working self are prioritised for remembering whereas memories that conflict with the working self are likely to be forgotten.

Within these goals there are two separate drives in goal activity: a drive for “correspondence” and a drive for “coherence” (Conway, 2005; Conway et al., 2004). Whereas a drive for correspondence is to represent reality in cognitively efficient ways, a drive for coherence is to retain knowledge in such a way as to support a coherent and effective self. Conway (2005) argued that coherence and correspondence are both necessary. The SMS model stipulates that both drives are important and that memory is a product of the trade-off or interplay between these separate but often competing demands. Within Conway’s adaptive or motivated Self-Memory System framework, recent memory in which details are important is biased towards correspondence at the expense of coherence. For example, recent goal processing, such as remembering what is in the fridge to make dinner allows one to subsequently make dinner or buy what is needed. On the other hand, long-term
memory, in which the gist is usually more important than the details, is biased towards coherence at the expense of correspondence. In this case, knowledge and memories relate to long-term goal processing where general autobiographical knowledge and gist of the events are sufficient.

Autobiographical memory goals of coherence or correspondence also may be more or less important depending on the specific function of autobiographical memory (Barnier, Sutton, Harris, & Wilson, 2008; Conway, 2005; Conway et al., 2004; Harris, Sutton & Barnier, 2010).

**Functions of memory.** Psychology researchers have identified three well-accepted broad functions of autobiographical memory: the directive function, the self function and the social function (Alea & Bluck, 2003; Bluck, 2003; Bluck & Alea, 2011; Bluck et al., 2005; Harris et al., 2014; Pillemer, 1992, 2003, 2009).

The directive function of autobiographical memory uses past experiences as a reference for solving current problems and as a guide to our actions for the present and future. The self function of autobiographical memory uses past experiences to preserve and enhance one’s own identity. The self function connects us to our past and is essentially our database for our sense of self. Finally, the social function of autobiographical memory uses past experiences to develop and maintain relationships and to define identities of groups, cultures and generations. We use the social function to recall with others in order to manage emotions and to understand events.

Correspondence and coherence thus interact with needed function of particular autobiographical remembering (Conway, 2005; Conway et al., 2004). Correspondence is generally short term and necessary for the directive function, such as remembering what one bought for dinner. Coherence is generally long term and more important for the identity and social functions where continuity and bonding take precedence over
accuracy.

The implications are that autobiographical memories already are quite malleable due to their reconstructive nature and because they already are socially oriented. This suggests that the social contagion paradigm would work for autobiographical memory. However, autobiographical memories also are better remembered compared to other types of memories. They are furthermore personally authored and may be experienced individually apart from those we later discuss them with. If autobiographical memories are unshared then they may be more difficult to influence than memories shared with others.

**Shared versus unshared remembering.** Memories for personal experiences can be shared or unshared. We may have spent the day at the beach together or else I may have gone alone and told you about my beach experience. Barnier et al. (2008) argued that social factors can exert their influence on memory in different ways depending on whether experiencing and remembering is shared or unshared (Barnier et al., 2008; Sutton, 2008). They proposed a framework that describes the varying social aspects of remembering.

If encoding is unshared, then one needs to consider whether the events were similar or distinct. For example, during a trial it is common to present victims who were affected at different times by the same perpetrator. Did the witnesses experience the same crime at two different times (e.g., home invasion) or was each criminal act different (home invasion vs. online embezzlement)? If encoding is shared, then one needs to consider whether sharing the event was meaningful or accidental. For example, did victims of a crime come together to discuss their memories in group therapy or was discussion accidental with other bystanders who just happened to witness a mugging? Barnier et al. (2008) next advised that it is
important to consider whether the retrieval is shared or unshared. If the retrieval is shared, is it meaningful and interactive or more minimal? For example, did the witnesses discuss, collaborate and co-construct revisions with each other when giving evidence or did they take turns in trying to recall what they had seen? All these factors contribute to how people may be affected by social influence.

These differences are important to consider for example because of the role of expertise in memory. Research has found that people are more susceptible to contagion if the contagion comes from an expert or from someone who they believe knows more about the event (Allan et al., 2012; French, Garry, & Mori, 2011; Gabbert, et al., 2007; Koppel et al., 2014). When an event is shared there is no natural expert as everyone is assumed to have the same expertise. Examples in research of memories of shared events come from studies on “flashbulb memories”. Flashbulb memories are vivid and detailed memories of highly emotional collectively experienced events (Brown & Kulik, 1977; Pillimer, 1998). Flashbulb memories have been reported and studied for events such as the September 11 attacks on the World Trade Center, the Challenger explosion, President Kennedy’s assassination and OJ Simpson trial (Brown & Kulik, 1977; Hirst, Phelps, Buckner, Hudson, Cuc, Gabrieli et al., 2009; Neisser & Harsch, 1992; Schmolck, Buffalo, & Squire, 2000; Winningham, Hyman, & Dinnel, 2000). Participants recalling flashbulb memories commonly display high confidence and describe a “photographic” memory of the specified event (Brown & Kulik, 1977; Pillimer, 1998). Although these memories are remembered with clarity, research has shown that they are highly malleable. It is believed that individuals contaminate each other’s memories for details during subsequent discussion of the events (Coman, Manier, & Hirst, 2009). In these instances, collaborative remembering often results in groups searching for a collectively agreed upon version of the past. In groups with a
shared history, members are likely to repeatedly recall events together and cue each other’s memories.

One important impact of collaborative shared remembering in autobiographical memory is that individuals are more likely to incorporate information from others as part of their own memory. Shared remembering can be affected by certain factors, such as individuals trusting other people’s memory over their own. For example, an individual may believe that the other person was in a better position to encode the event, or that the other person has a better memory. Hirst and Manier (2008) suggested that this is how people and groups develop a shared history.

However, when memories of important past events are not shared, or individually encoded, this induces a natural condition of expertise. It could be said that the individual to whom the autobiographical memories belong is the “expert”. The individual who experienced the event and is telling the corresponding autobiographical memory is the owner and expert of that memory. This is important in a forensic setting as it raises the issue of how privately experienced unshared memories might be influenced by social factors if the collaborating partner was not present during the event. Unshared remembering is very common in the legal system. Eyewitnesses may provide accounts with no one else to corroborate them (Howe & Conway, 2013). That is, they may be the sole person to witness or experience the event in question.

Research has indicated that individuals resist misinformation from sources who lack credibility (Dodd & Bradshaw, 1980; Underwood & Pezdek, 1988). If an individual is an expert on his or her own personal memory, they may be less
susceptible to social influence. An interesting question therefore is: how does social contagion translate to autobiographical memories that are unshared?

Evidence from other paradigms. Memory researchers have attempted to understand how different social interactions can lead to the development of false memory. There is evidence from other paradigms extended to more complicated memory stimuli that shared and unshared autobiographical memories can be altered by social influence from others.

Memory conformity. The memory conformity paradigm is analogous to the social contagion paradigm but usually is adapted to forensically relevant shared material, such as videos or crime slides. Like the social contagion paradigm, the memory conformity paradigm measures accuracy and examines the recall of false information from social influence. In the standard memory conformity paradigm, all participants watch a video simultaneously, but half of them watch one version of events and the other half watch another version of events. After watching the video, participants discuss as a group the events they watched, not knowing that these were two different versions of the tape.

For instance, Gabbert, Memon, and Allan (2003) investigated the memory conformity effect in people who witnessed a videoed crime of opportunistic theft in a library. Gabbert et al. (2003) found that a massive 70% of participants recalled misinformation from the video they did not watch. They incorporated incorrect items mentioned by a co-witness during collaborative recall into their individual memory of the watched event. Gabbert et al. (2003) argued that the memory conformity effect happened because of social influence, whereby participants confused their own memories of an event with information gained from other participants. To test their interpretation, Gabbert, Memon, Allan, and Wright (2004) conducted a subsequent
experiment in which they presented misinformation non-socially, as a written narrative, to half of the participants and socially, in discussion, to the other half. They found that participants displayed higher memory conformity for misinformation items presented socially than for misinformation items encountered non-socially. Gabbert, Memon, and Wright (2007) were interested to learn if the participants simply were relaying the information they heard from their co-witness or if they had actually formed a memory of the misinformation. To answer this question, at the end of their memory conformity study, Gabbert et al. asked the participants to discern whether they remembered hearing the misinformation from their partner or whether they had remembered the misinformation from the pictures. Half of the participants reported they had seen the misinformation in the original pictures, indicating they had formed false memories for the misinformation.

Although the memory conformity studies are highly relevant to our understanding of effects of misinformation on co-witness discussion, one possible limitation is that although the material was more complicated and similar to autobiographical memory it was not personal.

Autobiographical memories are different from the passive experience of watching a crime video. Experiencing an event involves personal involvement and emotional valence (Harris et al., 2008). In contrast, watching a crime video is a passive experience that lacks active involvement thus decreasing emotional and cognitive load (Harkness, Paterson, Denson, Kemp, Mullan, Sainsbury, 2015). Being a victim of a criminal event or witnessing a criminal event is likely to be significant and personally relevant. Furthermore, although the memory conformity paradigm has proven to be a very good model for situations where people witness a crime together,
this paradigm does not address the effects of social influence on memories for events that were not experienced together, such as uncorroborated witness testimony.

**Implanted memory technique.** Loftus’ misinformation paradigm has been adapted to investigate contamination of personally experienced unshared autobiographical events. This variation of the misinformation paradigm, referred to as the implanted memory technique, appears to show that false memories for personal autobiographical memories can be created by way of suggestions. In the original implanted memory study, Loftus and Pickerel (1995) asked participants over multiple interviews to describe various childhood episodes they had experienced. One of these events was getting lost in a crowded shopping mall at age of 5. Although they told participants that their parents had confirmed these events, the parents in fact had confirmed that their child had never been lost in a shopping mall at that young age. At first participants denied that the event had happened but by the second and third interview of suggestive questioning, more than a quarter of the participants recollected being lost in a shopping mall. Some even recalled vivid detail and exhibited high confidence about the fictional event.

Subsequent implanted memory studies have illustrated that entire false memories can be created for significant life events. Wade, Garry, Read, and Lindsay (2002) created false memories of hot air balloon rides by showing participants a photoshopped family picture of a hot air balloon ride. Braun, Ellis and Loftus (2002) used a fake Disneyland advertisement and successfully implanted memories into participants of meeting Bugs Bunny and 16% even reported remembering shaking hands with Bugs Bunny, on a trip to Disneyland, which was highly improbable as Bugs Bunny is a Warners Brothers character not a Disney character. Porter, Yuille, and Lehman (1999) demonstrated that adults are capable of creating entire detailed
false autobiographical memories of emotional childhood events such as medical procedures, animal attacks and serious accidents. It has been estimated that about 30% of participants can be successfully implanted with false memories by family members (Hirst & Echteroff, 2012; Lindsay, Hagen, Read, Wade, & Garry, 2004). The implanted memory technique has been especially effective in changing distant past childhood memories. Although technically, the autobiographical memories targeted by the implanted memory technique were unshared with the experimenter asking questions, there is still an assumption of expertise attributed to the experimenter. The experimenter tricked participants into believing the false event happened. This was done by the use of repeated suggestion, misleading questions or photoshop trickery.

Accuracy of recall is very important in both memory conformity and implanted memory research and both paradigms have been highly applicable to the forensic setting. The memory conformity paradigm has been applicable for co-witness discussion and the memory implantation paradigm, as a model for suggestive interviewing and the recovered memories debate.

**Collaborative remembering.** There is also research stemming from the collaborative remembering and collective memory literature that indicates that memory can be changed in more natural conversational settings where suggestive questioning is not used and accuracy is not as much of a concern (Cuc, Ozuru, Manier, & Hrist, 2006). For instance, Cuc et al. (2006) examined whether the presence of a dominant narrator in collaborative remembering among family members would influence collective memories. Cuc et al. (2006) had family members individually learn the same short story. After a short break and filler task the family members took turns recalling the story to each other. One week later, the family members
were asked to individually recall the story to the experimenter. Cuc et al. found that family members were more likely to incorporate into the stories details falsely remembered by a natural dominant narrator during the collaborative recall phase. They also found that families with a dominant narrator were more likely to develop similar types of collective memories for the stories than families who did not have a dominant narrator. Researchers have suggested that group discussion of individual memories has the effect of making the group's memories more similar over time and that the type of subsequent communication of memories plays an important part in the process (Brown, Coman, & Hirst, 2009; Cuc et al., 2006). In follow-up studies, researchers found that a listener cannot only affect what information the speaker remembers but also can affect the information that the speaker forgets (Cuc, Koppel, & Hirst, 2007; Hirst & Echterhoff, 2012; Stone, Barnier, Sutton & Hirst, 2010).

Judged on evidence from the above paradigms, I expect that unshared autobiographical memory will be susceptible to social influence through adaptation of the social contagion paradigm.

**Original and Revised Goals of this Thesis**

The original aim of this thesis was to test this prediction. There has been only one specific relevant study that has used the social contagion paradigm for autobiographical memories of unshared events (Barnier et al., 2008).

**Social Contagion of Autobiographical Memory**

Barnier et al. (2008) extended the social contagion paradigm to investigate if it is possible to contaminate freely recalled memory of personal unshared emotional past events. The researchers chose events such as a high school formal and first date. Research has indicated that memories with high emotional content, similar to these, can be as vivid and clear as some flashbulb memories of important national events.
Phase one was the elicitation phase. In this phase, participants freely recalled four important recent autobiographical events in detail such as a 19th birthday or a graduation formal. Phase two was the collaborative recall phase. In this phase, participants returned to the lab one week later and alternated with a confederate in recalling their memories. The participant and confederate then took turns to describe to each other the six most important aspects of the other person's autobiographical events. The confederate included a positive or negative contagion item for one of the six aspects for two of the four events. These contagion items were evaluative in nature (e.g., a positive contagion for birthday was, “it was a big turning point in your life” and the negative contagion for this event was “it was no big deal”). The third and final phase was the individual recall phase. In this phase, participants individually recalled their own autobiographical events. Barnier et al. discovered that the social contagion effect occurred for evaluative statements despite the fact that the confederate was a stranger to participants and had not experienced the same events with them. Specifically, they found that 30% of participants included at least one suggested contagion item in their final recall (e.g., after receiving the contagion item “it was a big turning point in your life”, one participant increased the number of people at her party from 30 in phase one to 70 a week later in phase three). Barnier et al. found that memory accounts of participants were affected in other ways. It appeared that other social factors besides contagion items changed participants’ subsequent memory recalls. Sixty four percent of the participants accepted “verbal contagion” for at least one event, whereby participants recalled actual verbatim or overall gist from the confederate’s scripted memories when recalling their own
memories. Barnier et al. concluded that suggested contagion of evaluation and verbal contagion of details from confederate’s script, demonstrated that the social contagion effect occurs for evaluative comments and factual information about unshared and personally significant life events.

However, Barnier et al. were not able to draw any conclusions on the accuracy of details and on the evaluations of autobiographical memories they gathered. They could not tell whether the suggested contagion effect was due to false memory or due to the confederate cueing the recall of participants’ genuine memories. Nevertheless, Barnier et al. illustrated how the social contagion paradigm can be used to examine the effect of social influence on unshared autobiographical memory reports.

Although Barnier et al. concluded that when people converse with each other, their own autobiographical memories can be contaminated even by people who did not share the event with them, there is otherwise a general lack of research on how social contagion affects unshared personal autobiographical memory recall. This is an important area of study as many witness, suspect, alibi and victim statements are uncorroborated by any other personally experienced testimonies. It is crucial to consider how subsequent social interaction influences individual memory of an individually encoded unshared event. Questions of interest raised from this study are: since the researchers found such a robust effect of social contagion on evaluative statements as well as unexpected uptake of information from the confederates’ script, can the social contagion paradigm be used to contaminate specific concrete details in unshared personal events?

I originally set out to extend the social contagion paradigm for autobiographical memory. As you will read in Experiment 1 (Chapter 2), I first needed to identify details to target in subsequent social contagion experiments. I
conducted an experiment based on the Barnier et al. (2008) paradigm but did not have a confederate and did not introduce any contagion. I called this procedure a “retelling paradigm.” I simply asked participants to recall four personal autobiographical memories on two occasions only seven days apart. My findings were unexpected, at least in the context of the social contagion literature, as I found many changes across retellings without contagion. Participants made omissions, additions and most made contradictions. My findings implied that aspects of the social interaction and individual differences, rather than just contagion, might drive performance in social contagion and misinformation experiments.

**Memory Variability Across Recalls**

In light of my findings I revised the goals of this thesis to also focus on intrinsic variation in the absence of contagion across repeated retellings of autobiographical memory accounts. To understand this broader context I briefly review research examining autobiographical memory variability in experimental settings where no contagion is introduced.

In general, this literature indicates that people make omissions, additions and contradictions, which may or may not be independent of contagion.

**Naturalistic Studies**

As reviewed above, research on the collective nature of flashbulb memories has demonstrated that despite reports of high clarity and confidence in accuracy of detail, memory for public traumatic events changes over retellings (Brown & Kulik, 1977; Pillemer, 1998). Individuals have been found to make omissions, additions and contradictions across retellings with more changes prevalent over each subsequent retelling (Neisser & Harsch, 1992; Schmolck et al., 2000). The cause of these changes has mostly been attributed to contamination from misinformation through the
frequent sharing of details with others who had experienced these shared public events (Hirst et al., 2009; Neisser & Harsch, 1992; Schmolck et al., 2000).

However, Herlihy et al. (2002) investigated memory account variability over retellings of traumatic and personal non-traumatic everyday events of Bosnian and Albanian refugees (with no obvious motivation to fabricate accounts). They found that participants made similar rates of contradictions and additions across both types of events. Participants made more additions and contradictions in peripheral than central details although many discrepancies were made in central details as well. This study supports the findings of Talirico and Rubin (2003) who found everyday personal events change across retellings in the absence of contagion. There are a plethora of studies that show that memory retellings change over time. For example, research has shown individuals have reported inflated high school and college grades over subsequent recalls (Bahrick, Hall, & Berger, 1996; Bahrick, Hall, & Da Costa, 2008), middle aged men confidently reported recollections of adolescent experiences that were identified to contain many contradictory details (Offer, Kaiz, Howard, & Bennett, 2000) and parents inaccurately recalled child rearing practices (Robbins, 1963). These changes across memory recalls happened after an extended period of time had elapsed between first and second recall where accuracy may not have been a priority.

However, memory changes have also been found for more controlled autobiographical retellings only one week apart, where the accuracy stakes were raised. For example, Strange, Dysart, and Loftus (2014) compared alibi accounts across two recalls just one week apart. In their study, participants imagined they were providing alibi statements to the police. On both occasions, participants were instructed to answer seven questions assessing different features of memory
including temporal, location, person and event details. Strange et al. found that participants omitted old information, added new information and contradicted themselves across their two recalls. Strange et al. also found variation across participants and categories. Specifically they found that approximately 50% of participants provided contradictory information across their two sessions. They also found participants made more contradictions in temporal details, such as exact timing of events in the afternoon, than person details such as who they were with.

Similar to findings from the social contagion and misinformation paradigm, the amount of time between recalls affected the amount of changes across retellings in the absence of misinformation and there seemed to be a degree of variation between studies and between individuals in the amount and types of changes made across recalls. For example, Schmolck et al. (2000) investigated changes participants made across memory recalls of the O.J. Simpson trial. The researchers asked participants a series of questions related to their memory of the trial (e.g., What time was it when you first heard the news of the verdict? How did you first hear about it?). Similar to Strange et al. (2014), Schmolck et al. found that although more than half of the participants provided contradictory details at later recalls, almost 40% of participants’ recollections contained no contradictions 15 months later when asked the same questions. Similar individual differences have been found in other studies as well (e.g., Neisser & Harsch, 1992; Winningham et al., 2000). Pillemer (2001) explained individual differences among people by noting that different participants tend to provide different types of autobiographical accounts. Some tend to provide autobiographical accounts that contain a depth of specific detail whereas others tend to provide autobiographical accounts that are more general or vague.

The reviewed research shows that people make changes across their retellings
when there is no contagion introduced in the experiment. What is not clear from these studies is whether people make contradictions and changes across retellings because of misinformation or whether other intrinsic factors lead to variation. Before I review factors that may influence changes across memory retellings in the absence of contagion it is first necessary to examine omissions, additions and contradictions in a laboratory setting where accuracy can be measured to consider what other factors contribute to changes across retellings besides misinformation.

**Controlled witnessed events.** Research studies have found that people make omissions, additions and contradictions across recalls in the absence of contagion (Fisher et al., 2013; Gilbert & Fisher, 2006; Vredeveldt et al., 2014). Gilbert and Fisher (2006) suggested that rather than a product of misinformation; changes across memory retellings may frequently be the result of different retrieval processes. In order to investigate this possibility, Gilbert and Fisher simplified memory material so that it could be assessed for accuracy in a laboratory setting. Gilbert and Fisher investigated the stability of recall referred to as consistency (same answer at time 1 and at time 2, e.g., *robber was clean shaven* at time 1, and *robber was clean shaven* at time 2), omissions referred to as forgotten (answer at time 1, e.g., *clean shaven* but no answer at time 2), additions referred to as reminiscent (no answer at time 1, but provided an answer at time 2, *clean shaven*) and contradictions (answer at time 1, e.g., *clean shaven* that differ from answer at time 2 *bearded*) in a laboratory setting for details of a crime. In their study, participants watched a short crime video, they were then asked to either recall details of the crime by (a) free recall, (b) by specific questioning or (c) both free recall and specific questioning over two separate recalls 48 hours apart. Gilbert and Fisher calculated the accuracy of each of the four response categories in addition to the accuracy of the entire testimony.
Gilbert and Fisher found that 98% of participants recalled additional details at the second recall that they did not recall at the first recall; how much the accounts changed depended on different elicitation conditions. They also found that contradictory details were accurate 62% of the time at first recall and 35% correct at second recall. The researchers argued that one reason that individuals made changes across recalls was because they were recalling different details from the same event on two different occasions (Roediger & Thorpe, 1978). Gilbert and Fisher suggested that people's memory over subsequent recall might change significantly because of different elicitation requests from the listener. Specifically, they found that participants who elicited free recalled accounts in session one and then accounts elicited by specific questioning in session two varied the most in the different types of details recalled. Fisher and Gilbert suggested that these cues influenced participants to search through their memory and locate different relevant details. Gilbert and Fisher concluded that their findings on different details provided at different times due to different retrieval cues disproved the commonly held belief that additional details must be result of exposure to post event misinformation (such as someone suggesting new information to a witness after the event) and that there must be other factors influencing memory recall variability.

Gilbert and Fisher's research suggests that memory variability can be intrinsic due to changes in memory organisation that happen as a consequence of forgetting resulting in reliance on different individual and social cues and strategies.

As Gilbert and Fisher (2006) noted, the link between misinformation through social influence (contagion) and memory changes appears to be to some extent simplified. Social influence can change memory across retellings, but it is not just a question of exposure or no exposure to contagion, aspects of the social interaction
can influence how one recall a memory.

**Subtle Social Influences**

When people share their memories with others their memories can be affected through social subtle cues rather than direct contagion from others. Chin and Schooler (2008) suggested that even that the prospect of social interaction and the act of translating thoughts into words can change how one remembers an event. People have an ingrained ability to adapt to different required social situations (Markus & Kunda, 1986). Memories usually are told differently on different occasions depending on who the audience is (Echterhoff, Higgins, Levine, 2009; Echterhoff, Lang, Kramer, & Higgins, 2009; Norenzayan & Schwarz 1999; Tversky & Marsh, 2000). Although memories of personal experienced events may be originally formed within individual experiences, subsequent recalling of memories is largely updated by social experiences in other ways than through misinformation. When people recall their memories in a social context, they tend to be selective (Hirst & Echteroff, 2012; Marsh, 2007; Pasupathi, 2001). They may focus on recalling information that will help them build a relationship, develop intimacy, entertain, elicit or provide sympathy or make a good impression (Dudukovic, Marsh & Tversky, 2004; Pasupathi, 2001).

People also may be more likely to be compliant in social settings and recall memories in a way they think is socially desirable (Bond & Smith, 1996). Compliance is defined as a type of response to a certain type of communication or request. The request can be explicit or implicit but in all situations the person recognises that he or she is expected to respond in a certain way (Cialdini & Goldstein, 2004). People may be motivated to form meaningful social relationships and to conform themselves to better affiliate with others (Cialdini & Goldstein, 2004). They may be motivated by the need for approval or fear of rejection or intimidation by authority (Gudjonsson,
Thus, when people talk about their experiences with others they may deliberately omit information and recall other additional information to present a particular image of themselves to their listeners. They may also tailor the information they provide because they expect the listener is interested in certain type of details over others or they think the listener expects them to respond a certain way. This has been well-demonstrated in research. For example, Norenzayan and Schwarz (1999) found that participants tailored their narrative accounts based on whether the listener was a cognitive or personality psychologist. When participants thought the listener was a personality psychologist they provided more personality characteristics and when they thought that the listener was a social psychologist they provided more situational characteristics. Similar effects in tailoring details to the listener have been found when participants retell a story to a peer versus an experimenter and when writing a letter of recommendation for a social club versus writing a letter of complaint (Hyman, 1994; Tversky & Marsh, 2000). Echterhoff et al. (2009) called this phenomenon the audience tuning effect. The audience tuning effect suggests that when retelling an event a speaker may omit or alter some details to tailor their account to match the perceived characteristics and goals of the listener.

Deliberate selective retelling of memories can then subsequently change how the speaker remembers a memory (Echterhoff, Lang et al., 2009; Echterhoff & Hirst, 2012) The selective remembering can lead to subsequent forgetting of certain information or adding of new information (Barnier et al., 2008; Harris et al., 2010). Social factors may exert their influences on memory by shaping and updating our narratives. Skowronski and Walker (2004) stipulate that retelling of autobiographical stories often involves elaborative rehearsal of memory. Such elaborative rehearsals
are particularly good at building memory for an event. This tailoring process, however, can have a significant impact on subsequent remembering by changing the memory of the event.

In summary, subtle social influences of tailoring accounts impact memory changes over retellings. This subtle shaping of narratives not only influences the reconstruction of autobiographical memory over retellings but it can lead to increased confidence that the details are correct.

Confidence

Research has indicated that the rehearsal of memory strengthens the narrative and feelings of fluency and coherence (Jacob & Dallas, 1981). Frequent sharing of memories can artificially increase one’s confidence in the memory of the event (Fitzgerald & Broadbridge, 2013). Retelling an event provides rehearsal. However, although people become more confident of their memories over retellings, research has indicated that the confidence is frequently inflated and often not related to the accuracy of details of what actually happened (Gran Hag, Stromwall, & Allwood, 2000). Participants have been shown to exhibit inflated confidence in the completeness and comprehensiveness of their memory (Yarmey & Yarmey, 1997). When people recall memories that are rich in detail, this strengthens their confidence that the memory is true (Johnson, Nolde, & De Leonidis, 1996). Individual differences have likewise been found to affect confidence. For example, participants who scored high on the NEO extroversion scale have been found to be more confident in the belief of the accuracy of their memories of the past (Rubin & Siegler, 2004).

The reviewed literature suggests that changes across retellings are influenced by a number of different factors. This thesis set out to investigate the likelihood, nature and sources of changes across repeated accounts of recent personal
autobiographical experiences. I aimed to expand our understanding of how and why autobiographical memories change across retellings by contributing new data and theory on the types of changes people make and the factors that contribute to them, especially in the presence and absence of contagion.

Although changes due to intrinsic variation and changes due to contagion have been looked at separately, usually in different disciplines, there is a gap in the research on the role each may have in memory variability. For example, although the rates of contradictions due to intrinsic variation are quite high in experiments that investigate misinformation effects, the changes are noted, but are frequently not explained alongside the misinformation effects. For example, in Paterson, Kemp and Ng’s (2011) second experiment the mean number of misinformation items recalled was 0.67 whereas the mean number of spontaneous intrinsic errors was 7.92. It is therefore interesting to consider where these other errors across retellings originate from and what factors may influence them. The importance of this work is that I examined intrinsic variation of memory accounts in the same context or program of research as variation of memory accounts due to misinformation and social contagion.

Motivation for Thesis

It is my experience of working in the forensic setting that has motivated this research. As a forensic psychologist I previously worked in private practice providing assessment reports for the court. My work consisted of travelling to prisons administering a number of assessment tools and engaging in lengthy interviews with various offenders attempting to gather as much information on the person’s life as possible. The social connection between myself and the interviewee was an important aspect in these interview. If rapport was not established I remained aware
that there was most likely important information that I was not able to access. On the other hand, if a natural rapport was established too quickly I was immediately suspicious of motivation and accuracy of information provided. Scoring the various assessment tools and going over my interview notes back in my office, I was always intrigued by the different narrative styles and the different perspectives on recollections of events that came out of those sessions. Threading through narratives and attempting to uncover “the truth” was complicated by a variety of intricate internal and external factors yet always seemingly influenced by social interactions. Understanding how memory recall varies across retellings and the different ways social influences affect individual variability is an important area to investigate that has largely been neglected in research.

**Goals of Thesis**

The goal of this thesis was to contribute to the knowledge and understanding of autobiographical memory variability across retellings in the forensic context. Although I was motivated by my forensic experience, the cognitive field also influenced me. In particular, perhaps for the first time, I brought two literatures from forensic and cognitive psychology together: the literature on changes in retellings due to intrinsic variability and the literature on changes in retellings due to social contagion. My aim was to extend cognitive findings by gathering data high in external validity that reflected the large amount of detail expected in a forensic context. This thesis set out to answer a series of questions. First, as outlined at the beginning of this chapter, the legal system relies on at least three factors when establishing the accuracy of autobiographical memory reports: (1) the amount of detail in memory accounts, (2) the variability of memory accounts (as measured by omissions, additions and contradictions) across retellings, and (3) the individual’s confidence in
the accuracy of their account. This thesis will set out to investigate influences that impact the variability of these three factors in reports of unshared autobiographical memories across two retellings.

Specifically, this thesis will set out to determine types of omissions, additions and contradictions across retellings and the different factors that may impact variation in retellings in a social setting. I will investigate the role of social interaction, individual differences and contagion on the different types of variances in memory accounts across retellings.

This thesis relies on Barnier et al.’s (2008) social contagion paradigm for autobiographical memory and an adapted retelling paradigm for autobiographical memory to investigate changes across retellings due to contagion and intrinsic variability. I chose to draw my methodology from the social contagion literature for two reasons. First, because it is a robust experimental paradigm that has been adapted to study autobiographical memories. Second, I chose the social contagion paradigm over other reliable paradigms investigating social influence on memory change because my main motivation as a forensic psychologist has been to focus on accuracy and investigate the contradictions across memory account retellings as these are the most important changes in a forensic context. I was interested in unshared memory as much legal testimony is unshared and individually experienced but yet there is very limited research on the implications of social influence on unshared memory accounts. It is important to establish how social influence may affect these unshared experiences. The role and dangers of social influence have been somewhat simplified in the legal system particularly at a cost to witnesses and suspects but also to everyone taking part in the legal proceedings. This thesis offers an important opportunity to advance the understanding of how memory may change
across retellings due to social influence. The outcomes of my project will be new data and theory on the genuine baseline of variation in autobiographical memory and the factors that contribute to it.

For the purpose of this thesis, across the next five chapters, “misinformation” will be referred to as “contagion.” Misinformation can come from social or non-social sources, whereas contagion has been defined as a specific variety of misinformation coming from social influence (Roediger et al., 2001). I however chose to use the term “contagion” for both social and non social sources to avoid future confusion when comparing findings from my different experiments.

**Structure of Thesis**

This thesis consists of six chapters, including this introductory chapter and a final discussion chapter. Chapters 2 to 5 describe four experiments in which I examined changes in autobiographical accounts across retellings. In Chapters 2 to 4 I describe Experiments 1, 2 and 3a where I used the retelling paradigm to examine how autobiographical memory accounts change across repeated retellings in the absence of contagion. Chapters 4 and 5 describe Experiments 3b and 4 where I used the social contagion paradigm to examine how memory accounts change across retellings in the presence of contagion. Across all chapters my aim was to investigate the different types of changes and the different sources of error that lead to variability across retellings. In each chapter I included my original coding definitions for each experiment from each year to illustrate the progression of my growing understanding of the difficult concepts of contradictions and other changes across retellings throughout the years of my research.

In Chapter 2 I describe Experiment 1 where I investigated how freely recalled written, typed and spoken accounts change across retellings. In Chapter 3 I describe
Experiment 2 where I investigated how the presence and absence of a listener and the personality characteristics of a speaker influence changes across retellings. In Chapter 4 I describe Experiment 3a and Experiment 3b where I examined changes across retellings in the presence and absence of contagion. In Experiment 3a I examined the number and type of contradictions in specified concrete details across two recalls of personal autobiographical events in response to a semi-structured interview format. I also investigated the role of dissociative tendencies and social desirability on memory variability and discovered participants’ underlying reason for making contradictions. In Experiment 3b I examined if participants are more likely to accept certain types of contagion details over others. I investigate the role of compliance on acceptance of contagion and participants’ underlying reasons for accepting contagion.

In Chapter 5 I describe Experiment 4 where I returned to my original goal. I extended the social contagion paradigm (Roediger et al., 2001) for autobiographical memory (Barnier et al., 2008) to investigate the social influence on the development of false memories for concrete details in important personal past events. I examined whether participants accept suggested contagion, verbal contagion and made contradictions due to intrinsic variation.

Lastly, in Chapter 6 I draw upon my entire thesis to interpret and critique the results of my experiments. I rely on theoretical frameworks to interpret my results and highlight the implications of my findings for the forensic setting. Finally, I indicate areas for further research. This work is novel in that it examines two sources of memory changes together to understand the ways memories might change over time. It reflects also on the assumptions held in different contexts about the variation of memory or how to interpret changes.
Chapter 2

Autobiographical Memory Variability in the Absence of Contagion: Written, Spoken and Typed Accounts
Autobiographical Memory Variability in the Absence of Contagion: Written, Typed and Spoken Accounts

The primary aim of Experiment 1 was to investigate how memory accounts obtained through three different elicitation modes changed or remained the same across two separate retellings one week apart when no contagion was introduced.

As reviewed in the Introduction, individuals involved in the legal process, such as witnesses, alibis, suspects and asylum seekers generally are expected to provide confident unvarying detailed autobiographical memory accounts across repeated retellings. Subsequent memory accounts containing omissions, additions and contradictions often are viewed as either deceptive or contaminated (Berman & Cutler, 1996; Blinka, 2010; Herlihy et al., 2012; Simon, 2012; Vredeveldt et al., 2014). Researchers and practitioners in the forensic setting recognise that when eyewitnesses come into contact with incorrect post-event information, their memory for the event can be distorted (Gabbert et al., 2003; Paterson & Kemp, 2005; Paterson & Kemp, 2006a; Paterson, Kemp & McIntyre, 2012). It is thus generally recommended that witnesses to a crime be separated to avoid contaminating individual autobiographical memories (Paterson & Kemp, 2005). An interesting question to consider is how much does memory vary across retellings when no contagion is introduced?

My initial motivation for this experiment was to examine commonly elicited concrete autobiographical details that I could later target for contagion in a subsequent social contagion experiment. To do this, I used a “retelling paradigm” adapted from Barnier et al.’s (2008) social contagion paradigm for autobiographical memory but my version differed in three ways. I did not introduce contagion items, I
did not use a confederate and finally I varied the elicitation mode of obtaining accounts. Participants either wrote, spoke or typed their memory accounts.

In the legal system, the elicitation mode (how information is obtained) varies depending on the context and situation. Individuals involved in legal proceedings can be asked to write, type or tell what happened (Family Court of Australia, 2015; Gabbert et al., 2009; Herlihy & Turner, 2002; McPhee et al., 2014). In research studies these three elicitation modes commonly are used to gather memory accounts with little consideration of differences in the quantity and quality of information each may invoke. Yet, writing, typing or spoken communication may differ in their interactive nature and fluency of narration. For example, speaking face-to-face to a listener is more socially interactive than writing or typing as speaking encompasses non-verbal communication such as facial expressions and body language (Bavelas, Coates, & Johnson, 2000; Schallert, Kleiman, & Rubin, 1977). Fluency, on the other hand, is affected by matches in speed of thought generation and the speed of communication mode (Ochsner, 1990).

Previous research has indicated that differences in recall can arise when memories are elicited by different modes. For example, Horowitz and Berkowitz, (1967) found that when participants were instructed to either provide written or spoken accounts describing a text they read, participants who spoke provided more detailed accounts and made more additions than participants who wrote their accounts (Horowitz & Newman, 1964; Horowitz & Berkowitz, 1967). The researchers attributed the differences in recall to the ease the spoken condition offered.

Similarly, McPhee et al. (2014) found differences in recalls in different modes. Specifically McPhee et al. found that untimed immediate recall of details of a crime video was comparable in spoken and written conditions, but spoken-recall was faster
and participants reported it to be less effortful than written recall. McPhee et al. suggested that the slower speed of writing compared to the speed of thought generation may have contributed to difficulties in complete recall.

Bekerian and Dennett (1990) demonstrated that spoken recall may be more accurate than written recall. Bekerian and Dennett showed participants a series of ten slides depicting an auto-pedestrian accident. Immediately after participants viewed the slides, Bekerian and Dennett asked participants to freely recall all the information they could remember in the viewed slides. Half were asked to provide spoken free recall accounts and the other half were asked to provide written free recall accounts. Participants had ten minutes to provide as much information as they could recall across both conditions. The investigators measured completeness (total features recalled from the slides), accuracy (total correct features recalled) and accuracy ratio (accuracy score divided by complete score). Bekerian and Dennett found that both the written and spoken conditions were equally complete. However, spoken recall was more accurate and had a higher accuracy ratio than written recall.

Sauerland and Sporer (2011) investigated differences in amount and accuracy of recall between written and spoken conditions after a short delay. In their study, Sauerland and Sporer instructed participants to watch a crime video. After a 30-minute delay and filler task, participants freely recalled spoken or written accounts of what they saw. The researchers found that there was no difference in overall accuracy between spoken and written accounts but spoken accounts were significantly more detailed. Marshal (1966) also investigated differences in amount and accuracy of recall between written and spoken conditions. Like Saurland and Sporer, Marshal instructed participants to watch a crime video and after a 30-minute delay to provide spoken or written free recall accounts of what happened. In contrast
to Sauerland and Sporer’s findings, Marshal found that spoken accounts contained more errors than written accounts.

In today’s age of technology, typing is becoming more common and important as a mode of elicitation. Witnesses can provide written or typed accounts of their past experiences in affidavits or statements of declarations in a court of law (Family Court, 2015; Saligari & Marlowe, 2015). Although neither writing nor typing offer as high degree of social engagement as involved in speaking, typing has been described as less effortful and higher in fluency than writing. Typing permits editing (e.g., ability to insert new text, backspace, use of forward cursor) and this editing option allows for more automatic processing of information, rather than writing with a pen, which requires more deliberate processing of information and structuring (Mangen & Velay, 2010; Mueller & Oppenheimer, 2014). According to Schilperoord (2001) individuals proficient in typing find typing easier than writing. Schilperoord suggested that writing is more effortful than typing because of the need to pause due to hand fatigue, writing apprehension and cognitive overload from organising content. However, although typing has been found to be easier, Mueller and Oppenheimer (2014) found that participants recalled more (i.e., class notes) when writing than typing.

In comparison to speaking, typing generally is slower and more effortful than speaking. Research has demonstrated that participants elicit more information when speaking than typing. Ekeocha and Brennan (2008) found participants who discussed their memory of a viewed movie clip by speaking directly with each other provided more detail than participants who discussed their memory of the movie clip electronically, by typing. Electronic groups typed half as many words as were spoken by face to face groups despite there being no time limit for either conditions. Ekeocha and Brennan also found that participants who previously discussed their memories
by speaking to each other recalled significantly more detail in a final subsequent individual typing recall task than participants who discussed their memories by typing to each other. The researchers attributed the differences to a reliance on face to face non-verbal social cues in the spoken condition.

Based on this research on differences in recall across different elicitation modes, I hypothesised that written, spoken and typed accounts would vary in the amount and type of details elicited over two retellings of personal autobiographical events. I had four aims in my first experiment.

My first aim was to investigate differences in the amount of detail elicited in each condition. I predicted that participants in the spoken condition would elicit the most detailed accounts since speaking has been described as more fluent and less effortful than writing and typing.

My second aim was to investigate qualitative characteristics of changes across accounts. I first examined which type of details were most likely to be omitted or added over two separate retellings just one week apart. Consistent with the source monitoring framework (Johnson et al., 1993; Mitchell & Johnson, 2000, 2009) reviewed in the Introduction, I predicted that participants would rely on specific memory characteristics to recall personally experienced events. I expected that participants would omit from session one and add in session two similar types of details. I expected participants to omit and add sensory, spatial, temporal, emotional and cognitive details in a subsequent retelling. This step was important as I hoped to identify specific concrete details to later target in social contagion experiments. Following this, I examined the amount of contradictions across conditions and retellings. This was to explore “accuracy” of accounts. As Drivdahl and Hyman (2014) pointed out, it is difficult to establish the accuracy of autobiographical memories of
personal past events, when assessing direct contradictory details. However it can be assumed in most instances that one response must be incorrect. I was interested to see if some details were more susceptible to contradictions than others.

My third aim was to examine the relationship between the different changes across retellings and ratings of confidence in accuracy of details and ratings of clarity of the elicited memories. Based on Conway et al.’s (2014) and Bell and Loftus’ (1988, 1989) research that detailed accounts are perceived to be more accurate, I predicted that participants who provided more detail in their accounts would be more confident of the accuracy of their reports and would rate their memories as clearer.

My fourth aim was to examine if variability in memory accounts was related to how much participants reported discussing the event with others. As detailed in the Introduction, research has indicated that rehearsal can make people feel more confident in the accuracy of their accounts (Fitzgerald & Broadbridge, 2013). However, sharing memories with others could also lead to introduction of contagion (Hope et al., 2008). I was therefore interested in whether sharing the memories outside of the experiment made participants more confident that the details were true or/and had an effect on omissions, additions and contradictions.

**Method**

**Participants and Design**

Twenty-one undergraduate psychology students from Macquarie University volunteered to take part in the experiment in return for partial fulfilment of a course requirement. Data for three participants were excluded from the experiment; one participant did not return for session two and two other participants were excluded due to technical difficulties. The remaining 18 adults (15 women and 3 men, $M_{age} = 22$ years, age range: 18 - 48 years) were included in analysis.
The experimental procedure was a “retelling paradigm for autobiographical memory” adapted from Barnier et al. (2008) in the sense that it was guided and inspired by the methodology of the social contagion paradigm but the retelling paradigm was different in that it had no confederate, no contagion and the elicitation mode of obtaining accounts from participants was varied.

The experiment adopted a 3 x 2 mixed factorial design. The mode of elicitation (written, spoken or typed) between participants, over two separate retellings (session one or session two) within participants was manipulated. The primary dependent variables were: (a) amount recalled as defined as number of words used, (b) number of omissions and additions, (c) number of contradictions across the two sessions, and (d) confidence in accuracy of details, clarity and degree of discussion ratings.

**Materials**

Participants provided accounts of four specific events. The four events were introduced separately throughout each session and the order in which the events were presented was randomised across participants. The events were autobiographical in nature (i.e., an event in the participant’s own experience) and were adapted from Barnier et al. (2008). They were carefully chosen as likely to be recent and personally significant to participants targeted for this study (based on their stage of life). These events included: 18th birthday, high school formal, first date, and the first or most memorable high school certificate (HSC) exam (final year of high school exam in Australia; the first HSC exam is usually the English exam). In cases where the participant was significantly older than 18 years of age, they described their most recent memorable birthday (i.e., 21st, 30th or 40th birthday). In cases where the participant had not experienced any of these events, or reported having
considerable difficulty remembering an event, the participant elicited an alternative autobiographical event also adapted from the Barnier et al. (2008) study, such as first driving test or first day at most recent place of employment. In one case, the participant was unable to recall one of the specified events so she instead recalled the birth of her twins.

Additionally a scale was provided after elicitation of each account measuring confidence in accuracy, clarity and degree of discussion. Participants rated on a 10-point likert scale: how confident they were of the accuracy of the details in their account, how clear their memory was for the event and how much they had talked about the event with others (See Appendix A).

**Procedure**

The experiment was conducted over two 30-minute sessions that were held seven days apart. Participants were tested individually.

**Session one.** Participants arrived to the lab and were greeted by the experimenter. The verbatim introduction to the experiment was:

Thanks for agreeing to take part in my study. Before we begin I'll just give you an explanation of my study. I'm investigating individual differences in people's ability to remember and think about autobiographical events. Each session will go for half an hour. In the first session I will be asking you to provide descriptions of some specific life events. You will do similar tasks in session two.

