Memory conformity between co-witnesses: The effects of discussion on subsequent memory accuracy

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Declaration

I declare that the candidate has written this thesis. It has not been accepted in any previous application for a degree in any other institution or university. The candidate has carried out the work, all quotations have been distinguished by quotation marks, and the sources of information specifically acknowledged.

Signed

Fiona Gabbert

September, 2004
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Abstract

Errors in eyewitness accounts can occur when a witness comes into contact with post-event information. A common way to encounter this is for witnesses to discuss their memories with one another. The current research addresses this issue, by investigating ‘memory conformity’ between individuals who witness and then discuss a crime-event or pictures. For this research, a novel procedure was developed and employed whereby dyad members each encode a slightly different version of the same basic stimuli, which is then discussed prior to a free-recall test that is completed individually.

Experiment 1 found a significant memory conformity effect between witnesses who had discussed an event prior to recall, in comparison to a control group with no discussion. At test, 71% of witnesses errantly reported at least one unseen detail that had been acquired during the co-witness discussion. No age-related differences in susceptibility to memory conformity were found between younger (18-30 years) and older (60-80 years) adults.

Experiment 2 found that misleading post-event information acquired during a discussion with a co-witness was a more powerful means of influencing memory reports than misleading narratives that are commonly employed in eyewitness research. This was true for both younger (17-33 years) and older (58-80 years) adults.

Following these findings, Experiments 3, 4 and 5 investigated possible factors underlying memory conformity, as well as incorporating a source-monitoring test. Individual differences in personality and memory ability were not reliably associated with susceptibility to memory conformity. However, a consistent finding when analysing the co-witness discussions was a relationship between ‘response order’ and memory conformity. Specifically, the first witness to mention a critical (experimentally manipulated) detail that they had seen was the most influential dyad member, and the most resistant to influence, even when their memory was disputed by a co-witness.

Applied and theoretical implications of the main findings are discussed.
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What are the consequences of witnesses discussing their memories together prior to providing a police statement that could be used as evidence in a criminal investigation? The lack of research that adequately addresses this question is both surprising and concerning given the frequency with which discussions between co-witnesses must occur. Of course, there are not always multiple witnesses to crimes. However, a recent U.K. study reporting data collected from actual eyewitness cases featuring identity parades found that 51% of the sample of reported crimes had more than one witness (Valentine, Pickering & Darling, 2003). A similar U.K. study reporting real-life data found that approximately 83% of police line-ups involved more than one eyewitness (Wright & McDaid, 1996). Moreover, a survey (Paterson & Kemp, in press) completed by real eyewitnesses in Australia (N=60) found that where multiple witnesses had been present, 86% of respondents admitted to discussing the event with a co-witness. Obviously, where eyewitness evidence does exist it is vital that each witness is able to provide the police with an independent and accurate account of what was seen. Are eyewitnesses who have discussed their memories with each other able to do this? This fundamental question forms the basis of the present thesis.

A striking example of how the memory report of one witness may influence that of another during discussion comes from an analysis of witness evidence in the Oklahoma bombing incident in 1995. The key evidence in this case came from interviews with witnesses who worked at Elliot's Body Shop where Timothy McVeigh rented the truck used in the bombing. McVeigh was arrested for the mass murder but there was a question as to who, if anybody, was his accomplice. Three witnesses saw McVeigh when he hired the truck, one of whom claimed he was accompanied by a second man. Initially, the other witnesses gave no description of this accomplice, however, later they too claimed to remember details of this second person. This led to a massive police hunt, costly in terms of money and resources, but which proved to be futile. Months later, the first witness confessed that he may have been recalling another customer. So, why did all three witnesses provide a
description of an accomplice when McVeigh had actually entered the shop alone? It is likely that the confident witness unintentionally influenced the others, leading them to report that they also recalled this second man (Memon & Wright, 1999; Schacter, 2001). Indeed, witnesses admitted in testimony that they had discussed their memories before being questioned (Memon & Wright, 1999).

Other examples, within the UK, include the Jill Dando murder enquiry (April, 2001) where witnesses became increasingly confident that Barry George was responsible for the crime after all sharing a taxi home with one witness who had identified George in a line-up (the other witnesses had not previously made an identification). For example, one witness who had not felt confident enough to make an identification at the time, subsequently felt “95% sure” that George was the man she had seen (Cathcart, 2002). More recently, the defence team in a high court appeal case in Scotland called for an expert witness (Professor Brian Clifford) to testify about the reliability of evidence from four police officers that showed suspicious similarity. The evidence in question concerned a 24 word statement that was claimed by the police officers to have originated from the defendant, and that suggested his guilt. All four police officers provided almost identical, verbatim recall for this alleged statement as evidence. However, Clifford concluded that the high degree of similarity in the statements could only have arisen as a result of comparison or collaboration (Campbell and Steele v. HMA).

One question that is important to consider is whether these real-life examples are representative of the effects that co-witness discussion can have on subsequent recall accuracy. There is reason to believe that they are. For example, a large body of research within the eyewitness literature (reviewed in Chapter 2) has found that individuals exposed to post-event information often errantly report this in a recall test even when asked to report original details only. Of course, discussing a mutually witnessed event with a co-witness is only one particular source of encountering post-event information. However, it is arguably one of the most common and natural ways to encounter post-event information. For example, if one considers how memory is used in everyday life many of the situations that come to mind involve us sharing our memories with others, whether this is discussing a recent mutually experienced event, or reminiscing about our past. If something as extraordinary as
witnessing a crime has been experienced, individuals would often be particularly motivated to discuss the details because of the importance of the event. Although it is good police practice to encourage witnesses not to talk to each other for fear of evidence contamination, this discussion could take place before the police arrive at the scene, or afterwards if witnesses neglect police advice. It is therefore of applied and theoretical importance to investigate whether co-witness discussion can affect memory, and if so, to explore how it affects memory, and whether there are any individual differences between people who are, or are not, susceptible to co-witness influence. All of these issues are explored in the experiments presented in the thesis.

To date there is a severe lack of ecologically-valid studies investigating the effect that discussion with a co-witness can have on subsequent recall accuracy. The present thesis addresses this gap in the literature and explores the theoretical and forensic consequences and implications of co-witness discussion. To investigate the effects of co-witness discussion on memory, a novel procedure has been developed that enables naturalistic co-witness discussion to be investigated with full experimental control in a laboratory-based setting (outlined in Chapter 5). Thus, the present studies go beyond previous co-witness research that has employed less ecologically-valid techniques where there has been no genuine interaction between witnesses. To equip the reader with relevant background information to the experiments comprising this thesis, the following introductory chapters provide an overview of findings from three pertinent areas of research; 1) the effects of post-event information on memory, 2) the effects of collaborative retrieval on memory, and 3) the effects of post-event information from a co-witness. The experiments in the present thesis draw upon and extend this existing knowledge base.
Chapter 2

The effects of post-event information on memory

2.1 Introduction

Discussing the details of a criminal event with a co-witness is one way in which to encounter additional information about what happened, who was involved, etc.. This post-event information might be largely consistent with one’s own recollections of the event, however some details may differ either because one witness has remembered something differently, paid attention to different details, or has even made a mistake. In a forensic setting it is vitally important that witnesses who encounter post-event information are able to disregard it when recounting their own memories of what was witnessed to the police and the courts. However, a common finding within the eyewitness memory literature is that exposure to post-event information that is inconsistent with a person’s memory can affect their ability to subsequently report details of the originally encoded event (see Ayers & Reder, 1998; Ceci & Bruck, 1993; Loftus, Miller & Burns, 1978; Payne, Toglia & Anastasi, 1994). This phenomenon is commonly referred to as the misinformation effect.

A standard misinformation experiment used to investigate the effect of post-event information on memory involves three stages. First, participants are exposed to an event (a video, slide sequence or live event). After a period of time, half of the participants receive misleading post-event information (misinformation) about the event, for example, they could be asked to read a narrative about the event that contains errant details (e.g. Searcy, Bartlett & Memon, 2000; Wright & Stroud, 1998). In the final stage, participants are given a memory test about the originally encoded information. It is a robust finding that misled participants perform more poorly than control participants because they often report the misinformation at test even when they have been asked to recall the original details of the event.

To date, the results of hundreds of experiments investigating the misinformation effect have been published (see Memon, Vrij & Bull, 2003, for a recent review). However, despite this wealth of data the underlying mechanisms responsible for the misinformation effect continue to be debated. Thus, there are a
number of explanations for why individuals errantly report misinformation at test when asked for the originally encoded information. Some theories implicate memory impairment, with supporters of this view arguing that the original memory trace is altered by the post-event information. This can occur either through the post-event information overwriting and replacing the original memory trace, or resulting in some kind of memory blend (Loftus et al., 1978; Metcalfe, 1990). Other researchers focus on factors other than memory impairment, suggesting that post-event information is reported at test due to processes operating at the time of retrieval, such as task demands (McCloskey & Zaragoza, 1985) or source monitoring errors (Johnson, Hashtroudi & Lindsay, 1993).

The aim of the present thesis is not to provide support for one explanation of the misinformation effect over another by trying to determine the fate of the original memory trace following exposure to post-event information. Thus it is not within the remit of this thesis to review arguments for and against the numerous competing theories. Instead two explanations for the effect will be reviewed here, namely McCloskey and Zaragoza’s (1985) ‘Task Demands’ account and Johnson et al.’s (1993) ‘Source Monitoring Framework’. The task demands explanation is worthwhile to review because it highlights problems of certain experimental procedures that have previously been found to bias the results of misinformation studies. Thus, an awareness of this critique can help insure against similar problems in the experiments comprising the present thesis. The source monitoring framework has been selected to review because it is able to provide a comprehensive, widely endorsed and well articulated explanation for the misinformation effect. Moreover, there is a consensus amongst many eyewitness memory researchers that the misinformation effect is largely attributable to source confusion, where individuals misattribute a memory from one source (e.g., discussion with a co-witness) to another source (the witnessed event). A review of the source monitoring literature can help understand why people sometimes errantly report post-event information at test, and when this is most likely to happen.
2.2 The biasing effects of task demands

Loftus's seminal paper (Loftus et al., 1978) is one of the most widely cited examples of how eyewitness memory distortion can arise following exposure to inconsistent post-event information. However, this paper has also been extensively criticised because of the chosen method to assess memory. In Loftus et al.'s (1978) experiment, participants were presented with a series of slides, one of which depicted a car approaching an intersection with a 'Stop' sign. In the second stage of the experiment, participants answered questions about the event. Those in the 'consistent' condition were asked "Did another car pass the red Datsun while it was stopped at the stop sign?", while participants in the 'misleading' condition were asked "Did another car pass the red Datsun while it was stopped at the yield sign?". A control group were asked the same question, but with the word "intersection" in place of either "stop sign" or "yield sign". In the final stage of the experiment participants were given a two-alternative forced-choice recognition test, in which they were asked which type of sign had appeared at the intersection (a yield sign or a stop sign). The results showed that relative to the control condition, participants in the misleading condition performed worse and participants in the consistent condition performed better. The misled participants actually performed below chance on the test, as they reported that a yield sign had been seen in the slides rather than a stop sign.