Following informed consent, participants were asked to elicit detailed accounts of the four target autobiographical events. Participants were randomly assigned to one of three conditions: the written condition, the spoken condition or the typed condition.
In the written condition there was no social interaction. Participants wrote their account of each event in a paper booklet. In the spoken condition participants told their account of each event face-to-face to the experimenter. The experimenter silently listened attentively to each memory recalled. Accounts in the spoken condition were audio recorded and later transcribed. In the typed condition participants typed their account of each event onto a desktop computer. Participants had 5 minutes to write, tell or type each memory. The verbatim instructions for the conditions were:

In today's session I will be asking you to write/tell me/type about some specific autobiographical events. A specific event is a unique single event that occurred at a specific point in time. It happens over seconds, minutes or hours but not over days. You do not need to tell me anything that happened before or after the event just focus on the specified event. You will have 5 minutes to write/tell me/type everything that you remember about the event. Include as many details as you can, but do not feel the need to make up details or “fill in” space with details you do not actually remember. There are a couple of things I would like you to think about when you are writing/telling me/typing about each event. I would like you to think about: what you did from beginning to end; any sensory impressions you may have had, that is, what you saw, heard, smelled, tasted and/or touched; how you felt at the time of the event; what you thought during the event; where the event took place; how you interacted with other people; and how other people interacted with you during the event. Please ensure that the information that you provide is information that you feel comfortable sharing and isn’t highly personal or confidential. If you do feel uncomfortable telling me about any of these events please let me know.
Participants were handed a prompt sheet with the six cues detailed in the instructions: what you did from beginning to end; sensory impressions, (i.e., what you saw, heard, smelled, tasted and/or touched); how you felt; what you thought; where the event took place; how you interacted with other people; and how other people interacted with you during the event. These cues were the same cues Barnier et al. 2008 used in their study to prompt participants’ memories and were drawn from basic memory characteristics in the source monitoring literature (Johnson et al., 1993; Mitchell & Johnson, 2000). Participants were told to refer to the form if they needed to prompt their memory at any time during the description of their memory.

After describing each autobiographical event, participants completed a likert scale rating the following three aspects: how confident they were that the details in their account was accurate (where 1 was “not very confident” and 10 was “extremely confident”); how clear was their memory for the event (where 1 was “very vague” and 10 was “very clear”); and finally how much had they talked about the event with other people in general (where 1 was “not at all” and 10 was a “great deal”).

After participants finished describing all four memories and completed all ratings for all four events, the experimenter thanked participants for their participation in the first half of the experiment and reminded them about the return date for the second session of the experiment.

**Session two.** Participants individually returned to the laboratory for session two of the experiment seven days after session one. The exact same procedure was followed as in session one. Participants were instructed to write, tell me or type the same events as in session one. Each participant was in the same condition as in session one. The verbatim instructions were:
In today’s session I am going to ask you to again describe the same memories you described in session one. You will again have 5 minutes to write/tell me/type everything that you remember about the event. Include as many details as you can, but do not feel the need to make up details or “fill in” space with details you do not actually remember.

After participants finished describing each event they were asked to complete the same questionnaire, as in session one, rating on a 10-point likert scale confidence, clarity and discussion. After participants finished describing all four accounts of memories for all four events and completed all scales, the experimenter informed them that the experiment was completed. The experimenter then fully debriefed and thanked participants for their involvement in the experiment.

**Coding**

Data was coded for omissions, additions and contradictions. The coding scheme was motivated by the source monitoring literature (Johnson et al., 1993; Mitchell & Johnson, 2000) and was drawn from the cues prompting memory recall used in this experiment and in Barnier et al. (2008). The most important identified characteristics of memories were relied on: perceptual information (sound, colour), contextual information (spatial, temporal), semantic detail, affective information (emotional reactions) and cognitive operations (e.g., recording or organising, elaborating, retrieving and identifying of data) outlined in the framework. The same general categories were used for omissions, additions and contradictions. Each addition, omission and contradiction could only be coded under one code.

**Omissions and additions.** Omissions were defined as concrete details or idea units present in accounts reported in session one that were absent in accounts reported in session two. Additions were defined as concrete details or idea units that
were present in accounts reported in session two that were absent in accounts reported in session one.

**Concrete detail.** A concrete detail was defined as a specific tangible detail (e.g., “It was held in the hotel in the city” would be two concrete details. “I was wearing a black strapless dress and black heels” would be defined as five concrete details).

**Idea unit.** An idea unit was defined as a sentence or phrase that communicates an idea rather than concrete information (e.g., “I did everything I could to not destroy my look” would be defined as one idea unit).

There were nine different types of omissions and additions identified.

**Sensory.** These details related to what the person saw, heard, smelled or tasted. Details like colour or sounds (e.g., “She wore a silver dress”).

**Contextual.** These details related to a specified location (e.g., “I went home”) or any spatial contextual information (“He sat behind me”).

**Temporal.** These details related to time related details (e.g., “It was six o’clock”), (“It was a Sunday”) or (“It took us 3 hours to get there”).

**Estimation.** These details related to any estimation or exact number of people or things. This did not include time as time related details were scored under ‘temporal’ in a non-specific way (e.g., “two of my friends showed up”) If a participant referred to specific people (e.g., “My friends Jill and Becky were there”) then the detail was coded under ‘person’.

**Emotion.** These details related to affective state in self or others (e.g., “I felt guilty”, “everyone around me was nervous”), emotional reactions (e.g., “I smiled”, “I cried”) or any feeling (e.g., “I felt good” If there was more sensory detail such as (“I felt my heart beat fast.”) The detail was coded as ‘sensory’.
**Evaluation and thoughts.** These details related to internal cognitive operations, such as an evaluation of past or present (e.g., “I thought the night went well.”) or what the person thought during an event (e.g., “I had thoughts of forgetting everything”).

**Person.** These details related to any new person or interaction (except for conversation, which was coded under conversation) that does not fit under ‘sensory’ (e.g., “I heard nurses talking, crying children.” Was coded as sensory whereas “A nurse showed me around” was coded as a ‘person’ detail).

**Conversation.** These details related to what was said in any past conversation whether specific (e.g., “I remember he said, “Let’s go.””) or non-specific. (e.g., “We talked about our families”).

**Action.** These details related to non-specific actions and semantic details in memory that could be coded in any other categories (e.g., “I opened them”, “I ate breakfast”).

**Contradictions.** Contradictions were defined as discrepant details across accounts. Contradictions were scored based on participants saying something different and discrepant in session two to what they said in session one. Contradictions were coded as they would be viewed important in a forensic context where the threshold for any discrepancies is very low (Simon, 2012; also see section cases in The Innocence Project, 2010). Inter-rater reliability was measured by having a second coder identify contradictions for 20% of the data (32 accounts). Inter-rater reliability was assessed by scoring and then comparing contradictions in each account on an item-to-item basis. An 86% inter-rate reliability was obtained and 100% after discussion.
There were 12 types of contradiction types that were identified and coded. Nine of these categories were the same ones used for coding omissions and additions but were different as they assessed discrepancies across two sets of details. The three categories that were different were: increased certainty, different details and different memory. These contradiction categories were not applicable to omissions and additions (See Appendix A for coding scheme).

**Conflicting sensory details.** These discrepancies were in sensory impressions such as what the participant saw, heard, smelled, tasted and/or touched during the recalled event across the two sessions (e.g., Participant 14 described her first date with her recent partner. The participant reported the date happened during the summer in session one and supplied rich sensory detail consistent with summer: “I remember being hot and sticky, warm and sweaty and the smell of flowers and humidity.” Then, in session two, when describing the same memory, the participant reported her first date happened during the winter and supplied sensory details consistent with winter: “I remember wearing my warm slippers...It was cold walking home”).

**Conflicting contextual details.** These discrepancies were in any location or spatial contextual details across the two sessions (e.g., Participant 13 described her first date. In session one she reported, “I went home after work.” Then in session two she reported “I went straight from work to Circular Quay”).

**Conflicting temporal details.** These discrepancies were in temporal details across the two sessions (e.g., Participant 4 described his first HSC experience. In session one he reported that “The two hours of the exam felt like 10 hours.” Then in session two he reported, “The exam felt very quick and I flew through it”). Another example of a temporal contradiction was where participants provided two different
times (e.g., Participant 6 described her birthday party. In session one she reported her party started at 12 p.m. Then in session two she reported her party started at 2 p.m).

**Conflicting estimation.** These discrepancies were in estimation or approximation of number of people or items across the two sessions. Any numerical difference between session one and two was coded as a contradiction (e.g., Participant 19 described her birthday trip to a town. In session one she reported, “It was a population of 485.” Then in session two she reported, “Population, 435”).

**Conflicting emotional state.** These discrepancies were in emotional states recalled across the two sessions (e.g., Participant 5 described her driving test. In session one she reported, “I was very nervous during and before the test.” Then in session two she reported, “I wasn’t overly nervous before the test”).

**Conflicting evaluation.** These discrepancies were in thoughts of evaluations across the two sessions (e.g., Participant 19 described her high school formal. In session one she reported, “I thought the whole experience was interesting.” Then in session two she reported, “I found the experience really funny”).

**Different person.** These discrepancies were in people present at the event across the two accounts in the two sessions (e.g., Participant 14 described her high school formal. In session one she reported her friend (girl) stayed the night. Then in session two she reported her boyfriend stayed the night).

**Different conversation.** These discrepancies were in discussions with others that took place at the same point in time across the two sessions (e.g., Participant 14 described her first date. In session one she reported, “We talked about Oz tag at dinner and family on the lawn.” Then in session two she reported, “We talked about family at dinner and then Oz tag on the lawn”).
**Different action.** These discrepancies were in actions across the two sessions (e.g., Participant 6 described her first day of employment. In session one she reported, “I called them.” Then in session two she reported, “I texted them”).

**Conflicting details.** These discrepancies were in different information supplied across the two sessions that could not be coded elsewhere. (e.g., Participant 3 described her first date. In session one she reported, “He then proposed to me” Then in session two she reported, “He then asked me for a first date”).

**Increase in certainty.** These discrepancies were in certainty of recall across the two sessions. Specifically this was coded as a contradiction if the participant claimed to remember a detail in session two that s/he previously had stated not to have remembered in session one (e.g., Participant 15 described her first date. In session one she reported, “I can’t remember if we kissed or not.” Then in session two she reported, “I remember him leaning over and kissing me”).

**Different memory.** These were discrepant memories supplied across the two sessions. Specifically, in this type of contradiction the participant supplied a memory of a different event in session two as to what he or she supplied in session one (e.g., Participant 3 described his first day of employment. In session one he described his experience as a tutor in a primary school and in session two he described his experience of his first day as a dishwasher in a restaurant).

**Results**

Data from 18 participants were gathered. This may be considered somewhat low and thus inferences may be limited by experimental power. However, an alternative way to consider experimental power is in terms of the number of memory accounts analysed. Specifically, in this experiment I analysed memory changes across 144 accounts. Each of the three conditions yielded 24 memories repeated twice and
therefore 48 memory accounts. All but one participant generated memories for four
of the six available main autobiographical events (n = 16 for 18th or most recent
birthday, n = 14 for driving test, n = 13 for formal, n = 12 for first date, n = 8 for HSC, n
= 8 for first day of employment). The participant who was older and was not able to
generate four of the designated six events described the birth of her two twins as a
substitute event. Due to the highly detailed nature of autobiographical accounts
gathered, it was very clear that all participants (besides Participant 1, first day of
employment event) recalled the same event in session one and session two.

Preliminary univariate analysis of variance (ANOVAs), t-tests and correlation
analysis revealed no significant differences for event order or event type for the word
count, omissions, additions, contradictions or confidence, clarity and discussion
ratings in this experiment (F's < 0.62, t's < 0.07, p's > .05). Analysis therefore centred
on total means across all four events.

Data analyses focused on how elicited accounts changed across the two
individual retellings from session one to session two. Specifically, I measured
whether: (a) there were differences in the amount recalled across conditions and
sessions, (b) participants added more details and/or omitted more details in their
final accounts and how this related to the elicitation mode, (c) participants made
contradictions across their two accounts and how this related to elicitation mode, (d)
there were differences in the nature of the contradictions, (e) some participants made
more contradictions than others, (f) there were differences in ratings of confidence,
clarity and how much participants discussed the event with others between
conditions and across recall sessions, and (g) there a relationship between
contradiction scores and the quality of final memories as indexed by confidence,
clarity ratings and how much they had discussed the event with others.
Amount Recalled

Table 2.1 presents the word count defined as the mean number of words used to describe each event, across conditions. A 3 (Elicitation Mode: written, spoken, typed) x (2) (Recall Session: session 1, session 2) mixed model ANOVA of the mean number of words recalled yielded a significant main effect of elicitation mode, \( F(2, 15) = 60.34, p < .001 \). There was no significant main effect of recall session \( F(1, 15) = 2.65, p = .12 \), and there was no significant interaction between elicitation mode and session \( F(2, 15) = 0.88, p = .43 \). Post hoc comparisons confirmed that participants in the spoken condition used more words than participants in both the written condition, \( t(10) = 8.95, p < .001 \), and the typed condition, \( t(10) = 6.79, p < .001 \). Also participants in the typed condition used more words than participants in the written condition, \( t(10) = 5.20, p < .001 \). This finding was expected as it indicates that people can speak faster than they can write or type. Session one word counts across all conditions were highly correlated with session two word counts \( (r = .964, p < .001) \).

These results indicate that participants provided the most detailed accounts when telling their memories as compared to writing or typing their memories and this remained constant across both retellings. Although the number of words used does not necessarily mean an account is more or less detailed, the large difference in word counts was indicative of higher detail. It is possible that filler words (e.g., uh, ah, you know) increased the number or words used in the spoken condition, but this was unlikely to have impacted on results of the amount of informational items when looking at amount of detail recalled as differences in word counts across conditions were quite clear.
Table 2.1

Number of Words Used to Describe Each Event in Sessions One and Two Across the Written, Spoken and Typed Conditions

<table>
<thead>
<tr>
<th>Mode</th>
<th>Word Count Session 1</th>
<th>Word Count Session 2</th>
<th>Word Count Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Written</td>
<td>127.00</td>
<td>26.08</td>
<td>131.96</td>
</tr>
<tr>
<td>Spoken</td>
<td>598.54</td>
<td>125.49</td>
<td>655.04</td>
</tr>
<tr>
<td>Typed</td>
<td>226.54</td>
<td>40.13</td>
<td>245.08</td>
</tr>
<tr>
<td>Total</td>
<td>317.36</td>
<td>221.15</td>
<td>344.02</td>
</tr>
</tbody>
</table>

Note. Values are mean number of words used and standard deviations to describe each event. M = Mean, SD = Standard Deviation.

Omissions and Additions

Table 2.2 provides the mean number of omissions and additions across the three elicitation modes. All accounts contained omissions and additions. Separate one-way univariate analyses of variance (ANOVA) were used to test for significance for omissions and additions across the three elicitation modes. There was a significant difference across conditions in omissions $F(2,17) = 4.81, p = .03$ and additions $F(2,17) = 5.49, p = .02$. There were no significant differences in omissions and additions in spoken and typed elicitation modes. Participants in both spoken and typed conditions made more omissions and additions than participants in written conditions ($t's > 2.50, p < .03$). See Table 2.2. As predicted, participants who elicited accounts in the spoken mode made the most omissions and additions.
Table 2.2

*Mean Number of Omissions and Additions Describing Each Event Across Elicitation Modes*

<table>
<thead>
<tr>
<th>Mode</th>
<th>Omissions</th>
<th>Additions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Written</td>
<td>4.38</td>
<td>1.79</td>
</tr>
<tr>
<td>Spoken</td>
<td>12.54</td>
<td>7.81</td>
</tr>
<tr>
<td>Typed</td>
<td>7.13</td>
<td>0.61</td>
</tr>
<tr>
<td>Total</td>
<td>8.01</td>
<td>5.58</td>
</tr>
</tbody>
</table>

*Note.* Values are mean number of omissions and additions for each event and standard deviations to describe each event.

Paired sample t-tests showed that participants across all conditions tended to make fewer omissions than additions $t(17) = 3.10, p = .007$. Irrespective of elicitation mode, omissions from accounts in session one were highly correlated with additions to accounts in session two ($r = .835, p < .001$). These results indicate that despite participants providing similar amounts of detail across session one and session two, they made more additions than omissions. These results also illustrate that regardless of elicitation mode, all participants omitted details in session two that they provided in session one and added details in session two that they did not provide in session one.
Table 2.3

Number of Different Types of Omissions Recalled in the Written, Spoken and Typed Elicitation Modes Across Four Accounts

<table>
<thead>
<tr>
<th>Omissions</th>
<th>Written</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Sensory</td>
<td>2.67</td>
<td>2.16</td>
<td>23.83</td>
<td>19.99</td>
<td>9.50</td>
<td>3.83</td>
<td>12.00</td>
<td>14.34</td>
</tr>
<tr>
<td>Contextual</td>
<td>2.33</td>
<td>2.25</td>
<td>3.33</td>
<td>3.48</td>
<td>3.00</td>
<td>2.37</td>
<td>2.89</td>
<td>2.61</td>
</tr>
<tr>
<td>Temporal</td>
<td>1.17</td>
<td>0.98</td>
<td>2.50</td>
<td>1.87</td>
<td>1.50</td>
<td>1.38</td>
<td>1.72</td>
<td>1.49</td>
</tr>
<tr>
<td>Estimation</td>
<td>0.17</td>
<td>0.41</td>
<td>0.33</td>
<td>0.82</td>
<td>0.17</td>
<td>0.41</td>
<td>0.22</td>
<td>0.55</td>
</tr>
<tr>
<td>Evaluation</td>
<td>3.83</td>
<td>2.23</td>
<td>5.50</td>
<td>2.43</td>
<td>5.50</td>
<td>3.39</td>
<td>4.94</td>
<td>2.69</td>
</tr>
<tr>
<td>Emotion</td>
<td>1.50</td>
<td>1.38</td>
<td>2.50</td>
<td>1.05</td>
<td>3.17</td>
<td>1.47</td>
<td>2.39</td>
<td>1.42</td>
</tr>
<tr>
<td>Person</td>
<td>3.67</td>
<td>2.25</td>
<td>3.67</td>
<td>2.07</td>
<td>3.83</td>
<td>2.64</td>
<td>3.72</td>
<td>2.19</td>
</tr>
<tr>
<td>Conversation</td>
<td>1.50</td>
<td>0.84</td>
<td>5.67</td>
<td>5.25</td>
<td>1.33</td>
<td>0.82</td>
<td>2.83</td>
<td>3.57</td>
</tr>
<tr>
<td>Action</td>
<td>0.67</td>
<td>0.82</td>
<td>2.83</td>
<td>2.71</td>
<td>0.50</td>
<td>0.84</td>
<td>1.33</td>
<td>1.94</td>
</tr>
</tbody>
</table>

*Note.* Values represent mean number of different types of details and standard deviation reported in session one but omitted in session two summed across all four events.

**Types of omissions and additions.** Participants made a range of different types of omissions and additions. Table 2.3 shows the different types of omissions across the four accounts in the three elicitation conditions. Table 2.4 shows the different types of additions across the four accounts in the three elicitation conditions. Participants were more likely to omit and add both sensory and evaluation types of details.
Table 2.4

Number of Different Types of Additions in the Written, Spoken and Typed Elicitation Modes Across Four Accounts

| Additions    | Written |           |            |           |           |           |           
|--------------|---------|-----------|-----------|-----------|-----------|-----------|-----------
|              | M       | SD        | M         | SD        | M         | SD        | M         |
| Sensory      | 5.00    | 2.97      | 16.50     | 11.52     | 11.17     | 5.60      | 10.89     |
| Contextual   | 2.33    | 1.97      | 9.33      | 6.89      | 5.50      | 4.09      | 5.72      |
| Temporal     | 0.33    | 0.51      | 4.83      | 4.26      | 2.00      | 1.67      | 2.39      |
| Estimation   | 0.50    | 0.84      | 1.33      | 1.21      | 1.00      | 1.26      | 0.94      |
| Evaluation   | 6.00    | 2.53      | 9.83      | 5.78      | 7.33      | 4.41      | 7.72      |
| Emotion      | 2.33    | 1.63      | 6.17      | 3.37      | 3.67      | 2.00      | 4.06      |
| Person       | 2.66    | 1.03      | 5.00      | 2.76      | 5.67      | 2.42      | 4.44      |
| Conversation | 0.83    | 0.98      | 9.33      | 9.78      | 2.17      | 1.83      | 4.11      |
| Action       | 3.50    | 2.73      | 6.50      | 4.89      | 1.33      | 1.97      | 3.78      |

Note. Values represent mean number and standard deviation of different types of details reported in session two but omitted in session one summed across all four events.

Contradictions

The majority of participants made contradictions across their two retellings. Seventy eight percent of participants had one or more contradictions across their accounts when the second recall was just seven days after their first recall and when no contagion was introduced. There was no significant difference across elicitation modes in the number of contradictions participants made, \( F(2, 17) = 3.13, p = .07 \). However, because there was a large degree of variation in the number of contradictions participants made (\( M = 3.61, SD = 6.24 \), range: 0-27), contradictions were recoded based on percentages to examine the data in another way. Four participants (22%) made no contradictions at all, 4 participants (22%) made 1 contradiction, 5 (28%) participants made 2 - 3 contradictions and 5 participants
(28%) made 4 or greater contradictions. Examining the data using these percentages, there were significant differences between conditions in the number of contradictions made \( x^2(1, N = 18) = 19.20, p = .04 \). (Cells have expected count less than 5, but collapsing data into fewer categories would not be suitable in this experiment.) Figure 2.1 illustrates the differences across conditions. The greatest number of contradictions occurred in the spoken condition \( (M = 8.17, SD = 9.58) \): 100% of participants in the spoken condition made contradictions in their recalled accounts across the two sessions and 83% made 4 or more contradictions in their accounts. The least number of contradictions occurred in the typed condition \( (M = 0.67, SD = 0.82) \): 50% of participants in the typed condition made no contradictions at all, 33% made only 1 contradiction and 16% made 3 contradictions across all accounts. Finally, in the written condition, \( (M = 2.00, SD = 1.26) \): 16% of participants made no contradictions, 16% made 2 contradictions and the remaining 66% made 2 to 3 contradictions across their accounts over the two sessions.

Participants who made the most contradictions also provided the most detailed accounts \( (r = .728, p < .001) \). This indicates that participants who used more words generally made more contradictions. Participants in the spoken condition used the most words and made the most contradictions and these two factors were highly correlated \( (r = .882, p = .02) \). However, participants who were in the typed condition used more words than in the written condition, yet made fewer contradictions than in the written condition. Further, the amount recalled and number of contradictions were not correlated in the typed condition \( (r = .247, p = .64) \). This indicates that the reliability of participants’ recall was influenced by the mode of eliciting their recall.
**Figure 2.1. Contradictions Across Three Elicitation Modes**

*Note. Legend refers to the number of recoded contradictions*

**Types of contradictions.** Table 2.5 shows the mean number of different types of contradictions across the four events in the three elicitation modes. The most frequent coded contradictions were sensory, evaluation and temporal details. I also identified individual differences in the types of contradictions participants made. Some participants seemed more likely to make certain types of contradictions across their two retellings in the two sessions than other participants. For example, Participant 14 made a very high number of sensory type contradictions compared to other participants whereas Participant 6 made a higher number of temporal type contradictions.

Interestingly, sensory contradictions only occurred in the spoken condition. This finding could be attributed to high individual variation among participants. Participant 6 and 14 made a much greater number of contradictions compared to other participants.
Table 2.5

*Number of Different Types of Contradictions in the Written, Spoken and Typed Elicitation Modes Across the Four Accounts*

<table>
<thead>
<tr>
<th>Contradictions</th>
<th>Written $M$</th>
<th>Written $SD$</th>
<th>Spoken $M$</th>
<th>Spoken $SD$</th>
<th>Typed $M$</th>
<th>Typed $SD$</th>
<th>Total $M$</th>
<th>Total $SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory</td>
<td>0.00</td>
<td>0.00</td>
<td>2.83</td>
<td>5.98</td>
<td>0.00</td>
<td>0.00</td>
<td>0.94</td>
<td>3.52</td>
</tr>
<tr>
<td>Contextual</td>
<td>0.17</td>
<td>0.41</td>
<td>0.67</td>
<td>0.82</td>
<td>0.33</td>
<td>0.52</td>
<td>0.39</td>
<td>0.61</td>
</tr>
<tr>
<td>Temporal</td>
<td>0.33</td>
<td>0.82</td>
<td>1.00</td>
<td>1.26</td>
<td>0.00</td>
<td>0.00</td>
<td>0.44</td>
<td>0.92</td>
</tr>
<tr>
<td>Estimation</td>
<td>0.00</td>
<td>0.00</td>
<td>0.83</td>
<td>0.75</td>
<td>0.33</td>
<td>0.52</td>
<td>0.39</td>
<td>0.61</td>
</tr>
<tr>
<td>Emotion</td>
<td>0.00</td>
<td>0.00</td>
<td>0.17</td>
<td>0.41</td>
<td>0.00</td>
<td>0.00</td>
<td>0.06</td>
<td>0.24</td>
</tr>
<tr>
<td>Evaluation</td>
<td>0.00</td>
<td>0.00</td>
<td>0.17</td>
<td>0.41</td>
<td>0.00</td>
<td>0.00</td>
<td>0.56</td>
<td>0.24</td>
</tr>
<tr>
<td>Person</td>
<td>0.00</td>
<td>0.00</td>
<td>0.50</td>
<td>0.84</td>
<td>0.00</td>
<td>0.00</td>
<td>0.17</td>
<td>0.51</td>
</tr>
<tr>
<td>Conversation</td>
<td>0.00</td>
<td>0.00</td>
<td>0.33</td>
<td>0.82</td>
<td>0.00</td>
<td>0.00</td>
<td>0.11</td>
<td>0.47</td>
</tr>
<tr>
<td>Action</td>
<td>0.00</td>
<td>0.00</td>
<td>0.33</td>
<td>0.52</td>
<td>0.00</td>
<td>0.00</td>
<td>0.11</td>
<td>0.32</td>
</tr>
<tr>
<td>Details</td>
<td>0.67</td>
<td>0.82</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.22</td>
<td>0.55</td>
</tr>
<tr>
<td>Certainty</td>
<td>0.17</td>
<td>0.41</td>
<td>0.83</td>
<td>1.17</td>
<td>0.00</td>
<td>0.00</td>
<td>0.33</td>
<td>0.67</td>
</tr>
<tr>
<td>Memory</td>
<td>0.17</td>
<td>0.41</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.06</td>
<td>0.24</td>
</tr>
</tbody>
</table>

*Note.* Values represent mean number and standard deviation of different types of details that were contradictory across the two sessions when describing all four events.

There was a significant correlation between omissions and contradictions ($r = .902$, $p < .001$). There also was a significant correlation between additions and contradictions ($r = .668$, $p < .002$). This indicates that the more omissions and additions participants made, the more likely they were to make contradictions across their two recalled accounts.

**Confidence, Clarity and Discussion Ratings**

A 3 (Elicitation Mode: written, spoken, typed) x (2) (Recall Session: session 1, session 2) mixed model ANOVA was used to test for significance for confidence, clarity and discussion ratings.
**Confidence in accuracy.** Table 2.6 presents the mean confidence ratings across sessions and elicitation modes. There was a significant main effect of elicitation mode, $F(2, 15) = 8.86, p = .003$. There was no significant main effect of recall session $F(1, 15) = 0.66, p = .43$ and there was no significant interaction between elicitation mode and session $F(2, 15) = 0.38, p = .69$. This indicates that confidence ratings were constant across sessions.

Post hoc comparisons indicated that participants in the typed condition reported higher confidence in the accuracy of the details in their accounts than participants in the written condition $t(10) = 4.12, p = .02$ and than participants in the spoken condition $t(10) = 2.97, p = .02$. Participants reported similar confidence ratings for accounts in the spoken and written condition $t(10) = 1.52, p = .16$. These findings suggest that participants were most confident in the accuracy of the details in their memories when they typed their responses. However all participants rated their confidence quite high.

Table 2.6

<table>
<thead>
<tr>
<th>Mode</th>
<th><strong>Session One</strong></th>
<th><strong>Session Two</strong></th>
<th><strong>Total</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>M</em></td>
<td><em>SD</em></td>
<td><em>M</em></td>
</tr>
<tr>
<td>Written</td>
<td>7.46</td>
<td>1.21</td>
<td>6.80</td>
</tr>
<tr>
<td>Spoken</td>
<td>7.79</td>
<td>1.04</td>
<td>7.92</td>
</tr>
<tr>
<td>Typed</td>
<td>9.13</td>
<td>8.75</td>
<td>8.75</td>
</tr>
<tr>
<td>Total</td>
<td>8.12</td>
<td>1.21</td>
<td>7.81</td>
</tr>
</tbody>
</table>

*Note.* Ratings were made on a scale of 1 to 10, where 1 = not very confident and 10 = extremely confident.
Clarity. Table 2.7 presents the mean clarity ratings across sessions and elicitation modes. There was no significant main effect of elicitation mode, $F(2, 15) = 2.75, p = .096$, recall session $F(1, 15) = 0.19, p = .67$ or interaction between elicitation mode and recall session $F(2, 15) = 0.20, p = .98$. Participants reported that their memories were quite clear across all elicited conditions. Clarity ratings were strongly correlated across the two sessions ($r = .487, p = .04$) indicating that participants rated their memories as being just as clear in session one as in session two. Clarity also was positively correlated with confidence in accuracy ($r = .794, p < .001$), indicating that participants rated the details of their accounts as more accurate if they perceived them to be clearer. There was no correlation between amount recalled, confidence in accuracy and clarity ratings, indicating that just because participants provided more details this did not directly increase confidence in accuracy or clarity ratings.

There was also no correlation between contradictions and confidence and clarity ratings. This indicates that just because participants reported high confidence in accuracy and rated their memory for the events as clear, this was no indication as to how many contradictions they made across retellings.

Table 2.7
Clarity Ratings in Sessions One and Two Across the Written, Spoken and Typed Elicitation Modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Session One</th>
<th>Session Two</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Written</td>
<td>6.92</td>
<td>0.98</td>
<td>7.04</td>
</tr>
<tr>
<td>Spoken</td>
<td>7.67</td>
<td>0.52</td>
<td>7.71</td>
</tr>
<tr>
<td>Typed</td>
<td>7.91</td>
<td>0.66</td>
<td>8.10</td>
</tr>
<tr>
<td>Total</td>
<td>7.50</td>
<td>0.83</td>
<td>7.61</td>
</tr>
</tbody>
</table>

Note. Ratings were made on a scale of 1 to 10, where 1 = very vague and 10 = very clear.
Discussion with others. Table 2.8 presents the mean clarity ratings across sessions and elicitation modes. There was a significant main effect of elicitation mode, $F(2, 15) = 8.79, p = .003$. There was no significant main effect of recall session $F(1, 15) = 0.54, p = .47$ and there was no significant interaction between elicitation mode and session $F(2, 15) = 1.72, p = .21$. Post hoc comparisons indicated that participants in both the spoken and typed condition reported discussing their memories of events with others more than people in the written condition $t's > 2.96, p's < .01$. Participants in both the typed and spoken condition reported similar levels of discussing their memories of events with others $t(10) = 1.06, p = .31$.

There was a significant correlation between amount recalled and discussion with others in session one ($r = .544, p = .02$) and in session two ($r = .541, p = .02$). This indicates that the more people discussed their accounts with others the more details they recalled in their memory accounts. There was no significant correlation between contradictions and how much participants had discussed their memory with others.

Table 2.8
Discussion Ratings in Sessions One and Two Across the Written, Spoken and Typed Elicitation Modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Session One</th>
<th>Session Two</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Written</td>
<td>4.16</td>
<td>1.97</td>
<td>4.00</td>
</tr>
<tr>
<td>Spoken</td>
<td>6.04</td>
<td>1.38</td>
<td>7.63</td>
</tr>
<tr>
<td>Typed</td>
<td>6.46</td>
<td>1.56</td>
<td>6.08</td>
</tr>
<tr>
<td>Total</td>
<td>5.56</td>
<td>1.86</td>
<td>5.90</td>
</tr>
</tbody>
</table>

Note. Ratings were made on a scale of 1 to 10, where 1 = not at all, 10 = a great deal.
Informal Observations and Summary

Informal Observations

Based on informal observations, social factors appeared to influence the changes across retellings. Specifically, individual differences in the manner participants interacted with me appeared to be linked to how many contradictions they made. Participants who were more socially responsive in their communication style tended to make more contradictions across their accounts than participants who were less socially responsive. For example, there were two participants (Participant 6 and 14) in the spoken condition who especially presented as highly socially responsive and who made the most contradictions compared to other participants. Participant 6 was highly interactive in her communication style. She was concerned that she may not compete the tasks properly. She asked many questions and sought approval during her tasks. When describing her events she faced me and exhibited steady eye contact. She attempted to engage me with appropriate facial expressions and made many hand gestures in line with her narratives.

Participant 14 was likewise highly interactive in her communication style yet differed to Participant 6. Participant 14 was very talkative. She spoke quickly in an elevated mood and attempted to make small talk at the start of the sessions. When describing her events she sat directly opposite me and maintained steady eye contact throughout her retellings. Her memories all contained an entertaining twist to them and the participant relayed her experiences with great enthusiasm.

In contrast, participants who presented as less socially responsive and maintained poor eye contact tended to make less contradictions. For example, Participant 13 presented as nervous. She made little eye contact during the sessions, instead keeping her eyes focused on the desk or out the window the entire time she
recalled each memory. These informal observations appeared to suggest that some participants were affected by the social interaction that the spoken condition provided.

Summary

In Experiment 1, I used a retelling paradigm for autobiographical memory to investigate how freely recalled accounts of important autobiographical events elicited by three different modes (written, spoken and typed) changed or remained the same over a subsequent recall in the absence of contagion. The most important finding to come out of this experiment was the high degree of intrinsic variability across autobiographical accounts. Participants’ accounts of recent, important autobiographical memories changed significantly in the amount and type of specific detail provided across two retellings just one week apart, regardless of the mode of elicitation. All participants made omissions and additions across their two retellings. Many also made contradictions. The details that were most likely to change were identified to be sensory, temporal, estimation and contextual in nature. These findings suggest that the idea of complete stability across retellings of memory reports is unrealistic. These findings are consistent with previous studies that suggest that new and varying details elicited across subsequent retellings are a natural part of recall and not necessarily an indication of deception (Gilbert & Fisher, 2006; Fisher et al., 2013; Payne, 1987; Vredevelt et al., 2014). For example, Gilbert and Fisher (2006) found that 98% of participants made at least two additions to their account of a witnessed event when tested one week later. What is interesting about my study is that the events elicited were personal, emotional and often well rehearsed yet still susceptible to change just one week later. The most interesting change identified was the number of contradictions participants made across their two retellings.
Participants freely recalled specific details, reported high confidence in the accuracy of the details of their memory accounts and rated their memories for the events as clear, yet made contradictions across accounts.

As predicted I found that the mode of elicitation influenced amount recalled. Participants in the spoken condition provided the most detail and this remained constant across retellings in session one and session two. In contrast, participants in the written condition provided the least detail across their accounts in the two sessions. This finding is consistent with previous research that individuals find speaking easier and more fluent and are thus able to provide more information than in the typed or written conditions (Ekeocha & Brennan, 2008; McPhee et al., 2014; Sauerland & Sporer, 2011).

Participants’ accounts in the spoken condition contained not only the most detail but also contained the highest number of contradictions, although there was a high degree of variability across participants. Whereas some participants in the spoken condition made many contradictions some only made one or two. One reason for this finding could be that some participants may have been affected by actively telling their memory to a listener. Supporting this interpretation was my informal observations that subtle social factors seemed to influence the way participants provided their accounts in this spoken condition. A second reason could be that participants in the spoken condition said more which might have provided more room for error.

In contrast, accounts in the typed condition were more detailed than accounts in the written condition yet contained the fewest number of contradictions. This suggests that participants did not necessarily make more contradictions because they recalled more words but rather that something about the elicitation mode influenced
the amount and variability in details across retellings. Consequently, what is not clear from this experiment is the role of social factors in contradictions: whether participants in the spoken condition made more contradictions because of the ease the spoken condition presented or because of the social interaction that the spoken condition provided. To investigate the role of social influence on contradictions across accounts it would be useful to examine spoken accounts with a listener present and a listener absent.

Participants across both sessions reported high levels of confidence in the accuracy of details in their memory. Participants also reported that their memories of the events were very clear. Although participants who were confident in the accuracy of their accounts also rated their memories for the event as being clear, this was not related to how many contradictions they made across retellings. This supports previous research that connects clarity ratings with perceived accuracy (Conway et al., 2014; Johnson et al., 1993) and highlights that confidence and clarity of details of an event are not necessarily an indication of accuracy (Granhag, Stromwall, & Allwood, 2000).

In conclusion, my results suggest that there is a range of factors, not just explicit, single suggestions of contagion that can change autobiographical memory over retellings. This is an important finding for the forensic setting, where significant variations in testimony across multiple recall occasions are often, but should not necessarily be, interpreted as a sign of a poor witness or of deception.

A limitation in this study is that it is possible that changes across retellings were influenced by novel vs. familiar task effects. In session one participants were presented with the novel task of freely recalling their events for 5 minutes. In session two participants recalled the familiar task from the previous session. This may have
contributed to intrinsic variability. A second limitation of Experiment 1 was the low sample size. Experiment 1 was conceptualised as a pilot, originally for a study that would have looked like a social contagion experiment, but the results were so surprising, I temporarily diverted from my original aim and investigated the factors that lead to intrinsic variability across retellings in more detail. My informal observations suggest that elements of the social interaction and personality may have influenced account variability in the absence of contagion. However, with a small sample size and lack of formal assessment tools, a more careful analysis was needed, I therefore proceeded on to a larger and more formal evaluation in Experiment 2.
Chapter 3

Social Context and Personality Impact Memory Recall of Unshared Personal Events Over Repeated Retellings
Social Context and Personality Impact Memory Recall of Unshared Personal Events Over Repeated Retellings

The primary aims of Experiment 2 were to investigate: (a) how the presence or absence of a listener, and (b) the personality of the speaker influence changes in free recalled accounts of important autobiographical events over two retellings. As revealed in the previous chapter, Experiment 1 demonstrated that participants’ accounts changed from one telling to the next just one week later in the absence of contagion. These changes across retellings appeared to be influenced by social context and individual differences.

Impact of Social Context on Memory Changes

Effects of a listener. My first aim of Experiment 2 was to investigate whether the presence or absence of a listener would influence the amount recalled and the number of contradictions participants made across their two retellings. In the previous experiment, some people in the spoken condition provided more detailed accounts and made more contradictions across their retellings than in other elicitation modes. An explanation for these findings may have been that some participants who told their accounts made more contradictions because they found speaking less effortful and said more compared to writing and typing. In this way, the speaking condition may have allowed more room for error. An alternative explanation could be that participants in the spoken condition were influenced by subtle social cues from the listener. The social interaction between the speaker and a listener has been demonstrated to have an effect on memory recall of the speaker (Barnier et al., 2008; Bavelas et al., 2000; Bavelas, Gerwing, & Healing, 2014; Echterhoff et al., 2009; Hirst & Echterhoff, 2012; Pasupathi, 2001). Research, as reviewed in the Introduction, has
suggested that listeners not only influence the amount of detail speakers provide, but also influences the type of detail that they provide (see Hirst & Echterhoff, 2012; Pasupathi, 2001; Skowronski & Walker, 2004 for reviews). Bavelas et al. (2000) suggested that merely having a listener present face-to-face affects how the speaker tells their account. This is because speakers depend on micro social cues such as subtle facial displays, bodily gestures, verbal utterances and gaze to tell their narrative (Bavelas et al., 2000; Bavelas et al., 2014). In their research, Bavelas et al. (2000) found that listeners who were attentive and engaged elicited more detailed autobiographical accounts from the speakers than listeners who were not attentive or engaged. The speakers subsequently provided a more detailed memory at later recall. In another study, Pasupathi and Hoyt (2010) likewise found that listeners who were distracted and unresponsive elicited less detailed accounts from their speakers than listeners who were agreeable and responsive. They explained their findings in terms of “silencing” or not disclosing information that appeared problematic or undesirable (see also Fivush, 2010). Pasupathi and Hoyt speculated that when participants were not met with social approval and acceptance, this negatively affected their recall of the account. This previous research on attentive and non attentive listeners leads one to consider what effect the presence versus complete absence of a listener would have on the recollection of past experiences over retellings. I predicted that participants would provide more detailed accounts when a listener was present due to subtle social cues from the listener.

**Impact of Individual Differences in Memory Reports and Memory Changes**

My second aim of Experiment 2 was to investigate the effect of personality characteristics on variation across memory retellings one week apart. In Experiment 1, some participants made more contradictions across their accounts than others. As
reviewed in the Introduction, previous research on memory recall variability has repeatedly demonstrated that there seems to be large discrepancies in who is susceptible to making errors and contradictions across recalls. Nevertheless usually results are discussed in terms of group averages rather than individual differences (Gilbert & Fisher, 2006; Paterson et al., 2011; Strange et al., 2014; Winningham et al., 2000). Yet individual differences do exist. For example, some people may have a tendency to mentally drift during experiences (Platt, Lacey, Iobst, & Finkelman, 1998; Wright & Livingston-Raper, 2002), which may make them more prone to misremembering. In an attempt to examine individual differences in memory recall, researchers have measured the influence of different personality characteristics (Horsenlenberg, Merckelbach, van Breukelen & Wessel, 2004; Platt et al, 1998; Rubin & Siegler, 2004; Sutin, 2008; Sutin & Robbins, 2008).

**Personality.** Personality influences both encoding and retrieval of events (McAdams, 2001; McIlwain, 2006). Absorption is one personality trait that has been discussed and linked with memory recall variability since people high in absorption report experiencing memory lapses (Labelle, Lawrence, Nadon, & Perry, 1990). Absorption is a personality trait commonly associated with highly hypnotisable people who have been found to be susceptible to memory distortions (Barnier & McConkey, 1999). People who score high on absorption can focus their complete attention in a way that means they may not notice what is going on around them (Tellegen & Atkinson, 1974). There is some evidence that the trait absorption is linked to memory variability and distortion. On the evening of the O.J. Simpson criminal trial verdict, Platt et al. (1998) contacted participants and asked them to complete a questionnaire on their personal memories of the verdict. Six, 12, and 18 months later the researchers asked participants to retell the same memories. They
also asked them to complete the Tellegen Absorption Scale (TAS). On completing the TAS, the investigators found that higher absorption scores on the TAS were associated with more contradictions across participants’ accounts. A link between absorption and memory distortion has been supported in other studies as well (Barnier & McConkey, 1992; Labelle et al., 1990; Meyersburg et al., 2009) although it has been unclear whether hypnotisability or absorption is the driver of changes in memory recall.

A tendency for lapses in memory is not the only influence identified to contribute to memory changes over time. Participants may choose to provide certain details in their memory accounts because they believe it is what the listener wants to hear. This consequently may influence how the person remembers the memory at a subsequent retelling (Barber & Mather, 2014; Hirst & Echteroff, 2012; Skrowonski & Walker, 2004). As described in Experiment 1, some participants presented as more socially interactive. Participants in the spoken condition who based on informal observation, maintained eye contact, used more gestures and presented as more sociable tended to make more contradictions across their two accounts than participants who did not make eye contact, used less gestures and presented as less sociable. These subtle social interactions were not observed in the written and typed conditions due to the minimal social interaction these modes offered. These informal observations raised the possibility that some personalities may be more sensitive to social influences than others.

Extroversion is a personality trait that makes people more perceptive to social cues. Extroverts have good social skills and thrive on social interactions with others (Funder, Furr, & Colvin, 2000; Watson & Clark, 1997). Rasmussen and Berntsen (2010) found that the extraversion personality trait was positively related to the social
A different way to think about and measure reactivity to social situations is to investigate attribution styles of personality characteristics. The attribution styles of agency, unmitigated agency and communion frequently are used to describe two basic attribution styles of how people relate in social interactions (McAdams, Hoffman, Day, & Mansfield, 1996). Communion is characterised by a focus on others. Mitigated agency is characterised by a focus on the self. Unmitigated agency is characterized by an unmitigated focus on the self, resulting in an attribution style that is arrogant, greedy and hostile (Helgeson & Fritz, 1999; Spence, Helmreich & Holahan, 1979). Participants may be motivated to make changes across their memory recall accounts based on their attribution style.

Finally, emotion has also been linked to changes in memory across retellings. It is common for courts to hear victim impact statements to understand how the crime may have impacted the victim at the time of the criminal act. Erk, Wunderlich, Spitzer, & Walter (2003) found that the emotional state of the person at the time of the event was correlated with the emotional state of the person at the time of reporting. It is possible that the mood at the time the person reports the event may
impact how they remember the event (Fiedler & Hütter, 2013). Remembering past events in social contexts has been also shown to change the recalled emotional states at the time of the event. Harris, Barnier et al. (2010) found that when people remembered together this reduced their recollection of their original emotional reactions. Skrownonski and Walker (2004) proposed that social rehearsal of event memories can change how one recalls affect. Finally, people have reported clearer memory for more emotional events (Pillemer, Goldsmith, Panter, & White, 1988).

Based on this I expected that personality characteristics, including attribution styles and emotion, would influence the amount recalled and contradictions across retellings. Specifically I expected that participants high on absorption and high on extroversion characteristics might the most changes across retellings. I also expected people high on communion might make more changes.

The procedure for Experiment 2 was similar to Experiment 1 but differed in two fundamental ways. First, all participants provided spoken accounts and second, participants were placed in either a listener present or listener absent condition. I also assessed participants with various assessment tools to identify measurable individual differences in selective personality traits, attribution styles and emotional states. Participants completed all assessment tools on a desktop computer that the experimenter had earlier programmed through INQUISIT software. I chose the Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982) because the MPQ measures (a) the absorption trait, which is the first personality trait hypothesised to contribute to contradictions across recall, (b) extroversion by measuring four facets that contribute to the core extroversion – well-being, social potency, social closeness and achievement as well as employing a social desirability scale to further assess the impact of social interaction, (c) a range of other personality characteristics since
absorption and extraversion may not be the only ones linked to increases in memory changes across recalls. I chose the Personal Attribute Questionnaire (PAQ) because the PAQ identifies agentic and communal attribute styles. Finally, I chose the Positive and Negative Affect Scale (PANAS) because the PANAS assess participants’ current and past positive and negative emotional states. I was interested in assessing emotional states at the time of the experimental sessions and emotional states at the time of the experienced events.

Based on the reviewed literature I hypothesised that participants would be influenced by the presence or absence of a listener and personality characteristics of the speaker.

**Method**

**Participants and Design**

Forty-three second year undergraduate students from Macquarie University volunteered to take part in the current experiment for partial fulfillment of a course requirement. Data for seven participants were excluded from the experiment. Two participants did not return within the specified seven days for session two; two participants were excluded due to technical difficulties; and three participants were excluded due to being significantly older than the rest of the sample. The reason for exclusion was that the target events were too distant and not as salient for significantly older individuals (e.g., in Experiment 1, a 48 year old female participant chose to describe the birth of her twins instead of one of the target events. Although the recollection of her birthing experience was salient, the event was dissimilar to the target typical young adult events chosen for this experiment). A total of 30 women and 6 men (\(M_{\text{age}} = 21.5 \text{ years}, \text{age range: 19 - 39 years}\) participated in and were included in the final analysis of the experiment.
The experimental procedure was the same as in Experiment 1 as it used the retelling paradigm for autobiographical memory. It differed in that all accounts were spoken and the condition of the presence or absence of a listener was manipulated.

The experiment adopted a $2 \times (2)$ mixed factorial design. The experimenter manipulated social interaction (listener present or listener absent) between participants over two separate recalls (session one or session two) within participants. The primary dependent variables were: (a) amount recalled defined as the number of words used, (b) the number of contradictions across the two sessions, (c) personality measures, and (d) confidence, clarity, comprehensiveness and degree of discussion ratings, (e) age of memory.

In Experiment 1 the main focus was on omissions, additions and contradictions. Experiment 2 contained a much larger sample of accounts and only spoken accounts were gathered. It is extremely time consuming to transcribe and code. For this reason, in Experiment 2 omissions and additions were not coded. The main focus was on contradictions, often defined as errors, which are most relevant to a forensic setting and consistent with the literature described in the Introduction to this experiment.

**Materials**

Participants provided four of the same types of personal events as participants provided in Experiment 1. The personal events were carefully chosen as likely to be recent and personally significant to participants targeted for this experiment (based on their stage of life). These events included: 18th birthday, high school formal, first date and driving test. In cases where the participants were older than 18 years of age, they described their most recent memorable birthday, that is, 21st, 23rd or 25th birthday. In cases where participants had not experienced any of these events or
reported having considerable difficulty remembering an event, participants elicited an alternative autobiographical event such as first day at most recent place of employment or first or most memorable HSC exam.

Additional materials in the order administered were: (a) The Positive and Negative Affect Schedule (PANAS), which assessed emotional states on a 5-point likert scale (See Appendix B). The scale consists of a number of words that describe different feelings and emotions. Participants indicated how they felt at the time of the experiment by rating six positive and six negative emotion words; (b) a scale, which assessed confidence in accuracy of details, clarity, comprehensiveness, how much they had talked about the event with others and age of the memory. Participants rated on a 10-point likert scale: how confident they were of the accuracy of the details in their account, how clear their memory was for the event, how comprehensive their account was and how much they had talked about the event with others. Participants were then asked to report when the event had taken place. This question was included in Experiment 2 because research has indicated that the age of a memory may affect variability across retellings (Anderson, Cohen & Taylor, 2000); (c) Personal Attributes Questionnaire (PAQ), which assessed attribute style. For the PAQ, participants rated on a 5-point likert scale pairs of contradictory characteristics. Participants were then assessed on tendencies for three attribution styles: communion, agency and unmitigated agency; (d) The Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982), which assessed personality dimensions. The MPQ is a self-report instrument that assesses personality dimensions. For the MPQ the participants completed a 300-item personality inventory. Participants were then assessed on 11 personality dimensions and three higher order dimensions.
Procedure

The experiment was conducted over two sessions. Session one lasted 30 minutes. Session two lasted 60 minutes and was held seven days after session one. Participants were tested individually.

Session one. Participants arrived to the lab and were greeted by the experimenter. Once informed consent had been obtained, participants rated their present emotional state by completing the PANAS scale.

Elicitation phase. The experimenter then asked participants to consecutively remember their four specific personally experienced events described in the materials section. The verbatim instructions were:

In today’s session I will be asking you to describe some specific autobiographical events. A specific event is a unique single event that occurred at a specific point in time. It happens over seconds, minutes or hours but not over days. You will not need to tell me anything that happened before or after the event, just focus on the specified event. You will later have 5 minutes to describe everything that you remember about each event. Before I ask you to describe the events I want to ensure that you remember these events. The first event that I will be asking you to describe is (e.g., your 18th birthday). Do you remember this event?

After participants indicated they remembered the first of the four events, they were instructed to write down a short phrase describing the event on the “memory cue form” (See Appendix B). If participants reported they did not remember the specified event or reported poor memory for the event, the experimenter asked them to recall one of the alternative events described in the materials section. This procedure was repeated until short phrases were elicited for each of the four events.
The purpose of eliciting short phrases for each memory was to cue participants’ memories for each event so they could recall the relevant memory in the description phase. This step was not included in Experiment 1 but was important in the current experiment to ensure the procedure was as similar as possible across the listener present and listener absent conditions as the experimenter could not cue participants in the listener absent condition. The experimenter randomised the order of the events across participants.

**Description phase.** After participants indicated they had remembered all four events and provided short phrases for all the events, the experimenter told participants they would next be asked to describe their four events. The verbatim instructions were:

I will now ask you to describe each of the four events you have remembered. Include as many details as you can, but don’t feel the need to make up details or “fill in” space with details you don’t actually remember. There are a couple of things I would like you to think about when you are telling each event. I would like you to think about: what you did from beginning to end, any sensory impressions you may have had, that is, what you saw, heard, smelled, tasted and/or touched, how you felt at the time of the event, what you thought during the event, where the event took place, how you interacted with other people and how other people interacted with you during the event. Please ensure that the information you provide is information that you feel comfortable sharing and isn’t highly personal or confidential. If you do feel uncomfortable telling me about any of these events please let me know.

Participants were handed a memory cue form with the six points referred to in the instructions (This was the same form that was given to participants in
Experiment 1: what you did from beginning to end, sensory impressions, (i.e., what you saw, heard, smelled, tasted and/or touched), how you felt, what you thought, where the event took place, how you interacted with other people and how other people interacted with you during the event. Participants were told to refer to the form if they needed to prompt their memory at any time during the elicitation of the event.

Participants were then randomly allocated to either the listener present or listener absent condition. In the listener present condition, participants told their memories face-to-face to the experimenter. In the listener absent condition, the experimenter left the room and participants told their memories facing the computer in an empty room. Participants in both conditions completed all questionnaires and scales on the computer, which was programmed through INQUISIT.

In the listener present condition the experimenter gave participants the following instructions:

I would like you to tell me everything you can remember for your [first] memory. You will have 5 minutes to tell me everything you remember about your [first] event. Please press the space bar to begin and start speaking when you are ready.

If participants stopped telling their memory before the 5 minutes had passed, the experimenter said:

Please tell me anything else you may remember about your event. We will continue to the next task when 5 minutes has passed.

The experimenter stopped participants telling their memory when 5 minutes had passed.
In the *listener absent* condition participants were guided by instructions on a computer screen that the experimenter earlier programmed. The verbatim instructions in the *listener absent* condition were:

You will have 5 minutes to tell me everything you remember about your [first] event. The screen will automatically change and provide further instructions when 5 minutes have passed. Press the space bar to begin and start speaking when you are ready.

When participants hit the space bar the instructions on the screen read: “Please start telling your memory now. The screen will change when 5 minutes have passed.” If the participants hit the spacebar before 5 minutes had elapsed, the screen changed to different instructions that read:

Please tell me anything else you may remember about your event.

When 5 minutes had elapsed, the screen automatically changed to instructions for the next task of completing a questionnaire.

After describing their first autobiographical event, participants in both conditions again completed the Positive and Negative Affect Schedule (PANAS) on the computer, as they did at the start of the session, but this time to rate their emotional valence during the first event. The verbatim instructions were:

This is the PANAS scale. Yes, you have seen this scale before, but this time please refer to how you felt AT THE TIME OF THE EVENT. The PANAS scale consists of a number of different words that describe different feelings or emotions. Read each item and using the mouse click on the number that corresponds to how you felt AT THE TIME OF THE MEMORY.

Participants then completed a likert scale rating the following four aspects: how confident they were that the details in their account were accurate (where 1 was
“not very confident” and 10 was “extremely confident”); how clear their memory for the event was (where 1 was “very vague” and 10 was “very clear”); how comprehensive their account was (where 1 was “not comprehensive” and 10 was “very comprehensive,” and how much they had talked about the event with other people (where 1 was “not at all”, and 10 was “a great deal”). Finally they answered the question “When did this event take place?”

After participants finished describing all autobiographical memories of their events and completed all scales and questionnaires, the experimenter thanked them for their participation in the first half of the experiment and reminded them about the return date for the second session of the experiment.

**Session two.** Each participant individually returned for session two seven days after session one. Participants followed the exact same procedure as in session one. Participants were again initially asked to rate their present emotional state by completing the PANAS scale. Participants then were handed the memory cue form from session one with the short phrases describing each of the four events participants had described. The experimenter ensured that participants recognised the cue and recollected the corresponding memory for each event described in session one. Participants then were tested in the same *listener present or listener absent* conditions as in session one. Participants were asked to retell each memory of the four events to a listener present or with no listener present just as they did in session one. Likewise, immediately after describing each event, participants were asked to complete the PANAS and the scales assessing confidence, clarity, comprehension and discussion and when the event had taken place for each event just as they did in session one.
**Personality characteristic measures.** After describing all four events and completing all scales, participants were asked to complete the Personal Attributes Questionnaire (PAQ) and the Multidimensional Personality Questionnaire (MPQ) on the computer. In the *listener absent* condition, the experimenter returned to the experimental room as participants were finishing the MPQ.

Finally the experimenter fully debriefed participants and thanked them for their participation in the experiment.

**Transcription**

All audio recordings of participants’ spoken events from session one and session two were transcribed by a professional transcriber and checked by the experimenter. The transcriber did not transcribe filler words (e.g., uh, ah, you know, hmmm) for the purpose of limiting non-informational items.

**Coding**

Data was coded for contradictions. Inter-rater reliability was measured by having a second coder blind to the conditions identify contradictions for 50% of the data (144 accounts). Inter-rater reliability was assessed by scoring and then comparing contradictions in each account on an item-to-item basis. An 85% inter-rate reliability was obtained and 100% after discussion.

**Contradictions.** Contradictions were defined as discrepant details across accounts as they would be identified in a forensic context. Contradictions were scored with the same coding scheme as in Experiment 1 and were based on participants saying something different and contradictory in session two to what they said in session one. The coding scheme differed in that two categories from Experiment 1 were not coded in Experiment 2. This was because ‘different memory’ was not identified in Experiment 2 and ‘increase in certainty’ was not coded as a
contradiction. The two categories (different details and different actions) were low in prevalence and difficult to distinguish so therefore combined together. Nine types of contradiction styles were coded.

**Conflicting sensory details.** These discrepancies were in sensory impressions such as what the participant saw, heard, smelled, tasted and/or touched during the recalled event across the two sessions (e.g., Participant 15 described her first date with her recent partner. In session one she reported she was wearing, “black jeans, heels and a flowy gold top.” Then in session two, when describing the same event, she reported she was wearing “black top with jeans and some boots.” Participant 17 described his driving test. In session one he reported, “I saw this big bus.” Then in session two when describing the same event he reported, “I saw this big truck.” Participant 22 described his birthday dinner. In session one he reported, “My mum made lasagne.” Then in session two he said, “My mum made roast”).

**Conflicting temporal details.** These discrepancies were in temporal details or experiences across the two sessions. (e.g., Participant 40 described his birthday. In session one he reported, “My birthday was on a Sunday.” Then in session two he reported, “It was on a Saturday”). Another example of a temporal contradiction is where the participant provided different temporal sequencing details for the event (e.g., Participant 25 described her first date. In session one she reported that her mum’s friend left them before lunch. Then in session two she reported that her mum’s friend left them after they ate lunch).

**Conflicting contextual details.** These discrepancies were in any location or spatial contextual details across the two sessions (e.g., Participant 16 described his driving test. In session one he reported, “I was inside my room sitting on a chair when the doorbell rang.” Then in session two he reported, “I remember lying on my bed and
hearing the doorbell.” Participant 27 described her driving test and where she was going after it finished. In session one she reported, “We were going to go visit my grandmother in Forster.” Then in session two she reported, “We were going to go to Avoca”).

**Conflicting estimation.** These discrepancies were in estimation or approximation of number of people or items across the two sessions (e.g., Participant 1 described her 19th birthday. In session one she reported, “There were 30 sandwiches.” Then in session two she reported, “There were 40 sandwiches.” Participant 5 described her high school formal. In session one she reported, “There were 12 of us girls who slept over at my friend’s house.” Then in session two she reported, “There were 15 of us who slept over”).

**Conflicting evaluation.** These discrepancies were in evaluations across the two sessions (e.g., Participant 19 described her last birthday. In session one she reported, “I was very happy with my ice-cream cake.” Then in session two she reported, “The ice cream cake was terrible, I don’t know what they made it with and I really don’t like chocolate, but I pretended I liked it anyway”).

**Conflicting emotional state.** These discrepancies were defined as differences in emotional states pertaining to the same circumstance across the two sessions (e.g., Participant 10 described her last birthday. In session one she reported, “I wasn’t happy or sad, it was just a normal day.” Then in session two she reported, “I felt sad I was so far away from my family and friends”).

**Different details.** These discrepancies were in details across the two sessions that did not fit under any other codes (e.g., Participant 21 described his high school formal. In session one he reported, “I had my tux and shoes on and my jacket in my hand.” Then in session two he reported, “I walked out in my socks. I had my shoes, my
jacket and tie in my hand”). In this experiment different details were combined with different actions, defined as discrepancies in actions across the two sessions (e.g., Participant 13 described her first day of employment. In session one she said, “I was hired as a dishwasher so I didn’t do any cooking.” Then in session two she said, “I helped around with the cooking, chopping potatoes, helping make naan bread and other dishes”). The reason these two contradiction types were combined was because it was difficult to clearly distinguish between the two types in this experiment.

**Different person.** These discrepancies were in the people recalled as present across the two sessions (e.g., Participant 42 described her high school formal. In session one she reported, “Both my mum and dad were taking pictures” Then in session two she reported, “Just my mum was there taking pictures as it was the afternoon and my dad was at work.” Participant 9 described her high school formal. In session one she reported, “We got escorted out by security.” Then in session two the participant reported, “We got escorted out by the principal”).

**Different conversations.** These discrepancies were in conversations that took place at the same point in time across the two sessions (e.g., Participant 41 described her first date. In session one she reported, “I asked him – ‘do you like this?’ And he said – ‘I don’t know’” then in session two she reported, “I asked him – ‘do you like this?’ And he said, ‘Yes’”).

**Scoring of Questionnaires and Scales**

**MPQ.** Each item on the MPQ was rated as 0 or 1. The items were added and then computed based on instructions in the scoring manual (Tellegen, 1982). The MPQ yielded scales measuring response styles. The Associative Slips Scale functions like an infrequency scale while the Index of Valid Responding Scale measures carelessness in answering questions. The Unlikely Virtues and Desirable Response
Inconsistency Scales both measure answers that may be due to social desirability behaviour rather than honesty.

The MPQ also yields three higher order factors: positive affectivity, and negative affectivity and constraint and 11 trait factors: wellbeing, social potency, achievement, social closeness, stress reaction, alienation, aggression, control, harm avoidance, traditionalism and absorption. The main interest in this study was whether the social scales and the absorption scales would correlate with the amount of contradictions participants made.

**PAQ.** The PAQ was scored according to Spence et al., (1979). Each item on the questionnaire was rated on a 5-point scale ranging from 0-4. The scores were added and then computed for each attribution style: communion, mitigated agency and unmitigated agency.

**PANAS.** The PANAS was scored according to Watson, Clark and Tellegen. (1988). The positive affect sum of ten items was tallied to get a total positive affect score. A higher score indicates more positive affect or the extent to which the individual feels enthusiastic, active and alert. The negative affect score was obtained by adding the remaining 10 items. A higher score indicates more negative affect, or the extent to which the individual feels aversive mood states and general distress. Across each session participants completed five PANAS questionnaires (one at the beginning of the session to assess emotional state at the time of testing and one after recalling each event to assess emotional state at the time of the event).

**Results**

Data from 36 participants were gathered. This may be considered somewhat low and thus inferences may be limited by experimental power. However, an alternative way to consider experimental power is in terms of the number of memory
accounts analysed. Specifically, in this experiment I analysed memory changes across 288 accounts. All participants except two generated memories for four of the six main autobiographical events that were used in Experiment 1 (n = 35 for 18th or most recent birthday, n = 32 for first date, n=29 for driving test, n = 28 for high school formal, n = 16 for first day of employment, n = 1 for HSC). Two participants generated substitute personal events that they identified as meaningful and salient (n = 1 for immigration to Australia, n = 1 for the Eid Al-Fitr Muslim holiday lunch). Univariate analysis of variance (ANOVA) for word count by event type and contradictions by event type revealed no significant differences across event types, all $F$’s < 1.00, all $p$’s > .05.

Data analyses focused on the amount recalled, contradictions and evaluations of the remembering process. Specifically, I measured: (a) amount recalled between listener present and listener absent conditions and depending on personality characteristics, (b) number and type of contradictions and recalled between conditions and across different personality characteristics, (c) differences in ratings of confidence in accuracy of detail, clarity, comprehensiveness and how much participants had discussed the event with others, (d) emotional state ratings and (e) age of the memory.

**Amount Recalled**

**Impact of listener.** Table 3.1 presents the mean number of words used in the listener absent and listener present conditions across both sessions. A 2 (Listener Condition: listener present, listener absent) x 2 (Recall Session: session one, session two) mixed model ANOVA of words recalled yielded a significant main effect of listener condition, $F(1, 34) = 6.59, p = .02$. There was no significant main effect of recall session $F(1,34) = .155, p = .70$ and there was no significant interaction between
listener condition and recall session, $F(1, 34) = .660, p = .42$. Session one word counts were correlated with session two word counts, $r = .925$. These results show that participants in the listener present condition provided more detailed accounts than participants in the listener absent condition across both sessions.

Table 3.1

<table>
<thead>
<tr>
<th></th>
<th>Listener Present</th>
<th>Listener Absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Count</td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>Session One</td>
<td>3034.94</td>
<td>616.69</td>
<td>2480.72</td>
</tr>
<tr>
<td>Session Two</td>
<td>3015.55</td>
<td>772.25</td>
<td>2536.50</td>
</tr>
</tbody>
</table>

*Note. Values are mean number of words used to describe each event and standard deviations*

**Impact of personality.** First a series of independent t-tests was performed to check if there were differences in personality characteristics between the listener present and listener absent conditions. Independent t-tests confirmed that there were no significant differences, all $F$'s $< 1.00$, all $p$'s $.05$.

**MPQ.** Table 3.2 provides the Pearson correlation coefficients for word count and personality characteristics. There was a significant positive correlation between the number of words used and the social closeness scale, $r(34) = .363, p = .037$, indicating that participants with higher social closeness scores, which is one of the facets that make up the extroversion scale, provided more detailed accounts. In contrast, there was a significant negative correlation between the number of words used and the aggression, $r(34) = -.535, p = .001$, and alienation, $r(34) = -.503, p = \ldots$
scales indicating that participants with higher aggression and alienation scores provided less detailed accounts.

Table 3.2

*Impact of Personality on Amount Recalled*

<table>
<thead>
<tr>
<th>Personality</th>
<th>Word Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-Being</td>
<td>.235</td>
</tr>
<tr>
<td>Social Potency</td>
<td>-.068</td>
</tr>
<tr>
<td>Achievement</td>
<td>.094</td>
</tr>
<tr>
<td>Social Closeness</td>
<td>.363*</td>
</tr>
<tr>
<td>Stress Reaction</td>
<td>-.304</td>
</tr>
<tr>
<td>Alienation</td>
<td>-.503**</td>
</tr>
<tr>
<td>Aggression</td>
<td>-.535**</td>
</tr>
<tr>
<td>Control</td>
<td>.157</td>
</tr>
<tr>
<td>Harm Avoidance</td>
<td>.218</td>
</tr>
<tr>
<td>Traditionalism</td>
<td>.304</td>
</tr>
<tr>
<td>Absorption</td>
<td>-.164</td>
</tr>
</tbody>
</table>

*Note.* *p* < .05. **p** < .01. Type 1 error was not controlled for in this correlational data. One way to control for Type 1 error is to divide my alpha by the number of comparisons I made, however this would have been extremely conservative. Since these personality aspects were rather exploratory, instead I acknowledge my use of multiple tests.

*PAQ.* There was no correlation between the mean number of words recalled and PAQ scores (communion: $r = .138, p = .42$, agency: $r = .059, p = .73$; unmitigated
agency: \( r = -0.146, p = .39 \), indicating that participants’ attribution style did not impact the amount of words recalled in their accounts.

**Contradictions**

*Impact of listener.* An independent t-test was used to test for differences in the number of contradictions between the listener absent and listener present conditions. Participants in the listener present condition tended to make more contradictions \( (M = 3.61, SD = 2.50) \), \( t = 2.51, p = .02 \), in their accounts across the two sessions than participants in the listener absent condition \( (M = 1.77, SD = 1.83) \). Inspection of the data showed however large variation across participants in the number of contradictions. Further frequency analysis revealed a cross section of participants in each condition who made either: 0 to 1, 2 to 3, or 4 to 9 contradictions. As in Experiment 1, contradictions were recoded to examine the data in another way.

Figure 3.1 illustrates three categories of contradictions (0-1 contradictions, 2-3 contradictions, and 4-9 contradictions) that emerged from the data. Figure 3.1 shows that can see that a greater number of people in the listener present condition made more contradictions than the number of people in the listener absent condition. This was conducted with chi square analysis \( \chi^2 (2, N = 36) = 6.17, p = .046 \). Whereas 44% of participants in the listener present condition made 4 to 9 contradictions, only 11% of participants in the listener absent condition made 4 to 9 contradictions. In other words for most participants who did change their accounts, the listener present or listener absent condition influenced how many discrepancies they incorporated. What is striking about this data is that although people in the listener present condition said more, this was not correlated with the number of contradictions \( r = .140 \). In other words, people who said more were not necessarily prone to making more contradictions.
Figure 3.1: Impact of Presence or Absence of Listener on Number of Contradictions made Across Accounts

**Types of contradictions.** Table 3.3 shows the different types of contradictions participants made across the two conditions. The most frequent contradictions were temporal and estimation contradictions. A series of independent t-tests found no significant differences in contradiction types between the listener present and listener absent conditions (all t's < 1.95, all p's > .06).
Table 3.3

*Different Types of Contradictions in the Listener Present and Listener Absent Conditions*

<table>
<thead>
<tr>
<th>Contradictions</th>
<th>Listener Present</th>
<th>Listener Absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Sensory</td>
<td>0.28</td>
<td>0.57</td>
<td>0.11</td>
</tr>
<tr>
<td>Contextual</td>
<td>0.39</td>
<td>0.61</td>
<td>0.28</td>
</tr>
<tr>
<td>Temporal</td>
<td>0.89</td>
<td>1.27</td>
<td>0.28</td>
</tr>
<tr>
<td>Estimation</td>
<td>0.72</td>
<td>0.96</td>
<td>0.38</td>
</tr>
<tr>
<td>Emotion</td>
<td>0.00</td>
<td>0.00</td>
<td>0.06</td>
</tr>
<tr>
<td>Evaluation</td>
<td>0.61</td>
<td>1.04</td>
<td>0.06</td>
</tr>
<tr>
<td>Detail/Action</td>
<td>0.33</td>
<td>0.69</td>
<td>0.11</td>
</tr>
<tr>
<td>Person</td>
<td>0.22</td>
<td>0.73</td>
<td>0.44</td>
</tr>
<tr>
<td>Conversation</td>
<td>0.17</td>
<td>0.38</td>
<td>0.06</td>
</tr>
</tbody>
</table>

*Note.* Values represent mean number and standard deviation of different types of details that were contradictory across the two sessions summed across all four events.

**Impact of personality.** Table 3.4 provides Pearson correlation coefficients for contradictions and personality characteristics. There was no correlation between personality characteristics identified by the MPQ and contradictions. There was no correlation between contradictions and personality characteristics of attribution styles identified by the PAQ (communion: $r = -.118$, $p = .49$, agency: $r = .107$, $p = .53$, and unmitigated agency: $r = .015$, $p = .93$). Thus although personality influenced the amount recalled, it did not influence the number of contradictions.
Table 3.4

**Impact of Personality on Contradictions**

<table>
<thead>
<tr>
<th>Personality</th>
<th>Contradictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-Being</td>
<td>.261</td>
</tr>
<tr>
<td>Social Potency</td>
<td>-.026</td>
</tr>
<tr>
<td>Achievement</td>
<td>-.006</td>
</tr>
<tr>
<td>Social Closeness</td>
<td>.264</td>
</tr>
<tr>
<td>Stress Reaction</td>
<td>-.257</td>
</tr>
<tr>
<td>Alienation</td>
<td>-.212</td>
</tr>
<tr>
<td>Aggression</td>
<td>-.117</td>
</tr>
<tr>
<td>Control</td>
<td>-.048</td>
</tr>
<tr>
<td>Harm Avoidance</td>
<td>-.154</td>
</tr>
<tr>
<td>Traditionalism</td>
<td>-.114</td>
</tr>
<tr>
<td>Absorption</td>
<td>-.026</td>
</tr>
</tbody>
</table>

*Note.* *p* < .05. **p** < .01.

**Confidence, Clarity, Comprehensiveness, Discussion**

Table 3.5 shows the means of confidence, clarity, comprehensiveness and discussion with others ratings across the two conditions. Separate 2 (Listener Condition: listener present, listener absent) x 2 (Recall Session: session 1, session 2) mixed model ANOVA’s were used to test for significance for confidence, clarity, comprehensiveness and discussion ratings. There were no significant main effects of listener condition, there were no significant main effects of recall session and there were no significant interaction between condition and session for confidence, clarity, comprehension or discussion (all F’s < 1, all *p*’s > .05). Participants reported similar
levels of confidence for the events, clarity of the events, how comprehensive they found their accounts, and how much they had talked about the events across the two conditions. This indicates that participants were equally confident in the accuracy of the details in their memories and found their memories just as clear and comprehensive regardless of whether or not there was a listener present.

Table 3.5

Confidence, Clarity, Comprehensiveness and Discussion Ratings Across the Listener Present and Listener Absent Conditions

<table>
<thead>
<tr>
<th></th>
<th>Listener Present</th>
<th></th>
<th>Listener Absent</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Confidence</td>
<td>8.23</td>
<td>1.08</td>
<td>8.19</td>
<td>1.09</td>
<td>8.21</td>
<td>1.07</td>
</tr>
<tr>
<td>Clarity</td>
<td>9.21</td>
<td>6.39</td>
<td>7.93</td>
<td>1.11</td>
<td>8.59</td>
<td>4.62</td>
</tr>
<tr>
<td>Comprehension</td>
<td>7.44</td>
<td>1.19</td>
<td>7.68</td>
<td>0.16</td>
<td>7.55</td>
<td>1.17</td>
</tr>
<tr>
<td>Discuss</td>
<td>5.79</td>
<td>1.88</td>
<td>6.34</td>
<td>2.27</td>
<td>6.05</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Note. Ratings were made on a scale of 1 to 10, (where 1 = not very confident and 10 = extremely confident; 1 = very vague and 10 = very clear; 1 = not comprehensive, 10 = very comprehensive 1=not at all, 10 = a great deal). As there was no significant difference between ratings in session one and session two, similar to Experiment 1, the ratings were collapsed across the two sessions.

Participants across both conditions reported high ratings of confidence in the accuracy of details, clarity and comprehensiveness of their accounts across both sessions. Reported confidence levels by participants remained very similar across session one (M = 8.29, SD = 1.09) and session two (M = 8.11, SD = 1.15), indicating participants remained as confident of the details of their events in their second retelling as they did in the first, all t’s < 1.72, all p’s > .095.
Confidence was positively correlated with clarity ($r = .816, p < .001$) and comprehension ($r = .808, p < .01$). Confidence ratings also were positively correlated with how much the person reported discussing their memory with someone else ($r = .349, p = .04$). In other words, the more participants discussed their events with others, the more confident they felt that the details of the events were true. There was a correlation between the Desirable Response Inconsistency scale and confidence in accuracy of details ($r = .472, p < .004$). This suggests that people who attempted to portray themselves in a favourable light reported higher confidence that the details of their memories were accurate than those who did not. Finally, similar to Experiment 1, there was no correlation between the amount of contradictions participants made, confidence in accuracy of details, clarity and comprehension ratings, indicating that just because participants reported high confidence in accuracy, clarity and comprehensiveness their accounts this was unrelated to the number of contradictions they made.

**Emotion**

Participants across both conditions and sessions reported experiencing higher levels of positive emotional states ($M = 27.73, SD = 6.39$) than negative emotional states ($M = 12.99, SD = 3.49$) indicating that participants generally reported feeling enthusiastic, active and alert during both sessions of the experiment.

**Emotional valence during sessions.** A 2 (Listen Condition: listener present, listener absent) x 2 (Recall Session: session 1, session 2) mixed model ANOVA was used to test for significance for PANAS positive and negative scores. There was a significant effect of recall session $F(1, 33) = 4.76, p = .04$. This indicates that participants in both conditions reported experiencing a slightly more positive mood during session one ($M = 28.86, SD = 6.18$) than during session two ($M = 26.61, SD = 6.63$).
6.48). There was no significant main effect of condition and there was no significant interaction between condition and session.

There was no significant main or interaction effects between condition and session for PANAS negative scores indicating that participants in both conditions reported experiencing similar low levels of aversive mood states in session one and in session two.

There was no correlation between positive or negative emotional states during session one and two and the number of contradictions participants made, confidence in accuracy, clarity, comprehensiveness or discussion ratings.

**Emotional valence during events.** A 2 (Listen Condition: listener present, listener absent) x 2 (Recall Session: session 1, session 2) mixed model ANOVA was used to test for significance for PANAS positive and negative scores. There was a significant effect of recall session $F(1, 33) = 5.62, p = .02$. This indicates that participants in both conditions described their events as slightly more positive in session one ($M = 32.69, SD = 6.24$) than in session two ($M = 31.21, SD = 7.65$). There was no significant main effect of listener condition and there was no significant interaction between listener condition and recall session.

There was no significant main or interaction effect of recall session for PANAS negative scores indicating that participants in both conditions described their events as equally negative (and not very negative).

Participants across both conditions and sessions reported higher levels of positive emotional states during their events ($M = 32.0, SD = 6.95$) as compared to negative emotional states during their events ($M = 17.41, SD = 5.35$) indicating that participants generally felt their elicited autobiographical events were positive experiences that invoked positive valence.
There was a correlation between positive emotional states during the experiment and positive emotional states during the events ($r = .798, p < .001$). There was also a correlation between negative emotional states during the experiment and negative emotional states during the events ($r = .668, p < .001$). This finding suggests that participants’ emotional states during the sessions influenced how they remembered their emotional states during their events. There also was a correlation between positive emotional states during the events and comprehensiveness ratings, indicating that participants who reported their events as being more positive also rated their accounts of the events as more comprehensive ($r = .354, p = .04$).

There was no correlation between positive or negative emotional states during the events and the number of contradictions a participant made, confidence in accuracy, clarity or discussion ratings.

**Age of Memory**

There were no differences found between the age of the memory of the event and the amount recalled or number of contradictions that accounts contained ($p > .05$).

**Summary and Informal Observations**

**Informal Observations.**

There were individual differences in narrative styles that weren’t captured by the personality or attribute assessment tools carried out in this experiment. However, during the coding task it became apparent that, like in Experiment 1, some individuals were more prone to making certain types of contradictions across their accounts as opposed to others. There were five participants who were identified to make certain distinct types of contradictions over others.
**Participant 5 - the estimator.** This participant made contradictions in estimations across her two sessions. She reported specific times and numbers in session one that were different to times and numbers she reported in session two.

For example, Participant 5 described her first date experience in which her best female friend and male date were at her house. She provided two different estimations of temporal details in session one and session two. In session one she said, “we waited to like 10:00 and she left” and “we ended up talking to 3:00 am.”

Then in session two she said, “but then at 10:30 she decided to leave” and “we ended up talking until like 2 in morning.” Participant 5 then described her 21st birthday and she provided a different number of people who gave speeches at her party. In session one she said, “my best friend said a speech.” Then in session two she said, “Six or seven of my best friends said a speech.” Participant 5 then described her high school formal experience that ended at her friend’s house. She provided two different estimations of people who stayed the night. In session one she said, “There were like 12 of us who slept at her house.” In session two she said, “We all slept at her house, like 15 of us.” Although the magnitude of changes (e.g. from 12 to 15, form 2 a.m to 3 a.m are often small, they would be significant in a forensic context.)

**Participant 19 - the evaluator.** This participant made contradictions in evaluations across her two accounts. For example, Participant 19 described her first date and provided two different evaluations of her meal. In session one she said “I had some vegetable stir fry. I didn’t like it but pretended to like it.” Then in session two she said, “I had vegetable sautéed noodles which I actually quite enjoyed.”

Participant 19 also provided two different evaluations of her experience of the kiss at the end of the date. In session one she said, “he ended up kissing me, it was weird, not cool at all, I didn’t like it and it made me uncomfortable.” Then in session two she
said, “I was afraid he was going to kiss me but then he did and it was okay.”

Participant 19 described her most recent birthday and provided two different evaluations of what she thought about her birthday cake. In session one she said, “I was very happy with my ice-cream cake” Then in session two, she said, “the ice-cream cake was terrible, I don’t know what they made it with, but I pretended to like it anyway.” Here both facts of the event and her attitude towards these facts appear to change.

**Participant 25 – the mistaken chronologist.** This participant made contradictions in chronology across her two accounts. For example, Participant 25 described her first date and in session one she said, “he paid for my movie so I said I would get the ice-cream” Then in session two she said, “he paid for my lunch so I said I would get the ice-cream.” That is she recalled that her date paid for her and that she said she would get the ice-cream but appeared to not recall at which point in time he said this to her (after the movie or after lunch). Then describing the same event in session one she said, “so we finished the movie and as we are walking out my mom comes up to me, she ended up coming to lunch with us.” Then in session two she said, “after the movie we step outside and I get a text from my mum saying there is a change in plans and she was going to meet me there later so me and him went to the nearest café”. The participant recalled her mother had met them, but in session one she recalled meeting her mother before lunch, whereas in session two she recalled meeting her mother after lunch. Finally, Participant 25 described lunch with her family on the day of her high school formal and meeting one of her mother’s friends. In session one she said, “she [mother’s friend] complimented me and then she left. I then sat down with my family and had lunch.” Then in session two she said, “she had finished, we thanked her, we had lunch and then she was off.” The participant recalled
meeting her mother’s friend and having lunch but in session one she recalled her mother’s friend leaving before they had lunch whereas in session two she recalled her mother’s friend leaving after they all had lunch together. Thus the components of her recall are consistent but their temporal order is confused.

Participant 22 – the detail deviator. This participant provided completely different sensory types of details across his two events. For example, Participant 22 described his most recent birthday at his house and said his girlfriend came over with a birthday present for him. In session one he said, “my girlfriend brought in a giant box which she pretended it was a computer but it was empty in the end.” Then in session two he said, “she gave me her old computer which she put in a new computer box to trick me.” Participant 22 then described his birthday dinner and in session one he said, “My mum made lasagna.” Then in session two he said, “My mom had made roast.” When describing the other presents he received Participant 22 reported what two aunts who were celebrating his birthday with him gave him. In session one he said, “one aunt got me an iTunes voucher, the other one got me a Rebel Sport certificate.” In session two he said, “My aunts got me a watch together.”

Participant 15 – The erroneous attirist. This participant made contradictions in what she was wearing across her two accounts. The contradictions that the participant made were sensory and specifically focused on what she and others wore at the time of the events. For example, Participant 15 described what she wore to her 21\textsuperscript{st} birthday dinner and in session one she said, “I wore a one shouldered, long sleeved, kind of flowy chiffon, kind of grey dress and I bought a new pair of shoes that day, a black pair of heels.” Then in session two she said, “I wore a pair of jeans and my mum’s old jacket.” The participant then described her first date
and in session one she said, “I wore black jeans, a gold flowy top and heels.” Then in session two she said, “I wore a black top with jeans and some boots.”

**Participant 23 – the conversation quoter.** This person frequently reproduced conversations in his narratives. The conversations he quoted differed across the two narratives. For example, Participant 23, when quoting his conversation as to why they were not going to go play laser tag at a recent birthday experience, quoted in session one, “So I said ‘Look there is not enough people, it’s hot anyway, we’ll just do lunch.’” Then in session two he quoted, “Because it was so hot I said, ‘OK, let’s just do lunch, maybe get some ice-cream.’” In session one he said that they did not go to play laser tag because there were not enough people then in session two he implied they did not play laser tag because it was too hot. Participant 23 then described his formal experience and described conversation when his friends called to organise to pick him up. In session one he quoted, “So I said, ‘I just got back from the shops, I’m having lunch.’” Then in session two when he described the same phone call he quoted, “You will be here at four.” Participant 23 then went on to describe the episode of rushing out the door and he quoted a conversation he had with his mother. In session one he quoted, “Mum was like ‘Have fun’. I was like ‘I will.’” Then in session two he quoted, “My mum kept calling out, ‘Have you got everything? Have your got your wallet, your phone’, and I was like ‘if I don’t, I don’t, I don’t have time.’” These conversation quotes are not necessarily contradictions and they were not counted as contradictions in the analysis performed, but the quotes from conversations always were quite different across the two sessions so it raised the question of how we should interpret conversation quoting of direct verbatim dialogue?
Summary

In Experiment 2 I sought to determine how the presence or absence of a listener and the personality characteristics of the speaker impacted the amount recalled and the number and types of changes made in free recalled memory accounts across two retellings.

Primary Findings

First, the presence of a listener and personality characteristics of the participants significantly influenced how much was remembered. Participants in the listener present condition said more in both sessions than participants in the listener absent condition. This supports research that suggests that subtle social cues can affect the way people recall their memories (Bavelas et al., 2000; Pasupathi, 2001). In terms of personality characteristics, people who scored high on the social closeness scale of the extroversion facet said more whereas people who scored high on the aggression and alienation scales said less. This finding is consistent with previous research that people who are socially motivated give more detailed accounts (Areh & Umek, 2004; Rasmussen & Berntsen, 2010). One possible explanation for people high on the aggression and alienation scales providing less detailed accounts is that their memory recall might be influenced by negative self-representation. Negative self-representation has been linked with over-generalised, less detailed autobiographical memory (Kleim & Ehlers, 2008; Valentino, Toth, & Cicchetti, 2009). As I did not control for Type 1 error in my tests for multiple correlations, these results however need to be interpreted with caution.

Second, people in the listener present condition made more contradictions than people in the listener absent condition. This is consistent with research that suggests when people tell their memory to someone they can change their memory of
the event (Hirst & Echteroff, 2012). Interestingly, though, the number of contradictions was not related to the amount of words recalled. This finding reveals that the people who provided the most detail were not necessarily the ones who made the most contradictions across their accounts.

Third, there was no difference in confidence, clarity or comprehension between conditions. People were equally confident of their memories regardless of whether or not there was a listener present. People across both conditions who were confident of the accuracy of their memory accounts also rated their memories for the event as being clear and comprehensive. Participants who reported discussing their memories with others also felt more confident that the details for the event were true. This indicates that rehearsal of memories with others may have inflated participants’ confidence that the details of the memory were true. This is consistent with prior research (Rubin & Kozin, 1984). The act of retelling autobiographical memories may have offered rehearsal of the memories (Skowronksi & Walker, 2004) and increased the confidence that the details of the memory were accurate (Fitzgerald & Broadbridge, 2013; Rubin & Kozin, 1984). People remained equally as confident across their accounts in both sessions. Similar to Experiment 1 there was no relationship between confidence and the number of contradictions made, supporting research that high confidence is not necessarily linked to accuracy (Granhag et al., 2000).

Contrary to expectations, personality was unrelated to the number and types of contradictions made across the two retellings of memory accounts. Interestingly, however, scores on the social desirability scale of the MPQ were related to confidence ratings. People who scored higher on the desirable response scale, reported higher confidence in the accuracy of their accounts. Also interestingly, although the targeted
personality characteristics in this experiment were not able to identify individuals more likely to make contradictions, six individuals were identified who were more prone to making certain types of changes across their accounts. I labelled these the estimator, evaluator, mistaken chronologist, detail deviator, erroneous attirist, and conversation quoter.

**Secondary Findings**

In addition to the two main highlighted findings there were other significant findings. First, similar to Experiment 1, the concrete details that were most likely to be contradicted across accounts were temporal, estimation and contextual details. My finding of prevalent temporal and estimation contradictions is consistent with Strange, et al. (2014) who found that participants made more “when errors” compared to “what errors” across alibi accounts. In contrast to Experiment 1, changes in sensory details were not as prevalent. This may be due to the fact that two participants in Experiment 1 made a large number of sensory contradictions in comparison with other participants.

Second, emotional states during the experiment were correlated with emotional states reported for the remembered events. Participants across both conditions reported significantly more positive affect for emotional valence during the experiment and during the events in session one than in session two. This suggests that participants’ emotional states during the experiment influenced the remembered emotional valence during the events. This indicates that memory retellings of emotional states across subsequent recalls can be affected by subsequent emotional states. This is consistent with research that a person’s recalled emotion may be affected by the person’s present mood (Fiedler & Hütter, 2013). This finding is relevant to the forensic context where individuals are interviewed several times
about their emotions for the event in question. Contrary to expectations, recalled emotion of the event was not correlated with confidence ratings, although participants who rated their events as more positive also rated their accounts as more comprehensive.

Finally there was no relationship between the age of the memory, the amount recalled and the number of contradictions made.

**Conclusion**

In conclusion, a range of factors contributed to how people remembered their events and the changes they made across retellings. The main findings were that the presence of a listener and personality characteristics influenced the amount of detail recalled, whereas the presence of a listener influenced the number of contradictions in details a person recalled. Personality characteristics influenced emotional valence and confidence in accuracy of the details recalled. Although a possible limitation in Experiment 2 was slightly low sample size, my effect sizes were very large. I achieved a relatively clear effect between listener present and absent conditions. Therefore my sample size was sufficient for my experimental purpose.

The findings from Experiment 2 are interesting in that they highlight the importance of individual factors and illustrate that social influence can work through subtle social influences rather than direct contagion. What this experiment was not able to determine was why participants made contradictions across their accounts. In order to investigate this question I needed to assess participants with different assessment tools to capture individual variation and ask participants to return for a third session to comment on their accounts from the previous two sessions.
Chapter 4

Intrinsic Variation and Contagion Across Repeated Memory Retellings
Chapter Introduction

The primary aim of Chapter 4 was to explore the role of intrinsic variation versus contagion in contradictions across memory reports in a social setting. In chapter 4 I discuss my findings from Experiments 3a and 3b. The primary aims differed across these two experiments. In Experiment 3a I examined the influences on and characteristics of contradictions due to intrinsic variation. In Experiment 3b I investigated the influences on and characteristics of contradictions due to contagion. Across both of these experiments I investigated the number and type of contradictions provided by participants in response to specific questions rather than free recall format. In both experiments I investigated the influence of different personality characteristics and the different possible underlying reasons that may have motivated participants to make contradictions. The data from Experiment 3a and 3b came from one larger study, which ran across three sessions, but I focused on different elements in my analyses. Recruiting participants who committed to three testing sessions over three months proved to be a challenge, therefore sample sizes in these experiments are smaller. I collected the data for Experiment 3a predominantly across sessions one and two. I collected the data for Experiment 3b in the third and final session of the study. Across these two experiments I explored the role of intrinsic error versus contagion in contradictions in details across memory reports in a social setting.
Experiment 3a

Memory for Specific Details in Autobiographical Memory Accounts:

Contradictions Due to Intrinsic Variation

In Experiment 3a I explored the frequency, nature and reasons for contradictions across repeated autobiographical memory accounts. My first aim in Experiment 3a was to investigate the amount of detail and the number of contradictions participants elicited when requested to provide specific forensically relevant details across two retellings. My previous two experiments demonstrated that people make contradictions across their accounts when they free recall. Although witnesses generally are asked to freely recall an event, it is also normal for the interviewer to ask questions to discover case-specific information important to the investigation (NSW Police Force, 2012; NSW Police, 2015). For instance, collecting evidence relating to the physical appearance of an offender is usually standard practice in interviews conducted with witnesses (Ginet, Guimond, & Greffeuilie, 2006). Remembering specific details such as the clothing, type of shoes, detailed description of a house where a crime has been committed, specific dialogue and utterances have all been demonstrated to be integral evidence leading to convictions (Davis & Friedman, 2007; Simon, 2012). For example, in the Immediate Witness Statement (McPhee et al., 2014), inspired by the Self Administered Interview (Gabbert et al., 2009), people are asked to freely recall their events in different methods but are then cued to report specific details from the event as well.