Initial interpretations of this finding posited that the original memory trace is altered or overwritten by the post-event misinformation, and therefore irrevocably lost (Loftus et al., 1978). In other words, the misinformation is errantly reported at test because the original memory trace can no longer be accessed, leaving the updated memory trace (containing the misinformation) accessible instead. This account interprets the misinformation effect in terms of a change to the structure of memory (i.e. the original memory trace is replaced with the new (mis)information). In relation to the example given above (Loftus et al., 1978), participants had originally created a memory trace for the 'stop sign'. It was later suggested to some participants that a 'yield sign' had been seen. Thus, in some instances, the memory trace for the 'stop sign' would have been overwritten by the new 'yield sign' trace.
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At test, participants no longer have the ‘stop sign’ in memory as it has been replaced by the ‘yield sign’, thus this post-event misinformation is errantly reported at test.

Loftus et al.’s (1978) experiment was seen as a powerful demonstration of how misleading post-event information can distort memory. However, McCloskey and Zaragoza (1985a, 1985b) challenged Loftus’s ‘trace alteration’ hypothesis, arguing that by offering participants the original information and the misinformation as the two response options in the final recognition test, it is not possible to deduce how the original memory trace has been affected by the post-event information, and that any findings using this type of memory assessment might have arisen through response biases and task demands. For example, participants might have been able to remember both the original detail and the misinformation, but select the (incorrect) misinformation at test because they feel obliged to choose the alternative suggested by the experimenter, and/or because participants might believe that the information provided by the experimenter is more reliable and, therefore, their own recollections might be wrong. Alternatively, participants might not have encoded the original detail and so post-event details were used to fill the gaps in their memory. Thus, at test there might have been a strategic bias to select the misinformation as this was the only familiar option (i.e., even if participants are aware that this detail had not actually been seen). McCloskey and Zaragoza’s criticisms highlight that the final recall test used by Loftus et al. (1978) does not allow the researchers to draw the bold conclusions that were made about misinformation altering or overwriting an original memory trace. Instead, different interpretations of the original findings exist, such as task demands, that do not necessarily imply trace alteration.

McCloskey and Zaragoza (1985a) developed an alternative testing procedure, called the Modified Recognition Test, as a more sensitive method for detecting possible memory impairment. This procedure controls for response biases and task demands. The critical difference between Loftus’s original procedure and McCloskey and Zaragoza’s modified procedure was the type of final recognition test given to participants. Rather than having a forced-choice recognition test between the original information and the misleading information, the modified recognition test presented the original information and a previously unseen foil as the forced-choice alternatives. Thus, the modified test excludes the misinformation as a response choice. McCloskey and Zaragoza reasoned that if exposure to post-event
misinformation does impair the original memory trace, then misled participants should still be less likely than controls to correctly identify the originally encoded information at test. However, in six experiments using the modified test (McCloskey & Zaragoza, 1985a) the control and misled participants performed at approximately the same level of accuracy, suggesting that the misinformation had not impaired the original memory trace. Further studies employing the modified recognition test have also failed to find a difference in performance between misled and control groups (e.g., Belli, 1993; Bowman & Zaragoza, 1989; Chandler, 1989, 1991; Loftus, Donders, Hoffman & Schooler, 1989; Zaragoza, 1987, 1991). However, it should also be noted that some studies have found memory impairment effects using the modified test procedure (e.g., Belli, Windschitl, McCarthy & Winfrey, 1992; Chandler, 1989, 1991; see also Payne, Toglia & Anastasi, 1994).

To summarise, it is likely that McCloskey and Zaragoza's (1985a, 1985b) research subdued some of the alarm caused by Loftus et al.'s (1978) findings. Importantly, their research was able to show that the misinformation effect is not an inevitable consequence of exposure to misleading post-event information, which obviously has enormous forensic implications relating to the reliability of eyewitness evidence. However, as mentioned above, some researchers have found evidence for the misinformation effect even when using McCloskey and Zaragoza's (1985a) modified recognition test that was developed to minimise task demands and thus provide valid results. In these studies it is possible that the misinformation was errantly reported at test because of source misattribution errors. This is discussed fully in the following section. McCloskey and Zaragoza's research has highlighted that to fully assess the important forensic question of how post-event information might affect memory in real life, experimentally induced task demands must be understood and controlled. Recent eyewitness research, employing valid methodological procedures, now supports the view that both the original information and the post-event information coexist in memory (see Ayers & Reder, 1998). This is obviously in contrast with Loftus' original view. Why then, do people errantly report post-event information at test, when the original information is available? As mentioned in the introduction, the present thesis favours the source monitoring framework (Johnson et al., 1993) as the explanation best able to account for the misinformation effect (see below).
2.3 The Source Monitoring Framework

The memorial task for eyewitnesses is essentially a source monitoring one. For example, when providing evidence for the police it is vital that witnesses are able to differentiate details of the witnessed event from related details from a different source. The source monitoring framework (Johnson et al., 1993) provides a theoretical account of how this task might be attempted, i.e., it describes the attributional judgement processes that individuals employ to accurately identify the source of a memory, as well as specifying factors that are likely to promote source-monitoring errors. In essence, source monitoring refers to the decision process by which memories are discriminated against one another in order to make attributions about the source of these memories. Monitoring decisions are based in part on the qualities of the retrieved memories. According to Johnson et al. (1993) memories can differ in quality, ranging from general feelings of familiarity, to memory for specific features such as sensory or perceptual details (e.g., sound, colour), contextual details (e.g., spatial, temporal), semantic detail, affective detail, and/or the cognitive processes engaged at the time (e.g., elaboration). Memories from different sources often reflect different qualities. For example, it is often possible to discriminate between imagined and perceived events because memories for perceived events typically have more vivid perceptual, temporal and spatial information than imagined events (Johnson & Raye, 1981; Johnson, Raye, Foley & Kim, 1982).

Many source attributions are made relatively automatically and rapidly using heuristic-based decisions such as matching memory qualities to expectations about characteristics of memories from different sources. For example, using the example above, if a memory has substantial perceptual and temporal detail accompanying it, one would tend to attribute it to a perceived event rather than an event that was read about, or imagined, because memories of perceived events, on average, contain more information. However, source-monitoring decisions can also be mediated through more controlled and deliberate strategies, such as the retrieval of additional information, supporting memories, or extended reasoning about whether a particular memory is plausible. Source misattributions, i.e., attributing a memory to the wrong source, can occur when the heuristic or systematic judgement process, based on the
expected memory characteristics, is wrong. The source monitoring framework assumes that these source misattributions arise from the same processes as do accurate classifications of memories, i.e., from processes of attribution that are based on the subjective qualities of the memory (Johnson, 1988; Johnson et al., 1993; Mitchell, Johnson & Mather, 2003). Thus, source confusions are likely to occur when the qualities associated with memory from each source are relatively similar. In support of this, researchers have found that factors that decrease the specificity of available source information can lead to an increase in source-monitoring errors (e.g., Hashtroudi, Johnson & Chrosniah, 1990; Johnson, Foley & Leach, 1988; Lindsay, 1990; Lindsay, Allen, Chan & Dahl, 2004; Lindsay & Johnson, 1991; Lindsay, Johnson & Kwon, 1991).

The fact that source judgements are often made heuristically, and that even with deliberate consideration they can be wrong, highlights the fact that being able to recall memories does not guarantee their authenticity. This is a little unsettling in itself, however it also has enormous forensic implications. For example, it suggests that it is possible for eyewitnesses to misattribute post-event information as being part of an originally encoded (i.e., experienced or perceived) memory. In this situation, witnesses or police interviewers would have difficulty distinguishing a true memory from information that has been encountered from a different (perhaps errant) source. Research into the reliability of source monitoring judgements is therefore clearly important, both theoretically and for more applied reasons. The following studies have been selected to review in more detail because they have identified situations that are likely to increase the likelihood of source misattributions.

Lindsay (1990) manipulated the discriminability of the original and misleading post-event information. Participants viewed a slide show and listened to an accompanying description of events. The post-event misinformation was presented in a subsequent audio description of the event. In the ‘low discriminability’ condition participants listened to the second description immediately following the slide show. This recording was in the same voice as had accompanied the slides. Those in the ‘high discriminability’ condition heard the second description 48 hours after the slide show. This was presented to participants in a different part of the room and in a different voice to the original recording. At test, Lindsay used the 'logic of
opposition' procedure, where participants were told to disregard the information in the second description of the slides because it was wrong. Thus, by being asked not to base any of their test responses on anything heard in the second description of the slides, participants were implicitly instructed to attend to the source of their responses. Lindsay (1990) found that a misinformation effect was only apparent in the 'low discriminability' condition. Participants in this condition would have found it more difficult to discriminate the source of their memories because of the high similarity between the original information and the post-event misinformation. Thus, source misattributions occurred, where the misinformation was often reported at test. In contrast, participants in the 'high discriminability' condition were able to take advantage of the differences in the memory characteristics accompanying the original information and the post-event information (e.g., different voice, different time and place of encoding). Consequently, fewer source misattributions were made in this condition.

Further to this, Zaragoza and Lane (1994; see also Mitchell & Zaragoza, 1996; Zaragoza & Mitchell, 1996) have shown that participants sometimes truly believe that they have seen items that were only suggested to them. Zaragoza and colleagues propose that this is largely determined by the extent to which the original event is retrieved and mentally reconstructed during the misinformation stage. For example, Zaragoza and Lane (1994) showed participants a series of slides prior to a misleading post-event stage where participants either a) read a misleading narrative about the slides, b) answered questions about the slides that presupposed the presence of objects that had not actually appeared, or c) had to unscramble sentences from the misleading narrative which required them to reconstruct the correct sequence of events from memory for the slides. The critical difference between the three post-event tasks was that answering the questions, and unscrambling the misleading narrative, required participants to retrieve the original event whilst processing the misleading post-event information, whereas passively reading the narrative did not. The results indicated that significantly more source monitoring errors were made when the original event had been retrieved during the misleading post-event stage. Zaragoza and Lane (1994, Experiment 3) demonstrated that these source misattributions were often made with high confidence, suggesting that the
source errors had not arisen through guesswork, but that participants truly believed that they had seen the suggested items in the slides.

Zaragoza and colleagues (1994) have concluded that the process of reactivating and reflecting back on the originally encoded event during a post-event task allows an opportunity for the post-event information to acquire some memory characteristics (e.g., perceptual detail) that are similar to those that accompany memories of the originally encoded event. For example, when reactivating the original memory to answer questions or organise the correct sequence of events, participants are often required to create a visual mental image of the scenes, which may also involve them visualising the suggested items. This can lead to a representation in memory of the suggested item that is qualitatively similar to that of an actual memory of a perceived object, and which also shares many of the same contextual associations. The memory characteristics for details from the original and post-event source may not be identical, but compared to unimagined misleading details, the differences between them would be very small. At test, participants might be likely to infer that all details for which there is an accompanying visual image must have been witnessed. Therefore, source misattributions are easily made, as the similarity in memory qualities for the original and post-event information make source discriminations especially difficult.

To place this research in the context of the present thesis, it is considered possible that discussing an event with a co-witness who introduces errant details into the discussion is another form of encountering misinformation whilst actively retrieving the originally encoded memory. For example, discussing an event with a co-witness requires the individuals to reactivate the originally encoded memory to enable any kind of meaningful discussion to take place. Thus, encountering post-event information whilst discussing an event with a co-witness might actually increase the chance of misinformation effects based on source misattributions.

Further support for the source monitoring framework is provided by findings from neuropsychology that have shown two areas of the brain to be critical for source memory, namely the medial-temporal and frontal regions (see Schacter, Norman & Koutstaal, 1998). Damage to these areas can often result in source monitoring deficits (Schacter, Harbluk, McLachlan, 1984; Shimamura & Squire, 1987). Normal ageing has also been associated with neuropathology in frontal (e.g.
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West, 1996) and medial-temporal regions (e.g., Golomb, Kluger, de Leon, Ferris, Convit, Mittelman, et al., 1994). Consistent with this research, some studies have found that older adults show source memory deficits that are related to their performance on neuropsychological tests of medial-temporal and frontal function (Glisky, Polster & Routhieaux, 1995; Henkel, Johnson & DeLeonardis, 1998; Schacter, Koutstaal & Norman, 1997).

In summary, the source monitoring framework posits that source attributions can be accurately made if memories are richly detailed and have unique source characteristics. Qualitative characteristics associated with retrieved memories, along with judgement processes, can be used to aid source monitoring decisions. Source misattributions can be made if the characteristics accompanying memories from two different sources are very similar and/or if judgement processes (based partly on these characteristics, but also on plausibility, supporting memories, etc) are errant. Source misattributions can also occur where deficits in the functioning of frontal or medial-temporal brain regions are present as a result of injury or ageing.

2.4 Summary

Our memories are best understood as being mentally experienced representations and reconstructions of past experiences, meaning that they are vulnerable to error. The research presented above has shown how post-event information can affect an individual’s ability to recall an originally encoded event. In an eyewitness situation this can have devastating consequences, thus, memory researchers have been keen to understand memory errors, and when they are most likely to occur. McCloskey and Zaragoza’s (1985a, 1985b) research has shown that different methods of assessment can lead to particular, and sometimes biased, conclusions. In contrast, the source monitoring framework provides a valid and comprehensive explanation for why individuals sometimes errantly attribute information acquired from one source, to a different source. The experiments comprising the present thesis draw largely from the research that has been presented in this chapter. However, they also further the existing research by investigating a natural, yet relatively under-researched, source of post-event information for eyewitnesses – discussing memories with a co-witness. The following two introductory chapters will focus more specifically on the effects
of collaborative retrieval on memory, and the effects of post-event information from a co-witness.
Chapter 3

The effects of collaborative retrieval on memory

3.1 Introduction

The present thesis focuses on co-witnesses as a source of post-event information, specifically on how post-event information can be acquired during a conversation with a co-witness that takes place shortly after the criminal event. Chapter 2 outlined how post-event information can impair an individual's ability to recall an originally encoded event. Thus, it could be hypothesised that encountering post-event information via a co-witness discussion will also have a detrimental effect on memory. However, it is also valid to ask whether there are any benefits of co-witness discussion? For example, it is possible that collaborative remembering can aid each individual's memory for an event by serving as a reminder of details. This might in turn provide effective cues for recalling additional information. The current chapter assesses the likely beneficial or detrimental effects of collaborative retrieval on memory by reviewing methods and findings from two relevant literatures, namely, discourse analysis and collaborative retrieval. Where possible, eyewitness studies that have employed methods from these research domains are also reviewed. Thus, not all of the studies incorporated in the current chapter are set within an eyewitness paradigm. However, all explore whether memory is affected by having knowledge of another person's memories for a mutually experienced event or mutually encoded stimuli. It will become apparent that researchers employing either discourse analysis or collaborative retrieval methods are both interested in exploring the effects of joint remembering, but have approached this investigation in very different ways. Clearly, the effects of joint remembering are also centrally important for the present thesis, thus it is beneficial to review the pros and cons of each methodology.

3.2 Discourse analysis

The primary aim of the present thesis is to investigate the effects of naturalistic co-witness discussion on memory. Therefore, the theory underlying discourse analysis (outlined below) is ideal to review and rely upon, because its ecologically-valid
methods are commonly employed to study everyday uses of memory, such as collaborative remembering. Specifically, discourse analysis is a technique that can be used to examine how people interact when discussing their memories. For example, researchers employing discourse analysis question whether people seek to create a single, shared version of their collective memories, and investigate what happens when disagreements occur and people's memories differ. These questions are pertinent to an eyewitness situation where it is vital to know whether witnesses who have discussed what they remember will subsequently have very similar memories, or (ideally) maintain their individual accounts.

To investigate collaborative remembering, studies typically involve a small group of people jointly remembering an event or film (for example, 'E.T.', Edwards & Middleton, 1986a). Participants are simply asked to try and remember as much as possible, and are then left to discuss their memories with no time-limits imposed. The audio-taped discussions are then analysed by examining the dialogue through which people had discussed and pooled their recollections. Thus, discourse analysis is essentially a qualitative analysis of how joint remembering is accomplished. As a method to study memory, discourse analysis can be commended for imposing minimal, if any, restrictions on how and what people choose to remember and how these memories are discussed. The only constraint is that participants are usually instructed which mutually experienced event to remember. The procedure developed for the research purposes of the present thesis has been influenced by this approach, i.e., by encouraging natural discussions to take place between co-witnesses with minimal restrictions imposed.

So, what has research employing discourse analysis found? Of prime importance to the current thesis, it has been shown that simply discussing an event can influence the way it is remembered. A number of studies have now demonstrated that when people form a group to discuss their memories, a single shared account will often become established during the conversation (Edwards & Middleton, 1986a, 1986b, 1987; Middleton & Edwards, 1994). Edwards and Middleton (1986a) discuss how this occurs. Their research investigated whether there were any characteristics that were commonly used within groups to organise collaborative remembering. Three hierarchically related characteristics, or 'functions', of joint remembering were identified. The first function, 'framing and orientation', typically
establishes the criteria for joint recall for the group, providing general ground rules within which particular events or experiences are then recounted. The second 'correspondence' function then establishes a correspondence between the original story or event and the account. This is typically found to comprise a semantic function – through which particular details or events are put into words, and a continuity function – which concerns remembering which order they occurred in. The third 'validation' function encompasses a variety of means by which the joint account reaches a consensus.

This third function, the process of validation, is the key to understanding how individual memories can be influenced by other people. For example, Edwards and Middleton (1986a) observed that a shared version of an experience is often sought after and established through discussion. People were found to 'negotiate' memories by influencing what each other remembers. Where varying accounts of a shared experience arose, people were often found to reinterpret and reconstruct what actually occurred. Thus, naturalistic studies of collaborative remembering have shown that memories are sometimes revised and reconstructed to conform to the memories of other group members.

Unfortunately, discourse analysis rarely investigates subsequent memory reports of the individual group members following their discussion. Thus, it is not clear whether the shared version of the event, established via the discussion, persists and forms the basis of future retrievals, or whether individuals revert to their initial memories of the event, held prior to the group discussion. Pasupathi and colleagues (Pasupathi, 2001; Pasupathi, Lucas & Coombs, 2002; Pasupathi, Stallworth & Murdoch, 1998) have addressed this to a certain extent within their research on autobiographical memories. Pasupathi (2001) and Pasupathi et al., (1998) have found that conversational reconstructions of autobiographical memory can influence subsequent memory retrieval, such that the reconstructed memories (rather than the original memories) become what is remembered on future occasions.

For example, Pasupathi et al. (1998) showed how memories can be reinterpreted dependent on the interaction that takes place between the speaker and the listener. Listeners can influence recounts even when they do not give verbal responses, simply by their level of 'responsiveness' (e.g., attentiveness, nodding, encouragement, etc). Pasupathi et al. (1998) demonstrated that responsiveness could
influence both the speaker’s immediate retelling of events and subsequent recollections of those events under different circumstances. To illustrate this, Pasupathi (2001) used a hypothetical example of a man called Thomas who had just tried technical rock climbing for the first time. Thomas is described as having found the experience difficult, tiring and anxiety provoking. Later, however, he recounts his experience to his friend and portrays the experience as being exciting, thus downplaying the anxiety he had actually felt. His friend might have encouraged this version of events by showing interest and enthusiasm. According to Pasupathi’s research (1998, 2001), rather than remembering the experience as it truly had been, Thomas would subsequently be likely to remember having enjoyed the experience of rock climbing, simply because of the way he told the story, and the way it had been received.

Relating this research to an eyewitness situation, one could imagine that retellings of the witnessed crime might differ depending on the audience. For example, the account might be told factually to a police investigator, but be more embellished or dramatised to friends. A recent eyewitness study (Marsh, Tversky & Hutson, in submission) investigated different ways in which a crime event might be recounted (emotionally or factually, versus not at all), and the implications that this has on subsequent recall performance. Differences were found between experimental conditions, for example, participants who had talked about their emotions made a greater proportion of errors in their subsequent free recall of the event. Thus, the way an event is described can affect subsequent memories for that event.