To constrain participants’ recall to specific information I used a semi-structured interview format. Using a semi-structured format provided me with more control to obtain the same details across both retellings. This was important as I chose to focus on contradictory information across retellings. The reason I chose to focus specifically on contradictory information was because contradictions are viewed as the most important
types of changes across retellings in a forensic context. As reviewed in the Introduction, people generally believe that being able to provide specific details of an event is linked to accuracy of recall. This has been referred to as the Memory-Accuracy-Details (MAD) belief (Bell & Loftus, 1988, 1989). Bell and Loftus found that when eyewitnesses reported very specific details, such as the clothes the perpetrator was wearing, participants judged the account to be more accurate than an account that did not contain such specific details. Similarly Conway et al. (2014) found that 70% of respondents from a survey agreed with the statement, “the more details a memory has the more accurate it is.”

Gathering specific details across two retellings, I intended to investigate the relationship between specific concrete details, the amount and type of contradictions in specific concrete details recalled, and confidence in accuracy of details across two retellings seven days apart. In Experiment 2, participants freely recalled dialogues from conversations and other specific details such as what people wore at the event, but they would often not cover the same features of the situation across their two retellings. For example, a participant may have described in detail what her best friend Amy was wearing to her birthday party in session one, and then in session two she may have described what her other friend Bianca was wearing to her party while omitting the detailed description of Amy’s attire. This made it at times impossible to compare any differences in some specific details. By using a semi-structured interview format I was better able to control the type of detail recalled making it easier to compare contradictions across accounts.

My second aim in Experiment 3a was to extend my findings from Experiment 2 and continue to investigate individual factors that may affect different types of changes participants make across retellings. Specifically, I aimed to investigate if there was a
relationship between contradictions and dissociative tendencies. Although Experiment 2 showed that some personality characteristics were correlated with how much detail a person recalled I found no correlation between personality traits or attribution styles and the amount of contradictions participants made across their accounts. In Experiment 2, I likewise found no relationship between absorption as measured in the MPQ and contradictions. In Experiment 3a I therefore measured dissociation traits in participants. I assessed participants with the Dissociative Experience Scale (DES) to investigate the relationship between contradictions and dissociation. The DES measures not only absorption but also the personality characteristics of derealisation/depersonalisation and amnesia tendencies that encompass dissociative experiences (Bernstein & Putman, 1986). These personality characteristics may affect encoding at the time an event took place. People high on dissociation may make more contradictions at subsequent retellings because they did not pay sufficient attention to the event.

Dissociation (as measured by the DES) has been associated with false memory across a range of different studies and stimuli (Hyman & Billings, 1998; Monds, Paterson, Kemp, & Bryant; 2013; Olsen & Beck, 2012; Polage, 2012; Porter et al., 2000) with mixed results. For example, Polage (2012) found that participants who scored high on the DES Scale were more likely to form false memories for false childhood events when specifically questioned on these events over two sessions one week apart. Hyman and Billings (1998) and Porter et al. (2000) also found that people who scored higher on the Dissociative Experience Scale were more susceptible to accepting false childhood memories as their own. Conversely Platt et al. (1998) failed to find a relationship between the DES and false autobiographical memories of the O.J. Simpson trial verdict when no false information was suggested.
My third aim was to investigate the relationship between contradictions and social desirability across retellings. Results of Experiment 2 illustrated that participants who scored high on the social desirability scale showed higher confidence in the accuracy of their accounts. Previous research suggests that people may display high confidence or report false information for reasons other than the formation of false memory. Some people may be motivated to impress the listener with their detailed memory abilities. Others may answer in a way they believe is expected (Cialdini & Goldstein, 2004). In Experiment 3a I was interested in investigating whether there was a relationship between how many contradictions participants made, the confidence in the accuracy of their reported details and social desirability. Specifically I wanted to expand on my findings from Experiment 2 and investigate the different ways that social desirability may possibly influence changes across memory retellings. Are changes across retellings motivated by a tendency to give inflated self-descriptions to an audience, which are driven by externally driven social factors, or are changes across retellings motivated by a tendency to give honest but inflated self-descriptions, which driven by internally motivated individual factors? I decided to use the Paulhus Deception Scales (PDS; Paulhus, 1998; Paulhus & John, 1998) in hopes of measuring and distinguishing between externally and internally motivated deceptive social desirability tendencies. The Paulhus Deception scales are unique as social desirability scales because they differentiate between consciously motivated (deceiving others) and unconsciously motivated (deceiving the self) social desirable responses. Paulhus and John (1998) suggested that social desirable behaviour can occur for one of two reasons. The first reason may be that social responding is an externally driven response style driven by the social context. The second reason may be that social responding is an internally driven trait driven by self-perceptions. Paulhus and John argued that social
desirability driven by external social contexts is more conscious and deliberate, whereas social desirability driven by internal traits is related to narcissism and ingrained overconfidence.

Finally, I was interested to discover participants’ explanations of why they made contradictions across their accounts. Participants in the previous two experiments reported high confidence in the accuracy of the details of their accounts. Research suggests that there is a discrepancy between how accurately people believe they remember events and how accurately they actually do remember the events (Conway et al., 2014; Kassam et al., 2009; Nisbett & DeCamp Wilson, 1977). I therefore asked participants to return for a third and final session to investigate if participants noticed the contradictions they made across their accounts and to elicit possible explanations from them on why they made contradictions.

The primary questions I hoped to answer in Experiment 3a were: First, did participants make contradictions across their accounts and if so what types and why? Second, was the number of contradictions participants made related to individual differences in dissociative and social desirability tendencies? Third, did participants notice their own contradictions and how did they explain them?

Based on previous research I predicted that participants who were high on dissociative tendencies would make more contradictions across retellings. I also predicted that participants who scored high on the Paulhus Deception Scales would exhibit inflated confidence similar to Experiment 2.

Method

Participants and Design

Fifteen second year Macquarie University psychology undergraduate students volunteered to take part in “a study of autobiographical memory” for partial fulfilment
of a course requirement for session one and two and the payment of 10 dollars for session three. One man and 14 women, ($M_{age} = 22.4$ years, age range: 18-30 years) individually participated in sessions one and two; 11 students (1 man, 10 women, $M_{age} = 22.10$, age range: 18-30 years) returned individually for their final third session three months after session two to comment on their transcribed accounts from session one and session two.

The experimental procedure was similar to the procedure in Experiments 1 and 2, however, it differed in that participants elicited autobiographical memory accounts in a semi-structured format. The experiment adopted a within subjects design for session one and session two. The primary dependent variables from session one and session two were: (a) the amount of detail recalled, (b) the number and type of contradictions across the first two sessions, (c) confidence, clarity, comprehensiveness and degree of discussion ratings, (d) Dissociative Experience Scale (DES) scores, (e) Paulhus Deception Scales (PDS) scores, and (f) participants’ reasons for making contradictions.

**Materials**

Participants elicited accounts of four specific events in a semi-structured interview. The events elicited were the same types of events that were used in Experiments 1 and 2. They were autobiographical in nature and were carefully chosen as likely to be recent and personally significant to participants targeted for this experiment (based on their stage of life). These events included: 18th birthday, high school formal, first date and driving test. In cases where participants were older than 18 years of age they described their most recent memorable birthday, (i.e., 21st, 23rd, or 25th birthday). In cases where participants had not experienced any of these events, or reported having considerable difficulty remembering an event, participants elicited an alternative autobiographical event such as the first day at most recent place of
employment or first HSC (final year) exam. The specific questions of the semi-structured interview were constructed based on details commonly elicited from witnesses that have been identified to be important in a forensic setting (Mcphee et al., 2014; Simon, 2012). The specific questions are outlined in the procedure section below.

Additional materials included: The same scales used in Experiment 2 to assess confidence in accuracy, comprehensiveness and discussion. Participants rated the following on a 10-point likert scale: how confident they were of the accuracy of the details, how clear their memory was for the event, how comprehensive their account was and how much they had talked about the event with others. For the purpose of this experiment two more questions were added to the confidence questionnaire in session two that were not included in Experiment 2. These questions were: had the participants looked at any pictures of the event since session one and had the participants talked to anyone about this event since session one (See Appendix C). The experiment also used the Dissociative Experience Scale (DES) is a 28 item self-report questionnaire that measures the tendency for dissociative experiences. Some examples of everyday dissociative experiences are driving a car and not recalling what happened during the drive, or listening to someone talk and realising that one did not hear all or part of what was said (Bernstein & Putnam, 1986). Finally, the Paulhus Deception Scales (PDS) is a 40 item self-report questionnaire that identifies individuals who distort their responses. Specifically, the PDS measures an individual's tendency to give socially desirable responses on self-report instruments. The PDS forms two principal and relatively independent subscales: self-deceptive enhancement (SDE), the tendency to give honest but inflated self-descriptions; and impression management (IM), the tendency to give inflated self-descriptions. Each scale consists of 20 items and is rated on a 5-point scale ranging from “not true” to “very true.” The PDS can be used in a variety of situations
where psychologists wish to assess socially desirable responding either as a response set (related to social situational demands), and/or a response style (a more individual stable, trait-like tendency) (Paulhus, 1998).

**Procedure**

The experiment ran over three sessions. Session one lasted 60 minutes. Session two lasted 30 minutes and was held seven days after session one. Session three lasted 30 minutes and was held three months after session two to mimic real world situations in the forensic setting where many months frequently pass between interviews (Herlihy et al., 2012; Neubauer & Fradella, 2011). Each participant was tested individually.

**Session one.** The participants arrived to the lab and were greeted by the experimenter. Once informed consent had been obtained, participants recalled their four autobiographical events in a face-to-face, semi-structured interview. The experimenter introduced the four events separately throughout the interview. The order in which the events were presented was randomised across participants. The verbatim introductory instructions were:

> I will be asking you some questions on some specific autobiographical events that you have experienced. Please try to be as detailed as you can in your descriptions but don't feel the need to make up any details or “fill in” spaces with details you don't actually remember. If you don't remember it is okay to say, “I don't remember”.

I followed a general interview template drawn from the IWS specific question section (McPhee et al., 2014) consisting of 11 standard questions related to categories of details that are generally important in a forensic context. Each question aimed to assess different features of participants’ memory (1) Who was at the event? (2) What did they look like (if first time met)? (3) What were they wearing? (4) What dialogue was
Participants were given the opportunity to expand on their answers initially but then questioning became more specific until all questions on the interview format were answered. The interviewer sat facing participants and typed the answers into a laptop. This followed general local police protocol in that police officers type witnesses’ answers directly into a computer while questioning the witness (NSW Police, 2015).

After describing each autobiographical event, participants were asked to complete a questionnaire, rating on 10-point likert scales, how confident they were of the accuracy of the details of the account, how clear their memory was for the event, how comprehensive their account was and how much they had talked about the event with others. At the conclusion of session one participants were reminded of their return date for session two.

**Session two.** Participants individually returned to the laboratory for session two of the experiment seven days after session one. In session two participants were instructed to recall the events they had described in session one, using the same semi-structured interview format. The procedure varied from session one in that session two was much more constrained than session one. Participants had only 5 minutes (i.e., 2 minutes fewer than in session one) to recall each event. Only 5 minutes were needed as the focus in this session was contradictions. The experimenter elicited information from session one and assessed contradictions in this elicited information rather than any new additional information. The experimenter was interested in obtaining the same
information that was obtained in session one so that the concrete details could be compared across the two sessions. Participants were implicitly instructed to aim for consistency. For example, if a participant began describing a coffee shop she and her date went to after their restaurant date, but had not mentioned the coffee date in session one, the experimenter stopped the participant by saying “Thank you” and proceeded to the next question. This was done in a very natural manner as would be conducted in a clinical interview if a client was providing irrelevant information. Participants were asked to answer questions in order. Participants were additionally asked individually tailored questions to obtain the same information as in session one. This was necessary as participants occasionally omitted certain details that they recalled in session one. For example, Participant 2 recalled the colour of the carpet when describing the setting of the Roads and Maritime Services building where the participant had taken his driving test in session one but omitted the information in session two. After obtaining the participant’s reply to the question: “What did the setting look like?” the experimenter followed up with the question, “Do you remember what the carpet looked like?” All questions were non-leading.

Again, after answering questions for each of the four events participants completed a questionnaire where they rated on a 10-point likert scales how confident they were of the accuracy in the details of the account, how clear their memory was for the event, how comprehensive their account was and how much they had talked about the event with others. In addition, participants were asked if they had looked at any pictures of the event since session one and if they talked to anyone about their event since session one.
When participants had answered all questions for all four events and completed all four questionnaires for each event, they were asked to complete the Dissociative Experience Scale (DES) and the Paulhus Deception Scale (PDS).

The experimenter ensured that all tasks were completed satisfactorily, thanked participants for their participation in both sessions and reminded them that they would be contacted in three months to return for the third and final session of the experiment.

**Session three.** Eleven participants returned three months after session two for the final session of the experiment. The purpose of session three was to determine if participants would identify their contradictions, and explore the reasons participants gave for making contradictions across accounts. Participants were individually contacted by email and told that the purpose of session three was to discuss the accounts of their events from sessions one and two. The email read:

Last semester you participated in session one and session two of my study on “Remembering the Past”. You were asked to provide four memories of past events you experienced over two sessions and you agreed to come back for a third and final session three months later. I am contacting you to arrange a time for you to come in for session three. In this final session we will discuss the memories you provided in session one and session two. The session will not last longer than 30 minutes and you will be given 10 dollars for your time.

Participants returned individually for session three. The verbatim instructions were:

Thank you so much for coming back for this final session of our research. In today’s session we will be talking about the memories you shared with me in session one and session two of this experiment on autobiographical memory. This last session will go for 30 minutes and you will be paid 10 dollars for your time. I will debrief you at the end of the session.
Reviewing accounts. Participants were then reminded of the events they described in sessions one and two. The verbatim instruction were:

Now, as you may recall you came in for session one and I asked you questions about four different events you experienced. These events were _____, ____ , ____ and ____. You then returned one week later and I asked you again questions about those same four events in session two. Do you remember completing these tasks? Here is the account from session one and from session two for [Event 1] that you described to me. Do you remember this memory?

After participants were presented with the transcripts of their accounts from both sessions of one of the four target events, they were asked to comment on the accounts. The verbatim instructions were:

I would like you to read carefully through these two accounts you supplied in our interviews in session one and session two and tell me what you think of them. Do you remember giving these answers? Sometimes during transcribing there can be typing errors. Have I typed out everything accurately? Please let me know if I have made any errors. Can you tell me what you noticed? What were the similarities and differences? Can you tell me more about that?

After participants had finished commenting on all their transcribed accounts for each of the four events, the experimenter removed the accounts. The experimenter then placed second copies of the transcribed accounts in consecutive order from session one and session two but this time with any contradictions highlighted in yellow. The experimenter then said: “These are the differences I picked up on across your two retellings.” “How do you explain the differences? Which do you think is correct? Do you think these are significant differences?”

All participants were fully debriefed at the end of the experiment.
Coding

Data was coded for contradictions. Inter-rater reliability was measured by having a second coder identify contradictions for 20% of the data (16 accounts). Inter-rater reliability was assessed by scoring and then comparing contradictions in each account on an item-to-item basis. A 97% inter-rate reliability was obtained and 100% after discussion.

Contradictions. Contradictions were defined as discrepant details across accounts as they would be identified in a forensic context. Similar to Experiment 2, omissions and additions were excluded from scoring as the focus of this present study was only on directly contradictory information. For the purpose of this study, contradictions were scored slightly differently to Experiments 1 and 2 (See Appendix C). Although the same types of contradictions were assessed, contradictions were scored and labelled as related to the 10 categories of the first 10 questions asked in the semi-structured interview. The 10 categories were:

Who. These details were gathered when answering the question, “Who was at the event?” Participants made contradictions when they relayed discrepant information about who was present at the event across their two sessions (e.g., Participant 2 described his driving test. He said, “the instructors were a woman and three men.” Then in session two he said, “There were three instructors in total.” Participant 4 described her high school formal. She recalled eight people sitting at her table at her high school formal and listed each of the eight by name but in session one stated that Reema and Novart were two of the eight whereas in session two she stated that Barb and Jason were two of the eight. In other words she listed six identical names in session one and session two but two of the extra names in each session were different. This was a
contradiction because if it was only a table for eight the participant must have been mistaken about two of the names either in session one or two).

**Appearance.** These details were gathered when answering the question, “What did they look like?” Participants made contradictions when they relayed discrepant information on the appearance of a person, which did not include clothing across their two sessions (e.g., Participant 9 described her driving test instructor. In session one she said, “she was probably in her 40’s.” Then in session two she said, “She was in her mid 30’s.” Participant 10 described a fight that took place at her birthday party. In session one she said, “Dave had one or two cuts on his knuckles and Jack had bruised ribs.” Then in session two she said, “Dave had bruised ribs and Jake had cuts to his hands on his knuckles”).

**Clothing.** These details were gathered when answering the question, “What were they wearing?” Participants made contradictions when they relayed discrepant information on the how the person(s) was dressed across their two sessions (e.g, Participant 5 described her end of high school formal dance event. In session one she said, “Joyce wore silver.” Then in session two she said, “Joyce wore blue or black.” Participant 10 described what people were wearing at her birthday party. In session one she said, “Dave was wearing a black singlet shirt.” Then in session two she said, “Dave was wearing a white singlet shirt”).

**Dialogue.** These details were gathered when answering the question, “What dialogue was exchanged?” Participants made contradictions when they relayed discrepant information on what was spoken across their two sessions (e.g., Participant 2 spontaneously reported that he confidently remembered word for word what his date said to him. In session one he said “I remember the exact words she said, ‘I forgive my dad but I would never completely forgive him just because I can willingly forgive a
person doesn’t mean they can abuse it.” In session two although he said something very similar, it was not completely verbatim dialogue as he previously claimed in session one: “Just because I have the ability to forgive someone doesn’t give them the right to abuse it or take advantage of it”).

**Where.** These details were gathered when answering the question, “Where did the event take place?” Participants made contradictions when they relayed discrepant information on where the event was or on where they were when they were heading or returning from the event across their two sessions (e.g., Participant 11 described her first date experience at a house party. In session one she said, “we caught a bus to the party.” Then in session two she said, “We caught a taxi to the party.” Participant 6 described her end of high school formal dance experience. In session one she said, “We got to pre-drinks in a hummer” and then in session two she said, “My mum dropped us off in our car to pre-drinks”).

**When.** These details were gathered when answering the question, “Where did the event take place (date, day, start time and finish time)?” Participants made contradictions when they relayed discrepant information in the date, day, start or finish time of the event across their two sessions (e.g., Participant 1 described her first date. In session one she said, “I think it was Easter.” Then in session two she said, “I think it was the middle of the year, August or September.” Participant 3 described her driving test. In session one she said, “I think it was Wednesday.” Then in session two she said, “I think it was a Friday.” Participant 15 described her interview for her first day of employment. In session one she said, “It was around 11.30.” Then in session two she said, “It was around 1p.m”).

**Setting.** These details were gathered when answering the question, “What did the setting look like (furniture, layout, props, etc.)?” Participants made contradictions
when they relayed discrepant information on the furniture, layout, and props of the event across their two sessions (e.g., Participant 12 described the office where she took her driving test. In session one she said, “The carpet was blue.” Then in session two she said, “The carpet was this greeny gross carpet.” Participant 11 described the party after her formal. In session one she said, “The music was hottest hits and R&B.” Then in session two she said, “The music was dance house.” Participant 8 described the table at the restaurant where she had her birthday dinner. In session one she said, “There were over 20 of us, it was a longish table, probably fit ten on either side and a couple of people on each end.” Then in session two she said, “we sat at a long table, five people on one side and five on the other and then two at the ends”).

**Weather.** These details were gathered when answering the question, “What was the weather like?” Participants made contradictions when they relayed discrepant information on weather conditions during the event across their two sessions (e.g., Participant 11 described the weather during her high school formal. In session one she said, “it was not raining.” Then in session two she said, “It was a bit windy and a light shower.” Participant 13 described the weather during her first date experience. In session one she said, “it was cloudy.” Then in session two she said, “It was cold and sunny”).

**Feel.** These details were gathered when answering the question, “What did you feel during the event?” Participants made contradictions when they relayed discrepant information on their emotional states during their event across their two sessions (e.g., Participant 5 described her birthday dinner. In session one she said she was stressed at her dinner. Then in session two she reported she was not stressed).

**Think.** These details were gathered when answering the question “What did you think during the event?” Participants made contradictions when they relayed discrepant
information on what they thought during the event across their two sessions (e.g.,
Participant 1 described her driving test. In session one she said, "I remember hoping he
would give me kerbside and three-point turn but he gave me kerbside and reverse
parking and that freaked me out." Then in session two she said, "In the exam I was
hoping for a three-point turn and kerbside but he gave me a three-point turn and
reverse parking").

**Scoring Personality Assessment Tools**

**The Dissociative Experience Scale (DES).** The DES is scored by summing the
total answered for each question and then dividing by 28. This yields an average score in
the range of 0-100 where higher scores are related to higher degrees of dissociative
tendencies (Bernstein & Putnam, 1986).

**Paulhus Deception Scales (PDS).** The PDS is scored by summing the raw data as
instructed by the manual and converting them to T scores that correspond to
Impression Management, Self Deceptive Enhancement and Total PDS scores.

**Results**

Data from 15 participants were gathered. This may be considered somewhat low
and thus inferences may be limited by experimental power. However, an alternative way
to consider experimental power is in terms of the number of memory accounts analysed.
Specifically, in this experiment I analysed memory changes across 120 accounts. A total
of 60 events were elicited across all participants with participants generating memories
for four of the six available main autobiographical events (n = 15 for 18th or most recent
birthday; n = 15 for first date; n = 13 for driving test; n = 12 for formal; n = 4 for first day
of employment).

The following analyses focused on: (a) amount recalled, (b) number and type of
contradictions across participants’ own retelling of memories, (c) correlations with
personality measures, (d) confidence in accuracy, clarity, comprehensiveness and
discussion ratings, (e) reasons participants gave for making contradictions. Analysis
examined how details in the accounts of significant autobiographical events acquired
through a semi-structured interview changed from session one to session two when no
contagion was introduced.

Amount Recalled

Participants recalled more words in session one \( (M = 298.38, SD = 75.42, \text{ range } =
216.75 \text{ – } 494.00) \) than in session two \( (M = 207.77, SD = 60.44, \text{ range } = 142.00 \text{ – } 374.25) \). Paired sample t-tests indicated that participants said more in session one than in session
two \( t(14) = 5.29, p < .001 \). This was to be expected as the interview in session two was
much more constrained than session one. Nevertheless the word count in session one
was correlated with the word count in session two \( (r = .541, p = .03) \) indicating that
participants who provided more details in session one were the same ones who
provided more details in session two.

Contradictions

Table 4.1 shows the mean number of contradictions participants made across
accounts. All participants exhibited contradictions in their autobiographical accounts
across their two retellings \( (M = 6.33, SD = 3.15, \text{ range } = 1.00-12.00) \). Paired sample t-
tests revealed no significant difference across contradiction types, \( t(14) < 1.41, p > .18 \).
The most frequent type of contradiction was discrepancies in temporal “when” details
\( (M = 2.13, SD = 1.57, R = 0.00-5.00) \) followed by sensory details; specifically,
discrepancies in description of clothing details \( (M = 1.66, SD = 1.49, \text{ range } = 0.0 \text{ - } 5.0) \).
The most infrequent type of contradiction participants made was in dialogue, emotion
and thinking (see Table 4.1). In response to the question “What dialogue was
exchanged?” only one participant (Participant 2) claimed to specifically recall word for
word a specific quote his conversational partner had said. Although this participant was 
very confident of the accuracy of his verbatim recollection, in the next retelling in 
session two, the dialogue was different, although the gist of the topic remained. The 
remainder of participants reported they recalled the gist of conversations, which did not 
vary across retellings.

Table 4.1
Mean Number of Different Contradictions in Four Accounts Across Participants

<table>
<thead>
<tr>
<th>Contradiction Type</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who</td>
<td>0.33</td>
<td>0.49</td>
</tr>
<tr>
<td>Appearance</td>
<td>0.40</td>
<td>0.74</td>
</tr>
<tr>
<td>Clothing</td>
<td>1.66</td>
<td>1.50</td>
</tr>
<tr>
<td>Dialogue</td>
<td>0.07</td>
<td>0.26</td>
</tr>
<tr>
<td>Where</td>
<td>0.20</td>
<td>0.56</td>
</tr>
<tr>
<td>When</td>
<td>2.13</td>
<td>1.64</td>
</tr>
<tr>
<td>Setting</td>
<td>0.86</td>
<td>0.99</td>
</tr>
<tr>
<td>Weather</td>
<td>0.53</td>
<td>0.74</td>
</tr>
<tr>
<td>Feel</td>
<td>0.07</td>
<td>0.26</td>
</tr>
<tr>
<td>Think</td>
<td>0.07</td>
<td>0.26</td>
</tr>
</tbody>
</table>

Note. Values represent mean number and standard deviation of different types of coded contradictions 
across all participants for the total four events.

The number of contradictions participants made was not correlated with the 
amount recalled in session one ($r = .272, p = .33$) or in session two ($r = .232, p = .41$). 
This indicates that similar to Experiment 1 and 2, those provided more details were not 
necessarily the same people who made more contradictions.

Individual differences were again found in the types of contradictions 
participants consistently made with certain participants more prone to making certain 
types of errors across their accounts. For example, Participant 3 and Participant 6
predominantly made errors (five contradictions each) in temporal “when” details across three of their four accounts. Whereas Participant 2, for example, predominantly made errors in appearance of person or clothing they were wearing (six contradictions) across all four accounts.

**Personality Characteristics**

Table 4.2 shows intercorrelations for the DES, PDS, word counts for session one and session two, contradictions, confidence in accuracy, clarity, comprehensiveness and discussion ratings for sessions one and session two.

**Dissociative Experience Scale (DES).** The total amount recalled in session two was correlated with DES scores. The mean number of contradictions was also correlated with DES scores. This indicates that people who scored higher on the DES scale provided more detailed accounts and were more likely to make contradictions across their accounts than people who scored low on the DES scale.

**Paulhus Deception Scales (PDS).** There was no significant correlation between the Paulhus Deception scales and the number of contradictions participants made. Interestingly, however, confidence in session two was highly correlated with the overall Paulhus Deception scales and the impression management subscales.

People who scored high on the Paulhus Deception scales, specifically the impression management scale, rated their confidence higher than people who scored lower on impression management scale. This suggests that people who were motivated to portray themselves in a positive light because of external social influences were more likely to report a higher confidence rating regardless of the number of contradictions they made. There were no significant correlations identified for the self-deceptive enhancement (SDE) scales. Thus, where the amount of detail and contradictions were related to dissociation, confidence was related to impression management.
Table 4.2

*Summary of Intercorrelations For Personality Scales and Key Variables*

<table>
<thead>
<tr>
<th>Measure</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
<th>13.</th>
<th>14.</th>
<th>15.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. DES</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. IM</td>
<td>-.45</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. SDE</td>
<td>.08</td>
<td>.31</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>4. PDS</td>
<td>-.32</td>
<td>-.89***</td>
<td>.71**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>5. Word Count S1</td>
<td>.31</td>
<td>-.05</td>
<td>.18</td>
<td>.05</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Word Count S2</td>
<td>.59**</td>
<td>-.1</td>
<td>.48</td>
<td>.15</td>
<td>.54**</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. Contradictions</td>
<td>.51*</td>
<td>-.28</td>
<td>-.3</td>
<td>-.37</td>
<td>.27</td>
<td>.23</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. Confidence S1</td>
<td>-.29</td>
<td>.48</td>
<td>.25</td>
<td>.47</td>
<td>-.17</td>
<td>.05</td>
<td>-.45</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9. Confidence S2</td>
<td>-.41</td>
<td>.67**</td>
<td>.44</td>
<td>.72**</td>
<td>-.19</td>
<td>.05</td>
<td>-.51*</td>
<td>.77***</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10. Clarity S1</td>
<td>-.01</td>
<td>.38</td>
<td>.04</td>
<td>.31</td>
<td>.03</td>
<td>.1</td>
<td>-.16</td>
<td>0.4</td>
<td>.68***</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11. Clarity S2</td>
<td>-.02</td>
<td>.29</td>
<td>.12</td>
<td>.28</td>
<td>.08</td>
<td>.17</td>
<td>-.35</td>
<td>0.45</td>
<td>.70***</td>
<td>.92***</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12. Comprehend</td>
<td>-.09</td>
<td>.38</td>
<td>-.05</td>
<td>.32</td>
<td>.19</td>
<td>.08</td>
<td>-.16</td>
<td>0.26</td>
<td>.58**</td>
<td>.93***</td>
<td>.82***</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13. Comprehend</td>
<td>-.12</td>
<td>.45</td>
<td>.21</td>
<td>.45</td>
<td>.15</td>
<td>.11</td>
<td>-.32</td>
<td>0.32</td>
<td>.70***</td>
<td>.91***</td>
<td>.84***</td>
<td>.97***</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14. Discuss S1</td>
<td>-.12</td>
<td>.14</td>
<td>.06</td>
<td>.12</td>
<td>-.22</td>
<td>.07</td>
<td>-.29</td>
<td>0.29</td>
<td>0.4</td>
<td>0.21</td>
<td>.32</td>
<td>0.1</td>
<td>.20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>15. Discuss S2</td>
<td>-.05</td>
<td>-.09</td>
<td>-.09</td>
<td>-.12</td>
<td>.15</td>
<td>.19</td>
<td>-.01</td>
<td>-.02</td>
<td>.33</td>
<td>-.04</td>
<td>.11</td>
<td>-.12</td>
<td>-.04</td>
<td>-.56</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* Summary of Intercorrelations for Scores on the Dissociative Experience Scale (DES), Impression Management (IM) and the Self Deceptive Enhancement (SDE) subscales and main Paulhus Deception Scales (PDS). Other key variables are contradictions across retellings, word counts for sessions one and two, and confidence in accuracy clarity, comprehensiveness and discussion rating for session one and two. Pearson correlation coefficients. *\( p = .05 \), **\( p < .05 \)***\( p < .01 \).

Type 1 error was not controlled for in this correlational data.
Confidence, Clarity, Comprehensiveness and Discussion

Table 4.3 provides the means for confidence, clarity, comprehensiveness and discussion ratings for session one and session two. Paired sample t-tests indicated no significant differences across sessions one and two in confidence $t(14) = 1.11, p = .29$, clarity $t(14) = 0.43, p = .68$, comprehensiveness $t(14) = 0.75, p = .46$ or discussion $t(14) = 1.49, p = .17$. Table 4.3 shows that participants reported high confidence in the accuracy of the details in their memory and reported their memories of the event to be clear across both sessions.

Table 4.3

<table>
<thead>
<tr>
<th></th>
<th>Session 1</th>
<th></th>
<th></th>
<th>Session 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Confidence</td>
<td>7.73</td>
<td>1.10</td>
<td></td>
<td>7.51</td>
<td>1.11</td>
</tr>
<tr>
<td>Clarity</td>
<td>7.35</td>
<td>1.04</td>
<td></td>
<td>7.30</td>
<td>1.13</td>
</tr>
<tr>
<td>Comprehensiveness</td>
<td>6.80</td>
<td>1.47</td>
<td></td>
<td>6.71</td>
<td>1.64</td>
</tr>
<tr>
<td>Discussion</td>
<td>5.35</td>
<td>1.37</td>
<td></td>
<td>4.88</td>
<td>2.13</td>
</tr>
</tbody>
</table>

Note. Ratings were made on a scale of 1 to 10 respectively (where 1 = not very confident and 10 = extremely confident; 1 = very vague and 10 = very clear; 1 = not comprehensive and 10 = very comprehensive; 1=not at all, 10 = a great deal).

As previously demonstrated in Table 4.2, confidence, clarity and comprehensiveness in session one were highly correlated with confidence in session two. Confidence, clarity, and comprehensiveness were all correlated in session two. This indicates that participants who reported their memories as clear and comprehensive in
session two also reported being more confident in the accuracy of the details of their memory.

There was no correlation between confidence, clarity, comprehension, and discussion ratings and the amount of words participants recalled. This indicates that participants remained confident in the accuracy of the details of their memory across both sessions and judged their memory to be clear and comprehensive regardless of how much detail they recalled.

Interestingly, unlike Experiments 1 and 2, confidence in session two and the number of contradictions participants made were negatively correlated. This indicates that participants who made more contradictions across their accounts were less confident that the details were correct.

**Pictures and discussion.** Nine participants reported looking at pictures of at least one of their events after session one and before coming in for session two and nine participants reported discussing at least one of their events with someone outside the experiment after session one and prior to coming in for session two. Independent t-tests found no significant differences in whether participants looked at pictures or whether participants discussed their events with others prior to returning for session two and confidence in accuracy of detail, clarity or comprehensiveness ratings. Independent t-tests also found no significant differences in whether participants looked at pictures or discussed their event prior to session two and how many words they recalled or how many contradictions they made for each event (all p’s > .09).

This indicates that participants were just as likely to be confident in the accuracy of the details of their memory and rate their memories as clear and comprehensive regardless of whether they looked at pictures or talked about the event prior coming in to session two. It also indicates that the amount of detail they provided and the number
of contradictions they made was not dependent on outside sources of information or
discussion. However the results must be tentative because numbers were low.

**Reasons for Contradictions**

The eleven participants who returned for session three reviewed their accounts
from session one and session two to provide reasons they made contradictions. Table
4.4 shows the different contradictions across sessions one and two and the reasons
participants gave in session three to explain their contradictions. Figure 4.1 illustrates
the percentage of reasons participants used to explain each contradiction. Participants
were able to explain 57% of their total contradictions. Two participants did not provide
specific reasons for making contradictions when they were pointed out. Participant 8
was in a rush to leave the second session so did not take adequate time to explain her
contradictions and Participant 9 acknowledged there were some differences in details
but did provide further reasons for differences across recalls. When I asked participants
if they could explain the reasons for contradictions across their accounts, they gave a
number of different reasons to explain why they made errors across their two
retellings. There were nine types of reasons identified among participants.

**Inference (I).** Inference was identified when participants drew from aspects of
the event or personal knowledge to logically reach a conclusion on a specific detail (e.g.,
Participant 1 explained her contradictions of the scarf she was wearing by inferring
what she was wearing. She said, “I knew I had the blue scarf and beige scarf so I knew
it was one or the other.” Participant 3 similarly explained her contradiction by
reporting, “I said jeans but I was just generalising. Gareth was wearing boardshorts
because he always wears boardshorts”).

**Personal weakness (W).** Personal weakness was identified when participants
reported they tended to have a bad memory for certain types of information (e.g.,
Participants 1 and 2 reported that they gave contradictory information on what people were wearing in their accounts because they were generally bad at remembering clothing details. Participant 1 said, “I am so bad at remembering those types of details.” Participant 2 said, “I never remember what people are wearing”).

**Remembering (R).** Remembering was identified when participants reported they remembered one of the contradictory details instead of the other, and would not offer further clarification why he or she remembered (e.g., Participant 4 explained her contradictions in clothing attire and exact times across the sessions by saying, “The ones from the second one [session two] are correct, I remember”).

**Not important (NI).** Participants explained that the details that were contradictory across the two retellings were unimportant to their recollection of the event (e.g., Participant 2 explained his contradictions in clothing attire and temporal details in his first date event by saying, “The memory was more about the girl, I don’t care about the girl anymore”).

**Source misattribution (SM).** Source misattribution was identified when participants misidentified a source in their memory (e.g., Participant 3 explained why she gave different accounts of a man’s appearance by saying, “I gave the description of security guard instead of guy standing behind me in line”).

**Estimation (E).** Estimation was identified when participants provided a more general answer to explain differences in specific times or amounts (e.g., Participant 3 described her contradictions in temporal details, “We went to the movies at 12:30 or 1:00 and got home at 3:30,” from session one and, “We went to the movies at 3 or 4 and got home at 6:00 or 6:30” by saying, “I think I went to the movies at 12:30 but got home at 6:30”).
**Memory loss due to alcohol (A).** Memory loss due to alcohol was identified when the participants blamed their contradictions on poor memory due to too much alcohol consumption (e.g., Participant 3 reported not remembering details and guessing because of feeling intoxicated by saying, “I was so drunk I really can’t remember”).

**Effects of mood (M).** Effects of mood were identified when participants’ mood appeared to impact their memory (e.g., Participant 5 identified and explained her contradictions in emotional details across retellings. Participant 5 agreed with her account in session one that she was stressed because she had an assessment period and that she must have forgotten the assessment in session two and the corresponding feelings of stress. Interestingly, Participant 5 had come out of an exam that did not go well before attending the third experimental session).

**Pictures (P).** Pictures were identified as a reason when participants explained their contradictions by reporting they had looked at pictures before the session (e.g., Participants 6 reported that she recalled details in session two correctly because “I looked at pictures before coming in for session two”).

Participants tended to explain most contradictions by reporting they were bad at remembering certain types of details and by reporting they inferred the knowledge from other general event circumstances or self-knowledge. There were individual differences across participants in the reason they reported. All participants reported there were no significant differences between their accounts with contradictions due to intrinsic variation. All participants reported the contradictions they made across retellings were unimportant and did not impact the overall truthfulness of the accounts of the events.
### Table 4.4

*Reasons Participants Provided For Making Contradictions*

<table>
<thead>
<tr>
<th>Total Contradictions</th>
<th>Session One</th>
<th>Session Two</th>
<th>Reasons Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>I wore a blue scarf</td>
<td>I wore a beige scarf</td>
<td>I had both in the closet (I)</td>
</tr>
<tr>
<td></td>
<td>Event started at 4am</td>
<td>Event started 5ish</td>
<td>I have never been good at times or dates (W)</td>
</tr>
<tr>
<td>C = 8</td>
<td>It was Easter</td>
<td>It was Aug or Sept</td>
<td>I remember that I was in the mall over some Christian holiday time as there were sales everywhere. (I)</td>
</tr>
<tr>
<td></td>
<td>Mum was earing a purple dress</td>
<td>Mum was wearing a green dress</td>
<td>I actually don’t remember what my mother was wearing. I am really very bad at remembering those types of details (W)</td>
</tr>
<tr>
<td></td>
<td>He wore navy pants</td>
<td>He wore black pants</td>
<td></td>
</tr>
</tbody>
</table>

| P2                    | She had her laptop in her bag didn’t have her jacket so she crawled into mine | I had the laptop, her bag had her jacket in it. | The memory was more about the girl and not the event. I don’t care about the girl anymore (NI) |
|                       | We finished at 11:15 or 11:30 | We finished at 10:30 |  |
| C = 10                | I was probably wearing my "If you keep reading my shirt it is pointless" or "I got out of bed for this" She wore a pink Floyd t-shirt | I was wearing this shirt "I used to think drinking was bad for you but then I gave up thinking" She wore a coloured blouse | I never pay attention to clothes and that is why I made some mistakes with clothing (W) |
|                       | He wore a shirt and coat | He wore a shirt and jumper |  |
|                       | Table cloths were bright red and yellow | Table cloths, not white, dark and drapey | I had just been to Shady Pines <another bar> and remembered the colours because they were reddish there (SM) |

| P3                    | Went to movies at 12:30 or 1 and got home at 3:30 | Went to movies at 3 or 4 and got home at 6 or 6:30 | I think I went to movies at 12:30 but got home at 6:30 (E) |
|                       |  |  |  |
| C = 6                 | Gareth was wearing board shorts | Gareth was wearing jeans | I was just generalising (I) |
|                       | It think it was a Wed | I think it was a Friday |  |
|                       | I think it was 1:30 | it was 3:00 |  |
|                       | The guy behind me in line had no hair and moustache | The security guard had no hair and a moustache |  |
|                       | We left at 6 | We left at 5 | I remember when the day started at my house the rest isn’t as important (NI) |

| P4                    | Joyce wore silver | Joyce wore blue or black | The ones from the second one are correct, I remember (R) |
|                       | Guy wore white pants | Guy wore a white shirt |  |
|                       | Work started at 9 | Work started at 9:30 |  |
| C = 5                 | I was happy but it was stressful | I was happy, No stress at all | I remember being stressed as I had assessment period (M) (participant just came out of exam) |

| P5                    | We went in a limo | My mum dropped us off in our car | I remember we went in limo (R) |
|                       | My mum dropped us off in our car |  |  |
|                       | Dress with light blue trimmings | Dress with grey trimming | I remembered more in session two because I looked at pictures (P) |
|                       | Driving test was at 12pm | Driving test was at 1pm |  |
| C = 7                 | Claire wore white top | Claire work black tank top | I spoke about the event at work before <Session Two> (SM) |
|                       | People arrived at 5:30 | People arrived at 6:30 |  |

| P12                   | It was in the morning at 11:30 am | It was around lunchtime, 1pm | I remember it was lunch time (I) |

| C = 4                 | Driving test was in the afternoon | Driving test was in the morning | I know test was in morning because the sun was out then and in the afternoon it was cloudy (I) |

Participants made contradictions across retellings when supplying specific details of unshared autobiographical important events in a semi-structured format. A number of interesting findings emerged. First, the amount of detail recalled was not correlated with the amount of contradictions people made. Second, participants made the most contradictions in temporal details and in details describing what individuals were wearing. This is consistent with my findings in Experiments 1 and 2 and with research suggesting that people are generally very poor at recalling specific times and other specific peripheral details (Brewer, 1988; Hyman & Loftus, 1998; Koriat, Goldsmith & Pansky, 2000; Strange et al., 2014). Participants did not offer to recall exact verbatim dialogue, but instead reported the gist of previous conversations. Only one participant claimed to remember a word for word dialogue in a conversation and upon recall in session two he supplied a similar yet different verbatim dialogue. This is
consistent with the fuzzy trace theory that remembering the exact content is not usually crucial and therefore likely to be forgotten (Reyna & Brainerd, 1995, 2011). Interestingly some participants were more likely to make certain types of contradictions compared to others. For example, some people made more errors in what people were wearing, whereas others made more errors in exact times. This indicates that some individuals may be better at remembering certain type of details compared to others.

Third, higher scores on the DES were correlated with recalling a greater amount of detail and also with making a greater number of contradictions. This suggests that perhaps not paying attention to the experienced event may have played an important part in subsequent memory for the events.

Fourth, similar to Experiment 2, participants who were identified to be influenced by socially desirable behaviour indicated higher confidence in the accuracy of the details of their accounts. Specifically, participants high on the impression management scale, which measured social desirable behavior motivated by external social factors, reported higher confidence in the accuracy of the details in their accounts than participants who scored lower on the impression management scale. There was no relationship between confidence scores and the self deceptive enhancement scale. This finding indicates that inflation in confidence scores were due to externally motivated factors rather than internally motivated. These findings suggest that although dissociation may contribute to distortions as measured by contradictions, social desirability behaviour may contribute to inflated confidence levels across recalls. As I did not control for Type 1 error in my tests for multiple correlations, these results however need to be interpreted with caution.
Interestingly for the first time in this program of research, I found that those who made more contradictions were less confident that their accounts were accurate. This may be due to the specific questioning elicitation method of this experiment. However although they gave a number of reasons for these contradictions, especially inferring from their general knowledge or schemas of events, they did not think their contradictions were important. This finding on their third session can be explained in two ways. The first explanation is that participants may not have been concerned about providing accurate details at their first two retellings. Although I asked them to specifically report only details that they remembered and to not fill in any blanks with details that they did not remember, participants may still have been driven by the social function of everyday retellings where the tolerance for error is much higher (Bluck et al., 2005; Misztal, 2003). However, a second explanation could be that participants were not able to regulate their metamemory during recall of their events although they were specifically instructed to report only the details they actually remembered. These findings are consistent with the “telling more than you know” phenomenon (Nisbett & DeCamp Wilson, 1977) that stipulates that people have little insight into their memory processes at the time of remembering. The identification of reasons for misremembering and labelling of contradictions as unimportant illustrates the hindsight bias (Blank, Musch, & Pohl, 2007) and is consistent with the findings of Strange et al., 2014 who reported that participants made errors in specific details that in a forensic setting would be crucial. Strange et al. found that participants were not concerned in how the misremembered details would be interpreted in a formal alibi statement and were confident that contradictions would not affect the validity of the statement. The demands of the forensic setting are inconsistent with the everyday remembering seen here. People made changes, did not notice changes, were confident
despite the changes they made and did not think their changes were important. In this situation cognitive processes such as the “telling more than you know” and “hindsight bias” seem to be operating. More importantly, even when told to be accurate cautious, not to “fill in gaps” as they would in an everyday setting, they were unable to align their remembering with this demand.
Experiment 3b

Memory for Specific Details in Autobiographical Memory Accounts:

Contradictions due to Contagion

In Experiment 3b I explored the role of contagion in memory for specific details in autobiographical accounts. The primary aim of Experiment 3b was to investigate if participants accepted contagion from the experimenter into their personal accounts of individually experienced events. In Experiments 1, 2 and 3a, I found that, in the absence of contagion, participants recalled details from their personally experienced events in session two that contradicted details they recalled in session one. In Experiment 3a I was further able to demonstrate that when reviewing their accounts from session one and session two, participants did not think their self-made contradictions were important. Participants reported they believed their accounts remained true despite contradictions in specific details and gave a number of different reasons for making contradictions due to intrinsic variation. An interesting question is whether participants will identify and recall contradictions in their personal unshared accounts if the contradictory information comes from an external source (the experimenter) (i.e., contagion) instead of an internal source (self).

Experiment 3b was modelled on experiences in the forensic context in which participants review their elicited statements of memory accounts at a later date. Following an interview process the witness frequently is asked to review a transcription of the interview and confirm the accuracy of the details of the account (Federal Rules for Civil Procedure, 2014). Errors made during transcription are a possibility.
In this experiment participants returned three months later to read and comment on transcribed accounts of their four autobiographical events from the two earlier sessions. Two of the four accounts contained contradictory contagion details inserted by the experimenter. Participants first read the accounts including the misleading contagion. They were then asked to review these accounts for errors. Finally, participants completed a specific recall task where they recalled details from each of the four autobiographical events.

I was interested to investigate if participants identified the contagion details when they reviewed their accounts for errors, if participants recalled the contagion details in a subsequent recall task, and finally if participants attributed the source of contagion to themselves or to another. I varied the plausibility of contagion details to investigate if this would impact acceptance of contagion in the review and recall tasks. Specifically I chose a contradictory temporal detail, which was still aligned with participants’ temporal sequencing, as my plausible detail. I chose temporal details for two reasons. First, participants tended to make the most contradictions in temporal details in Experiments 1 and 2. Second, past studies have found that people are poor at remembering specific times (Hyman & Loftus, 1998; Strange et al., 2014). Poor recall of specific temporal detail has been argued to be due to individuals reconstructing temporal details by relying on their general knowledge about time patterns and coherence with fragments of their event, rather than by retrieving exact times directly (Friedman 1993; Koriat et al., 2000).

I chose contradictory gender of the instructor (in the driving test event) as my implausible detail for two reasons. First, the driving instructor was generally the central character of the memory of the driving event. Second, participants never made errors in the gender of the driving instructor in Experiments 1 and 2. Past studies have found that people resist contagion that is blatantly contradictory (Loftus, 1979b). A driving instructor
changed from male to female or female to male would therefore be defined as blatantly contradictory information.

There may be many different reasons why participants accept contagion. Smeets, Merckelbach, Horselenberg, and Jelicic (2005) argued that some participants may simply cooperate with the researcher to appear helpful. Ost, Vrij, Costall and Bull (2002) found that compliance in participants was a crucial factor in whether participants accepted or did not accept false information about seeing footage of the crash that killed Princess Diana. Paterson et al. (2012) suggested that in co-witness discussions, a witness may report information they know not to be true for social reasons such as to gain social approval or to avoid disagreement. Paterson et al. (2012) noted that despite the clear evidence of co-witness memory conformity there are still many unanswered questions as to why witnesses report information provided by others. By investigating whether participants: (a) identified and (b) recalled contagion I hoped to differentiate between people susceptible to compliance and false memory.

My second aim was to investigate the relationship between acceptance of contagion and general trait compliance behavior. Compliance and conformity due to social pressure from others has been found to lead to false confessions (Gudjonsson, 1986, 2001; Kassin & Kiechel, 1996). I aimed to discover if there was a relationship between compliance and identification and recall of contagion. I chose the Gudjonsson Compliance Scale because it is well recognised for measuring compliance and has good reliability (Gudjonsson, 1989; Klaver, Lee, & Rose, 2008). The tendency to reproduce contagion suggested by others has been found to be associated with higher GCS scores. For example, Klaver et al. (2008) found that higher scores on the Gudjonsson Compliance Scale were correlated with falsely confessing after suggestion from others.
My predictions were that participants would be more likely to accept contagion for temporal detail than gender details, because temporal details are more plausible and susceptible to change. I also predicted that participants would be more likely to accept contagion during the review phase than the recall phase and that participants who scored high on the GCS would be more likely to accept contagion by failing to identify it and by recalling it as they would be motivated to be compliant in the social interaction.

**Method**

**Participants**

Eleven participants from Experiment 3a (1 man, 10 women, $M_{age} = 22.10$, age range: 18-30 years) returned individually for session three to comment on their accounts from session one and session two. The rationale for having participants return three months after session two was that I aimed to mimic real world situations in the forensic setting where many months frequently pass between interviews (Herlihy et al., 2012; Neubauer & Fradella, 2011).

Experiment 3b investigated if participants accepted contagion into their own autobiographical accounts. The experiment adopted a 2 x 2 within subjects model design for session three. I manipulated exposure to contagion (contagion or no contagion) and the type of the contagion items (temporal or gender) within participants. The primary dependent variables for session three were: (a) acceptance of contagion in the review task, (b) recall of contagion items in the recall task, (c) the attribution of contagion to self or others, and (d) Gudjonsson Compliance Scale (GCS) ratings.

**Materials**

Transcribed accounts from Experiment 3a were used in Experiment 3b.
**Contagion items.** Before session three took place details were changed in the transcripts of two of the four events; these changes were the “contagion items”. My contagion items were temporal and gender details.

**Temporal contagion details.** The temporal contagion details were defined as plausible. Temporal details were changed in both transcripts from session one and session two of (when possible) the first date event. The time(s) at which the event took place was changed. I used temporal details as my contagion items because Experiments 1, 2 and 3a demonstrated that participants made contradictions in details such as in precise times that events took place. For example, if the date took place in the evening, the experimenter would change the time to midday. Due to the idiosyncratic nature of autobiographical memory, the same magnitude of change was not possible across all participants. The minimum magnitude of change was 2 hours and the greatest magnitude of change was 5 hours. The magnitude of change was chosen based on how the times aligned with the individual temporal sequencing that each participant reported.

When the time of the first date was changed, then all other temporal details were shifted in both accounts from session one and session two to agree with the new temporal sequencing. (e.g., Participant 7 said in her original account, “He picked me up at around 6 and then we got there at around 6:30.” After editing to introduce contagion, the new account read “he picked me up at around 1” and the time they arrived at the restaurant, “we got there at around 1:30”).

**Gender contagion items.** The gender contagion details were defined as implausible. Gender details were changed in both transcripts from session one and session two of the driving event. The gender of the driving instructor was changed. I chose to change gender details as my implausible details, because in contrast to temporal details, no participants made contradictions in the gender of their instructor in previous experiments. When the
gender of the instructor was changed from a male to female, all pronouns were changed from he to she throughout both accounts from session one and session two. In cases where participants had not supplied a first date or driving event account, the gender or temporal details were changed in one of the other accounts of events supplied.

**Gudjonsson Compliance Scale.** (GCS; Gudjonsson, 1989). The Gudjonsson Compliance Scale (GCS) is a 20-question self-report measure of the construct of compliance, which is principally comprised of an eagerness to please and avoidance of conflict and confrontation. It consists of 20 true and false statements that measure how participants react to conflicts and confrontations. Higher scores indicate greater compliance. Compliance is relevant to police interviewing and false confessions (Gudjonsson, 1989). Responses are summed to obtain a total score, with higher scores reflecting a stronger tendency to comply.

**Procedure and Design**

**Session three.** As detailed in Experiment 3a, session three lasted 30 minutes and was held three months after session two. Each participant was tested individually.

Session three in Experiment 3b was the same session three as in Experiment 3a, but focused on different elements. Participants were individually contacted by email and told that the purpose of session three was to discuss the accounts of their events from sessions one and two. The email read:

Last semester you participated in session one and session two of my study on “Remembering the Past”. You were asked to provide four memories of past events you experienced over two sessions and you agreed to come back for a third final session three months later. I am contacting you to arrange a time for you to come in for session three. In this final session we will discuss the memories you provided in
session one and session two. The session will not last longer than 30 minutes and you will be given 10 dollars for your time.

Participants returned individually to session three. The verbatim instructions were:

Thank you so much for coming back for this final session of our research. In today’s session we will be talking about the memories you shared with me in session one and session two of this experiment on autobiographical memory. This last session will go for 30 minutes and you will be paid ten dollars for your time. I will debrief you at the end of the session.

**Review task.** Participants were then reminded of the events they described in sessions one and two. The verbatim instruction were:

Now, as you may recall, you came in for session one and I asked you some questions about four different events you experienced. These events were _____, ____ and _____. You then returned one week later and I again asked you the same questions about those same four events in session two. Do you remember completing these tasks? Here is the account from session one and from session two, your [Event 1] that you described to me. Do you remember this memory?

After participants were presented with transcripts of their accounts from both sessions of one of the four target events. They were asked to comment on the accounts. The experimenter warned participants that errors could be in their accounts. This step was taken because research suggests that individuals are less likely to accept contagion when there is a warning given that some information may not be accurate (Meade et al., 2002). The verbatim instructions were:

I would like you to read carefully through these two accounts you supplied in our interviews in session one and session two and tell me what you think of them. Do you remember giving these answers? Sometimes during transcribing there can be
typing errors. Have I typed out everything accurately? Please let me know if I have made any errors. Can you tell me what you noticed? What were the similarities and differences? Can you tell me more about that?

Contagion was always provided for the second and fourth accounts of events placed in front of the participants. The order of accounts that contained temporal and gender contagion was counterbalanced. There was no contagion provided for the first and third accounts of events. In the events that did not contain contagion, the original transcripts of accounts of the events were simply presented to the participants, as explained in Experiment 3a. After participants had finished commenting on their accounts, the two accounts were removed from their view. The purpose of the review phase was to see if participants noticed and identified the contagion in their accounts.

**Specific recall task.** In this task participants were asked a series of ten specific questions on the event, with the instruction to limit each answer to a few words. For example, the individually tailored questions for Participant 2’s account of his driving test were: (1) What were you wearing? (2) How many people approximately were there at the RTA? (3) What suburb was the RTA in? (4) What did you instructor look like? (5) What did your instructor say? (6) What was the weather like? (7) How many instructors were there in total? (8) Who drove you? (9) How did you feel? (10) What day was it?

Within the ten questions the experimenter always asked a question that required the participant to answer either with the contagion or with the details they originally provided in session one and two. The purpose of the specific recall was to test if, regardless of whether the participant noticed and/or identified the contagion items for the second and fourth event, they would report the contagion in a recall task. The exact same procedure described above was repeated until all four events had been reviewed and questions for all four events had been asked.
**Questionnaire.** After the reviewing and questioning of all events had been completed, the participants were asked to complete the Gudjonsson Compliance Scale questionnaire. Finally, participants were presented with their accounts with the contagion items highlighted. The experimenter asked participants to give reasons as to why they accepted or did not accept the introduced contagion. All participants were fully debriefed at the end of the experiment.

**Scoring Acceptance of Contagion**

The effects of presence of contagion in participants’ accounts were scored in three ways: (a) whether participants failed to identify the contagion in the review task: Participants were scored as failing to identify contagion if they confirmed the accuracy of the details in their transcribed account despite the erroneous contagion details they contained; (b) whether participants recalled the contradictory contagion details in the recall task; and (c) whether the participants attributed the contagion to the self or others when asked to give reasons.

**Acceptance of contagion in review task.** Participants received a score of 1 if they reported there were no errors in either of the two accounts with the temporal or gender contagion details. The maximum score participants could obtain was 2 (1 for failing to identify the gender contagion and 1 for failing to identify the temporal contagion) in the review task. Participants received a score of 0 if they identified the temporal and gender contagion in their accounts.

**Recall of contagion.** Participants received a score of 1 if they reported either the temporal or gender contagion details in the recall task. The maximum score participants could obtain for the recalling both temporal and gender contagion was 2.

Participants were scored as accepting contagion if they recalled either with: details directly contaminated by the suggested contagion or if they recalled with details that were
blended from the original details from the participants’ accounts and the suggested contagion.

**Direct contagion.** Participants recalled the direct contagion from the experimenter in the specific recall task (e.g., Participant 4 originally reported she went out on Valentine’s Day from “9 p.m to 12:30 a.m”. The experimenter changed the time to 6 p.m to 10:30 p.m. In the specific recall task, when the experimenter asked, “What time did you go out and return from your Valentine’s Day date?” The participant recalled she went out on Valentine’s Day from “6:00 to 10:30 p.m”).

**Blended contagion.** Participants recalled the contagion from the experimenter but maintained some of their original details as well (e.g., Participant 7 originally reported she went out for dinner with her boyfriend. She said, “We got to the restaurant around 6:30 and left around 8 or 9 p.m. The experimenter changed the dinner date to with the new corresponding times: 1:30 to 3 or 4 p.m. In the review phase the participant noticed an error when reading her transcripts. She said, “I put 3:00 but I think we actually left later than that”. In the specific recall task the participant recalled details that blended the original and contagion details. To the question, ”What time did you start your date?” The participant responded 1:30 p.m and to the question, ”What time did you get home from your date?” The participant responded 5:30 p.m. At the end of the experiment when the participant was informed that the experimenter had changed the times, the participant said, “I just remembered that when we left the restaurant it was dark so I thought around 5:30”.

**Accurate:** Participants received a score of 0 if they did not report the contagion or blended contagion but instead recalled the same details in the specific recall task as they did originally in their prior two sessions.


**Source of error.** Participants were scored as attributing the source of error to themselves or to another (the experimenter).

*Self.* Participants received a score of 1 if they blamed themselves for making the error (e.g., Participant 5 reported that she had gone for lunch. The experimenter changed the details across her two accounts to dinner instead of lunch. Participant 5 explained the temporal contagion in her two accounts by accepting herself as the source of the error. She said, “wow, that is really confusing, maybe it was another date I was thinking of.” Participant 15 reported her driving instructor was a male in session one and two. She explained the gender contagion in her accounts by accepting herself as the source of error. She said, “I don’t know why I said it was a female. I am pretty sure it was a male. I maybe switched it around like I do sometimes with left and right”).

*Other:* Participants received a score of 0 if they blamed external factors (such as the experimenter) for making the error (e.g., Participant 2 reported that he had gone for lunch for his birthday with his date. The experimenter changed the date to dinner instead of lunch. Participant 2 explained the temporal contagion in his accounts by blaming the experimenter. He said, “You made a mistake, I said I went to lunch not dinner”. Participant 4 explained the gender contagion in her first day of employment by blaming external factors rather than herself. She said, “I was not trained by a guy, I was trained by Beth. I did not say that. I don’t know where that came from”).

Participants were either coded 1 for error from the self or 0 for error from the other for each of the two contagion events. The maximum score participants could attain was 2 (1 for blaming self for temporal contagion and 1 for blaming self for gender contagion).

**Results**

Data from 11 participants were gathered. This may be considered somewhat low and thus inferences may be limited by experimental power. However, an alternative way to
Consider experimental power is in terms of the number of memory accounts analysed. Specifically, in this experiment I analysed memory changes across 44 accounts. A total of 44 transcribed accounts (22 autobiographical events gathered from session one and session two) contained contagion items. Eleven autobiographical events contained temporal contagion items (n = 8 for first date, n = 3 for 18th or most recent or milestone birthday). Eleven autobiographical events contained gender contagion items (n = 10 for driving test, n = 1 for first day of employment).

The following analyses focused on: (a) acceptance of contagion by failure to identify contagion in the review phase, (b) acceptance of contagion by recall of contagion, (c) attribution to self or others, (e) correlations with Gudjonsson Compliance Scale and contagion variables as well as correlations with personality assessments from Experiment 3a.

**Failure to Identify Contagion in Review Task**

Table 4.5 shows the temporal and gender contagion items accepted or not accepted by participants. Forty-five percent (5 out of 11) of participants failed to identify at least one of the two contradictory contagion details in their transcribed accounts of personal autobiographical events elicited in the previous two sessions. The mean contagion score (out of a maximum of 2) was 0.72 (SD = 0.91). Some participants either failed to identify both contagion items, some failed to identify one contagion item and some failed to identify both contagion items. Forty-five percent (5 out of 11) of participants failed to identify the temporal contagion details and 27 percent (3 out of 11) failed to identify the gender contagion details.

These findings indicate that participants were more likely to confirm the accuracy of the details of their accounts containing temporal contagion details than gender contagion
details. Participants who accepted the temporal contagion in the review task were the same ones who accepted the gender contagion in this task.

Acceptance of Contagion in Recall Task

Fifty-five percent (6 our of 11) of participants accepted the contagion by recalling the contagion details in a specific recall task. The mean score (our of a maximum of 2) was 0.55. ($SD = 0.52$). In other words, these participants reported either the direct contagion details or blended details when recalling their own personally experienced events. Participants recalled with either the direct temporal contagion details ($M = 0.27$, $SD = 0.47$) or blended temporal details ($M = 0.27$, $SD = 0.47$) when recalling details from their personally experienced events. No participants recalled the gender contagion details in the specific recall task.

Findings from the review task indicate that participants were susceptible to both temporal and gender contagion. But they only went to recall temporal details in the specific recall task. In other words, the more plausible contagion was more likely to not be identified as untrue and more likely to be incorporated into participants own recall.

Source of error. Ninety-one percent (10 out of 11) of participants attributed the source of error of at least one contagion item to themselves rather than to the experimenter. The mean source of error score (out of a maximum of 2) was 1.64. ($SD = 0.67$) showing their tendency to make self attributions for contagion errors. Ninety-one percent (10 out of 11) participants reported they must have made the error in temporal details when queried. Seventy-three percent (8 out of 11) of participants reported they must have made the error in gender details when queried.
Table 4.5 Reasons Participants Provided for Accepting or Not Accepting Contagion

<table>
<thead>
<tr>
<th>P#</th>
<th>Contagion 1</th>
<th>Accept Contagion</th>
<th>Reason</th>
<th>Contagion 2</th>
<th>Accept Contagion</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temporal</td>
<td>Review Recall</td>
<td></td>
<td>Gender</td>
<td>Review Recall</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4:30 changed to 7pm</td>
<td>Yes</td>
<td>No</td>
<td>My mum would never let me stay out till 7 (I)</td>
<td>Male changed to female</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Lunch changed to dinner at 7pm</td>
<td>No</td>
<td>No</td>
<td>I remember it was lunch not dinner (R)</td>
<td>Male changed to female</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>5 pm changed to 7pm</td>
<td>Yes</td>
<td>Yes</td>
<td>&lt;Suggested times&gt;made sense (S)</td>
<td>Female changed to male</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Dinner changed to lunch</td>
<td>No</td>
<td>No</td>
<td>I remember my sister was very protective and she would not have been that way during the day (I)</td>
<td>Female changed to male</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>9pm to 1am changed to 6 to 10pm</td>
<td>Yes</td>
<td>Yes</td>
<td>But I remember we left at 6 and got home at 10 (R)</td>
<td>Male changed to female</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>dinner at 6 changed to dinner at 8pm</td>
<td>Yes</td>
<td>Blended</td>
<td>Normal dinner time is between 7 and 8 (I)</td>
<td>Female changed to male</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>6:30 to 9pm changed to 1:30 to 3:30pm</td>
<td>No</td>
<td>Blended</td>
<td>I put 3:30 but I think we actually left later than that. Roughly left after 5. All I remember is that we left when it was dark (I)</td>
<td>Male changed to female</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>3:30 to 6pm changed to 12:30 to 3pm</td>
<td>No</td>
<td>No</td>
<td>I got the time wrong. I said 12:30 but I don’t think we met till 3 because I was doing something till 1:00 so could not have met before then (I)</td>
<td>Male changed to female</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>Got home at 12pm changed to got home at 10pm</td>
<td>Yes</td>
<td>Blended</td>
<td>I remember (R)</td>
<td>Female changed to male</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>Went to movies at 5 or 6 changed to went to movies at 7 or 8</td>
<td>Yes</td>
<td>Yes</td>
<td>It kind of all seemed to make sense (S)</td>
<td>Male changed to female</td>
<td>No</td>
</tr>
<tr>
<td>15</td>
<td>8 to 10pm changed to 6 to 8pm</td>
<td>No</td>
<td>No</td>
<td>I recall I had an assignment and it was pretty late so I could not have met for an early dinner (I)</td>
<td>Female changed to male</td>
<td>No</td>
</tr>
</tbody>
</table>

Note. P# = Participant. Table provides the original supplied details and contagion items, whether the participant accepted contagion in the review task and in the recall task and reasons given by participants for accepting or not accepting contagion. Letter with parenthesis indicates identified reason category. (I) = Inference, (R) = Remember, W = Personal Weakness; (S) = Makes Sense.
**Gudjonsson Compliance Scale**

Table 4.6 provides the Pearson correlation coefficients for Gudjonsson Compliance Scale scores and for acceptance of contagion in the review task, acceptance of contagion in the recall task, and the other personality scales from Experiment 3a.

The only significant relationship was a positive correlation between GCS scores and acceptance of contagion in the review task \( (r = .646, p = .04) \). This indicates that participants who scored higher on the GSC were less likely to identify the contagion details and were more likely to report that all the information across their accounts was correct when specifically asked, “Is all the information correct?”

Interestingly, there was no correlation between DES scales or PDS scales and performance on the review and recall tasks (unlike in Experiment 3a) suggesting that the acceptations of social contagion were driven by different factors to intrinsic variability. Also performance on the contagion review task and the contagion recall task were not correlated, suggesting that different factors may have driven acceptance of contagion (in the review phase) and recall of contagion (in the recall phase).
### Table 4.6

*Summary of Intercorrelations For Personality Scales and Key Variables*

<table>
<thead>
<tr>
<th>Measure</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GCS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. DES</td>
<td>.46</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. IM</td>
<td>.01</td>
<td>.29</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. SDE</td>
<td>.08</td>
<td>.40</td>
<td>-.01</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. PDS</td>
<td>.02</td>
<td>.08</td>
<td>.87**</td>
<td>.48</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Review</td>
<td>.65*</td>
<td>.21</td>
<td>.10</td>
<td>.41</td>
<td>.26</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. Recall</td>
<td>.18</td>
<td>.52</td>
<td>.16</td>
<td>-.51</td>
<td>-.12</td>
<td>-.07</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. Self</td>
<td>.16</td>
<td>-.13</td>
<td>.15</td>
<td>.29</td>
<td>.27</td>
<td>-.02</td>
<td>.08</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* n = 11, Summary of Intercorrelations for scores on the Gudjonsson Compliance Scale (GCS), Dissociative Experience Scale (DES), Impression Management (IM) and the Self Deceptive Enhancement (SDE) subscales and main Paulhus Deception Scales (PDS). Other key variables are total acceptance of contagion in review task, total acceptance of contagion in recall task and attribution to self for errors in transcription. Pearson correlation coefficients. *p = <.05, **p <.01. Type 1 error was not controlled for this correlational data.

### Reasons for Accepting or Not Accepting Contagion

Participants gave a number of different explanations for accepting or not accepting contagion and attributing blame to self or others. There were five different types of reasons identified among the participants. Table 4.5 shows the different reasons participants provided to explain accepting or not accepting contagion. Figure 4.2 shows the distribution of reasons provided by participants for accepting or not accepting temporal and gender contagion items.
Inference (I). Interference was identified as a reason for accepting contagion or not accepting contagion. This was reported when participants could not remember the original or contagion details but instead accepted contagion based on other details in their memory (e.g., Participant 7 changed the time she arrived and left the restaurant [from 6:30 to 8 or 9 p.m to 1:30 to 5.30 p.m], after receiving contagion temporal details that the date took place from 1:30 to 3:30 p.m. Participant 7 said, “I can’t remember what time we left but I remember it was dark outside.” In contrast, Participant 5 did not accept temporal contagion details that changed her date from the evening to lunch. She said, “I remember my sister was very protective and she would not have been that way during the day”.

Personal weakness (W). Personal weakness was identified as a reason for the participant reporting that she may had recalled the erroneous details in the first two sessions (e.g., Participant 15 reported her driving instructor was a male in
session one and two. She explained the gender contagion in her accounts by accepting herself as the source of error. She said, “I don’t know why I said it was a female. I am pretty sure it was a male. I maybe switched it around like I do sometimes with left and right”).

**Remembering (R).** Remembering was identified as a reason for accepting contagion or not accepting contagion. This happened when the person claimed to clearly remember details and did not provide any other reasons for remembering. These participants claimed they remembered details but could not expand on why they remembered (e.g., Participant 4 claimed to remember the temporal contagion details for her date as 6 to 10 or 10:30 p.m, instead of the details she originally provided in session one [which were 8:30 p.m to 1:00am] and in session two [which were 9 p.m to 12:30 a.m]. After I debriefed and showed her the highlighted contagion details and original details in her transcripts the participant still maintained she remembered the contagion temporal details. She reported, “but I remember we left at 6 and got back around 10:00 p.m.” In contrast, Participant 2 did not accept the contagion temporal details when suggested he went for dinner and not lunch. Participant 2 reported the details were incorrect because he remembered that he went out to lunch for his birthday and not dinner, when asked how he remembered, he said, “I just do”.

**Embarrassment (E).** Embarrassment was identified as a reason for accepting contagion in the review task. This was reported when the participant did not say there were errors in their accounts because he or she was embarrassed to do so (e.g., Participant 9 was asked to review her driving test transcripts from session one and session two. In session one and two the participant described her driving instructor as a woman. I changed the gender of the driving instructor from a woman to a man as
the contagion. Participant 9 indicated all details in her account containing contagion were correct when reviewing her transcript, even after being explicitly asked, "Have I typed out everything accurately? Did I make any errors in transcription?" Then in the specific recall task, she would not refer to the gender of her instructor even after being asked three questions that required the participant to reply with a pronoun. When forced to finally refer to gender the participant used the pronoun “they.” Afterwards, the participant was asked why she did not tell me that there was an error in the transcribed account, she replied, “I was embarrassed. I thought I made a mistake. I just didn’t want to draw attention to it. I do remember my instructor being a woman”).

Made sense (S). Made sense was identified as a reason for accepting contagion in the recall task. This was reported when the participant said that the contagion items ‘made sense’ with their memory account (e.g., Participant 12 accepted the contagion item for going to the movies at 7 or 8 when she originally said 5 or 6. “The participant said the details “kind of just seemed to make sense”).

Source misattribution (SM). Source misattribution was identified as a reason for blaming the self instead of the experimenter. This happened when participants said they may have recalled details from another memory (e.g., Participant 8 said, “maybe I got confused with my second test although I don’t remember that one”).

Participants identified changes in gender details to be important whereas temporal details were less important for most participants. Participants identified contagion details that were not congruent with the gist of their memories or with their personal self knowledge to be important.
Thus similar to Experiment 3a there were both a variety of reasons given for contradictions plus individual differences across participants in the reasons they provided for accepting contagion.

**Summary**

In this experiment participants accepted contagion for temporal and gender details from the experimenter despite being given a warning that the experimenter may have made errors in typing and therefore some information may be incorrect. Participants accepted contagion for temporal details more than gender details.

Results suggest that participants accepted contagion items for one of two reasons. The first reason may have been compliance. Some participants noticed the contagion but did not identify the contagion in the review phase. These participants reported there were no errors in their transcripts, yet when they recalled the details in the specific recall task, they recalled with their original details and not the contagion. As suggested in previous research, these participants may have complied to simply cooperate with the researcher (Ost et al., 2002; Smeets et al., 2005). The experimenter may have been viewed as an expert in the experiment. The misinformation effect has been demonstrated to have a stronger effect after a delay between the witnessed event and exposure to misinformation (Loftus, 1979, 2005). The misinformation effect also has been demonstrated to be stronger if the information came from a high credible source instead of low credible source, a firm interviewer instead of a friendly interviewer (Baxter et al., 2006; Underwood & Pezdek, 1998).

When questioned, participants who did not identify the contagion but knew it to be incorrect, reported being motivated by social pressures, such as not wanting to draw attention to the error or feeling embarrassed about the error they made. This
supports the suggestion that some participants accepted contagion because of compliance. Further support comes from the correlation between acceptance of contagion in the review phase and GCS scores, indicating that participants who reported higher compliant traits were the same ones who confirmed the accuracy of their memory reports.

The second reason may have been that participants formed false memories after introduction of suggestion of the contagion from the experimenter. Fifty-five percent of participants recalled the contagion in the specific recall task. Four findings supported that recall was due to the formation of false memories. First, participants only recalled temporal details in the recall task and did not recall the gender contagion details. These results indicate that although participants reported contagion for temporal and gender details, participants only appeared to develop false memories for temporal details. These findings are consistent with the results of Strange et al., (2014) that “when details” are more malleable than “who details.” They are consistent also with previous findings that participants are less likely to accept contradictory implausible details (Loftus, 1979b). Second, participants who recalled temporal contagion details reported reasons based on their beliefs, their inferences about surrounding details, and their reliance on daily life scripts. Third, there was no correlation between recalling contagion in the recall phase and GCS scores suggesting that participants did not recall the contagion due to compliance. Fourth participants often recalled details that were blended between the contagion and original details. This is consistent with research suggesting that individuals have difficulties remembering exact times and dates (Brewer, 1988; Hyman & Loftus, 1998; Simon, 2012; Strange et al., 2014) and suggests that people may compromise on details. Both
Intrinsic Variability and Contagion

compliance and development of false memory for contagion have serious repercussions in a forensic setting.

Two other important findings emerged from this study. First, as noted above, participants reported contagion despite a warning from the experimenter that errors in typing could have been committed. This supports findings by Paterson, et al. (2011) that participants reported information provided by co-witnesses despite warnings not to do so. The implication of this finding is that the legal system should not rely too heavily on warnings.

Second, participants believed that errors that they did not identify and that were aligned with their memory schemas were unimportant. In contrast, participants reported that errors that they did identify in their transcriptions as coming from the experimenter and that were not aligned with their memory schemas as being important and changing their memory narrative. This suggests that people often do not think that changes in memory are important if those changes are schema consistent. Interestingly, even when participants did not accept the contagion, the majority were still willing to blame themselves for making the error rather than the experimenter.

In summary, the results of Experiment 3b offer interesting findings and suggest that participants accepted contagion when inserted in their transcripts of reported events. However, a major limitation of this study was the low sample number of participants. Unfortunately some participants did not return after the second session, decreasing the already limited participant pool. Other limitations to consider are non-independence of data from Experiment 3a and lack of control for Type 1 error for multiple correlations. Therefore I interpret my findings with some caution.
Based on the results of this study, it would be interesting to investigate social contagion of autobiographical memory with a larger sample size. It would likewise be interesting to investigate if participants would accept contagion from a peer instead of an experimenter, where compliance may not be as important. Further, would participants report contagion if they were not directly questioned about it but instead had the opportunity to freely recall their memories with or without the contagion? Also I need to consider the relationship between contradictions influenced by the self and contradictions influenced by others. These factors will be explored in the next and final experiment.
Chapter 5

Your Words or Mine: Social Contagion Changes Details of Memories of Unshared Autobiographical Events
Your Words or Mine: Social Contagion Changes Details in Retellings of Memories of Unshared Autobiographical Events

The primary aim of Experiment 4 was to investigate the effects of social contagion on concrete details in memories of unshared autobiographical events. In this final experiment I returned to what I set out to do initially at the beginning of this thesis. I used the social contagion paradigm (Barnier et al., 2008) to carry out my investigation.

As detailed in the Introduction, Barnier et al. (2008) extended the social contagion paradigm (Roediger et al., 2001) to autobiographical memory to investigate if it was possible to contaminate free recalled memories of personal, unshared emotional past events with evaluative statements from a confederate. In response, Barnier et al.’s (2008) participants made changes such as increasing the number of people at their birthday party after receiving the contagion item, “your birthday was a big deal.” Participants’ memories were affected in other ways as well. Many participants recalled actual verbatim phrases or the overall gist adopted from the confederate’s scripted memories when recalling their own memories. Barnier et al. argued that their results highlighted the robustness of the social contagion effect for shared and unshared memories of autobiographical events.

My methodology extended Barnier et al. (2008) social contagion paradigm for autobiographical memory by using specific concrete details instead of evaluative comments as contagion items. Barnier et al. demonstrated that a confederate could change participants’ interpretation and evaluation of their personal unshared events. I was interested to see if the confederate could change participants’ previously reported specific concrete details of their own events. In other words, would participants claim concrete details falsely suggested by the confederate as their own?
This would be a highly interesting result; it would demonstrate that personal memories of important past experiences can be easily changed just one week later after initial recall by a confederate who was not there to witness or experience the original event.

Adapting the social contagion paradigm to change concrete details in free recalled autobiographical memory proved to be a challenge. This is because personal unshared autobiographical memories are so different and complicated compared to simple and shared memory material such as word lists, slides and staged videos where the experimenter can control the stimuli (Conway & Pleydell-Pearce, 2001; Harkness et al., 2015; Harris et al., 2008; Rubin, 1999). As discussed in my Introduction to this thesis, the fundamental difference is that autobiographical memories are idiosyncratic. Although the gist of personal events such as one’s 18th birthday or first date experiences frequently is similar, each individual’s experience is unique and personal. A range of individual influences (such as personality characteristics and schematic knowledge) and social influences (such as type of social interaction and contagion) lead to differences in recalling events (Barnier et al., 2008; Conway & Pleydell-Pearce, 2001; McAdams, 2001; Rubin, 1999).

**Methodological Decisions**

In the present experiment I mapped the methodology as closely as possible to the social contagion paradigm but I faced some significant challenges, which guided me to make methodological changes that were best suited for this experiment.

Participants’ recall of personal memories of unshared events made it impossible to choose identical contagion items across all participants. For example, if I chose “black shirt” as my contagion item across all participants and some participants recalled “black shirt” at final recall I would not know whether the recall
represented a false memory due to social contagion or to a now recalled accurate memory due to the assistance of my retrieval cue, unless the participant had explicitly divulged a contradictory detail at initial recall (e.g., white shirt). As noted above, Barnier et al. (2008) listed this challenge as a limitation in their study. To attempt to overcome this obstacle as best as possible I specifically chose concrete details as my contagion items that contradicted concrete details elicited at initial recall. The contagion items suggested were therefore different for each participant. Although this methodological decision affected consistency, it increased reliability of testing the social contagion effect.

My coding scheme was much clearer in Experiment 4 than in my previous experiments because I developed my coding scheme over time. Gathering the plethora of accounts in each experiment led to my increased understanding and experience in categorising contradictions and other changes in memory reports across retellings. I purposefully included my original coding scheme in each experiment to illustrate my tribulations and growing understanding of the difficult concept of autobiographical memory variability.

In this final experiment I therefore had a better grasp of what I could expect participants to recall over two retellings and consequently what I could manipulate in terms of concrete details. Through the process of gathering hundreds of autobiographical memory accounts across my first three experiments, I was able to identify the type of specific details most commonly reported in free recall accounts over two retellings. The concrete details that I found most likely to be recalled and to change across accounts at the two different recalls were sensory (e.g., type of clothing), temporal (e.g., exact times), estimation (e.g., specific amounts), contextual (e.g., location) and evaluative (e.g., thoughts and considerations) in nature. Although
participants in Experiment 1 tended to make the most contradictions in sensory details, in Experiments 2 and 3a participants tended to make most contradictions predominantly in temporal, estimation and evaluation details. However, some participants did not elicit any temporal, estimation or evaluation details when providing repeated free recalled memory accounts. In contrast, all participants across all events and experiments elicited sensory and contextual details at initial recall and final recall. Consequently the details I targeted for contagion in Experiment 4 were sensory (e.g., colour of clothing) and contextual (e.g., location) in nature.

My primary aim was to investigate whether participants would exhibit contradictions across their two autobiographical accounts as a direct result of accepting social contagion for specific details. There is an indication not only from the social contagion and misinformation literature detailed in the Introduction, but also from Experiment 3b, that social contagion will work for concrete details. Experiment 3b demonstrated that participants accepted and recalled false details of temporal changes that I introduced. However, the procedure in Experiment 3b modelled the experience of a witness reviewing their statement and was more similar to a misinformation paradigm than the social contagion paradigm in that the contagion was provided in participants’ transcribed accounts implicitly by direct deception. Compliance and direct questioning may have been strong influences. Specifically, participants in Experiment 3b recalled specific details from memory accounts elicited three months prior through specific questioning. The participants were misled by contamination of details in their own transcripts of their two original accounts. As reviewed in the Introduction, people are more susceptible to contagion after a delay and if the contagion comes from an expert or from someone who is believed to know
more about the event (Allan et al., 2012; French et al., 2011; Gabbert et al., 2007; Koppel et al., 2014; Loftus, 1979a, 2005).

This final experiment differed in that participants free recalled accounts with a peer confederate who introduced the contagion just one week after the initial retelling. The confederate posed as a peer participant who theoretically should have no influence over the participant. The social contagion paradigm induced a natural expertise condition for the participant who is the owner and author of the memory. The fact that participants provided freely recalled memory reports is important because participants were free to leave any details out of their recalls that they were uncertain about. This paradigm mimics the common real world situation when a conversational partner mistakenly summarises a speaker’s personal narrative. This may, for example, occur in a forensic setting when a witness discusses the details of their memory of the specified event with someone outside the case.

My second aim in Experiment 4 was to investigate the relationship between contradictions due to intrinsic variation (contradictions made across accounts in the absence of contagion) and contradictions made across accounts due to contagion. Experiments 1 though 3a showed that participants made contradictions and other changes across their accounts that were intrinsic rather than a result of direct contagion in the experiment. As detailed in the Introduction, a major concern in the forensic setting is contamination of memory from incorrect information introduced through social influence. I was interested to examine the relationship between the number of contradictions due to intrinsic variation and the number of contradictions due to contagion that participants made in a social setting.

My third aim in Experiment 4 was to investigate if participants would accept details from the confederate’s script, as noted by Barnier et al. (2008). Loftus and
Greene (1980) noticed a similar phenomenon in their study on memory for faces. They noticed that participants had a tendency to adopt verbal expressions of another witness when describing the face to the experimenter even if the witness was wrong. They called this adoption of verbal expression “verbal contagion”.

My fourth aim was to investigate if contagion items introduced by the confederate about participants’ events would affect participants’ confidence that the details of their accounts were accurate. In my previous three experiments confidence remained stable across the two sessions, despite contradictions. I was interested to investigate if hearing contradictory details from the confederate would lower participants’ confidence that the details of their memory were accurate.

My fifth aim was to investigate the relationship between contradictions due to suggested contagion, contradictions due to intrinsic variability, verbal contagion, omission, additions and more indirect social and individual factors involved in social interaction such as likability and social closeness. Research has demonstrated that people often incorporate components of each other’s memory reports into their own memories after discussing a shared event, particularly if the other person is viewed as trustworthy and likable (French, Garry, & Mori, 2008; Hope et al., 2008). Hope et al. (2008), for example, found that participants were more likely to accept contagion from a friend or romantic partner than from an unacquainted stranger for memories of unshared events. Participants who accepted contagion were also more likely to give higher ratings of likability of their collaborating partner. My interest was whether these indirect factors from the social interaction also increased social contagion for memories of unshared events.

My procedure for Experiment 4 adapted the social contagion paradigm for autobiographical memory. My methodology was similar to the retelling paradigm
used in Experiments 1 and 2 but differed in that I added a collaboration phase with a confederate who introduced contagion items. I was interested in whether short collaboration with a confederate changed participants’ autobiographical memories of their own personal unshared events. Based on the robust findings of Barnier et al. (2008) and on my findings from Experiments 1, 2, 3a and 3b that sensory and contextual details are susceptible to change due to intrinsic variation, I expected participants would exhibit the social contagion effect.

**Method**

**Participants and Design**

Fifty second year psychology undergraduate students from Macquarie University volunteered to take part in the experiment for partial fulfilment of a course requirement. Eight males and 42 females participated in the experiment ($M_{age} = 20.80$ years, $SD = 3.35$, age range: 19-36 years). Data for one participant was excluded from the experiment as she did not return for the second session of the experiment. Post-experimental inquiry indicated that no participants were suspicious that the other participant was actually a confederate.

The experimental procedure was drawn from the social contagion paradigm for autobiographical memory (Barnier et al., 2008). The experiment adopted a within participants design. I manipulated the type of contagion items (sensory or contextual) and exposure to social contagion (social contagion or no social contagion) within participants. Contradictions due to recall of social contagion items was the primary dependent variable. Other dependent variables were contradictions due to individual variation; verbal contagion from confederate’s scripts; omissions and additions; confidence in accuracy, clarity, and comprehensiveness ratings; social influence ratings; and social closeness measures.
Materials

Participants described four autobiographical events that were used as targets for social contagion. These events were recent and personally significant life events and included: high school certificate (HSC) exam, high school formal, first date and 18th birthday. If the participant was older than 18 years of age, they described their most recent memorable birthday (i.e., 21st, 25th or 30th birthday). In cases where participants had not experienced any of these events or reported having a very poor memory of an event, they wrote about alternative autobiographical events such as first day of university or first day at most recent place of employment.

For each event, contagion items were items that were constructed as direct contradictions to items mentioned during initial elicitation of their autobiographical memories. The contagion items were either sensory or contextual concrete details. Sensory contagion items were concrete or specific details involving what the participant saw, heard, smelled, tasted and/or touched during the event. Contextual contagion items were concrete details specifying location or other spatial contextual information. Each participant received one sensory contagion item and one contextual contagion item.

Additional materials were: (a) a 10-point likert scale on which participants rated how confident they were of the accuracy of the details in their accounts, how clear their memory was for the event, and how comprehensive their account was, (b) a filler task, which was the Trail Making Task consisting of two parts in which the participant was instructed to connect a set of 25 dots as fast as possible while still maintaining accuracy, (c) the Social Closeness Scale drawn from the Multidimensional Personality Questionnaire as used in Experiment 2. It consists of 22 true and false questions. High scorers would agree with the statement, “I prefer living with other
people than living alone.” Low scorers would agree with the statement, “I would be happy to live alone;” (d) Interpersonal Relationship Questions, which was a scale composed of three questions on the perceived interpersonal relationship with the confederate. The questions were: (1) On a scale from 1 to 10, where 1 means not at all and 10 means very much, how connected did you feel to the other participant who took part in this study? (2) On a scale from 1 to 10, where 1 means not important and 10 means very important, how important was it to you that the other participant liked you? (3) On a scale from 1 to 10, where 1 means not comfortable and 10 means very comfortable, how comfortable did you feel telling your memories to the other participant? These questions were used to measure participants’ perception of the confederate and social interaction.

**Procedure**

The experiment was conducted over two sessions. Session one lasted 30 minutes. Session two lasted 60 minutes and was held seven days after session one. Each participant individually recalled their memories in session one. Each participant individually recalled their memories with a confederate in session two.

**Session one.** Session one was the initial recall phase.

**Initial recall.** Once informed consent had been obtained, participants wrote detailed narratives for the four autobiographical events. The verbatim instructions were:

In today’s session, I will be asking you to write descriptions of some specific autobiographical events, such as your high school formal. I would like you to write down everything that you can remember for each specific event. There are a couple of things I would like you to think about when you are writing about each event. I would like you to write about: what you did from beginning
to end, sensory impressions, that is, what you saw, heard, smelled, tasted and/or touched, what you or others wore at the event, how you felt, what you thought, where the event took place, how you interacted with other people, and how other people interacted with you during the event.

Participants were allotted 5 minutes to write about each autobiographical event. The experimenter introduced the four events separately throughout the session. The order in which the events were recalled was randomised across participants. After participants finished writing their accounts for each event, participants completed the same 10-point confidence likert scale that was used in Experiment 2. For this scale, participants rated how confident they were that details in their account were accurate, how clear their memory was for the event, and how comprehensive their account was.

After participants finished writing their accounts and completed scales for all four events, the experimenter thanked them for their involvement in the first half of the experiment and reminded them about the return date for the second session of the experiment.

**Session two.** Participants returned individually for session two seven days after session one.

**Confederate training.** The experimental confederates in this experiment were three psychology final year students and one recent graduate from sociology. Confederates were paid at the level of research assistants. The experimenter interviewed all students expressing interest in the experiment. Two male and two female students were chosen to take part in the experiment as confederates, and were selected on the basis that they spoke English fluently and presented with good interpersonal skills. The confederates memorised scripts of all seven memories listed
in the materials section (see Appendix D). The scripts were similar to the scripts used in Barnier et al. (2008). They differed in that the first date and formal event accounts included additional specific details of what the confederate wore at the events. These sensory details were added to balance out the contextual details across the scripts of the events. Confederates received training to ensure that their verbal and behavioural responses were consistent with the experimental protocol. Training involved instructing the confederates on how to recall their script in a neutral manner, similar to the way the participants recalled their memories, and how to summarise participants’ memories with no difference in the contagion and non-contagion items recalled. One male and one female were the primary confederates; the remaining male and female were the reserve confederates. Confederates were matched on gender with participants. The female reserve was never used so the primary female confederate was the confederate for the 42 females. The primary male confederate was the confederate for six male participants and the reserve male confederate was the confederate for two male participants.

**Description phase.** Participants individually returned to the laboratory for session two of the experiment seven days after session one. In this session participants described their memories of the life events they wrote accounts for in the first session of the experiment with another apparent participant who was actually an experimental confederate.

The experimenter told participants and confederates to pay close attention to each other’s accounts because they would be asked to summarise what the other person had described. The participants and confederate were instructed to include only the six most important details of the other person’s memories in their summaries, and were given booklets to write these details into.
The confederate was always the first person to start describing their memories. After the confederate finished describing their memory of the first autobiographical event, participants described their memory of the first autobiographical event. This pattern of turn taking took place until the confederate and participants finished describing their memories of all four events to each other.

*Summary phase.* After the description phase of the experiment, participants and the confederate alternated summarising each other’s memories of each of the four events. The verbatim instructions were:

Now that both of you have described your memories of all four events to each other, let’s see what you remember about the other person’s experiences. I would like both of you to take turns telling to each other what the other person told you about their memory for each event. Remember you can refer to the notes you have made.

The experimenter always instructed the participants to begin summarising first. After participants finished summarising the confederate’s memory of the first autobiographical event, the confederate summarised participants’ memory of the first autobiographical event. This pattern of turn taking took place until participants and the confederate finished summarising each other’s memories of all four autobiographical events.