The literature presented so far has shown that during collaborative remembering discussants sometimes actively seek to construct a single, shared memory, and that the way we recount our memories to others, including the way they are received, can influence our subsequent recollections. Can it then be concluded that co-witnesses who have discussed their memories prior to giving evidence might all provide similar statements? The validity, and hence generalisablity, of the discourse analysis research suggests that this is a reasonable assumption. In which case, it is possible that similarity between witness statements might not always reflect true corroborative evidence with real forensic value, but instead might be a consequence of their discussion, thus reflecting a potentially disastrous ‘false corroboration’.
A number of real-life examples of trials containing evidence from multiple witnesses suggest that 'false corroboration' following a co-witness discussion can occur. One such example, involving evidence from the Oklahoma Bombing Trial, was outlined in the general introduction to the present thesis. A second example concerns an undisclosed case in which an artist was accused of sexually molesting four of his models. Details are summarised by Crombag (1999) who served as an expert witness in the trial. The artist accused was well known for sculpting female nudes and frequently hired dancers as models. When dancers were unavailable he advertised in the local paper for models. The four women filing the charge had been recruited in this way. All were students and inexperienced at modelling. The accusations of sexual molestation from the four women did not come out of the blue; the models had repeatedly and extensively talked about their experiences amongst themselves before going to the police. Crombag (1999) proposes that the women talked to each other because they were uncertain about the artist's method of working. They were trying to interpret whether the artist was using his artistic work also for sexual gratification. The inexperienced models obviously felt uncomfortable with the artist's method of working, however, they were uncertain as to his underlying motivations. After several months of working with the artist they filed a complaint with the police that he had been using his work as a pretext to molest them sexually. Crombag (1999) expresses his concern about the level of discussion that took place between the witnesses, stating that the four women cannot be seen as independent witnesses and their statements cannot be taken as corroborating one another. Furthermore, in light of the initial uncertainty between the models as to the artist's intents, Crombag raises the possibility that the four women mutually agreed that they had been molested, and subsequently and repeatedly reinforced this idea to one another whilst trying to interpret the ambiguous information. Crombag (1999) claims that the models may not have realised that whilst discussing their experiences they were probably adding to or changing their memory of the events that actually occurred. The artist was convicted of multiple sexual offences against all four models. However, the court of appeals later reviewed the case and reversed the conviction.
3.3 Summary of discourse analysis

From the naturalistic methods employed in discourse analysis it is possible to gain an insight into real-life uses of memory. Discourse analysis research has shown that a single shared memory is often established between discussants following their joint recall of an event or experience. One limitation of this research is that we do not know how accurate this shared memory is likely to be, or how much each individual's original memories have altered as a consequence of the discussion. Neither do we know whether subsequent memory retrievals will more closely resemble the original memory or the reconstructed, shared memory. There is some evidence from the two examples involving real eyewitnesses suggesting that the single, shared memory may form the basis of subsequent retrievals, but why? Perhaps individuals who have discussed their memories truly believe that the agreed consensus depicts the most accurate representation of what actually happened, therefore this is the version reported subsequently. Alternatively, individuals might report details from the shared account established via the discussion because of a source confusion, as outlined in Chapter 2. Only methods employed from both discourse analysis and the misinformation literature can determine whether individuals are able to recall their original memories for an event following a post-event discussion with others. The experiments comprising the present thesis draw upon both of these methodologies to explore this issue.

The following section reviews the main findings from the collaborative retrieval literature. As mentioned in the introduction, researchers of collaborative retrieval are also interested in exploring the effects of joint remembering. However, in comparison to discourse analysis, this method of investigating collaborative remembering is not concerned with how individuals might use their memory naturally. Instead, maximum experimental control is exerted over the (relatively artificial) encoding and retrieval processes to see whether collaborative retrieval is beneficial or detrimental to an individual's ability to recall individually encoded stimuli.
3.4 Collaborative retrieval

Collaborative retrieval researchers are interested in quantitative differences in memory performance between collaborative and nominal groups. Memory performance is measured in terms of amount recalled and memory accuracy. A typical study involves showing participants lists of words which they are asked to remember. Participants are then asked to recall as many words as possible, either working alone or as part of a collaborative group who interact and work together on the task. Individuals working alone are often subsequently formed into nominal groups. Specifically, nominal groups are groups only in name, comprising individuals who work alone, but for the purposes of analysis their data are combined as if they had worked together collaboratively.

Meudell, Hitch and Boyle (1995) examined whether collaborative group performance exceeded nominal group performance by investigating whether collaborative group members could improve their memory performance through 'cross-cueing' each other. This is where the recollections of one group member serve as cues to help others remember related information. No evidence for cross-cueing was found. The authors found instead that collaborative retrieval seemed to inhibit, rather than facilitate, recall. Collaborative inhibition has also been observed by other memory researchers (Basden, Basden, Bryner & Thomas, 1997; Weldon & Bellinger, 1997), and is currently thought to be caused by a 'disruption to normal memory processes'. For example, across four experiments, Basden et al. (1997) showed that recall from categorised lists depends on 'organised' retrieval strategies, and that an individual's own retrieval strategies are the most effective at cueing retrieval from their memory. However, these organised strategies are vulnerable to disruption, and can become less effective simply by hearing other group members retrieve information following their own personal retrieval strategies. Thus, when working as a group, each group member might have to substitute their previously formulated individual strategy for a less effective one. Furthermore, Weldon, Blair and Hesbsch (2000) found that collaborative groups were unable to outperform nominal groups even when offered a large cash incentive.

A recent study by Wright and Klumpp (in press) investigated whether it is the product of the recall (e.g., seeing what the another group member has recalled) or the process of recalling (e.g., the 'turn-taking' aspect of collaborative retrieval) that
underlies the disruption that causes collaborative inhibition. In a standard collaborative retrieval study a nominal group is compared with a collaborative group, where both the product and the process of recall can interfere with performance. However, Wright and Klumpp (in press) introduced a condition that included the procedural (turn-taking) aspect of the standard collaborative condition, but where the participants never actually encountered the product of the other person's recall. They found that participants in this condition performed at a similar level to those in the nominal group. In contrast, participants who saw what their collaborator had recalled did experience collaborative inhibition, thus providing support for Basden et al.'s (1997) strategy disruption hypothesis.

In summary, research has shown that memory collaboration is typically associated with reduced recall. Collaborative memory performance is usually above that of the best performing individual, but below that of nominal group performance. In other words, collaborative retrieval is often found to be worse than the sum of its parts (see Weldon, 2001, for a review). This collaborative inhibition effect is most likely caused by a disruption in each individual's retrieval strategies.

If it could be assumed that these findings are generalisable to a real eyewitness situation, the implication is that co-witnesses who collaboratively remember what they have just seen might hinder each other's recall. However, in real life, when providing evidence for the police, witnesses would be separated and asked to recall the event individually. Thus, a crucial question to consider is whether the effects of collaborative inhibition remain when collaborators are subsequently tested individually? Interestingly, the effect is reversed (Basden, Basden & Henry, 2000). Basden et al. (2000) tested the memory performance of collaborative versus nominal groups on their ability to free-recall categorised lists of words. Collaborative inhibition was present in the interactive groups, however, when a final individual free recall test was given to participants, collaborative group members recalled a higher proportion of words than members of nominal groups. This was found in two experiments, leading the authors to conclude that collaboration benefits memory when collaborators are subsequently tested individually. This conclusion supports the previously mentioned hypothesis that collaboration inhibits retrieval by disrupting an individual's retrieval strategies. For example, collaborative group members were found to perform worse than nominal group members when working together, but
outperformed nominal group members when subsequently tested individually, presumably because each was able to resume their individual retrieval strategy.

The findings from Basden et al. (2000) can be more readily applied to an actual eyewitness situation than previous collaborative retrieval procedures that have not used a final individual retrieval task. For example, there are parallels with a witness situation at the encoding stage (witnessing an event), the collaborative retrieval stage (discussing the event with other co-witnesses), and the final individual retrieval stage (reporting individual memories of the event to the police). Of course, Basden et al. (2000) were not applying their research to eyewitness memory. Their categorised word lists used as stimuli bear very little resemblance to the importance and level of detail present in an actual witnessed event. Studies from the eyewitness literature allow for a more ecologically valid test of whether collaborative groups outperform individuals on eyewitness memory performance. The research summarised below has used simulated crime events to investigate the effects of co-witness collaboration on memory. The findings from this research, employing relatively realistic stimuli at encoding, is subsequently discussed in light of Basden et al.'s (2000) conclusions.

Yarmey and Morris (1998) investigated whether individual reports of eyewitness recall and recognition are more, or less, accurate than witnesses who consult with each other prior to giving either joint or individual reports. Participants viewed a videotape of a simulated armed bank robbery by a single male culprit. They then took part in one of four experimental conditions; 1) 'collaborative dyads' were instructed to discuss the incident and come to a consensus of agreement regarding culprit characteristics, 2) 'crime-discussion dyads' simply discussed the incident and shared their descriptions of the culprit with each other, 3) 'neutral-discussion dyads' discussed neutral topics unrelated to the videotaped robbery, and 4) participants in the 'no discussion group' were instructed to privately think about the event and the culprit. Participants were subsequently asked to write a report on everything they could remember about the robbery, as if giving a statement to the police. Participants in the 'collaborative dyad' condition gave joint written responses, whereas those in the other three conditions responded individually. Participants' written narrative recalls were scored in relation to the number of words written (regardless of accuracy), the number of accurate propositions, the level of conciseness (i.e., the
number of words reported divided by the number of accurate propositions), the number of fabrications and the number of metastatements (e.g., attributing motives or intentions to the culprit). Yarmey and Morris (1998) found that eyewitnesses who had discussed the criminal incident (conditions 1 and 2) recalled more accurate details than witnesses who had not discussed the crime (conditions 3 and 4). However, no differences were found between the two crime-discussion groups, i.e., between the collaborative dyads who recalled the event as a pair and reached a consensus, and the crime-discussion dyads who discussed the event before recalling details individually. Warnick and Sanders (1980) also found no differences in memory performance between witnesses who had discussed a simulated crime-event and reached a consensus about what had happened, versus witnesses who discussed the event but later responded individually.

From Basden et al.’s (2000) research reviewed earlier, it might have been expected that collaborative retrieval amongst co-witnesses would inhibit memory, but that collaboration followed by individual retrieval would facilitate memory (in terms of the amount recalled). However, Yarmey and Morris (1998) and Warnick and Sanders (1980) did not find a difference in retrieval performance between groups that had discussed the simulated crime and recalled the incident collaboratively, and groups that recalled the incident individually, following the group discussion. Perhaps the crucial difference relates to the experimental stimuli used by the researchers. As mentioned previously, a large amount of the collaborative retrieval research (e.g. Basden et al., 1997; Basden et al. 2000; Meudell et al., 1995) typically uses categorised word lists as stimuli to encode. In contrast, eyewitness researchers often use simulated crime events. These events have an ordered sequence of actions and events, and thus ‘tell a story’, which is more meaningful than learning lists of words. Perhaps retrieval inhibition was not found by Yarmey and Morris (1998), or Warnick and Sanders (1980), precisely because participants were recalling a more realistic, ‘sequentially-ordered’ event. For example, having a structured event to recall probably encouraged each group member to adopt a similar retrieval strategy, where the sequence of actions and events were recalled in the order in which they occurred. Having a similar retrieval strategy to one-another would reduce the likelihood of collaborative inhibition, as was found. This interpretation of the findings is speculative at present. However, from the research reviewed so far it
seems that when realistic and meaningful stimuli are encoded, individuals can benefit from being able to discuss an event (in terms of amount and accuracy of details recalled), regardless of whether their memory is subsequently tested individually or not.

Underwood and Milton (1993) are another team of researchers to have used a simulated eyewitness scenario as stimuli. They too investigated the retrieval accuracy of witnesses who discussed an event, versus those who did not. In their experiment however, all participants completed a recall questionnaire about the event individually, regardless of whether the event had previously been discussed or not. Underwood and Milton (1993) showed participants a short film depicting a busy traffic scene filmed at a crossroads in a town centre. Towards the end of the film two vehicles collide. The authors manipulated witness expectancy by informing half the participants prior to watching the video that they would see a road accident and be asked about it. They also manipulated whether participants were able to discuss the event or not. Half completed the experiment individually, while the others formed groups of three and were encouraged to discuss their perceptions and recollections of the event prior to the administration of the recall questionnaire. Thus, the experiment comprised four conditions; 1) expectant discussion groups, 2) non-expectant discussion groups, 3) expectant individuals, and 4) non-expectant individuals. Witnesses were asked about the scene of the accident, about the two vehicles involved, and about the timing of the collision relative to the traffic signal. Underwood and Milton (1993) found no overall difference between the recall accuracy of those who had, or had not, previously discussed the incident. Thus, having the opportunity to discuss the event, and come to an agreement as to what happened, did not influence recall accuracy. However, an interaction was found where the discussion group expecting to see a collision (condition 1) were more accurate than the individuals (conditions 3 and 4). No interpretation of this interaction was offered by the authors.

What are the implications of this finding? Perhaps collaborative facilitation in recall is enhanced when individuals are aware of the nature of the task before them. However, in real life there would be very few occasions where people could expect to see an incident, thus becoming an 'eyewitness' who consequently must recall what was seen. Does that mean that there are no benefits of discussion unless actually
Chapter 3: The effects of collaborative retrieval on memory

anticipating an incident and subsequent questions about it? This question is difficult to answer from the existing collaborative retrieval literature. For example, participants in collaborative retrieval experiments (e.g., Basden et al., 1997; Basden et al., 2000; Meudell et al., 1995) are typically given instructions to pay close attention to the stimuli in preparation for a subsequent recall test. Even participants in Yarmey and Morris’s (1998) study expected to be tested for their memory about the video-taped event. Thus, at present it is not possible to compare Underwood and Milton’s (1993) specific findings regarding expectant versus non-expectant participants with other research on the effects of co-witness collaboration.

3.5 Summary of collaborative retrieval

The collaborative retrieval research presented here allows some conclusions to be drawn about joint versus individual recall performance, but also leaves some questions unanswered. Collaborating with others on a recall task has been shown to impair memory when a single collaborative answer is required (e.g., Basden et al., 1997; Meudell et al., 1995). However, this collaborative inhibition might be a phenomenon associated with ‘artificial’ stimuli, such as word lists commonly used in collaborative retrieval research. When trying to encode and retrieve word lists, individuals might formulate their own retrieval strategy (e.g., trying to remember the words in order, using a mnemonic technique, etc) which can become disrupted by hearing someone else’s retrieval attempts. Thus collaborative inhibition is often found. Experiments using more meaningful and structured stimuli (e.g., short films with a basic plot) do not find evidence of collaborative inhibition (e.g., Yarmey & Morris, 1998). Perhaps because this kind of stimuli encourages a similar retrieval strategy for all group members, thus limiting the amount of disruption that could serve to inhibit retrieval.

Where participants are tested individually following collaborative recall, memory performance appears to outperform nominal groups. This has been found with word lists and video-taped events as stimuli. However, there is some evidence from Underwood and Milton (1993) that this effect might be contingent on participants being aware of the task ahead of them, i.e., aware that a particular event is about to be witnessed. Individuals in real life are seldom aware if or when a crime
is about to occur, and that their memory for the witnessed event will be tested. More research is needed however before concluding that collaboration between unsuspecting witnesses does not facilitate recall performance.

3.6 Overall summary

This chapter began with some questions relating to the possible beneficial or detrimental effects of discussing memories with others. Research incorporating very different methodologies has been presented in an attempt to answer these questions. Discourse analysis research has shown qualitatively that our memories can be open to influence, negotiation and reconstruction following a discussion with others about a mutually experienced event. Furthermore, these reconstructed memories can form the basis for subsequent retrievals. What we do not know from discourse analysis is whether the original memory can still be accessed. This question has not been addressed by discourse analysts, as to provide an answer would require measurement techniques that focus on individual memory performance and artificial, laboratory-based memory tests which discourse analysts claim are a non-ecologically valid means in which to study memory as it is used in real life. However, this question is of crucial importance in a forensic setting, and one which needs to be addressed.

On the other side of the coin is research employing quantitative methods to study collaborative retrieval. These studies could not be further removed from discourse analysis research. For example, the collaborative retrieval experiments are highly controlled laboratory-based studies, often employing non-ecologically valid stimuli such as word lists to measure whether collaborative groups are more accurate and more complete in their recall in comparison to nominal groups. This research has shown that collaborative groups out-perform nominal groups only when memory is tested in a final individually performed memory test following the collaboration period. Collaborative inhibition can occur when responding as a group. The underlying reasons for this may be in relation to individual retrieval strategies, and the possible relationship between retrieval strategies and different types of stimuli, which were discussed. Crucially, some evidence from Underwood and Milton (1993) suggested that the increased accuracy of individual recall performance following
collaboration might have been dependent on individuals knowing that they were about to witness an event for which their memory would be tested.

How can the findings from the research presented in this chapter be utilised when trying to decide whether discussion between co-witnesses is beneficial or detrimental? There is a dearth of studies that have actually addressed this question directly, despite the obvious forensic importance that good knowledge would have. Moreover, from the research summarised so far, we are left with no firm conclusions and a number of previously mentioned questions that remain unanswered (e.g. Is the original memory trace accessible? Do the benefits of collaboration depend on the type of stimuli encoded and/or whether participants are expecting to witness a crime?). What we do know from the research presented here is that other people can influence memory, showing that our memories do not operate in a social vacuum. Findings from both discourse analysis and collaborative retrieval have shown that people can incorporate additional information to their memory following a discussion with others. An important question to address is whether this additional information is later reported at test because a) it has genuinely reminded an individual of a previously forgotten memory, b) because it is accepted as being accurate, as opposed to genuinely being remembered, or c) because of a source confusion, where an individual can no longer remember the correct source of the information. Determining which explanation is correct is of enormous forensic relevance, as each explanation depicts very different outcomes. In other words, discussion could either lead to an increased amount of accurate information which could prove hugely important in a criminal investigation, or it could lead to contaminated evidence where witnesses report details that they had not actually seen, with serious potential consequences.

A possible way to investigate which explanation might be correct could be for one of the collaborative group members to deliberately mention some errant details in the discussion. If other group members later recall this misinformation then it would provide evidence of false corroboration, where information that has not been originally encoded by the individual is errantly reported at test. An analysis of the amount and accuracy of the information recalled could determine the extent to which collaboration also benefits memory. None of the studies reported so far have introduced misinformation. The following chapter however will focus specifically on
the effects of encountering misinformation from a co-witness. The question of whether co-witness discussion is beneficial or detrimental to memory can then be reassessed.
Chapter 4

The effects of encountering post-event information from a co-witness

4.1 Introduction

Encountering misinformation from a co-witness is relatively under-researched in comparison with other sources of post-event information, such as misleading narratives (e.g., Searcy, Bartlett & Memon, 2000; Wright & Stroud, 1998) or leading questions (e.g., Loftus, 1975). However, a small number of studies do exist and will be reviewed in this chapter. These experiments vary enormously in the methods used to present the co-witness information to participants. Rarely is a 'real' co-witness actually present to impart the information. More commonly, the co-witness information is presented to participants indirectly, either via the experimenter telling participants what a previous participant has recalled (e.g., Corey & Wood, 2002), or where the responses of previous participants are deliberately noted on a recall test (e.g., Betz, Skowronska & Ostrom, 1996). Some studies have presented the misinformation first-hand by employing a confederate to introduce the information (Hollin & Clifford, 1983; Meade & Roediger, 2002). However, only two experiments have investigated the effects of encountering misinformation during a natural discussion (Principe & Ceci, 2002; Wright, Self & Justice, 2000, Experiment 2). Thus, from the co-witness research available to date, it is difficult to fully assess whether co-witness discussion is beneficial or detrimental (or both) to memory performance, as only a few studies have investigated the impact of misinformation encountered via an actual interaction.

Despite the lack of experiments that have specifically engineered a situation whereby misinformation is presented within a co-witness discussion, the range of studies investigating the effects of co-witness influence are informative to review for a few reasons. Of primary importance is that they provide a general overview of the consequences of encountering post-event information from a co-witness. For example, a few experiments have directly compared the influential effects of encountering both accurate and inaccurate information from a co-witness (e.g., Shaw, Garven & Wood, 1997; Wright et al., 2000, Experiment 1). Experiments have
also investigated whether it is possible for participants to disregard the co-witness information (e.g., Corey & Wood, 2002), and have employed source monitoring instructions to examine the extent to which co-witness information is errantly reported at test because of a genuine source confusion (e.g., Meade & Roediger, 2002). Other experiments have attempted to identify situations where co-witness information is particularly influential, for example by manipulating the credibility of the co-witness (e.g., Kwong See, Hoffman & Wood, 2001, Experiment 1). By reviewing this research the different methods of presenting the co-witness information can be assessed (e.g., actual versus implied co-witness presence) allowing limitations and advantages of particular methods of presentation to be identified. The experiments in the present thesis can draw upon these strengths and weaknesses to advance the small existing literature on co-witness influence.