For two of the four events, the confederate included a sensory or contextual contagion item when summarising participants’ memories. These contagion items were specific concrete details that contradicted a specific detail that participants provided during the description phase of the experiment. For example, if a participant wrote that their date was wearing a white shirt in their original free recalled account, the confederate introduced a black shirt as the contagion item in the summary phase.
The contagion items always were the third detail of the six details mentioned by the confederate in their summary of participants’ autobiographical memories. The confederate did not have to memorise the contagion items, as after participants’ initial recall the experimenter wrote the contagion items in the booklet used by the confederate during the description and summary phases of the experiment.

When possible, the contextual detail was changed in the ‘high school certificate event’ and the sensory detail was changed in the ‘first date event’. (See Appendix D for examples). To exclude possible primacy and recency effects on recall, social contagion was always provided for the second and third events that the participants described during the description phase of the experiment. The order of sensory and contextual contagion items was counterbalanced. For the first and fourth event where social contagion was not provided the confederate simply summarised participants’ experiences without offering any changed details.

**Filler task.** After the summary phase of the experiment, the experimenter separated participants and the confederate. The experimenter gave participants the filler task and told them that the task assessed perceptual ability and they had 5 minutes to complete it. The confederate left the laboratory at this point in the experiment and did not complete the filler task or any of the final recall tasks. The experimenter left the room every 5 minutes to give the impression that the confederate was undergoing an identical procedure.

**Individual final recall.** After the filler task, participants were instructed to write down everything they could remember about the autobiographical events they described to the confederate. The verbatim instructions were:

Now I would like you to write down everything you can remember about each of your own specific autobiographical events that you discussed with
(confederate’s name), just like you did when you came in for the first session. Again, there are a couple of things I would like you to think about when you are writing about each event. I would like you to write about: what you did from beginning to end, sensory impressions, that is, what you saw, heard, smelled, tasted and/or touched, what you or others wore at the event, how you felt, what you thought, where the event took place, how you interacted with other people, and how other people interacted with you during the event. You will have 5 minutes to write about each event. I will stop you when 5 minutes has elapsed. Include as many details as you can, but don’t feel the need to make up details or “fill in” space with details you don’t actually remember.

After participants described each event they rated their confidence in the accuracy of the details of their account, the clarity of their memory and comprehensiveness of their account, just as they did at initial recall when they came in for the first session of the experiment. The autobiographical events were recalled in the same order as described and summarised during session two of the experiment.

The experimenter then went through participants’ accounts for these events and asked participants to make remember/know judgements for each basic idea unit or detail in their account (e.g., “I felt very nervous before my first HSC exam”). This remember/know distinction was based on the instructions of Gallo, Roediger, and McDermott (2001). The verbatim instructions were:

I would like you to make a “remember” judgment if you can recollect some specific aspect of what happened or was experienced at the time of the event. For example, you remember the way something sounded, or the way
something happened, or what you were thinking or doing at that time. You will say that you remember something when you recall a particular thought, image or something about the way the event happened.

Participants were asked to make a “know” judgment for details that they did not have specific recollections for, but rather were details that they were simply confident took place. The verbatim instructions were:

To know is the ability to recognise things without being able to remember anything specific about the experience. You know something happened when you are simply confident that it happened. Okay, so here you mentioned (e.g., I felt very nervous before my first HSC exam). Is it more like you remember or know that this happened?

**Questionnaires.** Participants then completed two questionnaires. The participants first completed the Social Closeness Scale followed by the Interpersonal Relationship Questions Scale.

**Post-experimental inquiry.** The experimenter then conducted a post-experimental inquiry to ensure that participants were not suspicious of the confederate. The experimenter asked participants a series of questions that attempted to determine whether participants noticed the contagion items mentioned by the confederate and their reactions to these contagion items. The experimenter asked participants questions like, “Did you notice anything different or strange about the other participant that you described your memories with?,” “What did you notice?,” “Did the other participant say anything in his/her summary of your memories that you didn’t mention?,” “Do you remember what the other participant said?” and “What did you think when the other participant said this?”
The experimenter then fully debriefed participants and asked them their reasons as to why they did or did not accept the contagion items. The experimenter lastly thanked participants for their involvement in the experiment.

**Definitions and Coding**

My coding choices in my Experiment 4 relied heavily on the findings from my previous three chapters. Data were first coded for contradictions due to suggested contagion and contradictions due to intrinsic variation. Inter-rater reliability was measured by having a second coder identify contradictions due to suggested contagion and intrinsic variation for all the data. The experimenter and coder obtained 100% for identifying suggested contagion in accounts at individual final recall. The experimenter and coder obtained 95% for contradictions due to intrinsic variation and 100% after discussion. Inter-rater reliability was assessed by scoring and then comparing contradictions in each account on an item to item basis.

**Suggested contagion.** A contradiction due to social contagion was coded when participants recalled the contagion item at individual recall in session two that contradicted the original detail they recalled at initial recall in session one. The contagion item was either a falsely suggested sensory or contextual concrete detail. Sensory details were defined as what participants saw, heard, smelled, tasted and/or touched during the relayed event. When participants reported articles of clothing then the contagion item was an opposite colouring of clothing. (e.g., Participant 5 wrote down, “my date was wearing a white shirt in session one. After receiving the contagion item, “your date was wearing a black shirt”, the participant wrote, “my date was wearing a black shirt” in the individual final recall phase). If participants did not provide clothing details then another sensory detail was suggested that matched the type of sensory detail provided in session one (e.g., Participant 33 wrote down she
wore her hair in a bun but after receiving the contagion item, “You wore your hair in a pony tail”, the participant wrote, “I wore my hair in a pony tail”).

A contextual contradiction due to social contagion was coded when participants recalled the contextual (i.e., location or spatial contextual information) contagion item at individual recall in session two that contradicted the original contextual detail recalled at initial recall in session one (e.g., Participant 15 wrote that her lecture was in building W5A. After receiving the contagion item that her lecture was in building E3A, the participant wrote “was in building E3A” in the individual final recall phase).

Participants scored 1 for each social contagion item they recalled. The maximum score a participant could receive was 2.

**Absence of contagion.** Absence was coded for when the participant did not mention the original specific concrete detail or the suggested contagion item in final individual recall. Participants scored 1 for each instance in which they recalled neither the original detail nor the social contagion item. The maximum score participants could obtain was 2.

In summary, participants had three options in their final individual recall task: (a) they either accepted the contagion item and wrote it down in their final individual recall; (b) they did not accept the contagion item and repeated the original concrete detail in their final individual recall; or (c) they did not mention either the suggested contagion or the original detail final individual recall.

**Contradictions due to intrinsic variation.** These were discrepancies in details across accounts that were not due to social contagion (i.e., were not due to any direct contagion suggested by confederate). There were six types of contradictions due to intrinsic variation that were identified and coded in this experiment. These
types of contradictions were coded across narratives of autobiographical memory accounts and were based on the same scoring used in Experiment 2. They differed in that two of the contradictions coded for in Experiment 2 were not coded for in Experiment 4 (‘different conversation’ was not identified in Experiment 4 and ‘different person’ was combined with ‘different action’).

**Conflicting sensory details.** These discrepancies were in sensory impressions such as what the participant saw, heard, smelled, tasted and/or touched during the event across the two sessions (e.g., Participant 5 described her first date event. In session one she reported she was wearing “denim shorts.” Then in session two she reported she was wearing “a black skirt”).

**Conflicting temporal details.** These discrepancies were in temporal details or experiences across the two sessions (e.g., Participant 38 described her first date event. In session one she reported, “I had met him a week prior our date.” Then in session two she reported she met him “a fortnight ago”).

**Conflicting contextual details.** These discrepancies were in any location or spatial contextual details across the two sessions (e.g., Participant 8 described her high school formal event. In session one she reported, “A friend picked us up to go to the after party.” Then in session two she reported, “A friend gave us a lift home. We didn’t go to the after party”).

**Conflicting estimation.** These discrepancies were in estimation or approximation of the number of people or items across the two sessions (e.g., Participant 8 described her first date event at a skating rink. In session one she reported, “there were only a few people there.” Then in session two she reported, “there was only one couple there”).
Conflicting evaluation. These discrepancies were in evaluations across the two sessions (e.g., Participant 4 described her 18th birthday event. In session one she reported, “the food looked and tasted good.” Then in session two she reported, “the food was average though”).

Conflicting actions. These discrepancies were in what the participants said they did across the two sessions (e.g., Participant 18 described his first date event. In session one he reported, “they smoked and drank.” Then in session two he reported, “we smoked and drank”).

Data was then coded for other changes across retellings that were not direct contradictions. These changes were details or ideas that participants either reported in session one but did not report in session two, or details or ideas that participants reported in session two that were not reported in session one. Specifically, items were coded for verbal contagion, omissions and additions.

Verbal contagion. Verbal contagion was defined as additions in session two that were specific concrete details or idea units that were incorporated directly from the confederate’s script. These details or idea units were not reported at initial recall during session one but were reported in final individual recall in session two after collaboration with the confederate. An example of a verbatim phrase adopted from the confederate’s script was, “My hand hurt from writing so much.” Participants then received a verbal contagion score from 1 to 4. Participants scored one point if they recalled on the final recall test at least one confederate contagion idea unit. Thus, regardless of how many verbal contagion units the participant recalled, the maximum verbal contagion score a participant could attain was a score of 4, one point for each event. This verbal contagion score was the predominant score used in analysis. This scoring technique was the same one as used in Barnier et al. 2008 (See Appendix D).
Each verbal contagion detail was also counted for the purpose of separating these out from additions.

**Omissions and additions.** Similar scoring rules were used in Experiment 4 as in Experiment 1. The scoring differed in that omissions and additions were scored but not coded for different types (i.e., sensory, contextual, temporal details, etc.) as in Experiment 1. The purpose for this change was that in the present experiment I was more interested in the number and the relationship between variables rather than identifying specific types of omissions and additions elicited.

**Omissions.** These were concrete details or idea units present in accounts reported in session one that were not present in accounts reported in session two.

**Additions.** These were concrete details or idea units that were present in accounts reported in session two that were not present in accounts reported in session one.

**Concrete detail.** A concrete detail was defined as a specific tangible detail (e.g., “It was held in the hotel in the city” would be two concrete details. “I was wearing a black strapless dress and black heels” would be defined as five concrete details.

**Idea unit.** An idea unit was defined as a sentence or phrase that communicates an idea rather than concrete information (e.g., “I did everything I could to not destroy my look” would be defined as one idea unit).

**Specificity.** If the participant wrote “black shoes” in session one and “black heels” in session two, “heels” would be coded as an addition as “heels” is more specific than “shoes”. “Shoes” therefore would not be coded as an omission.
Results

One hundred and ninety six events were elicited over each of the two sessions. A total of 392 written accounts were gathered across the two sessions. Most participants generated memories for the four main autobiographical events (n = 49 for birthday; n = 44, for first date; n = 37 for first HSC exam; n = 43 for formal). Participants also generated memories for the substitute events (n = 16 for first day at university; n = 7 for first day of first employment). Events containing contagion items were: n = 35 for first date; n = 22 for HSC exam; n = 17 for birthday, n = 14 for formal; n = 9 for first day of university; and n = 1 for first day of employment.

Data analyses focused first on how accounts changed across the two individual retellings in session one and session two. Specifically I measured: (a) contradictions of details and absence of details due to social contagion, (b) contradictions due to intrinsic variation, (c) verbal contagion from the confederate’s script after discussion with the confederate, and (d) omissions and additions, and (e) confidence, comprehensiveness and clarity ratings of the memory reports. Data analysis focused next on reasons why participants made changes across their two individual recalls. Specifically, I examined (f) whether Social Closeness scores or Interpersonal Relationship question scores were correlated with any of the above measures, (g) whether participants were more likely to judge the contagion items as known rather than remembered, and (h) the reasons participants gave for accepting or not accepting suggested contagion.

My data analysis looked at differences between contagion and control events and between participants who accepted and did not accept contagion items. I conducted paired t-tests to investigate differences between contagion and control
events and independent t-tests to investigate differences between participants who accepted and did not accept contagion.

**Contradictions**

The first set of analyses investigated the amount of contradictions participants made. Contradictions were divided into contradictions made due to social contagion and contradictions made due to intrinsic variability.

**Social contagion.** Twenty percent of participants (10 out of 49 participants) recalled at least one of the two suggested concrete details ($M = 0.20$, $SD = 0.41$, range $0.00 - 1.00$) from the confederate that directly contradicted their elicited concrete details at initial recall in session one. Participants either accepted sensory contagion ($M = 0.12$, $SD = 0.33$) or contextual contagion ($M = 0.08$, $SD = 0.41$). There were no participants who accepted both sensory and contextual contagion items. In summary, ten participants displayed the social contagion effect.

**Absence of both original and contagion detail.** Next, I examined if the confederate’s suggestion of the contradictory contagion item would affect participants’ recall of the original item. Overall 45% of participants (22 out of 49 participants) did not recall at least one of the original details or at least one of the contagion items from their final recall after receiving the contagion item contradicting their original detail ($M = 0.48$, $SD = 0.74$, range: $0.00 - 2.00$). There were no instances where the participants recalled both their original and contagion item. Eighteen participants failed to recall one of the original details from one contagion event after being suggested the contradictory contagion items. Four participants failed to recall both of the original details from both contagion events after being suggested the contradictory contagion items. For example, Participant 40 reported she went to “Monkey Thai” for her first date in her initial recall. After receiving from
the confederate the contradictory contagion item that she went to “Thai Riffic” for her first date, the participant wrote, “we went for Thai” at final recall without mentioning the specific name of the restaurant. This was counted as absence because the participant did not report the original targeted specific detail or the specific contagion concrete detail. There was no significant correlation between participants who accepted contagion and those who chose to not recall the original detail \( r = .261, p = .07 \). This result suggests that the confederate’s introduction of the contagion item in summarising the participants’ memories may have affected their recall for original details in other ways besides direct contamination.

**Intrinsic variation.** In my next analysis I investigated contradictions due to intrinsic variation (not due to contagion) across participants and events. First, I investigated the number of contradictions made due to intrinsic variation across all four accounts. Overall, 62.5% of participants contradicted themselves in details at final recall in session two when no social contagion was introduced for the contradicted details \( (M = 1.20, SD = 1.27, \text{range} = 0 - 4) \). Eighteen participants made no contradictions, 14 participants made 1 contradiction, 8 participants made 2 contradictions, 4 participants made 3 contradictions and 4 participants made 4 contradictions across their four accounts.

Next, I investigated the differences in contradictions due to intrinsic variation across the contagion and control events. Table 5.1 shows the mean number of different types of contradictions due to intrinsic variation that all participants made across their two contagion and their two control events (where control events are events with no suggested contagion introduced). Paired sample t-tests found no significant difference in the amount of contradictions due to intrinsic variation in the contagion and control conditions \( t(47) = 0.81, p = .42 \). There was no significant
difference in the contradictions due to intrinsic variation in sensory details in the contagion and control events $t(47) = 0.28, p = .79$ or between contextual details in the contagion and control events $t(47) = 0.63, p = .53$. This indicates that across all events, participants made similar amounts and types of contradictions due to intrinsic variation regardless of whether direct social contagion items were introduced.

Table 5.1

Contradictions Due to Intrinsic Variation Across the Contagion and Control Events.

<table>
<thead>
<tr>
<th>Contradictions</th>
<th>Contagion</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Sensory</td>
<td>0.12</td>
<td>0.33</td>
</tr>
<tr>
<td>Contextual</td>
<td>0.12</td>
<td>0.33</td>
</tr>
<tr>
<td>Temporal</td>
<td>0.16</td>
<td>0.37</td>
</tr>
<tr>
<td>Estimation</td>
<td>0.08</td>
<td>0.28</td>
</tr>
<tr>
<td>Evaluation</td>
<td>0.08</td>
<td>0.28</td>
</tr>
<tr>
<td>Different Action</td>
<td>0.06</td>
<td>0.24</td>
</tr>
<tr>
<td>Total</td>
<td>0.63</td>
<td>0.88</td>
</tr>
</tbody>
</table>

*Note.* Contradiction means summed across two contagion events and then across two control events.

My next analysis examined differences in the number of contradictions due to intrinsic variation in the 20% of participants who accepted social contagion and the 80% who did not accept social contagion. Table 5.2 shows the different types of contradictions due to intrinsic variation made by participants who accepted the contagion items and those who did not accept the contagion items. An independent-samples t-test found no difference between the amount of contradictions due to intrinsic variation made by participants who accepted contagion items and those who
did not accept contagion items, $t(46) = 0.25, p = .80$. There also was no significant difference in contradictions due to intrinsic variation in sensory details, $t(46) = 0.60, p = .55$, or in contextual details, $t(46) = 0.79, p = .43$, between participants who accepted contagion and those who did not. This indicates that all participants, regardless of whether they accepted social contagion items or not, made a similar number of contradictions due to intrinsic variation. This finding suggests that contradictions due to intrinsic variation were independent of social contagion.

Table 5.2

Contradictions Due to Intrinsic Variation Across the Participants Who Accepted and Those Who Did Not Accept Contagion Items.

<table>
<thead>
<tr>
<th>Contradictions</th>
<th>Contagion Accepted</th>
<th>Contagion Not Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Sensory</td>
<td>0.20</td>
<td>0.42</td>
</tr>
<tr>
<td>Contextual</td>
<td>0.30</td>
<td>0.48</td>
</tr>
<tr>
<td>Temporal</td>
<td>0.50</td>
<td>0.84</td>
</tr>
<tr>
<td>Estimation</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Evaluation</td>
<td>0.20</td>
<td>0.42</td>
</tr>
<tr>
<td>Different Action</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>1.30</td>
<td>1.34</td>
</tr>
</tbody>
</table>

*Note.* Contradiction means summed across four events.

These results illustrate that all participants were more likely to make contradictions due to intrinsic variation ($M = 1.20, SD = 1.27$) than due to suggested contagion ($M = 0.20, SD = 0.41$).

My next set of analyses investigated variation besides contradictions in accounts across the two retellings. Specifically I examined verbal contagion from the confederate’s script and omissions and additions.
Verbal Contagion

I first examined rates of verbal contagion across all four events. Participants scored 1 point if they recalled on the final recall test at least one verbal contagion unit (direct verbatim or the gist uptake from the confederate’s script). Thus the maximum verbal contagion score a participant could attain was a score of 4, one point for each event. Overall 86.00% of participants recalled on the final recall test at least one verbal contagion unit for at least one event when looking across all four events ($M = 1.63$, $SD = 1.07$, range = $0 – 4$). Seven participants received a score of 0, 17 participants received a score of 1, 14 participants received a score of 2, 9 participants received a score of 3, and finally 2 participants received a score of 4. In summary, the majority of participants recalled either direct verbatim phrases or the gist from the confederate’s scripted memories in the final recall in session two that they did not report at their initial recall in session one. For example, participants included verbatim phrases from the confederate’s 18th birthday script such as “I was quite tipsy” or from the first HSC exam, “It was so quiet you could hear a pin drop”. When participants adopted the gist from the confederate’s memories they, for example, followed a parallel structure to the confederate’s narratives in individual recall or they described the same types of experiences as the confederate described while omitting their previous experiences from their initial retelling in session one.

Next, I analysed differences in verbal contagion for the contagion and control events. There was no significant difference in verbal contagion in contagion and control events, $t (47) = 0.16$, $p = .88$. The means of verbal contagion were similar across the contagion events ($M = 0.64$, $SD = 0.69$) and control events ($M = 0.70$, $SD = 0.10$). This indicates that participants were equally likely to borrow direct verbatim
or ideas from the confederate's script whether the confederate correctly summarised participants' memories or not.

There was no significant difference in verbal contagion scores between the 20% of participants who accepted suggested contagion ($M = 0.83, SD = 0.47$) and the 80% who did not accept contagion ($M = 0.63, SD = 0.55$), $t(46) = 1.15$, $p = .25$. This indicates that participants who did not accept social contagion items were just as likely to accept verbal contagion ideas or items from the confederate as were participants who did accept direct contradictory social contagion from the confederate. This again suggests that these forms of social influence on memory were somewhat independent.

**Omissions and Additions**

In my next analysis I investigated the total number of omissions in session one and the total number of additions in session two. All participants made omissions ($M = 9.86, SD = 3.32$) and additions ($M = 8.36, SD = 3.65$) across their memory accounts. There was a significant correlation between the number of omissions and additions ($r = .550$, $p < .001$). This indicates that participants who omitted more details from their memory accounts at initial recall in session one were more likely to more new details to their accounts at final recall in session two. There were no significant differences found for omissions or additions in contagion and control events or between participants who accepted social contagion and those who did not. This indicates that participants were equally likely to omit details from their initial recall in session one and add details to their final recall in session two whether contagion was present or absent and whether or not they accepted the contradictory suggested contagion items from the confederate.
Confidence in Accuracy, Clarity and Comprehensiveness

First, I examined differences in confidence in accuracy of details, clarity and comprehensiveness in session one and session two for all participants. Paired sample t-tests found a significant difference in confidence in accuracy of details of the account scores between session one and session two, \( t(47) = 2.43, p = .02 \). Participants reported higher confidence in the accuracy of the overall details of their recalled memory in session one (\( M = 8.28, SD = 1.11 \)) than session two (\( M = 7.97, SD = 1.05 \)). This indicates that participants were less confident of the accuracy of the details of their own personally experienced events after collaboration with the confederate who introduced contradictory contagion items for some of the events in session two. There was no significant difference in clarity ratings between session one (\( M = 7.52, SD = 1.02 \)) and session two (\( M = 7.67, SD = 1.02 \)), \( t(47) = 1.26, p = .21 \) and no significant difference between comprehension ratings in session one (\( M = 6.81, SD = 1.29 \)) and session two (\( M = 6.91, SD = 1.14 \)), \( t(47) = 0.76, p = .45 \).

Confidence, clarity and comprehensiveness scores across session one and session two were all correlated (all \( r's > .458 \), all \( p's = or < .001 \)). This indicates that the more confident participants were in the accuracy of the details of their account the clearer and more comprehensive they reported their memory accounts to be.

Next, I investigated if there were differences in confidence in accuracy of detail, clarity, and comprehensiveness, across contagion and control events. Table 5.3 shows these ratings at final recall in session two for contagion and control events. Paired sample t-tests indicated no significant differences (all \( p's > .05 \)). Confidence in accuracy, clarity and comprehension ratings were similar across all events. These results indicate that although the confederate introduced contradictory contagion
items for only two of the events, this decreased participants’ confidence ratings at individual recall for all four events.

Table 5.3

Confidence, Clarity and Comprehensiveness Ratings at Final Recall Across Contagion and Control Events

<table>
<thead>
<tr>
<th></th>
<th>Contagion</th>
<th></th>
<th>Control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Confidence</td>
<td>7.97</td>
<td>1.16</td>
<td>7.94</td>
<td>1.20</td>
</tr>
<tr>
<td>Clarity</td>
<td>7.67</td>
<td>1.12</td>
<td>7.61</td>
<td>1.15</td>
</tr>
<tr>
<td>Comprehension</td>
<td>6.92</td>
<td>1.29</td>
<td>6.83</td>
<td>1.33</td>
</tr>
</tbody>
</table>

Note. Ratings at final recall came from session two. Ratings were made on a scale of 1 to 10, (where 1 = not very confident and 10 = extremely confident; 1 = very vague and 10 = very clear; 1 = not comprehensive, 10 = very comprehensive).

Table 5.4 shows confidence, clarity and comprehensiveness ratings at final recall in session two for the 20% of participants who did accept contagion and the 80% of people who did not accept contagion. Independent t-tests found no significant differences in confidence in accuracy, clarity or comprehensiveness ratings between participants who accepted the suggested contagion items and those who did not accept suggested contagion items (all t’s < 2.29, all p’s > .22). This result indicates that participants who accepted suggested contagion were just as confident of the accuracy of the details of their events as the participants who did not accept the suggested contagion.
Table 5.4
Confidence, Clarity and Comprehension Ratings at Final Recall Across Participants who Accepted Contagion and those who did not Accept Contagion

<table>
<thead>
<tr>
<th>Participants</th>
<th>Contagion M</th>
<th>Contagion SD</th>
<th>No Contagion M</th>
<th>No Contagion SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence</td>
<td>7.90</td>
<td>1.38</td>
<td>7.98</td>
<td>0.97</td>
</tr>
<tr>
<td>Clarity</td>
<td>8.02</td>
<td>1.37</td>
<td>7.58</td>
<td>0.91</td>
</tr>
<tr>
<td>Comprehensiveness</td>
<td>6.88</td>
<td>1.56</td>
<td>6.92</td>
<td>0.17</td>
</tr>
</tbody>
</table>

*Note. Final recall means final individual recall in session two*

Additions of verbal contagion details were correlated with comprehensiveness ($r = .314, p = .03$) ratings in session two. This indicates that participants who adopted a higher number of verbatim or ideas from the confederate's scripts, also reported their accounts from session two as more comprehensive than participants who adopted a lower number of verbatim or ideas from the confederate's script. There were no correlation found between additions of verbal contagion details and confidence of accuracy scores. There was no correlation between confidence, clarity and comprehensiveness scores and the amount of contradictions participants made. This indicates that the participants’ judged confidence, clarity and comprehensiveness of a memory account was no indication of how many contradictions it contained.

**Social Closeness Scale**

An independent t-test found no significant differences in social closeness scores in whether participants did or did not accept suggested contagion $t(47) = 1.57$, $p = .12$, indicating that participants with high social closeness scores were no more or
less likely to report suggested social contagion items in the final recall test, compared
to participants who scored low on the Social Closeness scale.

Table 5.5 shows correlations between social closeness scores, interpersonal
questions, omissions, additions, contradictions, verbal contagion, and confidence,
clarity and comprehensiveness ratings from session two. There also was no
correlation between social closeness scores and verbal contagion scores indicating
that participants with high social closeness scores were no more or less likely to
report verbal contagion units at final recall. There was no correlation between social
closeness scores and contradictions due to intrinsic variation, omissions or additions.

Table 5.5
Summary of Intercorrelations For Scales and Key Variables

<table>
<thead>
<tr>
<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Social Closeness</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Connected</td>
<td>.14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Likability</td>
<td>.27</td>
<td>.52**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. Comfort</td>
<td>-.02</td>
<td>.14</td>
<td>.11</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. Contradictions</td>
<td>-.01</td>
<td>-.05</td>
<td>-.09</td>
<td>.01</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Omissions</td>
<td>-.06</td>
<td>.03</td>
<td>.02</td>
<td>-.17</td>
<td>.11</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. Additions</td>
<td>.16</td>
<td>.50</td>
<td>.12</td>
<td>-.02</td>
<td>.12</td>
<td>.55*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. Verbal Contagion</td>
<td>.25</td>
<td>.21</td>
<td>.36*</td>
<td>.02</td>
<td>.03</td>
<td>.22</td>
<td>.19</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9. Confidence</td>
<td>.28</td>
<td>.15</td>
<td>.11</td>
<td>.23</td>
<td>-.17</td>
<td>.15</td>
<td>.21</td>
<td>.26</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10. Clarity</td>
<td>.05</td>
<td>-.01</td>
<td>.10</td>
<td>.27</td>
<td>-.07</td>
<td>.07</td>
<td>.28</td>
<td>.28</td>
<td>.65**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11. Comprehensive</td>
<td>.09</td>
<td>.11</td>
<td>.11</td>
<td>.37*</td>
<td>-.01</td>
<td>.09</td>
<td>.19</td>
<td>.31*</td>
<td>.76**</td>
<td>.82**</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. Summary of intercorrelations for scores on the Social Closeness scale, ratings to the questions
‘how connected did you feel to the other participant’; ‘how important was it to you that the other
participant liked you’; ‘how comfortable did you feel telling your memories to the other participant’;
Other key variables are contradictions due to intrinsic variation, omissions, additions, and confidence
in accuracy clarity, comprehension ratings for session two. Pearson correlation coefficients. * p < .05,
**p < .01. Type 1 error was not controlled for this correlational data.
Interpersonal Relationship with Confederate and Contagion

Independent t-tests found a significant difference in ratings to the question “How important was it to you that the other participant liked you?” between participants who did and did not accept contagion, $t(47) = 2.26, p < .03$. Participants who accepted suggested contagion gave higher ratings ($M = 6.40, SD = 2.26$), indicating it was more important for them that the confederate liked them, than participants who did not accept suggested contagion ($M = 4.64, SD = 2.18$). There was also a correlation between the same question of “How important was it to you that the other participant like you?” and verbal contagion items ($r = .359, p = .012$). This indicates that high scorers recalled more verbal contagion details than low scorers. Taken together these findings suggest that participants who were more concerned about negative evaluation from the confederate were more likely to accept suggested contagion and adopt specific verbatim phrases or overall gist from the confederate’s script into their own personal autobiographical accounts.

How comfortable the participant rated being around the confederate was also correlated with comprehensiveness scores in session two ($r = .367, p = .010$). This indicates that participants who reported higher comfort levels around the confederate rated their memory reports in their final individual recall as more comprehensive than participants who reported lower comfort levels around the confederate. This finding suggests that comfort levels in social interaction may influence comprehensiveness of an account.

Remember/Know Judgments

For the ten people who accepted suggested contagion, 66% of contagion items they accepted were rated as “remembered” rather than “known”. Thirty-three percent were rated as “known.” This was an unexpected finding and indicates that
participants reported they actually remembered the contagion items that contradicted their original accounts in previous recall.

**Post-Experimental Inquiry Comments from Participants**

Participants reported they accepted suggested contagion when it was schema consistent. For example, Participants 9 said, “I either wear my hair in a ponytail or bun” when explaining why she accepted the contagion item for having her hair in a bun. Participant 16 said, “I remember the location of my classes but I don’t pay attention to the names of the buildings” when explaining why she accepted a contagion item for a different building. Participant 5 reported that the confederate had mistakenly said the wrong colour of shirt, yet in her individual recall she reported the colour of the shirt that the confederate suggested. She later said, “I was just guessing, I really don’t remember what colour shirt he was wearing” when explaining why she accepted the contagion for a white shirt when she originally said black.

In contrast, participants reported they did not accept suggested contagion when it was schema-inconsistent. For example, Participant 10 said, “I know they were white orchids and not white carnations because my mom loves orchids” when explaining why she did not accept the contagion item “carnations” in her memory. Participant 18 said, “I know my girlfriend wore a yellow dress because she hates the colour green and it is not her colour” when explaining why he did not accept the contagion item “green dress”. Participant 22 said, “I know I wore track pants because I would never wear jeans to an exam”, when explaining why she did not accept the contagion item for jeans. Participant 28 said, “I know my English exam was in the school hall and not the library because all the exams were in the school hall” when explaining why she did not accept the contagion item for “library”. These findings
indicate that rather than relying on memories for details in events they made judgments based on whether the details aligned with their individual schemas. Interestingly, however, they still judged many of their misrememberings to be remembered.

**Summary**

The most important finding to come out of this final experiment was that memory reports across retellings were very much affected by social interaction. Specifically a short interaction with a stranger who was also a peer and did not share or have any personal knowledge of the participants’ events significantly altered participants’ memory accounts from initial to subsequent recall. Participants’ accounts over retellings changed in a number of different ways.

First, some participants accepted contagion items from the confederates into their freely recalled accounts, although the rates were low. Only 20% of participants accepted one of the contagion items. None accepted both. This finding was comparable to the Barnier et al. (2008) results where 30% of participants accepted social contagion. However, in contrast to Barnier et al.’s study, my study, the participants changed details in their accounts after suggestions for specific concrete details instead of evaluative statements. This indicates that the social contagion effect can impact specific as well as general changes. When participants did not accept contagion items it was because they indicated the contagion was not schema consistent. This acceptance of false details from others for schema consistent details could be because people generally assume that others provide true and accurate information in a conversation (Gilbert, 1991; Grice, 1975; Levine, 2014; Street, & Masip 2015). Paterson et al. (2012) alternatively suggested that sometimes people
may be unable to distinguish information they actually experienced from information they gained from others and that people may report hearsay without knowing it.

Second, although the rate of contagion acceptance was low, more than half of the remaining participants chose to omit both the original detail and the social contagion item from final individual recall after receiving suggested contagion. This suggests that participants were less confident that the original detail was accurate after the confederate suggested the contagion item and therefore chose not to include the specific detail at all. This finding is consistent with other research that indicates that people strategically regulate the grain size in memory reporting either by withholding information that they feel unsure about or providing relatively imprecise information that is unlikely to be wrong to achieve accuracy (Koriat & Goldsmith, 1996).

Lower confidence ratings in session two likewise support the idea that participants were less confident of the accuracy of the details in their memory after receiving suggestions of the contagion items from the confederate. The finding that a stranger’s erroneous summary of certain details of the speakers’ accounts has such influence over confidence when the event is unshared and personal is important.

Third, participants’ accounts changed in other ways. As in Experiments 1, 2, and 3a many participants made contradictions due to intrinsic variation. Sixty-three percent of participants made contradictions that were not the result of suggested contagion across their retellings. The proportion of contradictions due to intrinsic variation was over three times higher than the proportion of contradictions due to acceptance of social contagion. Interestingly, those who did not accept suggested contagion did not make more contradictions due to intrinsic variation than those who did accept suggested contagion.
Fourth, although only 20% of participants accepted contagion items, 86% of participants adopted specific details or ideas from the confederates’ script into their own memory accounts. This is consistent with Loftus and Greene’s (1980) finding of “verbal contagion” in participants’ accounts for memory of faces. What is different about my finding is that the confederate did not witness or experience the event with the participant, so theoretically the peer stranger should not influence the participants’ memory of the event. However, effects of forgetting and cueing due to social interaction may be one explanation for high rates of verbal contagion in this experiment (Stone, Barnier, Sutton, & Hirst, 2013). When people discuss similar experiences selective remembering could prompt similar remembering and forgetting in the listener (Cuc et al., 2007; Stone et al., 2010). An alternate explanation could be that participants actually thought they said the verbal contagion items instead of the confederate. Hyman, Roundhill, Werner, and Rabiroff (2014) found that after collaboration participants were susceptible to making egocentric source monitoring errors. In other words, participants claimed their collaborating partner’s memory as their own.

Interestingly, participants who were more concerned that the confederate liked them were more likely to report more suggested contagion and verbal contagion in their own accounts. This indicates that participants who were concerned about negative evaluation were more likely to uptake erroneously summarised details of their own memories as well as verbatim phrases or gist from the confederate’s “memories”. This is consistent with past research that likeability ratings and concerns of evaluation can increase a person’s susceptibility to social contagion (Hope et al., 2008; Wright et al., 2010). All participants made omissions and
additions across their two retellings. However, these were surprisingly independent from suggested and verbal contagion.

Finally, the more clear and comprehensive participants judged their accounts to be the more confident they were of the accuracy of the details. However, similar to my previous experiments, these ratings were not related to how many contradictions, intrinsic or from suggested contagion, participants made across their two retellings.

Interestingly, the participants’ comfort levels were related to their comprehensiveness ratings, suggesting that the interviewer may have an effect on the comprehensiveness of an account. This finding may be considered in applied settings when matching witnesses/asylum seekers with interviewers. Ensuring a witness feels comfortable may increase the quality of an elicited account.

This experiment offers interesting findings, although as I did not control for Type 1 error in my tests for multiple correlations, some results need to be interpreted with caution.

In conclusion, this experiment shows that social contagion can change memory recall over retellings but direct contamination is just one small influence on subsequent memory changes. My results imply that social influence can effectively shape subsequent retellings. However, changes across recall are predominantly dictated by a variety of social factors and individual factors driven by schemas. These forces inevitably lead to variability in memory accounts across retellings. Although variation in peripheral details across autobiographical memory accounts should be viewed as normal and difficult if not impossible to extinguish, sources of variation can be identified. I now turn to discuss these findings and their implications in my general discussion.
Chapter 6

Discussion
This thesis set out to investigate the likelihood, nature and sources of changes across repeated accounts of recent personal autobiographical experiences. I aimed to expand our understanding of how and why autobiographical memories change across retellings by contributing new data on the types of changes people make and the factors that contribute to them. When I initially started this research I intended to conduct a series of experiments that measured the different factors within the established social contagion paradigm. My first goal was to identify specific autobiographical details commonly recalled in accounts of events, which I could later target for contagion. But I found that autobiographical memories of the past changed substantially when retold just one week after their initial recall and importantly in the absence of contagion. Motivated by the broader misinformation literature and work in social contagion (Gabbert et al., 2003; Loftus & Palmer, 1974; Loftus, et al., 1978, Roediger et al., 2001), which identifies contagion as a primary source of contamination from social influence, I expected the subsequent retellings to remain more or less the same when freely recalled in a time span of 5 minutes just one week later.

After my surprising discovery of substantial intrinsic variability I became interested in the role that social and individual factors play in memory changes across retellings. I wanted to know what contributed to memory changes across retellings in the absence and presence of contagion. I therefore changed direction to systematically measure: (a) the factors that influence changes due to intrinsic variability, and then (b) the factors that influence changes due to contagion by using two distinct paradigms. Across Chapters 2, 3 and 4 (Experiment 1, 2 and 3a) I used a retelling paradigm to investigate changes due to intrinsic variability and where the
source of change is not obviously others. In Chapters 4 and 5 (Experiments 3b and 4), I used the social contagion paradigm to investigate changes due to contagion and where the source of change is more obviously others. My research is innovative in that it draws from separate areas of research to understand how and why memory accounts of important personal events might change over time: the social contagion literature (Gabbert et al., 2003; Loftus & Palmer, 1974; Loftus et al., 1978; Roediger, et al., 2001; Strange et al., 2014), where accuracy is very important, and the collaborative remembering and collective memory literatures which do not focus as directly on accuracy but focus on effects of social interaction (Barnier et al., 2008; Cuc et al., 2006; Harris et al., 2011; Hirst & Echterhoff, 2012; Pasupathi, 2001; Skowronski & Walker, 2004).

**Summary of Main Findings**

Across all my experiments participants recalled memories of recent personal and important past events, such as a first date and their 18th birthday, across two retellings seven days apart. In Experiments 1, 2, and 3 I used a retelling paradigm to investigate changes in the absence of contagion.

In Experiment 1 (Chapter 2) I examined how freely recalled written, typed or spoken autobiographical memory accounts changed or remained the same across two retellings one week apart. I found that although the amount of detail recalled remained constant over the two retellings, all participants made omissions and additions and most also made contradictions. I identified the specific details most likely to be either omitted or added across the two retellings as sensory and evaluative in nature. I identified the specific details most likely to be contradicted across the two retellings as sensory perceptions, contextual information, the exact days or times when experiences occurred, and precise numbers of items or people
present. There was no difference in confidence and clarity ratings over the two retellings. Participants reported high confidence in the accuracy of the details of their memories and judged them to be clear. However, confidence and clarity were not related to the number of contradictions they made. Participants in the spoken condition provided the most detailed accounts and made the most contradictions across their two retellings. Finally, informal observations suggested that individual differences and certain aspects of the social interaction seemed to influence changes that participants made.

In Experiment 2 (Chapter 3) I investigated how the presence or absence of a listener and personality characteristics influenced freely recalled spoken autobiographical memory accounts across two retellings one week apart. Participants in the listener present condition said more in both sessions and contradicted themselves more often than people in the listener absent condition. However, amount recalled was independent of the number of contradictions that participants made. Interestingly, certain personality characteristics influenced how much detail participants remembered. Those who scored high on measures of social closeness said more whereas those who scored high on measures of aggression and alienation said less. Also, participants who scored high on the social desirability scale reported higher confidence in the accuracy of their memories. Participants made the most contradictions in details describing the exact days or times when experiences occurred and in giving precise numbers of items or people present. Similar to findings in Experiment 1, participants reported high confidence in the accuracy of their memories even when they made contradictions. Informal observations revealed again that some participants were more likely to make certain types of contradictions over others.
In Experiment 3a (Chapter 4) I used a semi-structured version of the retelling paradigm to better examine contradictions in specific forensically relevant details. Further, I investigated whether dissociation and social desirability traits influenced the number of contradictions participants made. I demonstrated that participants made contradictions across retellings, primarily in details describing exact times and the specific clothing people wore. I also found that particular participants were more likely to make certain types of contradictions than others. Participants who scored high on a measure of dissociation made more contradictions and recalled more detail whereas, similar to Experiment 2, participants who scored high on the measure of social desirability reported higher confidence that the details of their memories were accurate. In contrast to Experiments 1 and 2, participants who made more contradictions were also less confident in the accuracy of their accounts. Finally, participants gave a number of reasons why they made contradictions across their accounts, which suggested they did not think their contradictions were important and that they guessed or inferred specific details that aligned with the memories of their events or with their general self-knowledge.

For Experiments 3b and 4 I used the social contagion paradigm to investigate changes across retellings in the presence of contagion. In Experiment 3b (Chapter 4) participants accepted suggested contagion when it was inserted into transcripts of their previously recalled events. Suggested contagion items were specific concrete details that contradicted participants’ originally recalled details in previous recalls. Although many participants confirmed the accuracy of their accounts despite them containing erroneous temporal and gender details, participants only recalled temporal contagion details (i.e., different times experiences took place) when recalling their own memories. Participants who scored high on measures of
compliance were more likely to confirm the accuracy of their transcribed accounts containing suggested contagion details but were no more likely to recall these suggested contagion details. Participants in Experiment 3b provided a number of different reasons for accepting or not accepting the suggested contagion. Most importantly participants accepted suggested contagion details that aligned with the gist of their memories of the events or with their general self knowledge.

Finally, in Experiment 4 (Chapter 5) I returned to my original aim of investigating if I could change concrete specific sensory and contextual details in participants’ autobiographical memories using the social contagion paradigm (Barnier et al., 2008; Roediger et al., 2001). I found that some participants accepted suggested contagion from the confederate. Interestingly, many participants who did not accept the suggested contagion items omitted the relevant original detail from their final recall. Consistent with Experiments 1, 2 and 3a participants also made contradictions due to intrinsic variability. Further, participants accepted verbal contagion in which they incorporated into their final recall new details and gist that came from the confederate’s ‘memories’. Verbal contagion differed from suggested contagion as there was no motivation to change participants’ memories and the contagion was not necessarily misleading. Participants were more likely to show such verbal contagion and suggested contagion when they reported it was important to them that the confederate liked them. Of particular note, acceptance of suggested contagion, contradictions due to intrinsic variability and acceptance of verbal contagion were all independent of one another. Finally, participants in Experiment 4 reported lower levels of confidence in the accuracy of their memories after exposure to contagion.
In this final chapter I draw together the findings from all of these experiments and consider implications for the social contagion literature in cognitive psychology and for applications in the forensic setting. Specifically I consider if there are qualitative differences between intrinsic variation in memory across retellings and variation due to contagion. To do this, I: (a) examine the characteristics of variation in the absence of contagion, (b) examine the characteristics of variation in the presence of contagion, (c) compare and contrast the two types of variations, (d) offer a theoretical framework within which to interpret my findings, with a particular focus on differences in variation thresholds for inaccuracy, (e) discuss the implications of my findings, (f) and acknowledge limitations and suggest future research.

**Retelling Paradigm: Sources and Characteristics of Intrinsic Variability**

In the first phase of my thesis I used a retelling paradigm to examine the influences and characteristics of intrinsic variability. I defined intrinsic variability as changes identified across two retellings of memory accounts in the absence of contagion. Participants reported memories of four important recent personal autobiographical events. They then returned one week later to retell the same events. As mentioned at the beginning of this chapter, the most interesting finding was how much memory retellings changed just one week after initial recall. Participants made omissions, additions and most made contradictions. This finding led me to consider the influences that led to these changes when no contagion was introduced. I specifically examined the role of social factors, individual factors, characteristics of details susceptible to change, personal evaluations of confidence in the accuracy of memories and of their clarity, and comprehensiveness, and the reasons participants reported for making contradictions across retellings. Across three experiments I manipulated conditions and used a variety of assessment tools.
Social Factors

Across Experiments 1, 2 and 3a I demonstrated that aspects of the social interaction influenced intrinsic variability across retellings.

In Experiment 1 I found that participants generally said more and made more contradictions if they spoke rather than wrote or typed their accounts. I speculated that social factors were motivating these changes. I was, however, not able to deduce if changes across retellings were predominantly influenced by subtle cues between the listener and speaker in the spoken condition (Bavelas et al., 2000; Ekeocha & Brennan, 2008; Pasupathi, 2001) or else the ease or the fluency the spoken condition offered (McPhee et al., 2014). To clarify my findings I varied the social condition in Experiment 2 by asking participants to tell their memories to a listener or to no listener, while holding the speaking condition constant. In line with my predictions, my results demonstrated that aspects of the social interaction changed memory retellings in two ways; participants who told their memory to a listener increased the amount of detail recalled and also the number of contradictions they made.

My finding that the mere presence of a listener could impact the number of contradictions across retellings was surprising as research in the social contagion tradition has primarily attributed contradictions across retellings to contagion from social influence (Loftus, 2005; Loftus & Palmer, 1974; Paterson & Kemp, 2006b; Roediger et al., 2001; Wright et al., 2009). However, my findings are consistent with research in other experimental traditions that has demonstrated that social factors can exert their influence in more subtle ways (Bavelas et al., 2000; Pasupathi, 2001), such as listeners relying on non-verbal cues from the social interaction and providing more detailed accounts to interested rather than disinterested listeners. My findings, likewise, fit with the audience-tuning literature (Hirst & Echterhoff, 2012; Marsh,
2007; Skowronski & Walker, 2004), which suggests that speakers are selective in the information they retell based on perceived characteristics of the listener. I interpret my findings as showing that participants were affected by micro social cues such as subtle facial displays, bodily gestures and gaze that were not available when the listener was absent. These micro social cues presumably influenced how participants tailored their accounts.