A further reason to review the effects of encountering post-event information from a co-witness is to investigate the possible benefits or detriments to an individual’s subsequent recall accuracy. For example, the studies reviewed in the previous chapter indicated that having knowledge of another person’s memories regarding mutually encoded stimuli can improve memory performance in terms of an increase in the amount recalled. However, these studies were unable to provide insight into whether this improved recall performance indicates an individual’s genuine remembrance of previously inaccessible items of information from memory. Alternatively, individuals might have no original memory for some of the items they hear their partner recall during collaborative retrieval, but subsequently report these ‘new’ items at test either because they accept them as being correct, or because of a source misattribution. As suggested in Chapter 3, one way to investigate this further is to deliberately manipulate the post-event information so that it contains both accurate and errant details. The following section reviews studies that have done this.

4.2 Accurate vs. inaccurate information from a co-witness

The following three studies (Schneider & Watkins, 1996, Experiment 1; Shaw et al., 1997, Experiment 2; Wright et al., 2000, Experiment 1) have all employed a very similar experimental design to examine the effects of encountering accurate and errant post-event information from a co-witness, on subsequent recall performance.
Findings were replicated across all three studies, suggesting that the results are reliable.

Schneider and Watkins (1996, Experiment 1) tested participants in pairs and gave each a long list of words to study. The participants were led to believe that they had studied the same list, but in fact they had not. A single recognition test was used for all participants that included previously seen target words, and previously unseen lures. Because participants had studied slightly different lists, some of the words in the recognition test were targets for one participant and lures for the other, and vice-versa. The experimenter read the words in the recognition test aloud, and participants were instructed to respond "yes" or "no" to indicate whether they remembered the word from the study list. Each member of the pair provided their response after a word had been called, taking turns in responding first. Accuracy base-rates were determined by calculating the proportion of correct responses given by participants reporting their recognition judgement first. Here, 62% of the target words were correctly identified.

Of course, because participants had studied different word lists, a correct response for the first respondent may or may not have been correct for the second person. Thus, when responding second, participants could have either just heard the first person give a response that is consistent with the answer they should provide, or a response that would be wrong to agree with. In essence, when responding second participants could have received either accurate, or inaccurate information prior to giving their own recognition response.

Schneider and Watkins (1996) found that what the first person had said affected what the other person said. When the first person had provided accurate information, the hit rate rose from 62% (baseline) to 74%, however, when the first person had provided errant information, the hit rate dropped to 55%. These results clearly suggest that the judgements made by the second of two respondents are influenced by the first respondent. This was true regardless of whether or not the first respondent provided accurate information.

In a similar experiment, Wright et al. (2000, Experiment 1) presented pairs of participants with 40 pictures of cars to study. Thirty of these cars were the same for each member of the pair, but the remaining ten were unique for each individual.
Participants were told that they had been given the same set of pictures to study. As in Schneider and Watkins' (1996) procedure, participants were tested in pairs, and took turns to provide their recognition responses. The researchers found that when participants reported their recognition judgement first, 52% of cars were correctly identified. When responding second, participants who had just heard their partner provide accurate information demonstrated a hit rate of 54%, however, when 'misinformation' had been heard immediately prior to giving a recognition response, the hit rate dropped to 47%. Despite the fact that the differences between the experimental conditions were not as large as those found by Schneider and Watkins (1996), the same basic pattern of results was found.

A third study to manipulate whether witnesses receive accurate or misleading information from a co-witness is that of Shaw et al. (1997, Experiment 2). In this study the researchers employed a confederate to act as a co-witness. Participants viewed a short video of a simulated robbery and, after a short delay, were questioned about it together. The questions were two-alternative, forced-choice items. Again, adopting a similar procedure to that used by Schneider and Watkins (1996), participants took turns in answering the questions first. For one third of the questions, the actual participant responded first, thus receiving no co-witness information prior to giving their response. Here, the correct response was given 58% of the time. For the remaining items, the confederate co-witness responded first, either providing an accurate or an errant response before the true participant gave their answer. When accurate information had been encountered prior to responding, participants' accuracy level elevated to a 67% hit rate. When inaccurate information was encountered, the accuracy level dropped to 42%.

To summarise so far, these three studies, employing a very similar experimental design and procedure, have all shown the same pattern of results. Accuracy increases in comparison to baseline levels when accurate co-witness information has been encountered, and decreases below baseline performance when errant co-witness information has been encountered. There are small differences between studies in baseline accuracy levels, and in the differences between the experimental conditions. However, these could be explained by methodological differences such as the length of time stimuli were exposed for, the different retention intervals, etc. Overall, the research shows that people are influenced by
hearing what another person remembers, regardless of whether the other person is right or wrong. Thus, regardless of whether or not collaborative retrieval can aid the genuine remembrance of previously inaccessible items from memory, the evidence here suggests that co-witness information can also be detrimental to memory, and that people will report that they remember items for which they have no original memory. Questions that remain include 1) Why do participants report co-witness information at test rather than relying on their own memory?, and 2) What factors mediate co-witness influence (e.g., the level of confidence in one’s own memory, the perceived credibility of the co-witness, etc.)? The following sections in the current chapter address each of these questions.

4.3 Why is co-witness information reported at test?

The results presented so far in this chapter show that participants tend to ‘conform’ to their partner’s answers in a recall test, resulting in an increase or decrease in memory accuracy (in comparison to baseline performance) dependent on whether they have encountered accurate or errant information from a co-witness. Why does this conformity effect occur when errant post-event information is encountered from a co-witness? As mentioned in Chapter 2, errant post-event information might be reported at test because of a source confusion. To recap, source confusions can lead an individual to retrieve the post-event information, and report it with the belief that it is their actual recollection of the original stimulus information. Thus, a genuine memory error could underlie the observed memory conformity effect.

‘Normative’ or ‘informational’ influence (Deutsch & Gerard, 1955) are alternative explanations. Normative influence reflects an individual’s need for social approval and can result in compliance, where a participant agrees with the co-witness information without actually believing it. It is entirely possible that the findings reported so far have resulted from normative influence as participants were tested together, and therefore may have wanted to appear to be in agreement with each other. This is a common normative behaviour used to increase social acceptance and to appear more likeable (see Tajfel & Turner, 1986). Informational influence reflects an individual’s desire to be accurate. Here, the co-witness information is likely to be reported at test because it is believed to be true. Of course, this does not mean that
the co-witness information has impaired the individual's own memory. Both the original information and the co-witness information might still be accessible. However, participants choose to report the post-event information at test, rather than their own memory, because they believe it is more likely to be correct. This might be because they do not have confidence in their own memory, which could be caused by a number of personality or situational factors (discussed below). Unfortunately, from the studies summarised so far it is not possible to tell why the co-witness information is reported at test. However, the studies reviewed next have attempted to distinguish between normative influence, informational influence, and source errors as possible explanations for the effects found.

Shaw et al. (1997, Experiment 2, reviewed above) found that participants immediately conformed to the responses given by a co-witness, regardless of whether or not they were correct. As mentioned earlier, this might reflect normative influence which commonly occurs in the presence of the person being agreed with as a means to appear more likeable and gain social approval. Normative influence does not normally persist over a delay, and when the other person is no longer present. However, a follow-up study by Shaw et al. (1997, Experiment 3) explored whether the effects of encountering the co-witness information would remain following a delay of 48 hours. This experiment was in two phases, with Phase 1 employing the same procedure as before, where participants encountered accurate and errant information from a co-witness, prior to answering recall questions. At the end of Phase 1, both the actual participant and the confederate were asked to return for the second phase, two days later. On arrival, the participant was informed that their partner (the confederate) had not turned up. Participants were asked to continue with the experiment by completing the final memory test individually. They were then asked the same two-alternative forced-choice questions as before, and again were required to answer out loud. Of course, in this phase of the experiment there was no confederate present to provide any co-witness information.

The responses to the questions following the 48-hour delay, and with no co-witness presence, were very similar to the pattern of results found in the first phase of the experiment. For example, where no co-witness information had been encountered in Phase 1, the mean accuracy rate for participants in Phase 2 was 57% (Phase 1 = 57%). For questions where accurate co-witness information had been
encountered prior to giving a response in Phase 1, the mean accuracy rate in Phase 2 was 70% (Phase 1 = 69%). Where errant co-witness information had been given in Phase 1, the mean accuracy rate in Phase 2 was 40% (Phase 1 = 30%).

The finding that co-witness influence persists following a 48 hour delay, and in the absence of the co-witness, is unlikely to be caused by continuing normative pressures to agree with the previous responses of the co-witness, as there are no benefits (in terms of gaining social approval) of complying with someone who is no longer present. It is possible that informational influence was responsible for the continuing effects of encountering co-witness information, suggesting that the co-witness’ responses were agreed with because they were believed to be correct. Thus, similar responses would have been given at Phase 1 and 2, providing that the participants were able to remember the responses that had been given 48 hours previously, as opposed to the video itself. Alternatively (or additionally) the participants might have made a number of source errors, where the errant responses heard from the co-witness and agreed with in Phase 1 were subsequently misattributed to the video, and thus believed to be the correct response in Phase 2.

A study by Corey and Wood (2002) investigated the extent to which co-witness information was still reported after a delay because of informational influence or an actual memory error by explicitly asking participants to disregard the co-witness information if they were able to. Corey and Wood (2002) incorporated these instructions into their experiment. Participants witnessed a live simulated theft as a group before being interviewed about it individually. The interviewer asked 18 questions about the event, six of which were paired with alleged co-witness information that was accurate (e.g., “What colour was the thief’s hat? ...The other witnesses said it was black”), six were paired with alleged co-witness information that was inaccurate (e.g. “What colour was the thief’s hat? ...The other witnesses said it was red”), and the remaining six were not paired with any co-witness information. As the previous research had found, participants’ immediate responses to these questions were influenced by the co-witness information, where accuracy was highest when correct co-witness information had been encountered, and lowest when incorrect co-witness information had been encountered.