My interpretation that aspects of the social interaction drove changes across retellings was further supported by the results of Experiment 3a. I found that constraining the parameters of the social interaction by asking participants specific questions about their events, rather than allowing them to freely recall, led participants to make more contradictions across retellings. My findings are consistent with previous research that has demonstrated that people generally will provide specific details about events that they do not accurately remember even when they are given the option to state “I don’t know” or “I can’t remember” (Hastie, Landsman & Loftus, 1978; Simon, 2012). In Experiments 1 and 2 most participants made contradictions but there were also some who did not make any contradictions. In contrast, all participants made contradictions across their retellings in Experiment 3a. My findings are consistent with literature that demonstrates that individuals generally are more accurate when they freely recall their memories because they can choose what information to report and what information to withhold when they are unsure (Goldsmith & Koriat, 1999; Koriat & Goldsmith, 1996, Koriat et al., 2000). However, although participants in Experiment 3a made more contradictions, I found a correlation between contradictions and confidence. In contrast to Experiments 1 and 2, participants in Experiment 3a who made more contradictions were less confident in the details of their accounts. This is consistent with previous research
that has found people are more confident about erroneous information they provide when freely recalling memories because they exercise control of what details they choose to report (Goldsmith, Koriat, & Pansky, 2005).

Overall, my results suggest that subtle social cues influence changes across retellings. Participants seemed to tailor their memory accounts to match the perceived characteristics and goals of the listener and participants seemed to adjust the specificity of detail in response to the expectation of the social interaction. These findings can be interpreted in light of current views on the social functioning of remembering (Alea & Bluck, 2003). If autobiographical memory is shared with others to fulfil social goals, it is logical that different aspects of a social interaction may influence memory retellings.

There were, however, several findings that could not be explained by social factors alone. First, across Experiments 1 and 2, although participants made changes across their memory accounts, the amount they recalled across both of their retellings remained constant, regardless of the condition they were in. In other words, participants who recalled more detailed accounts at their first retelling also recalled more detailed accounts in their second retelling whereas participants who provided less detailed accounts at their first retelling also provided less detailed accounts at their second retelling. Second, although participants in the listener present condition said more and made more contradictions, those two factors were unrelated. Finally, there was a large degree of variation in the amount of contradictions participants made. Some participants made many contradictions whereas some did not make any. Thus the number of contradictions participants made was not always due to the condition they were in. My findings indicate that
although social factors are important sources of intrinsic variability across retellings, there are other factors that influence changes.

**Individual Factors**

In Experiments 1, 2 and 3a I demonstrated that there were individual differences in intrinsic variability across retellings. Across all three experiments, I identified personality and other individual characteristics that influenced different types of changes across retellings. Initially in Experiment 1, through informal analysis, I noticed that participants who were more engaged in the social interaction of the spoken condition made the most changes across their retellings. Specifically, those participants who directly faced me seemed to use more gestures when recollecting their accounts, held eye contact, said more and made more contradictions than participants who chose to face the window, did not use hand gestures and who did not make eye contact with me. Research has indicated that personality characteristics influence both encoding and retrieval of memories (McAdams, 2001; McIlwain, 2006) and that some personalities may be more socially responsive than others (Funder et al., 2000). Based on previous research and on my informal observations, I predicted in Experiment 2 that personality characteristics would influence intrinsic variability across spoken retellings. My findings supported and contradicted my prediction. Supporting my prediction I found that personality characteristics influenced the amount of detail participants provided and their confidence in accuracy of detail ratings. Participants who scored high on social closeness, one sub-factor of the extroversion scale, said more while participants who scored high on the alienation and aggression said less. Contrary to my prediction, personality characteristics did not influence the number of contradictions participants made in Experiment 2.
Personality characteristics also seemed to affect participants’ evaluation of their remembering of the event. Participants who scored high on social desirability reported greater confidence in the accuracy of their memories, although this was not correlated with the amount of contradictions they made. My finding that participants’ personality characteristics influenced how they recalled their memories is consistent with research that suggests people align their autobiographical memory narratives with their personality style (Areh & Umek, 2004; McAdams, 2001; Rasmussen & Berntsen; 2010; Sutin, 2008). Based on my findings and previous research, it can be assumed that extroverted participants were socially inclined to talk more so they provided more details, whereas participants who were concerned about how they would be perceived by others responded in a way they thought was socially desirable and would lead to positive evaluation from the experimenter, by inflating their confidence in details (Bond & Smith, 1996).

I suggested in Chapter 4 (Experiment 3a) that perhaps I did not assess the personality characteristics in Experiment 2 that captured susceptibility to distortion. In Experiment 3a I predicted a relationship between dissociative characteristics and contradictions. As reviewed in Chapter 1 and Chapter 4 (Experiment 3a), dissociation has been associated with memory errors over recalls (Hyman & Billings, 1998; Monds et al., 2013; Polage, 2012; Porter et al., 2000). Furthermore, I wanted to determine if inflated confidence ratings were driven by the motivation to make a good impression or by more stable personality factors such as an ingrained belief that one has a good memory. As expected, I found that dissociative personality characteristics predicted changes across retellings. Dissociative tendencies influenced both the amount recalled and the number of contradictions. My finding fits with previous research that suggests that people with dissociative tendencies make more errors in recall because
they do not pay sufficient attention to the experienced event (Olsen & Beck, 2011). One explanation that is consistent with previous research is that because people with higher dissociative tendencies might not pay sufficient attention to the event, they subsequently overcompensate and confabulate details to maintain the coherence of their autobiographical narratives. This aligns with the importance of the narrative function of autobiographical memory (Fivush et al., 2011; Habermas & de Silveira, 2008; Nelson & Fivush, 2004).

Similar to Experiment 2, participants who scored high on social desirability reported inflated confidence. Building on my results in Experiment 2, I demonstrated in Experiment 3a that social desirability influences on confidence were driven by a motivation to make a good impression rather than by a stable personality trait or belief in above-average abilities. Specifically, just as in Experiment 2, participants high on social desirability exhibited inflated confidence that was not related to the number of contradictions they made. My findings are consistent with literature that indicates social desirability behaviour can lead to an overreporting bias by an exaggeration of responses on a range of scales and surveys (Belli, 2013). Thus, across Experiments 1, 2 and 3a it is clear that different individual factors exerted their influences via the level of detail provided, or the number of contradictions across retellings, or by inflating confidence.

Finally, across my three experiments in the retelling paradigm, I noted other individual differences that were more difficult to formally assess but which also seemed to influence the number and type of contradictions and other changes across retellings. My informal observations revealed that there were differences across participants’ remembering styles. Across my experiments, some participants were more prone to make certain types of contradictions across their accounts compared
to others. For example, some participants made contradictions in the exact times and
days that experiences took place, whereas others were more prone to make
contradictions in specific types of clothing that different people wore. My findings
suggest that although a contradictory statement describing what a person was
wearing (e.g., a blue shirt versus a red shirt) may tell us nothing about a description
of, for example their emotional state, it may tell us that other observed clothing
details may be incorrect as well. There is some research to support my view. Wells
and Leippe (1981) demonstrated that paying attention to certain elements can impair
memory for other elements. They found that people who were more accurate in
describing the physical details of a crime scene were less accurate in describing the
perpetrator. Conversely, people who were less accurate in describing the physical
details of the crime were more accurate in describing the perpetrator. Although my
informal observations are potentially important, more formal research is needed to
draw conclusions about different kinds of people making different kinds of errors or
changes.

Taken together I can conclude that individual factors influenced changes
across retellings. Some personality characteristics that were more ingrained and
trait-like (social closeness, alienation, aggression and dissociation) (Bernstein &
Putnam, 1986; Tellegen, 1982) seemed to influence the amount recalled and the
number of contradictions across retellings, whereas other personality characteristics
driven by context specific motivation (social desirability) (Paulhus & John, 1998)
seemed to influence participants’ evaluation of the remembering process, specifically
by increasing confidence in memory. Finally, my results suggest that individual
differences that were not captured by the formal assessment tools used in the
retelling paradigm also contributed to different types of contradictions made and other changes across retellings.

The influence of individual factors on intrinsic variability in memory can be interpreted in light of research on the self function of remembering. Events are remembered through individual perspectives to maintain self-coherence (Conway, 2005). Participants recalled their memories in a way that used past experiences to enhance their identity (Bluck & Alea, 2011; Bluck et al., 2005). My results indicate that there is an interaction between social and individual factors. In this next section I demonstrate that characteristics of the details recalled are an important factor in susceptibility to intrinsic variability.

**Details Susceptible To Intrinsic Variability**

Across all experiments in the retelling paradigm I demonstrated that similar types of details were susceptible to intrinsic variability across retellings. First, in Experiment 1 I found that participants generally made omissions and additions in sensory details and evaluations. In their second retelling they often would expand on their sensory perceptions of the event as well as offer new thoughts on and evaluations or interpretations of the event. This finding highlights the distinction between memory for simple material and complicated autobiographical memories, which not only include factual information but also feelings and impressions that moderate memories over retellings (Conway & Pleydell-Pearce, 2000; Conway, 2005). In terms of contradictions I found that, on average, participants made the majority of contradictions when reporting temporal details (specifying the exact times that different experiences in the event took place), sensory details (such as specifying clothing people were wearing) and quantitative estimative details (specifying precise numerical values of people or things). Consistent with my
findings, research indicates that individuals generally are poorer at recalling peripheral specific details than the gist of an event (Reyna & Brainerd, 1995, 2011). In general, people have difficulties recalling exact times, precise numerical values and clothing that people were wearing (Hyman & Loftus, 1998; Strange et al., 2014). This is an important finding as participants in my experiments confidently reported these details although they were wrong. These details are the same details that often are pivotal in forensic cases. In contrast, participants did not make errors in more central details such as in the gender of the main character of their recalled event. For example, when recalling their driving test, no participants recalled their driving instructor to be a female at their second retelling if they reported that their driving instructor was a male at their first retelling.

**Confidence**

I found across all my experiments in the retelling paradigm that participants reported high confidence in the accuracy of their memories over both retellings, as well as high clarity and comprehensiveness of their memories over both retellings. There was no difference in ratings from the time of their first retelling and the time of their second retelling. Generally, the clearer participants rated their memory for the event to be, the more confident they were in the accuracy of the details of the event and the more comprehensive they believed their accounts to be. When participants freely recalled their accounts, confidence was not related to the amount of contradictions participants made. My findings can be interpreted in two ways. Participants may have misjudged the accuracy of their memory because they could recall the details clearly. Research has indicated that just because a memory may seem clear and comprehensive, this is not necessarily an indication of accuracy (Granhag et al., 2000; Yarmey & Yarmey, 1997). This is consistent with previous
research that has found that clarity of the memory strengthens confidence that the memory is true (Johnson et al., 1996) and that people will report inflated confidence in how comprehensive and complete their memory for an event is (Yarmey & Yarmey 1997). Alternatively, my participants may have believed their memories were accurate and true enough for them to report high confidence in the accuracy of their details. This interpretation is supported by research that has indicated that indexing for accuracy is not as important when recalling memories in most social situations (Harris et al., 2011; Misztal, 2003). As reviewed in the Introduction, the threshold for inaccuracy is higher in day to day life because the goal of memory is not only to convey information but also to reinforce a sense of self, to build and maintain relationships and to teach and to manage emotion (Alea & Bluck, 2003; Bluck, et al, 2005; Harris et al., 2014).

**Elicited Reasons**

Finally, I identified participants' perceptions of the changes in their memories across retellings. In Experiment 3a participants reported they did not think that the contradictions across their accounts were important nor did they feel they detracted from the truth of their narratives. Generally, participants attributed their contradictions to guessing at the correct details based on their inferences from circumstances in the event and general self-knowledge. Participants reported reasons consistent with the schematic remembering literature which suggests people recall details based on inferred knowledge from similar experiences (Alba & Hasher, 1983; Bellezza & Bower, 1981; Bellezza & Bower, 1987), rather than on an actual process of vivid remembering as defined in the source monitoring literature (Johnson et al., 1993).
My findings raise the question of why participants guessed at details when I specifically asked them to only recall details that they might have remembered. It is unclear from my research whether participants did not think details were important at the time of remembering and therefore were filling in the blanks with details that made the most sense as they were recalling their events in session one and session two, or if there was a failure in participants' perceptions of their own memory abilities. Therefore, my findings can be interpreted in two ways.

First, participants may have been consciously filling in the blanks of their memory with details that made the most sense. Participants may have not understood or followed my instructions or participants may have also been working with a different understanding of what “remembering” is and how it differs from guessing. They may have believed that characteristics of the contradictory details were peripheral in nature; despite my instructions, accuracy may not have been their most important goal at the time of recall (Alea & Bluck, 2003).

Alternatively, there may have been a discrepancy in their metamemory processes at the time participants recalled their memories and at the time at which they reviewed their accounts and recalled their earlier remembering of the memories (Blank et al., 2007; Nisbett & DeCamp Wilson, 1977). Participants may have believed they were providing accurate details in their recalled events at the time of remembering but may have later altered their perception and believed they were guessing when their errors were pointed out to them.

In summary, findings from my retelling paradigm suggest that subtle social cues from the social interaction, individual factors such as personality traits and motivational characteristics, types of details and various cognitive mechanisms
influenced intrinsic variability. In the next section I discuss my findings from the social contagion paradigm.

**Social Contagion Paradigm**

In the second phase of my thesis I used the social contagion paradigm for autobiographical memory to examine influences on and characteristics of changes in autobiographical memory due to social contagion. The social contagion paradigm differed from the retelling paradigm in that whereas in the retelling paradigm the focus was on variability across memory retellings with the *self* as the primary source of contagion when no contagion was introduced, in the social contagion paradigm the focus was on variability across memory retellings with the *other* as the primary source of contagion.

Participants reported memories of the same types of events as used in the retelling paradigm. The most interesting finding to come out of this paradigm was that participants incorporated details into their own accounts of memories of unshared experiences from external sources. Similar to the retelling paradigm, I explored social factors, individual factors, characteristics of the details of contagion and the reasons participants reported for accepting suggested contagion.

**Social Factors**

I demonstrated in Experiments 3b and 4 that social factors influenced changes across retellings due to contagion. Across these two experiments I was able to demonstrate that participants either accepted or did not accept contagion into their own autobiographical memories due to a range of social influences.

Participants accepted suggested contagion into their own personal autobiographical accounts whether the suggested contagion was embedded in transcriptions of their own accounts or presented in an erroneous verbal summary
from a peer confederate. My results are consistent with findings from both the misinformation paradigm and the social contagion paradigm that participants will accept erroneous suggested information into their own memory accounts (e.g., Gabbert et al., 2003; Loftus & Palmer, 1974; Loftus et al., 1978; Loftus & Pickrell, 1995; Meade & Roediger, 2002; Roediger et al., 2001; Wade et al., 2002) That is, when people remember together they can contaminate the other person's memory by what they say (Paterson & Kemp, 2006b). My findings from Experiment 4 built on the findings of Barnier et al. (2008) in that I demonstrated that participants accepted suggested contagion for concrete details rather than just for evaluative statements. This finding can be understood in light of the remembering process in an everyday context where people monitor more for coherence than for accuracy of specific details, which leads people to generally trust what others say if there is no motive to deceive (Gilbert, 1991; Grice, 1975). I speculated that participants may have incorporated erroneous suggested information into their own accounts because they were not certain about the details so they chose to trust the external source.

The notion that trust may have been an important factor in the acceptance of contagion is supported by contrasting findings in Experiments 3b and 4. I found that a higher percentage of participants accepted suggested contagion in Experiment 3b than in Experiment 4. In these two experiments participants may have had varying levels of trust in the source of contagion as the method of contagion was quite different. Trust and source credibility have been identified as important factors in driving the acceptance or rejection of suggested contagion (Dodd & Bradshaw, 1980; Skagerberg & Wright, 2008; Underwood & Pezdek, 1988; Vornik, Sharman, & Garry, 2003). In Experiment 3b the methodology was more similar to the misinformation paradigm than the social contagion paradigm. Meade and Roediger (2002) argued
that misinformation effects are driven by the assumption that information placed in a
narrative is correct because the experimenter presented the information. I can
conclude that trust played an important part in acceptance of suggested contagion
and that participants may have trusted their own transcribed accounts more than a
peer confederate.

A second social influence that may have affected different rates of recall of
suggested contagion is the elicitation method. In Experiment 3b participants were
instructed to respond to specific questioning whereas in Experiment 4 participants
were instructed to respond by free recall. In Experiment 4, although only 20% of
participants freely recalled suggested contagion, almost half of the participants
omitted the suggested contagion detail and the original detail. Previous research has
found that the questioning style of an interview can influence acceptance of suggested
contagion (Fiedler et al., 1996; Loftus, 2005; Roediger et al., 1996; Zaragoza et al.,
2001). Fiedler et al. (1996) found that participants will recall suggested contagion
more when asked direct questions rather than open free recalled questions. My
results indicate that participants in Experiment 4 were perhaps withholding
information they were uncertain about (Goldsmith et al., 2005).

One highly interesting feature noted in Experiment 4 was that social factors
affected participants’ final recall in other ways besides acceptance of suggested
contagion. Specifically, the short interaction with a peer confederate appeared to
shape participants’ subsequent memory recall. Many participants incorporated into
their final recall new information that came from or was triggered by the
confederate’s recalled memories. I identified this phenomenon as verbal contagion
based on Loftus and Greene’s (1980) findings that participants had a tendency to
adopt verbal expressions of another witness when describing facial characteristics to
the experimenter. My findings were consistent with the results of Barnier et al. (2008) in that verbal contagion was more common than suggested contagion. My results are supported by research in the collective memory domain that demonstrates that people display mnemonic convergence in their remembering over time even when information is individually encoded (Cuc et al., 2006; Yamashiro & Hirst, 2014). Participants may have not realised that the details came from the confederate's script. As noted in Chapter 5 (Experiment 4) people can show egocentric memory bias, meaning that they unconsciously claim other people’s memories as their own (Hyman et al., 2014). What is not possible to know from this experiment is whether my participants falsely recalled the verbal contagion or whether the confederate's scripted memory served as a retrieval cue to accurate recall. The brief interaction may have caused the participant to forget some details and recall others. Research has indicated that when people remember together they can affect one another in the information they remember and forget (Harris, Barnier, & Sutton, 2010; Stone et al., 2013).

Participants in the social contagion paradigm were still just as likely to make contradictions due to intrinsic variability when contagion was present indicating that the self was still a potent source of changes across retellings. Of particular note, contradictions due to intrinsic variation, contradictions due to suggested contagion and verbal contagion were all independent from one another in the social contagion paradigm.

Finally, social factors affected participants in ways that had little or nothing to do with memory. Experiment 3b and 4 illustrated the effects of social factors on acquiescence. In Experiment 3b the majority of participants confirmed the accuracy of their transcribed accounts despite the accounts containing erroneous suggested
contagion details. I suspected participants may have been influenced by the social interaction to be compliant, responding in a way that they believed was expected (Cialdini & Goldstein, 2004; Ost et al., 2002; Smeets et al., 2005). Research has suggested that people are more likely to be compliant in social settings (Bond & Smith, 1996), particularly if there is a perceived discrepancy in expertise or power (Cialdini & Goldstein, 2004; Dodd & Bradshaw, 1980; Vornik et al., 2003). Interestingly, no participants in Experiment 4 corrected the confederate in mistakenly summarising their accounts even if they noticed the mistake. Taken together, these results suggest that although participants did not recall suggested contagion they were affected by it.

In summary, my results suggest that social factors influenced contagion in three ways. First, participants incorporated into their own accounts erroneous details that were suggested by an external source. It seemed that varying levels of acceptance appeared to be influenced by the trust in the source of the contagion and by the elicitation method. Second, participants incorporated details into their own accounts that they adopted from the confederate’s memories. Third, although some participants did not recall suggested contagion at their final recall they were willing to go along with the false information when asked to confirm the accuracy of their accounts. The robust influence of social factors across Experiments 3b and 4 illustrate and go beyond the social contagion effect and support the value of Barnier et al.’s (2008) social contagion paradigm for detecting such influences and changes in autobiographical memory. These findings can be interpreted in light of current views on the social functioning of remembering (Alea & Bluck, 2003). Memories that are shared with others are influenced by social goals and interactions.

What is not entirely clear is how social factors interacted with other factors in
influencing acceptance of contagion. I next attempt to clarify the influence social factors exert by examining individual factors and qualities of the details in the next sections.

**Individual Factors**

Across both experiments, individual characteristics influenced acceptance of suggested and verbal contagion. First, in Experiment 3b, I found that participants who scored high on the Gudjonsson Compliance Scale were more likely to confirm the accuracy of their transcribed accounts despite the presence of erroneous suggested contagion details. I did not identify any relationship between compliance scores and whether participants recalled the suggested contagion in the subsequent recall task. This finding supported my prediction that participants who failed to identify erroneous details in their transcribed accounts were driven by compliance. My findings suggest that there was a strong interaction between individual and social factors that affected whether participants accepted suggested contagion. Certain participants were more or less influenced by specific social factors. My findings are consistent with research that aspects of the social interaction can motivate some individuals to be compliant (Cialdini & Goldstein, 2004; Gudjonsson, 1989). Participants who scored high on compliance were willing to confirm the accuracy of their accounts even though they knew some details to be incorrect. However, in contrast to findings in the social contagion literature (Gudjonsson, 1986; Loftus, 2005; Meyersburg et al., 2009; Wright & Livingston-Raper, 2002; Zhu et al., 2010), compliance did not influence recall of suggested contagion. This indicates that compliance may exert different influences for recall of unshared recent events and suggests that compliance and false memory susceptibility may be unrelated in some circumstances.
Second, I identified in Experiment 4 that participants who gave higher ratings on the question, “How important was it to you that the other participant liked you?” also accepted more suggested contagion and verbal contagion from the confederate. This was an interesting finding as it indicated that participants concerned about likability and anxious of evaluation not only accepted erroneous details about their own details but they were also more likely to align their reported memories with the reported memories of the confederate. My finding supported the idea that individual factors are not separate from social factors in influencing contagion (Barnier et al., 2008; Drivdahl & Hyman, 2014.) To interpret my findings, I drew from literature across different disciplines. First, drawing from research in the social contagion and memory conformity literature, higher likability ratings have been correlated with acceptance of suggested contagion (Hope et al., 2008). Furthermore, people with a higher fear of negative evaluation have been identified as more likely to accept contagion from others for information encoded together than people with a lower fear of negative evaluation (Wright et al., 2010). However, my results build on findings from the memory conformity literature in that I differentiate between different kinds of social contagion (verbal contagion versus suggested contagion). Verbal contagion may be explained by research in social psychology has indicated that people engage in behaviours of which others will approve. Specifically Chartrand and Bargh (1999) found that people who mimicked behaviours in a social interaction increased likability ratings from the person they were interacting with. Drawing from these areas of research it can be concluded that suggested and verbal contagion errors were driven by the social function of building rapport with the confederate for participants who were concerned about likability and negative evaluation.

In summary, individual factors influenced suggested contagion and verbal
contagion. These findings can be interpreted in light of current views on the self and social functioning of remembering. Participants reacted to contagion from others in a way that reflected their personality characteristics. In the next section I argue that the characteristics of the contagion details are central to whether contagion is accepted or not accepted.

**Details Susceptible to Contagion Error.** I found that characteristics of the details of suggested and verbal contagion were an important factor in whether participants accepted contagion. Across both Experiments 3b and 4 participants recalled suggested contagion that was plausible and schema consistent. In Experiment 3b, although participants were willing to confirm the accuracy of their accounts when they contained erroneous plausible temporal details and implausible gender details, when participants recalled suggested contagion they only recalled plausible temporal details. No participants recalled implausible gender details. My findings are supported by research that shows that plausibility and schema consistency play an important part in acceptance of suggested contagion (Loftus, 1979b; Kleider, Pezdek, & Goldinger, & Kirk, 2008; Wright & Stroud, 1988). The findings from Experiment 4 yielded similar results. Participants accepted sensory and contextual details but, similar to Experiment 3b, participants recalled suggested contagion that they found plausible and consistent with the gist of their memory. These findings supported results from the original social contagion paradigm that found that participants were much more likely to recall items that were consistent with the household scene than items that were less consistent (Roediger et al., 2001). Similarly, participants recalled verbal contagion only from the same types of events. For example, if participants recalled their first date event they adopted details or the gist from the confederate’s first date script (i.e. rather than from their driving test script).
Confidence

Acceptance of suggested contagion did not impact confidence, clarity or comprehensiveness ratings. In Experiment 4 I found participants who reported high confidence in the accuracy of their memories also reported their memories as clearer and more comprehensive, although this was not at all indicative of the amount of suggested contagion they recalled. Interestingly, however, the presence of suggested contagion appeared to decrease participants’ confidence that the details in their memory account were accurate whether or not they accepted the suggested contagion. Participants were less confident in the accuracy of the details at the second retelling than at the first. My findings may be partly interpreted by participants becoming suspicious of other details in their memory by the presence of suggested contagion. Loftus (1979a) for example, found that participants became more suspicious and alert to any erroneous information once they detected that some suggested contagion had been presented. The notion that confederates’ erroneous summaries influenced participants to be suspicious and doubtful of their own memories supports the assumption that trusting the source plays an important role in suggested contagion.

I also found acceptance of verbal contagion and comprehensiveness ratings were correlated. It is possible the participants believed the confederate cued their memory and aided them to remember more. This finding is consistent with research that indicates that remembering can change individual memory but also can help individuals remember more genuine details thereby increasing comprehensiveness of the memory account (Basden et al., 2000; Harris et al., 2011; Harris et al., 2008; Pasupathi, 2001).

In summary, the presence of contagion (suggested and verbal) had a large
effect on participants’ evaluation of their remembering process. The finding that a
stranger’s erroneous summary of certain detail of the participants’ memory accounts
has such influence over confidence and that a stranger’s summary of their own events
has such an effect on judgments of comprehensiveness even when the event is
unshared and personal is fascinating.

**Elicited Reasons**

Participants reported a number of different reasons in Experiments 3b and 4
for accepting or not accepting suggested contagion. The reasons participants
provided for accepting suggested contagion across both experiments were similar.
Participants attributed their acceptance of suggested contagion to its consistency
with other circumstances of the event and with self-knowledge. I found that
participants did not think contradictions due to suggested contagion were important
if they accepted the suggested contagion. There are two ways to interpret this finding.
As stated earlier, participants may have thought that changes were unimportant
because they were plausible and consistent with the gist of their memory account. An
alternative explanation could be that participants were influenced by a hindsight bias
(Blank et al., 2007). They did not think the details were important because they
needed to make sense of why they had accepted erroneous details into their own
memory.

**Similarities and Differences Between Intrinsic Variability and Contagion**

My findings from the retelling paradigm and the social contagion paradigm
clearly demonstrate that changes across retellings in both the presence and the
absence of contagion are strongly influenced by social factors, individual factors and
by the plausibility of the erroneous details. In this section I take an integrative
approach to examine similarities and differences across findings in both paradigms.
Social Factors

Across both paradigms I found that social factors were a strong influence on both intrinsic variability and variability due to contagion. In the retelling paradigm social factors exerted subtle influences as the primary source of changes was the self rather than others. In contrast, in the social contagion paradigm social factors exerted direct influences as the source of changes was others rather than the self. Across both paradigms changes incorporated from the self and changes incorporated from others were both driven by implicit social factors, based on the selection of information that participants supplied in response to the perceived characteristics and goals of the listener (audience tuning and compliance) and by explicit social factors, based on the specific requests from the listener, such as questioning style (i.e., specific versus free recall or review versus recall).

Across both of these paradigms my findings can be interpreted in light of current views on social functions of remembering. In the presence or absence of contagion, different aspects of the social interaction influenced autobiographical memories that were shared to fulfil social goals.

Individual Factors

Comparing across paradigms I was able to draw some interesting conclusions about the influence of individual factors. First, there was a strong interaction between social and individual factors. Second, the interaction between social and individual factors varied based on personality characteristics. Specifically there were differences in whether personality characteristics were more stable and trait-like (internally driven) or whether personality characteristics were more context-aligned and motivational (situationally driven). Participants who scored high on more stable trait-like personality characteristics appeared to be affected indirectly by social
influence. Participants aligned their narrative to their personality regardless of the social interaction. Participants high on social closeness said more due to their natural inclination to talk more; participants high on alienation and aggression said less, but this was not related to the specific social interaction. People with dissociative tendencies made more contradictions (in Experiment 3a) but this was not related to whether they accepted suggested contagion (in Experiment 3b).

In contrast, participants high on social desirability or compliance, and those more concerned with negative evaluation appeared to be driven by motivation and were directly affected by the social interaction. Social desirability was related to inflated confidence and compliance to acquiescence. Concern of negative evaluation was related to increased acceptance of suggested and verbal contagion. Taken together these findings indicate that stable individual characteristics and motivational styles are influenced by social factors in different ways. Stable individual characteristics appear to be proactive to social factors whereas motivational styles appear to be reactive to social factors.

Across both paradigms the influence of individual factors on intrinsic variability and variability due to contagion in memory can be interpreted in light of research on the self and social function of remembering (Alea & Bluck, 2003; Bluck & Alea, 2011; Bluck et al., 2005; Harris et al., 2014).

**Confidence**

Across both paradigms I found that although participants reported high confidence in the accuracy of their memories and rated their clarity and comprehensiveness highly, this was generally not related to the number of contradictions they made. In both paradigms the clearer participants rated their memory to be for the event, the more confident they were in the accuracy of the
Moreover, I found differences in confidence ratings across the two paradigms. In the retelling paradigm participants remained equally confident in the accuracy of their accounts across both retellings. In contrast, in the social contagion paradigm participants were less confident of the accuracy of the details of their accounts after hearing suggested contagion from the confederate whether they accepted the suggested contagion or not. My findings indicate that errors from others have more effect on confidence ratings than internally driven errors from the self.

**Characteristics of Details**

I identified the plausibility of the details as fundamental to changes due to intrinsic variability and contagion. Participants made contradictions due to intrinsic variation that were the same types of contradictions due to suggested contagion. These were details they identified as plausible, peripheral and schema-consistent. Participants did not make contradictions in the absence or presence of contagion in more implausible details such as the gender of the instructor. This is a very important finding as it indicates that regardless of whether the contagion was introduced or not participants only made changes that aligned with their narrative. This finding questions the widespread view of the dangers of contagion on memory. My findings appear to indicate that people make changes across retellings and will insert certain plausible, peripheral details into their autobiographical memory retellings that support their narratives regardless of whether details came from within (the self) or from an external source (others).

In summary, these results lead me to conclude that social and individual factors regulate changes in details incorporated from different sources that align with
the individual's narrative. In the next section I turn to theoretical frameworks within which to interpret my findings.

Theoretical Frameworks

Schematisation

Schema reliance appeared to be one driving force for changes across retellings in the absence and presence of contagion. Consistent with past literature participants appeared to make changes in details across their accounts that appeared to match their schemas (e.g., Henkel & Mather, 2007; Kleider et al., 2008; Roediger et al., 2001). When participants made contradictions across their two retellings it was because they guessed at details by relying on their own personal schemas rather than by misremembering. This applied equally for contradictions due to intrinsic variability and contradictions due to suggested contagion. Across both paradigms, participants reported that they erroneously reported details across retellings due to relying on either the circumstances of the event or on self-knowledge. Participants therefore trusted their own schemas enough to accept congruent details either from the self or from others.

Schemas can be individual and linked to individual specific representations affected by personal experiences and personality characteristics but they also can be shared and linked to more general representations affected by shared similar experiences (Hirst & Echterhoff, 2012; Wertsch, 2008). This distinction between individual and shared schemas assists in explaining differences in acceptance of suggested contagion and verbal contagion, and aids in explaining my findings in the context of social contagion research. When participants made contradictions due to suggested contagion it was because the external source (confederate or transcribed account) provided information that aligned with their individual schema. Although
trusting the external source may have been an important factor in accepting suggested contagion, the trust was placed in how well the external source retained the information given by the participant rather than in the information the external source knew independently of the participant. In contrast, when verbal contagion was accepted participants chose to trust the schema of the source of contagion. The trust was placed in the external source’s knowledge, which was assumed to be shared and trusted, rather than the external source’s memory retention skills. Drawing on Barnier et al.’s (2008) multi-dimensional framework for shared and unshared remembering, when people remember together they rely on similar schemas for the event. Participants may have trusted the confederate to fill in gaps in their memory because although the elicited events such as high school formal or end of high school exam were not shared, the events were still similar. I assume participants felt they could update their memories using shared schemas. In this way, participants may have viewed the confederate as an “expert” in similar types of experiences (Barnier et al., 2008). Research has found expertise to be a powerful influence in changing memory (Allan et al., 2012; French et al., 2011; Gabbert et al., 2007; Koppel et al., 2014).

The concept of individual and shared schemas aids in explaining the differences in uptake of suggested contagion and verbal contagion. As noted previously participants accepted much more verbal contagion than suggested contagion. I can interpret my findings by concluding that verbal contagion was influenced by shared schemas and therefore easier to integrate into participants’ retellings, whereas suggested contagion was influenced by individual schemas so therefore more difficult to integrate. My findings demonstrate that social contagion manifests in different ways when the memory material is more complicated and
personal. My results highlight that autobiographical memory may be moulded by social contagion in ways that cannot necessarily be inferred from studying simple memory material.

**Variation Thresholds**

Across both paradigms participants made omissions, additions and contradictions in their two autobiographical accounts. Experiments 1 and 2 demonstrated that despite these changes across retellings and some variability between conditions and individuals, the amount participants recalled across both of their retellings remained constant. These results illustrate the reconstructive nature of autobiographical memory (Conway & Pleydell-Pearce, 2000; Rubin, 1995). They also provide evidence that changes due to intrinsic variation and social contagion are important to support the narrative drive of autobiographical memory. Although people forget specific details (Michaelian, 2011; Reyna & Brainerd, 2011; Schacter, 2001), they still need to maintain narrative abilities for social interaction (Fivush et al., 2011; Habermas & de Silveira, 2008; Nelson & Fivush, 2004). When people retell their experiences of events they need different strategies to cope with gaps in their memory to preserve their narrative. When old details from an initial retelling are forgotten or omitted new details are inserted from the self or from others to maintain the narrative coherence over a repeated retelling (Conway, 2005; Conway et al., 2004;). Details incorporated from the self and details incorporated from others both serve to fill in forgotten gaps by updating memories at each retrieval.

Specificity of detail is therefore fundamental to the scaffolding of a coherent narrative. This specificity in elaborative recall is an important aspect of social interaction (Nelson & Fivush, 2004), yet relaying the truth remains an important aspect of social interaction as well (Grice, 1975). The consequence is that people are
continually grappling with modulating the specificity of detail necessary for narrative completeness with correspondence with the past. Depending on the social demands, and on the individual characteristics of the person, specificity of detail may be more or less important. To retain the specificity of their narratives when details are forgotten, participants may resort to relying on schemas to generate the necessary details needed to support the narrative. This indicates that the balance between the completeness of the narrative and its correspondence with the past is dependent on varying thresholds across different individuals and social settings. People will have higher or lower thresholds for inaccuracy from the self or from other external sources based on their need to provide complete narratives versus their need to be accurate.

My results indicate that people generally have a higher need for narrative completeness in a social setting. Factors such as speaking rather than writing or typing memories, the presence of a listener, and specific questioning versus free recall all lead to increasing the pressure for narrative completeness and to an increase in the threshold for inaccuracy.

My results suggest that some people may have a higher threshold for inaccurate details than others. People with certain personality characteristics may be more sensitive to social interaction. These people may therefore have a higher drive for narrative completeness and thus a higher inaccuracy threshold for specific details. My results suggest that a higher threshold for inaccuracy is tolerated for acquiescence (acceptance through inaction) of incorrect details in participants’ own personal accounts, but that the threshold decreases when individuals are expected to recall information that they know to be incorrect. A higher threshold for inaccuracy was tolerated for verbal contagion where schemas were shared. Participants were willing to trust shared schemas, but the threshold for inaccuracy was lowered when
participants had to trust others with their own individual schemas. Participants who were particularly socially motivated to react to the perceived expectations of the social interaction had a higher threshold for inaccuracy. For example, participants high on compliance were willing to go along with incorrect information, participants high on social desirability exhibited inflated confidence and participants concerned of negative evaluation accepted suggested contagion and incorporated details or the gist from the confederate’s script. Finally, many participants tolerated contradictions due to intrinsic variability from the self and contradictions due to suggested contagion for plausible schema consistent details. Taken together, these findings imply that precedence in reporting the amount and types of detail across memory retellings served interrelated social and individual purposes. The resultant outcome is different thresholds among individuals and settings.

Function and Nature of Memory

My findings from both paradigms are consistent with the functional approach to remembering in an everyday social setting (Alea & Bluck, 2003). The directive function of obtaining accuracy in specific details is only one of different functional motivations for remembering (Alea & Bluck, 2003; Bluck & Alea, 2011; Bluck et al., 2005; Harris et al., 2014, Pillemer, 1992, 2003). Remembering also is important for social bonding and maintaining a coherent sense of self. The consistent variation between participants and across retellings may have been due to different functional motivations for outcomes. Taking a functional approach to remembering may explain why participants who placed high importance on being liked by the confederate were also the ones most likely to accept suggested and adopt verbal contagion from the confederate, or why participants generally did not believe that their contradictions impacted the accuracy of their account as a whole. It could be that social bonding and
coherence of self were the most prevalent goal for these participants rather than accurately reporting specific details.

Taking the functional approach can not only explain differences between participants but also can aid to explain changes made across retellings. Participants may have provided details that vary across their retellings for three different reasons. First, they may have been motivated by social pressures to respond a certain way to their audience. The balance may have primarily fallen on completeness of narrative driven by the social function of remembering. Participants may have told their memories with a number of different goals besides accuracy. They may have wanted to impress, entertain or conform (Bond & Smith, 1996; Cialdini & Goldstein; 2004; Ost et al., 2002; Smeets et al., 2005). Second, they may have guessed at correct details that they infer to be correct. Participants may have inserted details that were most aligned to their self-identity and general schema knowledge. Third, they may have misremembered details across retellings. Participants may rely on these different strategies for providing specific details depending on the changing functions and goals of autobiographical memory recall.

What remains unclear is why participants did not strive for accuracy in the experiment when I instructed them to do so. Across my experiments participants were primed to take a more directive approach than in their normal everyday social setting, yet they still made contradictions across retellings. In the experimental context of this research participants were instructed to include as many details as they could but to not make up details or fill in spaces with details they did not actually remember. Participants may have thought they were following instructions as they reported high confidence in the accuracy of the details of their memory. Although participants most likely had a lower threshold for accuracy of details because of
social function of remembering, results suggest that people in actuality may be unable to switch between functions based on the specific demands of the setting (Nisbett & Decamp Wilson, 1977). This is because the function of memory is also intertwined with the nature of autobiographical memory.

As previously noted, social narratives are a recognised feature of autobiographical remembering (Fivush et al., 2011; Habermas & de Silveira, 2008; Nelson & Fivush, 2004). Yet many details are not encoded of the experienced event and many others are forgotten (Michaelian, 2011; Schacter, 2001; Simons, 2007). If the setting demands complete detailed narratives across retellings it is reasonable to assume that either completeness or accuracy will be compromised. The different functions of autobiographical memory are balanced by the working self in the Self Memory System (SMS). The balance lies between a drive for correspondence to represent reality in cognitively efficient ways and a drive for coherence to retain knowledge in such a way as to support a coherent and effective self (Conway & Pleydell-Pearce, 2000; Conway et al., 2004; Conway, 2005). The memories of unshared personal experiences elicited in my experiments may have been already been encoded and previously retrieved in ways that best served the participants’ past goals. These past goals may have been primarily driven by coherence. This coherence of autobiographical accounts is important for serving the self and building social relationships in an everyday setting where a higher threshold for inaccuracy is often tolerated (Alea & Bluck, 2003; Bluck et al., 2005; Harris et al., 2011; Misztal, 2003). However, when I changed the demands of the setting to focus more on accuracy (by asking participants to be as detailed as possible but to only report details that they remember and not to make up details or fill in spaces with details they did not remember), the working self worked towards the drive for correspondence to adapt
to the directive function although due to previous goals, the specific details may have been already lost or not encoded in the first place. Conway and Pleydell Pearce (2001) noted that autobiographical memories align with goals. If the self knowledge contradicts the goal, the goal cannot be maintained. The memories change to align with the goals. This interaction between the drive, function and setting then may lead to dependence on the clarity of qualitative characteristics of memory and increased confidence in the accuracy of details with little insight into the reasons why changes are made across retellings (Nisbett & Decamp Wilson, 1977). Participants' observations that their contradictions were unimportant may be attributed to the working self’s alignment of goals towards coherence in an attempt to minimise cognitive dissonance.

Although I did not specifically prime participants for a forensic setting. My theoretical interpretation is supported by other research, such as Strange et al. (2014) who did prime participants in this way by instructing participants to imagine that they were the suspect in a crime and were being questioned by police concerning their alibi. Despite the priming instructions, Strange et al. found participants made errors across their two recalls when attempting to provide specific precise information.

The conflict in different needs for remembering presents a significant dilemma in real world settings where function and context do not align. It is not unusual for eyewitnesses or suspects to be unaware of the significance of what they saw at the time of encoding. A witness may have been in the vicinity of a theft or assault and not comprehended the significance of details of the event until some time after the event has occurred and an investigation is launched (Kassam et al., 2009). Memory that has been encoded and shared for social purposes is suddenly expected to adhere to
forensic standards. My research suggests that people have a desire to follow instructions. They will generally provide compete detailed recall and remain confident of the accuracy of the details even when some of those details are incorrect.

Confidence in memory can be attributed to successful reliance of memories in the past (Boyer, 2009). However, memory in everyday settings is not scrutinised for accuracy of each detail. The differences in social remembering across settings can materialise in incorrect beliefs and perceptions that can lead to significant problems in the forensic setting.

**Theoretical Model**

Figure 6.1 provides a model of how changes across retellings may arise. The source of error from the “self” or “others” appears to be interrelated. Changes across retellings whether from the self or from others are influenced by different functions and drives of remembering. They are balanced by varying aspects of the social interaction and individual factors.

First where remembering is primarily influenced by the social function (Alea & Bluck, 2003; Bluck et al., 2005), tolerance for inaccuracy may be high. Changes across retellings may occur because participants are ‘audience tuning’ (Echterhoff et al., 2008, 2009). Telling an entertaining story by embellishing details or maintaining fluidity of conversation by accepting contagion may take precedence over accuracy. My results from Experiments 1, 2 and 3b support this notion. Participants recalled the most discrepant information when they told their memory to a listener. Participants also agreed with contradictory information even though they knew it to be untrue.
Second, changes across retellings may also be influenced primarily by the self function (Bluck et al., 2005). People may fill in gaps with details that are most congruent with the self (Bluck, 2003; Bluck & Alea, 2008; McAdams, 2001). This may happen irrespective of whether the details come from the self or from contagion. In this situation, people may guess or confabulate details to maintain a coherent self (Conway & Pleydell-Pearce, 2001). This would be driven primarily by the person’s self-schema and their personal interpretation of previous experiences (Petersen, Stahlberg, & Dauenheimer, 2000). My findings from Experiments 3a, 3b and 4 support this notion. Participants recalled information they reported was most congruent with their self-schemas.
Finally, people may be influenced by the directive function (Bluck & Alea, 2003) to remember specific details when the threshold for inaccuracy is low. A drive for correspondence (Conway et al., 2004) over coherence may result in misremembering details that previously might have been important in generating a complete social narrative for past social and self functions. People will attempt to report details that they believe they actually remember based on source monitoring judgments (Johnson et al., 1993; Mitchel & Johnson, 2000). In this situation, individuals may falsely believe they witnessed details as they may vividly recall certain details. My findings from Experiments 1, 2, 3b and 4 support this notion. Participants reported high confidence in the accuracy of details despite the number of contradictions they made.

Figure 6.1 shows that people have different thresholds for these three changes across retellings due to different aspects of the social situation (such as face to face communication, comfort levels and likability of speaker) and individual factors (such as different personalities: social closeness, alienation, aggression and dissociation, and different motivational styles: social desirability and compliance).

Using this model one can hypothesise that although individuals may provide very detailed memory reports, there are many factors that can lead to more or less autobiographical memory variability across retellings. Understanding the social and individual factors at play can assist researchers and practitioners to: (1) understand changes across memory reports, and (2) structure and personalise interviews that require elicitation of repeated autobiographical memory reports. This model may prove useful to those who work in forensic settings such as the asylum seeking process where memory report variability can lead serious repercussions.


**General Findings, Implications to the Forensic Context, and Extension of Previous Cognitive Findings**

My overall results indicate that autobiographical memories of personal unshared events change significantly when retold just one week later in the absence or presence of contagion. Across all five experiments, I found that autobiographical memory accounts changed just seven days after their first retelling. Participants made omissions and additions and most made contradictions. My findings are in conflict with the commonly held belief, and the expectation of the forensic setting, that witnesses should be able to provide error-free memory accounts that do not vary across retellings (Blinka, 2010; Herlihy et al., 2012; Read, 2007; Simon, 2012).