The participants were asked to return one week later for the second part of the experiment. Here they received a questionnaire containing the same 18 items about
the event. Half of the participants were instructed to work through the questionnaire as accurately as possible. The other half were informed that the co-witness information disclosed by the experimenter last week was bogus and should be dismissed. These participants were asked to respond to the questions with information that was remembered from observing the theft only. Results from this second stage of the experiment differed depending on experimental group. The 'uninformed' group, who had not received a warning about the co-witness information, again demonstrated an effect of co-witness information with the same pattern of results as found at time one, and with no effect of time of interview. In contrast, participants who had been warned about the co-witness information were generally successful in dismissing the bogus information. In this condition the warning served to decrease the use of co-witness information, however it did not eliminate it entirely.

As a whole these studies tell a fairly straightforward story. For example, it is evident that people are influenced by co-witness information regardless of whether it is right or wrong. The fact that people are influenced by, and later report, errant information suggests that the co-witness information is simply absorbed and later repeated, as opposed to actually benefiting the retrieval of the originally encoded information. The pattern of co-witness influence was found to remain following a delay in both Shaw et al.'s (1997) third experiment, and Corey and Wood's (2002) uninformed experimental condition. It is unlikely that normative influence is responsible for these findings, as participants completed the second test individually, i.e., with no immediate co-witness presence. However, informational influence could account for the effects remaining after a delay, as here participants report the answer they believe to be correct whether this is based on their own memory or the co-witness information. Corey and Wood (2002) found that even though conformity effects were found after a delay, participants were able to disregard the co-witness information when instructed to. This again suggests that informational influence is largely responsible for the conformity effects found, as evidently the participants were still able to access their original memory when necessary, but had often chosen not to. Interestingly the warning to ignore the co-witness information did not entirely eliminate the conformity effect. This might be because the sources of the original information and the co-witness information had become confused over time (as
discussed above briefly, and in more detail in Chapter 2). The potential consequences of confusing the sources of the originally encoded information and the post-event information are very serious in a forensic investigation relying on eyewitness evidence, as witnesses who have encountered errant post-event information might report this to the police mistakenly believing that this information is a true memory, and is therefore accurate.

Meade and Roediger (2002, Experiments 1 & 2) specifically addressed whether co-witness information was reported after a delay because of a source confusion. In their first experiment, participants took part with a confederate who they believed to be another participant. They were shown six slides of common household scenes (e.g., a kitchen). Following a short delay, participants took part in a collaborative recall phase where the actual participant and the confederate alternated recalling items from the scenes until they had both recalled six items from each. For three of the six scenes the confederate correctly recalled six items that had been present. For the other three scenes, the confederate correctly recalled four items that had been present, and falsely recalled two items of misinformation that had not been present. Where the confederate recalled items of misinformation, one was always a high expectancy item for the scene (e.g., a toaster) and the other was a low expectancy item (e.g., oven mitts).

Shortly after the collaborative recall phase, participants completed an individual recall task. All participants were told to recall as many items as possible from each of the scenes, however, half of the participants were warned that the confederate might have made some mistakes. The warned participants were told to only report items that they were sure had appeared in the scenes. Participants were then presented with a 36-item recognition and source-monitoring test that required them to identify the source of each item on the test. For example, for each item, participants had to specify whether a) it had appeared in a scene but had not been mentioned by the other participant, b) it had been mentioned by the other participant but had not appeared in a scene, c) it was in a scene and had been mentioned by the other participant, or d) it was an entirely new item that had not appeared in a scene or been mentioned by the other participant. It was found that participants were influenced by the misinformation encountered from the confederate in the collaborative recall task, and that the level of false recall was greater for high
expectancy items than for low expectancy items. The warning that was given to half of the participants significantly reduced the conformity effect, but again, did not entirely eliminate it. The source-monitoring data revealed that participants often misattributed the source of the falsely recalled items to their appearance in the slides. Thus, there is evidence that participants actually came to believe that objects falsely suggested by the confederate had, in fact, been present. This suggests that a source error was responsible for the conformity effect that was still found when participants had been instructed to disregard the co-witness information.

A follow-up experiment by Meade and Roediger (2002, Experiment 2) explored whether the individual recall test, completed prior to the final recognition and source-monitoring test, might have induced the source confusion that was found. Thus, for half of the participants in Experiment 2, the recognition test was not preceded by a (potentially confounding) recall test. The other half of the participants followed the same procedure as before (i.e., with the preceding recall test). The results of Experiment 2 replicated those of Experiment 1. Participants reported items that had not actually been present but that they had heard the confederate recall in the collaborative recall task. Furthermore, participants often attributed the source of these items as having occurred in the scenes. There was no effect of prior recall, indicating that the apparent source confusions could not be attributed to the act of recalling items from the scenes prior to having to determine the source of the items.

From the experiments presented here, the bottom line so far is that post-event information from a co-witness can influence what an individual subsequently claims to remember (both immediately and following a delay). However, the evidence suggests that this may largely be due to normative or informational influence, as an instruction to disregard the co-witness information significantly diminishes the conformity effect (Meade & Roediger, 2002, Experiment 1), even after a weeks delay (Corey & Wood, 2002). The fact that the conformity effect was not entirely eliminated in these studies, however, suggests that encountering co-witness information can impair the ability to retrieve the original stimulus material. Meade and Roediger (2002, Experiments 1 and 2) successfully demonstrated that this is due to a source misattribution.

Obviously, it is important for co-witness studies to be as ecologically valid as possible so that any findings can be confidently generalised to understanding and
explaining real life witness behaviour. However, one criticism of the majority of the co-witness research is the lack of ecological validity. For example, the majority of the studies reviewed here claim to be investigating a hypothetical forensic situation whereby co-witness information is encountered. The effects that this co-witness information has on an individual's own memory is then examined. In real life however, it is not standard police procedure for witnesses to be questioned together. Furthermore, if witnesses ever were questioned together, the procedure would not resemble the one typically employed in these studies, i.e., where participants take turns in providing their response to a two-alternative forced-choice question. This type of laboratory-based experimental procedure is entirely conducive to the typical pattern of results that has been found, i.e., where the social pressure to conform is very strong. In contrast, this pressure is unlikely to be present in real life, where the police interview witnesses individually, and there is an obvious emphasis on the importance of providing accurate information. Corey and Wood's (2002) study perhaps comes closest to resembling a real life situation, where it is possible that an interviewer might reveal what another witness had said. However, this situation should not occur in real life either as it is poor police procedure to rely on such biasing interview techniques in order to extract information from a witness. Furthermore, there might be some important differences between encountering co-witness information from a police interviewer versus directly from a co-witness. For example, individuals might feel more pressure to agree with an authority figure whom they are trying to help.

Arguably, the lack of ecological validity of the studies reviewed so far means that the findings cannot confidently be generalised to real life. Furthermore, none of the research reported so far has focused on the effects of encountering post-event information directly from a co-witness (e.g., via a discussion) prior to having to recall one's original memories for what was seen. In fact, a literature search yielded only two studies that have investigated a witness's ability to accurately report what was seen following a face-to-face interaction with a co-witness who errantly recalls certain details (Hollin & Clifford, 1983, Experiment 1; Wright et al., 2000, Experiment 2), outlined below. An additional study by Principe and Ceci (2002) will also be discussed due to the ecological validity of the experimental procedure. However, this study explored the effects of naturally occurring discussions on
preschoolers’ memories, and was primarily concerned with the development of false memories (i.e., a memory for an event that has not actually been experienced) rather than exploring how co-witness information can influence an existing memory. These three studies are important to review not only to investigate the methods used by researchers to simulate a naturalistic co-witness discussion within a controlled experiment (i.e., that could be implemented in the present thesis), but also to examine whether individuals become influenced by misinformation encountered in this way, such that they later report errant details at test.

Hollin and Clifford (1983, Experiment 1) staged a live crime event in a lecture and then divided the class into two experimental groups, each containing 11 witnesses. Both groups were asked 16 questions about the incident which were either answered individually (the no-discussion condition) or were discussed as a group (the discussion condition). The researchers organised the experiment so that two confederates were present in the discussion condition. The confederates were trained to provide the same errant answers to eight of the 16 questions. Finally, all participants completed a 32-item cued-recall questionnaire comprising the previous 16 questions and a further 16 that had not been encountered before. The results showed that the participants in the discussion condition often changed a response that had been given initially, to one which agreed with an errant response that had been given by the two confederate co-witnesses. Thus, the researchers claim that discussion between witnesses can affect subsequent individual memory reports. No source monitoring test was employed to establish whether the errant co-witness information was reported because of a true memory error.

A limitation of Hollin and Clifford’s (1983) experiment is the lack of ecological validity in the discussion condition, specifically, of the procedural manipulation used to impart the co-witness information. Participants in this condition were asked 16 questions by an experimenter and took turns to provide their responses. Whether there was any actual discussion between the group members was not explicitly stated, though there is a strong indication that no interaction took place. Instead, it is implied that group members simply alternated between providing their response to the questions, and listening to the responses of other group members. The researchers obviously aimed to achieve a controlled situation where each group member was given an equal opportunity to respond to the questions. However, this
highly artificial arrangement does not resemble a natural discussion, where group members are free to openly debate information that is recalled, and where disagreements can occur. In fact, it is possible that if a group discussion had taken place in Hollin and Clifford’s (1983) study, the other group members might have disagreed with the errant items of information reported by the two confederates, and their opinion would have been outvoted. Unfortunately, although Hollin and Clifford (1983) claimed to be investigating the effect of co-witness discussion on memory, there is little to learn from their experimental procedure in terms of developing an ecologically valid procedure for the experiments in the present thesis.

In contrast, Wright et al. (2000, Experiment 2) designed an experimental procedure that did require co-witnesses to interact and discuss their memories. Participants viewed a storybook containing 21 colour pictures, and were then asked ‘true’/‘false’ recognition questions about what they had seen. Participants rated their confidence after each question. They were then asked to discuss their memories about the sequence of events with a second participant before answering the same questions once again. Crucially, each member of the pair had in fact witnessed a different critical scene in the storybook, in one version an accomplice had been present and in another there was no accomplice. Of the 20 pairs of participants tested, 19 were initially accurate in their memory for an accomplice, suggesting that there must have been a high level of disagreement when the pairs came to discuss their memories for the event. When the same questionnaire was given to participants after the discussion period, however, 15 of the 19 pairs (79%) came to agree on whether or not an accomplice had been seen. Considering the high levels of accuracy in the initial recall test, this is a high level of conformity. There was no general tendency for the conformity to be in one direction or another (i.e., agreeing that there was, or was not, an accomplice). However, confidence ratings were found to predict which person in the pair persuaded the other. Specifically, pairs tended to conform to the participant with the higher confidence, but only for participants who had seen the accomplice; the confidence rating of the person who did not see the accomplice had little value in determining the direction of conformity. Thus, if a person confidently says that they saw something, they are trusted, but if a person says that they did not see something, they are less likely to be trusted. Wright et al. (2000) suggest that this
is not an unexpected finding, as in everyday life people often fail to encode information, yet do not often spontaneously create false memories.