Second, the amount of detail participants recalled was not related to the amount of contradictions they made across the two retellings. Participants provided specific details such as specific articles of clothing, exact times, and number of people who were present and frequently contradicted themselves in these specific details at their second retellings. As highlighted, specific detail and accuracy often work against each other (Koriat & Goldsmith, 1996). Although immediate retellings may correlate with correspondence, detailed accounts are driven by the self and social functions over time. Therefore, an expectation of complete, detailed, error-free recall over retellings can be problematic. My findings further highlight that just because a person may be more likely to socially connect and supply more details this does not indicate that they are any more likely to supply correct details compared to someone who may be less likely to socially connect and supply less detail. My findings are in conflict with the identified public perception that detailed memory indicates accuracy (Conway et al., 2014; Bell & Loftus, 1989) and that credible witnesses should be able to provide
accurate memory accounts that are complete and detailed across retellings (Herlihy et al., 2002; Herlihy et al., 2012; Read, 2007).

Third, participants across all experiments gave high confidence ratings that the details of their memory were accurate. Participants who found their memory accounts clearer and more comprehensive were also more confident in the accuracy of the details of their accounts, yet this was not an indication of the number of contradictions participants made. My results showed that confidence is influenced by other factors such as discussion with others and social desirability motivations that were not related to the number of contradictions a person made. Comprehensiveness on the other hand was linked to how much verbatim or gist they adopted from the other person in the social interaction. My findings conflict with the public perception that high confidence, clarity and comprehensiveness ratings are an indication of accuracy and reliability (Brewer & Burke, 2002; Conway et al., 2014; Keoh & Markham, 1998; Penrod & Cutler, 1995; Simons & Chabris, 2011).

Fourth, my results indicate that people may be very poor at aligning their beliefs in their ability to remember at the time of remembering with their beliefs in their ability to remember in hindsight. Specifically, although participants freely elicited specific details from memory of their past events and reported high confidence that the details were accurate, when their contradictions were pointed out, participants did not think they were important nor did they feel it impacted the accuracy of their accounts. This indicates the possibility that witnesses may not be able to report why they made errors across testimonies.

Finally, my research suggests that variation across retellings is normal and should be expected. Most importantly, my results also indicate that variation thresholds for errors across retellings exist and vary in different individuals and
social settings. Participants were influenced by social and individual factors and individual and shared schemas for tolerance of inaccuracy. This implies that there will be a range of individual differences among witnesses across varying social interactions but offers a wide array of new potential directions in future research.

My thesis research provides novel findings for forensically driven cognitive research. Although the malleability of autobiographical memory is well recognised in cognitive psychology, this is the first body of work (to my knowledge) that examined intrinsic variation of memory accounts across retellings in the same context as variation of memory accounts due to misinformation and social contagion. The highly detailed memory accounts that I gathered offered data high in external validity and extended previous cognitive findings. My thesis makes a significant contribution to the forensic applied context by illustrating the importance of measuring individual variation thresholds when examining changes across autobiographical memory retellings. This finding is highly important and relevant to the asylum seeking process and to gathering witness testimony where individuals are expected to provide detailed unchanging personal autobiographical accounts across multiple retellings.

In general, my research suggests there still exists a significant gap between knowledge in the research setting and in the forensic setting. Specifically, assumptions and standards are applied to groups as a whole with little regard for varying thresholds.

**Limitations and Future Direction**

The idiosyncratic nature of autobiographical memory that made it so fascinating to study also led to limitations within my project. The biggest general limitation of this program of research is that I had no way of knowing if contradictions were an indication of inaccuracy (Drivdahl & Hyman, 2014). As I was
not there when participants encoded the details of the event I cannot be certain that all coded contradictions were indeed direct contradictions. My coding judgment was reassured by participants who later commented on their contradictions in Experiments 3a and 4. Not a single participant corrected my identification by suggesting their contradiction was in actuality merely an addition (e.g., the shirt was actually red and blue-striped rather than either blue or red). Although participants confirmed these were contradictory details, my research has highlighted that shifts in details across retellings are normal. This raises methodological issues on how to assess and score contradictions in settings where specific concrete details are crucial.

A second limitation was the low number of participants across my studies. I faced many challenges in the collection and interpretation of my data. Gathering and coding detailed autobiographical accounts from participants posed significant challenges. First, recruitment was challenging. Participants were required to commit to participating in two or three sessions and there were a number of participants who did not return for their subsequent sessions in the time period indicated. Second, the different testing sessions meant that it took a considerable amount of time for each experiment to be completed. Third, technical difficulties posed a problem. Due to the highly detailed accounts I gathered, it was imperative that all participants in the spoken conditions (in Experiments 1, 2, and 3) were clearly audible. If audio recordings that were not clearly audible they could not be used. Finally, the time it took to transcribe (Experiments 1 and 3) and code data from all experiments was extremely labour intensive. For example, in Experiment 2, each participant on average generated 10 pages of their memories. I therefore had approximately 360 pages to code in Experiment 2. It would have been extremely difficult to complete this thesis in a timely manner if I had minimum of 20 participants per cell in each study
with the very detailed data I gathered. My primary aim was to contribute to the forensic applied setting and therefore it was imperative I attained the highest level of external validity I could achieve, which unfortunately came at a cost to sample size. It is also important to note that accounts I gathered were very detailed. Therefore, some data analyses were similar to qualitative analysis or case studies. As mentioned in each study, due to the low sample size yet highly detailed accounts attained, an alternative way to consider experimental power in this thesis was in terms of the number of memory accounts analysed.

A third limitation was that because participants recalled unshared autobiographical events, it was difficult for me to establish control conditions in my social contagion paradigm. The difficulty in establishing clear contagion and control events became apparent in my early experiments, where it was revealed that social contagion of autobiographical memory can be direct from misinformation or indirect and influenced by a variety of internal individual and external social factors. As in the original paradigm, for half of the autobiographical accounts the confederate introduced contagion items. Each participant recalled two events where contagion items had been introduced and two events where no contagion items had been introduced. My contagion event containing a sensory contagion item was, when possible, the first date. My contagion event containing the contextual detail was, when possible, the high school certificate exam. My control events, when possible, were 18th birthday and high school formal. The reason I chose these control events was because birthday event memories frequently provided similar sensory details to first date (e.g., similar types of clothing), and high school formal accounts frequently included similar contextual details to high school certificate exam (e.g., school location).
A fourth limitation, which I noted above was that perhaps I did not prime participants adequately enough for a forensic setting. It is possible that participants would be motivated to make fewer contradictions if primed for a forensic context. It would be interesting for future studies to prime participants for a forensic setting by instructing them to imagine they were providing a witness report for the police thereby permitting a better investigation of the interaction of social and individual factors on memory retelling when better primed for a directive function.

Although misremembering does not usually cause significant problems in a everyday setting, the same processes govern our memory in a legal setting. Although the effects of contagion are well recognised in the forensic context, they have been oversimplified. My results demonstrate that people make contradictions due to intrinsic variability and contagion. It is not only exposure to contagion that poses the problem but the varying individual and social factors that influence the acceptance of information from the self and from others. My research suggests that future studies should incorporate these important factors when assessing social influence on memory retellings. Variability across retellings is normal and should be expected particularly if the expectation is to attain large amounts of specific detail. However, my research suggests that thresholds can be identified. Future research should concentrate on variation thresholds for inaccuracy across individuals and settings to investigate general patterns and to determine how much change matters.

**Conclusion**

In conclusion, autobiographical memory is complicated. Variation across retellings is inevitable due to the central narrative feature in social remembering. Whether variation is intrinsic or due to contagion, the balance totters between a desire for completeness of narrative and accurate correspondence with the past.
Motivational style, personality characteristics, aspects of the social interaction and types of detail affect the balance. My results imply that social and individual factors and reliance on individual and shared schemas drive the social contagion effect. This suggests that susceptibility to contagion cannot be adequately captured in research studying simple shared material. Variation in peripheral details across autobiographical memory accounts should be viewed primarily as supporting the needs of the social narrative for remembering with others rather than as deviations from the truth. It is the pattern and nature of changes that is fundamental to deciding on the “truthfulness” of accounts across retellings.
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Appendix A
Materials Used in Experiment 1

Participant Information and Consent Form.................................310
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Remembering Life Events

You are invited to participate in a study of individual differences in the recollection of autobiographical events. Across this experiment we hope to learn whether and in what ways different factors influence individuals’ memory of events that happened in the past. You have been selected as a possible participant in this research because you volunteered for participation in response to our advertisement on SONA.

If you decide to participate the experimenter will ask you to elicit specified memories from your life. You will be asked to rate these memories on a number of scales. You may then be asked to discuss these memories with other participants. Note, however, that when you are asked to recall these memories you will NOT be asked to reveal any highly personal or confidential details about yourself. If you give your permission, this session may be audio recorded. You will be asked before we turn the tape recorder on, and advised when it is turned off. During the session, you will be given an opportunity to describe your experiences and reactions to the procedure. You will fully debriefed at the end of the experiment.

The experiment will take place over the course of two days: Each session will last approximately 30 minutes. In return you will be learning about the process of psychological research and you will receive 2 credits for Psychology 246. It is not expected that you will experience any discomfort or inconvenience from your participation today. However, some of the memories you recall may lead you to experience different feelings (including positive and negative moods). Although the effects of these moods are usually temporary, you may stop the experiment and withdraw your consent without penalty at any time should you feel uncomfortable recalling these memories.

If you have memories that make you feel uncomfortable or upset to talk about, you should consider getting some counselling to help you cope with your feelings. There is free counselling available 24 hours a day by phone through Lifeline (phone 13 11 14). Alternatively, the Psychology Clinic at Macquarie University has a bookable counselling service (phone 9850 8000, or website http://www.psy.mq.edu.au/clinic.htm) or a comprehensive list of clinical psychologists is available through the Australian Psychological Society (phone 1800 333 497, or website http://www.psychology.org.au). The experimenter can give you further information about these services or assist you in contacting them if you wish.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or except as required by law. If you give us your permission by signing this document, we plan to publish the findings of the research in academic journals and/or present the findings at professional conferences and/or report the findings to the Australian Research Council. In any publication, information will be provided in such a way that you cannot be identified.

If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without having to give a reason and without consequence. This means that if you choose to withdraw, you will still receive credit.

This research is being conducted by Misia Temler from the Macquarie Centre for Cognitive Science to meet the requirements of the degree of PhD in Cognitive Science, under the supervision of Associate Professor Amanda Barnier. It is part of a larger project funded by the Australian Research Council and being conducted by Associate Professor Amanda Barnier (MACCS) and Associate Professor John Sutton (Philosophy Department). If you have any questions, please feel free to ask at any time during the experimental session. If you have any additional questions later, or would like to know about the outcomes of the research, please contact Misia Temler (9850 4133, mtemler@maccs.mq.edu.au) or Amanda Barnier (9850 4861, abarnier@maccs.mq.edu.au).

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or
reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.
MACQUARIE CENTRE FOR COGNITIVE SCIENCE

CONSENT FORM

Remembering Life Events

1. I, .................................................................................................................... of
   ..................................................................................................................,
   aged ............................................................................................................., aged
   ...........................................................................................................years, agree to participate as a subject in the experiment described in the
   Participant Information Statement set out above.

2. I acknowledge that I have read the Participant Information Statement, which explains the aims of the
   experiment and the nature and the possible risks of the investigation, and the statement has been
   explained to me to my satisfaction.

3. Before signing this Consent Form, I have been given the opportunity to ask any questions relating to
   any possible physical and mental harm I might suffer as a result of my participation. I have received
   satisfactory answers to any questions that I have asked.

4. I understand that I can withdraw from the experiment at any time without giving a reason and
   without prejudice to my relationship to Macquarie University.

5. I agree that research data gathered from the results of the study may be published, provided that I
   cannot be identified.

6. I understand that if I have any questions relating to my participation in this research, I may contact
   Dr Amanda Barnier on telephone (02) 9850 4861, who will be happy to answer them.

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics
Committee. If you have any complaints or reservations about any ethical aspect of your participation in this
research, you may contact the Committee through the Director, Research Ethics (telephone (02) 9850 7854;
email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you
will be informed of the outcome.

________________________  ____________________________
Signature of participant   Signature of witness

Please PRINT name   Please PRINT name

________________________  ____________________________
Date   Nature of witness
WITHDRAWAL OF CONSENT

I hereby wish to WITHDRAW my consent to participate in the research proposal described above and understand that such withdrawal WILL NOT jeopardise any treatment or my relationship with Macquarie University.

________________________
Signature

___________________________
Date

Please PRINT name
Confidence, Clarity and Discussion Scale

How confident are you that the details of your memory are correct? (1=not confident, 10=extremely confident)
1 2 3 4 5 6 7 8 9 10

How clear is your memory for this event? (1=very vague, 10=very clear)
1 2 3 4 5 6 7 8 9 10

How much have you talked about this event with other people in general? (1=not at all, 10=a great deal)
1 2 3 4 5 6 7 8 9 10
Coding Scheme Used in Experiment 1 and Adapted for Experiments 2 and 4.

**CONTRADICTIONS** - Contradictions are defined as discrepant details used to describe the same experience across accounts. Contradictions were scored based on participants saying something in session two different and discrepant to what they said in session one. For example, if the participants said “she wore a green dress” in session one and then said “she wore a purple dress” in session two, this would be counted as 1 contradiction. However, if the participant said “she wore a green dress and gold shoes” in session one and then said “she wore a purple dress and silver shoes” in session two, this would be counted as 2 contradictions.

**Conflicting sensory details** - Discrepancies in sensory impressions such as what the participant saw, smelled, tasted and/or touched during the recalled event across the two sessions (e.g.; “he wore a red shirt” vs. “he wore a blue shirt”; “it was sunny” vs. “it was cloudy”), heard (e.g., “I remember hearing house music” vs. “I remember hearing country music”), tasted (“they served me beef” vs. “they served me chicken”; “I ordered red wine” vs. “I ordered white wine”) or touched (e.g., “I remember walking on the tiled floor” vs. “I remember it was a carpet”).

**Conflicting contextual details** - Discrepancies in any location across the two sessions (e.g., “I went home after work” vs. “I went straight out after work”; “the restaurant was in Leichardt” vs. “the restaurant was in the city”) or spatial contextual details (e.g., “I sat in the front” vs. “I sat in the back”; “the music played inside” vs. “the music was playing outside”; “the dance floor was in the middle” vs. “the dance floor was to the left”).

**Conflicting temporal details** - Discrepancies in temporal details across the two sessions. These discrepancies can include different perceptions of time, (e.g., “time went quickly” vs. “time went slowly”; “the test took me 15 minutes” vs. “the test took me 30 minutes”); differences in exact times (e.g., “the party started at 6 p.m.” vs. “the party started at 8 p.m.”); different days or months (e.g., “the driving test was Wednesday” vs. “the driving test was Thursday”; “the formal was in October” vs. “the formal was in November”); differences in temporal chronological order (e.g., “we
went for a movie and then met some friends at the bar” vs. “we met some friends at the bar and then went for a movie”).

Conflicting estimation - Discrepancies in exact numerical values of people or items across the two sessions (e.g., “there were 10 of us” vs. “there were 15 of us”; “there were 12 counters” vs. “there were 10 counters”; “there were 5 speeches” vs. “there were 2 speeches”; “I saw three couples” vs. “I saw two couples”; “I received a dozen roses” vs. “I received two dozen roses”).

Conflicting emotional states - Discrepancies in emotional states (how the participant reported feeling) recalled across the two sessions (e.g., “I was very nervous before the test” vs. “I wasn’t nervous before the test”; “I was happy” vs. “I was sad”; “I don’t remember being stressed or anything, it was good” vs. “I was super stressed because I had an assignment”).

Conflicting evaluation - Discrepancies in thoughts of evaluations across the two sessions (e.g., “it was a really fun evening” vs. “the whole night was actually really boring”; “the food was really yummy” vs. “the food wasn’t great”; “he was a really nice guy” vs. “he was quite annoying”).

Different person - Discrepancies in people present at the event across the two accounts in the two sessions. This detail is not to be coded when it appears it could be an addition but only when it appears to be a direct contradiction (e.g., “my best friend Tina and my friend Amy stayed the night” vs. “my boyfriend and Amy stayed the night”; “my mum drove us to the formal” vs. “my dad drove us to the formal”).

Different conversation. Discrepancies in specific conversations (e.g., “I asked her ‘do you like this?’ and she said ‘I don’t know’” vs. “I asked her ‘do you like this?’ and she said ‘no’” or in discussions with others that took place at the same point in time across the two sessions (e.g., “we talked about football at dinner and about our families in the car” vs. “we talked about our families at dinner and then about football in the car”).
**Different action** - Discrepancies in actions across the two sessions (e.g., “I ran” vs. “I walked quickly”; “I emailed” vs. “I called”).

**Conflicting details** - Discrepancies that do not fit under other codes.

**Increase in certainty** - Discrepancies were in certainty of recall across the two sessions. Specifically, this was coded as a contradiction if the participant claimed to remember a detail in session two that s/he previously had stated not to have remembered in session one ( “I don’t remember what he wore”, vs. “he wore a blue shirt”).

**Different memory.** Discrepant memories supplied across the two sessions. Specifically, in this type of contradiction, the participant supplied a memory of a different event in session two as to what he or she supplied in session one (e.g., supplying two different first date experiences with different people across the two sessions).

*Each contradiction can only be identified under one code.*

For example, if participants said “at 5 p.m I received a dozen roses” vs. “at 5:30 p.m I received two dozen carnations”. This would be counted as three contradictions: “5 p.m” vs. “5:30 p.m” would be counted as a temporal contradiction, “dozen” vs. “two dozen” would be counted as an ‘estimation contradiction’, and “roses” vs. “carnation” would be counted as a ‘sensory contradiction’.
Appendix B
# Materials Used in Experiment 2

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Consent Form Used in Experiment 2

MACQUARIE CENTRE FOR COGNITIVE SCIENCE

PARTICIPANT INFORMATION STATEMENT

A Study of Autobiographical Memory

You are invited to participate in a study of individual differences in the recollection of autobiographical events. Across this experiment we hope to learn whether and in what ways different factors influence individuals' memory of events that happened in the past. You have been selected as a possible participant in this research because you volunteered for participation in response to our advertisement on SONA.

If you decide to participate, the experimenter will ask you to elicit specified memories from your life. You will be asked to rate these memories on a number of scales. You may then be asked to discuss these memories with the experimenter. Note, however, that when you are asked to recall these memories you will NOT be asked to reveal any highly personal or confidential details about yourself. If you give your permission, this session may be audio recorded. You will be asked before we turn the tape recorder on, and advised when it is turned off. During the session, you will be given an opportunity to describe your experiences and reactions to the procedure. You will fully debriefed at the end of the experiment.

The experiment will take place over the course of two days: The first session will last 30 minutes. The second session will last 1 hour. In return you will be learning about the process of psychological research and you will receive 3 credits for Psych 246. It is not expected that you will experience any discomfort or inconvenience from your participation today. However, some of the memories you recall may lead you to experience different feelings (including positive and negative moods). Although the effects of these moods are usually temporary, you may stop the experiment and withdraw your consent without penalty at any time should you feel uncomfortable recalling these memories.

If you have memories that make you feel uncomfortable or upset to talk about, you should consider getting some counselling to help you cope with your feelings. There is free counselling available 24 hours a day by phone through Lifeline (phone 13 11 14). Alternatively, the Psychology Clinic at Macquarie University has a bookable counselling service (phone 9850 8000, or website http://www.psy.mq.edu.au/clinic.htm) or a comprehensive list of clinical psychologists is available through the Australian Psychological Society (phone 1800 333 497, or website http://www.psychology.org.au). The experimenter can give you further information about these services or assist you in contacting them if you wish.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or except as required by law. If you give us your permission by signing this document, we plan to publish the findings of the research in academic journals and/or present the findings at professional conferences and/or report the findings to the Australian Research Council. In any publication, information will be provided in such a way that you cannot be identified.

If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without having to give a reason and without consequence. This means that if you choose to withdraw, you will still receive payment.

This research is being conducted by Misia Temler from the Macquarie Centre for Cognitive Science to meet the requirements of the degree of PhD in Cognitive Science, under the supervision of Associate Professor Amanda Barnier. It is part of a larger project funded by the Australian Research Council and being conducted by Associate Professor Amanda Barnier (MACCS) and Associate Professor John Sutton (Philosophy Department). If you have any questions, please feel free to ask at any time during the experimental session. If you have any additional questions later, or would like to know about the
outcomes of the research, please contact Misia Temler (9850 4133, mtemler@macs.mq.edu.au) or Amanda Barnier (9850 4861, abarnier@macs.mq.edu.au).

The ethical aspects of this study have been approved by the Macquarie University Ethics Review Committee (Human Research). If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Ethics Review Committee through its Secretary telephone 9850 7854; email ethics@mq.edu.au. Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.
MACQUARIE CENTRE FOR COGNITIVE SCIENCE

CONSENT FORM

A Study of Autobiographical Memory

1. I, ..................................................................................................... of
                                                                                           aged ......................................years, agree to participate as a subject in the experiment described in the
Participant Information Statement set out above.

2. I acknowledge that I have read the Participant Information Statement, which explains the aims of
the experiment and the nature and the possible risks of the investigation, and the statement has
been explained to me to my satisfaction.

3. Before signing this Consent Form, I have been given the opportunity to ask any questions relating
to any possible physical and mental harm I might suffer as a result of my participation. I have
received satisfactory answers to any questions that I have asked.

4. I understand that I can withdraw from the experiment at any time without giving a reason and
without prejudice to my relationship to Macquarie University.

5. I agree that research data gathered from the results of the study may be published, provided that
I cannot be identified.

6. I understand that if I have any questions relating to my participation in this research, I may
contact Dr Amanda Barnier on telephone (02) 9850 4861, who will be happy to answer them.

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telephone 9850 7854; email ethics@mq.edu.au. Any complaint you make will be treated in confidence
and investigated, and you will be informed of the outcome.

________________________    _________________________
Signature of participant    Signature of witness

________________________    _________________________
Please PRINT name           Please PRINT name

________________________    _________________________
Date                       Nature of witness
WITHDRAWAL OF CONSENT

I hereby wish to **WITHDRAW** my consent to participate in the research proposal described above and understand that such withdrawal **WILL NOT** jeopardise any treatment or my relationship with Macquarie University.

________________________  _________________________
Signature                      Date

Please PRINT name
PANAS Scale Used in Experiment 2

Positive and Negative Affect Scale (PANAS)

This scale consists of a number of different words that describe different feelings or emotions. Read each item and indicate how you are currently feeling, then mark the appropriate answer in the space next to the word.

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<td>very slightly or not at all</td>
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__________ interested       __________ irritable
__________ distressed       __________ alert
__________ excited          __________ ashamed
__________ upset             __________ inspired
__________ strong            __________ nervous
__________ guilty            __________ determined
__________ scared            __________ attentive
__________ hostile           __________ jittery
__________ enthusiastic      __________ active
__________ proud             __________ afraid
Memory Recall Cue Form Used in Experiment 2

Participant Name: ______________________________________________________

Date: ______________________________________________________________

Memory 1:
________________________________________________________________________

Memory 2:
________________________________________________________________________

Memory 3:
________________________________________________________________________

Memory 4:
________________________________________________________________________
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Materials Used in Experiments 3a and 3b

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Consent for Experiment 3

MACQUARIE CENTRE FOR COGNITIVE SCIENCE

PARTICIPANT INFORMATION STATEMENT

A Study of Autobiographical Memory

You are invited to participate in a study of individual differences in the recollection of autobiographical events. Across this experiment we hope to learn whether and in what ways different factors influence individuals’ memory of events that happened in the past. You have been selected as a possible participant in this research because you volunteered for participation in response to our advertisement on SONA.

If you decide to participate the experimenter will ask you to elicit specified details from specified memories from your life. You will be asked to rate these memories on a number of scales. You may then be asked to discuss these memories with the experimenter. Note, however, that when you are asked to recall these memories you will NOT be asked to reveal any highly personal or confidential details about yourself. If you give your permission, this session may be audio recorded. You will be asked before we turn the tape recorder on, and advised when it is turned off. During the session, you will be given an opportunity to describe your experiences and reactions to the procedure. You will fully debriefed at the end of the experiment.

The experiment will take place of the course of three days: The first session will last 60 minutes. The second session will last 30 minutes. You will receive 3 credits for Psych 246 for your participation in the first two sessions that will be rewarded to you at the end of session 2. The third and final session will last 30 minutes and you will receive 10 dollars for your participation. In return you will also be learning about the process of psychological research. It is not expected that you will experience any discomfort or inconvenience from your participation today. However, some of the memories you recall may lead you to experience different feelings (including positive and negative moods). Although the effects of these moods are usually temporary, you may stop the experiment and withdraw your consent without penalty at any time should you feel uncomfortable recalling these memories.

If you have memories that make you feel uncomfortable or upset to talk about, you should consider getting some counselling to help you cope with your feelings. There is free counselling available 24 hours a day by phone through Lifeline (phone 13 11 14). Alternatively, the Psychology Clinic at Macquarie University has a bookable counselling service (phone 9850 8000, or website http://www.psy.mq.edu.au/clinic.htm) or a comprehensive list of clinical psychologists is available through the Australian Psychological Society (phone 1800 333 497, or website http://www.psychology.org.au). The experimenter can give you further information about these services or assist you in contacting them if you wish.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or except as required by law. If you give us your permission by signing this document, we plan to publish the findings of the research in academic journals and/or present the findings at professional conferences and/or report the findings to the Australian Research Council. In any publication, information will be provided in such a way that you cannot be identified.

If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without having to give a reason and without consequence. This means that if you choose to withdraw, you will still receive credit or payment.

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MACQUARIE CENTRE FOR COGNITIVE SCIENCE

CONSENT FORM

A Study of Autobiographical Memory

1. I, ..................................................................................................... of
................................................................................................
...........................................................................................
..............., aged ......................................years, agree to participate as a subject in the experiment described in the
Participant Information Statement set out above.

2. I acknowledge that I have read the Participant Information Statement, which explains the aims of
the experiment and the nature and the possible risks of the investigation, and the statement has been
explained to me to my satisfaction.

3. Before signing this Consent Form, I have been given the opportunity to ask any questions relating to
any possible physical and mental harm I might suffer as a result of my participation. I have received
satisfactory answers to any questions that I have asked.

4. I understand that I can withdraw from the experiment at any time without giving a reason and
without prejudice to my relationship to Macquarie University.

5. I agree that research data gathered from the results of the study may be published, provided that I
cannot be identified.

6. I understand that if I have any questions relating to my participation in this research, I may contact
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email ethics@mq.edu.au. Any complaint you make will be treated in confidence and investigated, and you
will be informed of the outcome.

________________________  ___________________________
Signature of participant   Signature of witness

________________________  ___________________________
Please PRINT name          Please PRINT name

________________________  ___________________________
Date                      Nature of witness
WITHDRAWAL OF CONSENT

I hereby wish to WITHDRAW my consent to participate in the research proposal described above and understand that such withdrawal WILL NOT jeopardise any treatment or my relationship with Macquarie University.

________________________
Signature

________________________
Date

Please PRINT name
Confidence Rating Scale for Session Two Used in Experiment 3a

Confidence, Clarity and Discussion Rating Scale – Session 2

How confident are you that the details of your memory are correct (1=not very confident, 10=very confident)

1 2 3 4 5 6 7 8 9 10

How clear is your memory for this event? (1=very vague, 10=very clear)

1 2 3 4 5 6 7 8 9 10

How comprehensive is your account? (1=not comprehensive, 10=very comprehensive)

1 2 3 4 5 6 7 8 9 10

How much have you talked about this event with other people in general? (1=not at all, 10=very much)

1 2 3 4 5 6 7 8 9 10

Have you looked at pictures from the event since session 1 (e.g. on Facebook)?

___________________________

Have you talked to anyone about this event since our last meeting?

___________________________
Coding Scheme for Experiment 3a

Contradictions

Contradictions are defined as discrepant (contradictory) details used to describe the same experience across accounts. Contradictions are scored based on participants saying something in session two different and discrepant to what they said in session one. For example, if the participants said “she wore a green dress” in session one and then said “she wore a purple dress” in session two, this would be counted as 1 contradiction. However, if the participant said “she wore a green dress and gold shoes” in session one and then said “she wore a purple dress and silver shoes” in session two, this would be counted as 2 contradictions.

There are ten categories that contradictions can be coded in. Each contradiction can only be coded in one category.

Who. These details were gathered when answering the question, “Who was at the event?” Participants made contradictions when they relayed discrepant information across their two sessions on who was present at the event (e.g., “there were five people” vs. “there were three people” or “John was my date” vs. “Andrew was my date”).

Appearance. These details were gathered when answering the question, “What did they look like?” Participants made contradictions when they relayed discrepant information across their two sessions on the appearance of a person, which did not include clothing (e.g., “she was in her twenties” vs. “she was in her thirties”; “he was bald” vs. “he had short black hair”; “she was short” vs. “she was tall”).

Clothing. These details were gathered when answering the question, “What were they wearing?” Participants made contradictions when they relayed discrepant information across their two sessions on how the person(s) was/were dressed (e.g., “he wore a black shirt” vs. “he wore a brown shirt”; “I wore a blue dress” vs. “I wore a yellow top”). ‘Blue dress’ and ‘yellow top’ would be coded as 2 clothing contradictions.
**Dialogue.** These details were gathered when answering the question, “What dialogue was exchanged?” Participants made contradictions when they relayed discrepant information across their two sessions on what was spoken (e.g., “he said ‘yes’ “ vs. “he said ‘no’ “; “I remember the exact words he used, they were ‘I had a wonderful evening’ ” vs. “I remember the exact words he used, they were ‘I had a nice time’ ”).

**Where.** These details were gathered when answering the question, “Where did the event take place?” Participants made contradictions when they relayed discrepant information across their two sessions on the location of the event (e.g., “the restaurant was in Leichhardt” vs. “the restaurant was in the city”) or how they got there (e.g., “we took a taxi” vs. “we took a bus”).

**When.** These details were gathered when answering the question, “Where did the event take place (date, day, start and finish time)?” Participants made contradictions when they relayed discrepant information across their two sessions on the date, day, start and finish time of the event (e.g., “time went quickly” vs. “time went slowly”; “the test took me 15 minutes” vs. “the test took me 30 minutes”), differences in exact times (e.g., “the party started at 6 p.m” vs. ”the party started at 8 p.m”), different days or months (e.g., “the driving test was Wednesday” vs. “the driving test was Thursday”; “the formal was in October” vs. “the formal was in November”), and differences in temporal chronological order (e.g., “we went for a movie and then met some friends at the bar” vs. “we met some friends at the bar and then went for a movie”).

**Setting.** These details were gathered when answering the question, “What did the setting look like (furniture, layout, props, etc.)?” Participants made contradictions when they relayed discrepant information across their two sessions on the surroundings of the event (e.g., “the carpet was black” vs. “the carpet was grey”; “the chairs were white” vs. “the chairs were silver”; “there were red balloons on the table” vs. “there were pink balloons on the table”; “the dance floor was in the middle” vs. “the dance floor was on the side”).

**Weather.** These details were gathered when answering the question, ”What was the weather like?” Participants made contradictions when they relayed discrepant
information across their two sessions on weather conditions during the event (e.g., “it was sunny” vs. “it was cloudy”; “it was warm” vs. “it was cold”).

**Feel.** These details were gathered when answering the question, “What did you feel during the event?” Participants made contradictions when they relayed discrepant information across their two sessions on their emotional states during the event (e.g., “I was sad” vs. “I was happy”; “I was nervous” vs. “I was not nervous”).

**Think.** These details were gathered when answering the question “What did you think during the event?” Participants made contradictions when they relayed discrepant information across their two sessions on what they thought during the event (e.g., “I thought I would fail” vs. “I thought I would pass”; “I thought it was fun” vs. “I thought it was boring”).
Appendix D
Materials Used in Experiment 4

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Consent Form for Experiment 4

MACQUARIE CENTRE FOR COGNITIVE SCIENCE

PARTICIPANT INFORMATION STATEMENT

A Study of Autobiographical Memory

You are invited to participate in a study of individual differences in the recollection of autobiographical events. Across this experiment we hope to learn whether different factors influence individuals’ memory of events that happened in the past. You have been selected as a possible participant in this research because you volunteered for participation in response to our advertisement on SONA.

If you decide to participate, the experimenter will ask you to elicit specified details from personally significant memories from your life. You will be asked to discuss these memories with another person. Note, however, that when you are asked to recall these memories you will NOT be asked to reveal any highly personal or confidential details about yourself. If you give your permission, this session may be audio recorded. You will be asked before we turn the tape recorder on, and advised when it is turned off. During the session, you will be given an opportunity to describe your experiences and reactions to the procedure. You will fully debriefed at the end of the experiment.

The experiment will take place over the course of 2 days. The first session will last 30 minutes. The second session will last 60 minutes. You will receive 3 credits for Psych 246 for your participation. In return you will also be learning about the process of psychological research. It is not expected that you will experience any discomfort or inconvenience from your participation today. However, some of the memories you recall may lead you to experience different feelings (including positive and negative moods). Although the effects of these moods are usually temporary, you may stop the experiment and withdraw your consent without penalty at any time should you feel uncomfortable recalling these memories.

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MACQUARIE CENTRE FOR COGNITIVE SCIENCE

CONSENT FORM

A Study of Autobiographical Memory

1. I, ................................................................................................................................ of

.................................................................................................................................., aged ........................................ years,
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4. I understand that I can withdraw from the experiment at any time without giving a reason and without
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informed of the outcome.

________________________  ____________________________
Signature of participant    Signature of witness

_________________________  ___________________________
Please PRINT name          Please PRINT name

_________________________  ___________________________
Date                      Nature of witness
WITHDRAWAL OF CONSENT

I hereby wish to WITHDRAW my consent to participate in the research proposal described above and understand that such withdrawal WILL NOT jeopardise any treatment or my relationship with Macquarie University.

________________________
Signature

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Date

Please PRINT name
Confederate Job Advertisement for Experiment 4

RESEARCH ASSISTANT TO PLAY CONFEDERATE IN EXPERIMENT

ARC Centre of Excellence for Cognition and its Disorders (CCD). Department of Cognitive Science, Macquarie University

Work type: Casual   Level: 2

- Join a world class Research Centre and learn about memory

Macquarie University is one of Australia’s leading universities and a leader in research and innovation. It is internationally renowned in its research success. There is plenty of food and shopping and the campus is easily accessible by rail and bus. The Faculty of Human Sciences covers a broad range of disciplines including our Department of Cognitive Science. The Faculty has invested in the ARC Centre of Excellence in Cognition and its Disorders (CCD) as part of their expansion. The ARC CCD in the Department of Cognitive Science is located in The Australian Hearing Hub building which is a newly built air conditioned world-class facility purpose-designed to facilitate collaborative research.

The Role  Experimental Confederate

In your role as a confederate you will be asked to play the part of an “apparent” participant. You will be given thorough instructions and a script to memorise prior to the experiment commencing. During the experimental session will also be inserting changes in the participants’ accounts. You will be trained to ensure that your verbal and behavioural responses are consistent with the experimental protocol and you will be supervised the entire time. Timesheets will be given on a weekly basis and will be between business hours Monday through Friday. Each experimental session is 1 hour long.

Essential Selection Criteria:

- High level of interpersonal and communication skills
- Between the age of 18 and 25
- Reliability and punctuality
- High level of commitment

Desirable Selection Criteria:

- Acting experience, drama background or some acting ability

Enquiries: Please contact Misia Temler on 02 9850 2960 or email misia.temler@mq.edu.au
Confederate’s Script for Experiment 4

First date/romantic outing. I was extremely nervous. I kept thinking that we weren’t going to have anything to say or that I might do or say something stupid. I made sure that I looked good for my date. I wore a black shirt and jeans/I wore a black dress and sliver heels. I picked her up from her house (he picked me up from my house). When I saw my date I got even more nervous, I could hardly say ‘hi’. From my (her) house we went for a movie. After the movie we went to a restaurant where we had some Italian food—which was delicious. I payed for her even though she insisted that I didn’t (he payed for me even though I insisted that he didn’t). We found it a little difficult to make conversation at first, but then slowly we both got more comfortable with each other and we ended up having lots of things to talk about. Considering how nervous I was, I think that it ended up being a good night.

18th Birthday/most recent birthday (if not 18 yet). I was a bit hesitant to have an 18th birthday party, but I ended up having one after my friends kept insisting that I have a party. I had quite a few guests, even though it was just close friends and family. The DJ played all these great songs, so we danced for most of the night. We also played all these drinking games because it was my first time drinking alcohol- I had tasted it before, but I never had a full serve. I was quite tipsy by the end of the night. I remember losing my balance a couple of times. I also got mixed up with people’s names, so I got a few funny looks from people. I had heaps of fun and thankfully I didn’t do anything really embarrassing.
Driving test. The driving test was a really nerve-racking experience. I wish I never have to go through it again. I remember going to the RTA and waiting impatiently for my turn to come. As soon as I saw the examiner my heart practically popped out of my chest. The tester was wearing a bright orange vest so you couldn't miss him. I thought that he was going to be really mean, but he was actually quite pleasant. I got into the car and remember driving so slowly that I might as well have been going backwards. But slowly I got used to the whole testing situation and picked up some speed. Every time he wrote something on his clipboard my heart started to beat a little bit faster. I remember hitting the kerb while trying to reverse park but still managed to pass the test. I was so happy that I passed simply because I couldn't imagine going through all that ever again.

First HSC exam. I think the first HSC exam was early Monday morning and it was English. I felt really nervous because I knew that if I didn’t think and write fast enough I wouldn’t finish the exam on time, especially because it was English. I remember entering the school hall and seeing all these empty tables and seats. The school hall was so quiet, it was incredible. I think you could have heard a pin drop. As soon as the exam supervisors told us to start I remember feeling this surge of adrenalin. I just kept writing not knowing whether any of it made any sense. Towards the end of the exam my hand was so sore from writing, but I was so scared that I wouldn’t finish on time that I just kept going. I didn’t have the faintest idea how I went after the exam was over, but I didn’t care because I felt so good knowing that the first exam was done.
**Formal.** I remember getting all dressed up for my formal. I wore a black dress and black heels/ black jacket and silver tie. My formal was held at the Hilton hotel in the city. I got there in a limo, with my date and a couple of friends. The hotel was really nice. Our formal was held in one of the function rooms, which was decorated beautifully. For the first half hour we were there, we just posed for photos. After the photos, there were speeches, which were really boring, and then we had dinner. After dinner, the music started pumping and that was when the real fun started. My friends and I danced for hours. After the formal we ended up going to a club nearby where we did more dancing. By the end of night my feet were really sore and I felt as if my ears were ringing, but we had so much fun that it was all worth it.

**First day at most recent place of employment.** My first job was in a video store. I was quite excited to start because I liked the thought of having more money to spend. I got there with plenty of time to spare because I wanted to make an impression on the boss. I remember thinking how different everything looked from behind the counter because I was so used to being the one who was served. I was a little overwhelmed because there was a lot to learn, but the other workers were quite nice and helped me out when I didn’t know how to do something. Most of the customers were quite patient with me as well. Thankfully, there were no disasters. Actually, everything went quite well in the end. Even the boss said that he was pleased with me.

**First day of classes at university.** On my first day at university I was excited but nervous as well. I had been to the university before for enrolment purposes, but I never realised how huge the university was until my first day of classes. I got lost going to my
first lecture, but thankfully I got there on time. When I got there I was amazed to see close to 500 people in the lecture theatre. First I thought that I was in the wrong class, and then I realised that this is how big the classes are at university. I remember thinking that there is no way I am ever going to ask a question in this class. After my lecture I went to a tutorial and sat in the room for 15 minutes wondering why I was the only one there and then I remembered that there were no tuts in the first week! So I went home early.
### Examples of Contagion Item Suggestions

<table>
<thead>
<tr>
<th>Autobiographical Event</th>
<th>Sensory Suggestions</th>
<th>Contextual Suggestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>First HSC Exam</td>
<td>Cold vs. warm</td>
<td>Classroom vs. library</td>
</tr>
<tr>
<td>First Date</td>
<td>White shirt vs. black shirt</td>
<td>Restaurant vs. cafe</td>
</tr>
<tr>
<td>Birthday</td>
<td>Blue shirt vs. red shirt</td>
<td>Outside vs. inside</td>
</tr>
<tr>
<td>High School Formal</td>
<td>Pink dress vs. silver dress</td>
<td>Hilton vs. Intercontinental</td>
</tr>
<tr>
<td>Driving Test</td>
<td>Orange vs. yellow vest</td>
<td>Drove to school vs. home</td>
</tr>
</tbody>
</table>
Interpersonal Relationship Questions

1. On a scale from 1 to 10, how connected did you feel to the other participant who took part in this study?

1 2 3 4 5 6 7 8 9 10
(not at all) (very much)

2. On a scale from 1 to 10 how important was it to you that the other participant liked you?

1 2 3 4 5 6 7 8 9 10
(not important) (very important)

3. On a scale from 1 to 10 how comfortable did you feel telling your memories to the other participant?

1 2 3 4 5 6 7 8 9 10
(not comfortable) (very comfortable)
Coding Instructions for Experiment 4

Coding Definitions

**Direct Contagion** – When participant writes down what the confederate (detail on posted sticky note) said in session two.

**Absence of Contagion Item and Original Detail** – Participant does not mention the contagion detail or the detail in session two that was targeted for contagion in session one

**Contradictions** – discrepancies (contradictions) in details or idea units from session one to session two that happened spontaneously (not due to anything that confederate said). (see coding scheme for more detail).

**Omissions** – (coded in session one narratives) details or idea units that were written in session one that were not written in session two.

**Additions** – (coded in session two narratives) details or idea units that were written in session two that were not written in session one).

*Idea unit example* – I did everything I could to not destroy look : score =1 omission or "I felt I was one of the worst in the class"

*Concrete detail* – “ held in hotel in city” = 2 omissions

**Verbal Contagion** – Changes in session two narratives that have been incorporated from confederate’s script. (See confederate’s script)
These include any word for word details or mentioned in session one that came from the confederates script.
For example, these are the verbal contagion phrases identified for Participant 1 (HSC exam) in session two recall:

1) "my hand hurt near the end"
2) "I was quite nervous"
3) "my first exam"
4) "felt a surge of adrenaline"
Appendix E
Copy of Final Ethics Approval Email

From: Ethics Secretariat <ethics.secretariat@mq.edu.au>
Date: Fri, Apr 27, 2012 at 3:10 PM
Subject: Ethics application ref: 201200245 - Approved
To: Amanda Barnier <amanda.barnier@mq.edu.au>
Cc: Misia Temler <misia.temler@mq.edu.au>

Dear Amanda

Re: Social contagion of Autobiographical memory

The Human Research Ethics Committee approved the above application at its meeting today and you may commence your research. A formal email of final approval will be sent to you next week.

Please do not hesitate to contact me if you have any questions.

Kind regards
Fran

Office of the Deputy Vice Chancellor (Research)
Ethics Secretariat
Research Office
Level 3, Research HUB, Building C5C
Macquarie University
NSW 2109

--------- Forwarded message ---------
From: Ethics Secretariat <ethics.secretariat@mq.edu.au>
Date: Mon, Apr 30, 2012 at 3:23 PM
Subject: Approved- Ethics application- Barnier (5201200245)
To: A/Prof Amanda Barnier <amanda.barnier@mq.edu.au>

Dear A/Prof Barnier

Re: "Social contagion of Autobiographical memory"  (Ethics Ref: 5201200245)

The above application was reviewed by the Human Research Ethics Committee at its meeting on 27-Apr-12 . Final Approval of the above application is granted, effective 30 April 2012, and you may now commence your research.

This research meets the requirements of the National Statement on Ethical Conduct in Human Research (2007). The National Statement is available at the following web site:
The following personnel are authorised to conduct this research:

Chief Investigator: A/Prof Amanda Barnier

Other Personnel: Ms Misia Temler

NB. STUDENTS: IT IS YOUR RESPONSIBILITY TO KEEP A COPY OF THIS APPROVAL EMAIL TO SUBMIT WITH YOUR THESIS.

Please note the following standard requirements of approval:

1. The approval of this project is conditional upon your continuing compliance with the National Statement on Ethical Conduct in Human Research (2007).

2. Approval will be for a period of five (5) years subject to the provision of annual reports. Your first progress report is due on 30 April 2013.

If you complete the work earlier than you had planned you must submit a Final Report as soon as the work is completed. If the project has been discontinued or not commenced for any reason, you are also required to submit a Final Report for the project.

Progress reports and Final Reports are available at the following website:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

3. If the project has run for more than five (5) years you cannot renew approval for the project. You will need to complete and submit a Final Report and submit a new application for the project. (The five year limit on renewal of approvals allows the Committee to fully re-review research in an environment where legislation, guidelines and requirements are continually changing, for example, new child protection and privacy laws).

4. All amendments to the project must be reviewed and approved by the Committee before implementation. Please complete and submit a Request for Amendment Form available at the following website:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

5. Please notify the Committee immediately in the event of any adverse effects on participants or of any unforeseen events that affect the continued ethical acceptability of the project.
6. At all times you are responsible for the ethical conduct of your research in accordance with the guidelines established by the University. This information is available at the following websites:

http://www.mq.edu.au/policy/

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/policy

If you will be applying for or have applied for internal or external funding for the above project it is your responsibility to provide the Macquarie University's Research Grants Management Assistant with a copy of this email as soon as possible. Internal and External funding agencies will not be informed that you have final approval for your project and funds will not be released until the Research Grants Management Assistant has received a copy of this email.

Please retain a copy of this email as this is your official notification of final ethics approval.

Yours sincerely
Dr Karolyn White
Director of Research Ethics
Chair, Human Research Ethics Committee