The experimental procedure designed by Wright et al. (2000) is the first to successfully demonstrate how misinformation encountered during a discussion with a co-witness can alter an individual's memory report. The fact that the manipulation allowed for a natural discussion between two unsuspecting co-witnesses, i.e., with no confederate required to impart the misinformation, is particularly novel. In relation to other co-witness studies that have been reviewed, this study comes the closest to simulating what might really happen in an eyewitness situation involving co-witnesses, despite the use of forced-choice recognition questions at test. Principe and Ceci's (2002) study is currently the only other experiment that has investigated how conformity to misleading information can occur following a discussion.

Principe and Ceci (2002) staged a classroom-based archaeological dig for three groups of preschool children (M = 54 months). During the event, one third of the children witnessed two extra 'target' activities. A second third of the children were classmates of those in the first group, but did not witness the target activities. The remaining third were not classmates of the other children, nor did they experience the target activities. Following this event the children were interviewed in either a neutral or suggestive manner on three occasions, over the course of three weeks. A different interviewer then questioned the children about their memories of the dig.

The results from the final interview revealed that the classmates of the children who had witnessed the target activities often falsely claimed that they had witnessed them too. In fact, there was no difference in the recall of the target events between the children who had actually witnessed them, and their classmates who had been interviewed in a suggestive manner. Even when interviewed in a neutral manner, classmates were more likely to falsely recall the target activities than were non-classmates. Clearly, these false reports were created through the simple, everyday activity of interacting with peers and discussing memories of an event. There were no artificial factors present in the experimental design, procedure or stimuli that might have confounded the validity of the findings. Thus, Principe and Ceci (2002) can be commended on the level of ecological validity achieved in this study.
In summary, the research conducted by Wright et al. (2000, Experiment 2) and Principe and Ceci (2002) has shown that it is possible to investigate the effects of co-witness discussion both naturalistically, and with experimental control. The ecological validity of this research means that the findings can be generalised to real life with more confidence than findings from co-witness research that has used hypothetical co-witnesses or confederates, i.e., that are less able to simulate a realistic situation. Wright et al.'s (2000, Experiment 2) experiment is more suitable for adapting into a procedure that could be used in the experiments comprising the present thesis because it allows the effects of natural co-witness discussion to be investigated within a laboratory-based setting, in comparison to Principe and Ceci's (2002) field-based setting. Having a laboratory-based experiment is preferable simply because it will be easier to implement experimental manipulations and achieve maximum experimental control. Thus, the effects of co-witness discussion can be fully investigated to explore forensically relevant issues such as establishing the extent to which memory conformity is an inevitable consequence of co-witness discussion, and identifying possible boundaries to the effect, such as the type of person who might be most susceptible to memory conformity, when it is most or least likely to occur, etc. The following section reviews a number of studies that have already focused on factors that might mediate the memory conformity effect. Although these studies have often used less ecologically valid means to impart the co-witness information than Wright et al.'s (2000) or Principe and Ceci's (2002) research, the findings provide a good insight into factors that potentially influence the memory conformity effect, which could then form the basis for future, more ecologically valid, co-witness research.

4.4 What factors mediate co-witness influence?

The following studies are not all set within an eyewitness paradigm, but are informative to review because they have investigated both internal factors (e.g., self confidence) and external factors (e.g., perceived source credibility) that could mediate the effects of co-witness influence. For example, researchers have manipulated the memory strength of encoded items to investigate whether individuals are more likely to conform when their memory is poor, and vice-versa (see Betz et al., 1996; Roediger, Meade & Bergman, 2001; Walther, Bless, Strack,
Rackstraw, Wagner & Werth, 2002). Other researchers have manipulated the number of co-witnesses imparting misinformation (see Betz et al., 1996; Meade & Roediger, 2002, Experiment 3; Walther et al., 2002), or the credibility of the co-witness (see Hoffman, Granhag, Kwong See & Loftus, 2001, Experiment 1; Kwong See et al., 2001), to investigate the extent to which an individual’s acceptance of misinformation is influenced by the source of the information. This research is important to review because it helps identify possible boundaries relating to when co-witness information is most or least likely to influence an individual’s subsequent memory accuracy. Furthermore, this research could potentially further a better understanding of when the observed memory conformity effects are most likely to represent normative or informational influence, or a true memory error. These considerations are discussed in relation to the studies reviewed below.

The following studies have explored whether individuals are more likely to conform when they are unconfident about their own memory, and are hence more trusting of somebody else’s memory. Roediger et al. (2001) manipulated the amount of time participants had to encode stimuli. The experimental procedure was essentially the same as that of Meade and Roediger’s (2002, Experiment 1). For example, participants viewed six household scenes with a confederate who they believed to be another participant. The scenes were viewed for either 15 or 60 seconds. Obviously, when the scenes were presented for only 15 seconds, participants would have had little opportunity to study them carefully. Consequently, the memory strength for the objects within these scenes would be poor in comparison to the other condition, where the scenes had been viewed for 60 seconds each. In a subsequent collaborative recall test, each participant took turns to recall six items from each of the scenes. The confederate occasionally made mistakes by reporting items that had not been present. Some of these items of misinformation were schema-consistent, some schema-inconsistent (as in Meade & Roediger, 2002, reviewed above). Following a brief delay, participants took part in an individual recall test where they were asked to recall as many items as possible from the six scenes.

Roediger et al. (2001) found a higher rate of conformity to the errant co-witness information when the stimuli had been presented for less time. Participants in this condition were more likely to incorporate the suggested items into the final recall
test than were participants who saw the scenes for 60 seconds. Thus, a lowered confidence in one's own memory (directly manipulated here via the length of time allowed to encode the stimuli) can lead people to trust another person's memory more than they trust their own. An alternative explanation is that there is simply a negative correlation between memory strength and conformity. For example, having less time to encode stimuli might result in a weaker representation of this information in memory, which is thus more susceptible to the effects of misleading post-event information. Previous researchers have investigated whether individuals with a poor memory of an event could be particularly susceptible to misinformation effects, however there has been a lack of consensus among research findings regarding this point. A couple of early studies failed to find a relationship between memory accuracy and susceptibility to misinformation (Loftus, 1981; Powers, Andriks & Loftus, 1979). In contrast, more recent research draws opposite conclusions (Jaschinski & Wentura, 2002; Liebman et al., 2002; Loftus, Levidow & Duensing, 1992; Tomes & Katz, 1997). For example, Tomes and Katz (1997) demonstrated that memory accuracy for an encoded event was one individual difference measure that was able to successfully discriminate between individuals who were habitually susceptible to misinformation. The researchers used Loftus et al.'s 'discrepancy detection' hypothesis to explain their results (Loftus et al., 1992). This hypothesis proposes that the less likely a person is to detect a discrepancy between the misinformation and their original memory for an event, the more likely they are to accept the misinformation. Tomes and Katz (1997) suggest that participants with poor event memories are most likely to miss the discrepancy, and so accept the misinformation, as was found. The possibility that individuals with a poor memory of an event might be particularly susceptible to misinformation effects will be addressed in the experiments comprising the present thesis.

Whether the memory conformity effects found by Roediger et al. (2002) resulted from a lowered confidence in memory, or a weaker representation of the originally encoded information in memory, it is possible that informational influence might have led the participants to report the co-witness information at test. As mentioned before, this does not mean that the co-witness information has impaired the individual's own memory, simply that the co-witness information is trusted more so than the person's own recollections. Unfortunately participants were not required
Chapter 4: The effects of encountering post-event information from a co-witness
to identify the source of their memories in this experiment, and so it is not possible to
determine whether or not a true memory error had occurred.

Betz et al. (1996) and Walther et al. (2002) manipulated witness' confidence
in their memory by varying the memorability of the to-be-encoded stimuli, as well as
the amount of co-witness pressure to conform. Betz et al. (1996, Experiment 1)
tested participants in groups of six to eight. Participants were asked to read a story
and were then given a multiple-choice recognition test to assess their memory for
facts from the story. Some of these questions concerned highly memorable story
facts (as determined by a pilot test), while others asked about facts that were
typically less well remembered. Participants worked through this recognition test
individually on a computer. For each question they were presented with four
alternative answers and had to specify which one they believed to be correct. They
were informed that for some of the questions they would be shown the responses of
the other participants immediately after providing their own response (a control
group did not receive this information). The (bogus) co-witness information differed
depending on whether the responses unanimously agreed or disagreed with the
answer given by the participant, or whether the consensus between the co-witness
responses was split (here only one of the respondent's responses agreed with the
participant's answer). Following this, participants were tested on their ability to
recall the highest-frequency responses that had been given by the other respondents
on the initial multiple-choice recognition test. Participants were then assessed once
again on their memory for the stimulus story with a cued-recall test. The questions
were taken directly from the previous multiple-choice questions, but the response
format was open-ended.

Betz et al. (1996, Experiment 1) found that the participants' responses on the
cued-recall test were significantly influenced by the co-witness information, as
compared with a control condition. This conformity effect was particularly evident
when the apparent consensus between the bogus responses was high. When item
memorability was high however, the conformity effect decreased. This again could
indicate that confidence in one's own memory determines the extent to which a
person will be influenced by others. Alternatively, as mentioned above, perhaps the
relatively less memorable items simply had a weaker representation in memory, thus
increasing susceptibility to the misinformation. Arguably however, a weak
representation in memory might underlie a lowered confidence regarding the originally encoded items.

Although not an explicit source test, the recognition task for the bogus information was an attempt to measure the extent to which any observed conformity effects could be attributed either to informational influence, or to source-confusion. For example, the authors suggest that if participants had (errantly) reported the response given by their co-witness(es) rather than their original answer in the cued-recall test, and indicated that they could not remember that this had been a response given by the other participants, this would suggest that the co-witness misinformation was reported because the source of this information had been forgotten, and thus errantly attributed to the originally encoded source. Betz et al. (1996, Experiment 1) found evidence that genuine source confusions were playing a significant role in generating the conformity effect found, even when participants' memory for the bogus information was taken into account.

A similar study by Walther et al. (2002, Experiment 1) also investigated the effects of item memorability and group consensus on the ability to influence an individual's memory. Groups of four participants were presented with a series of slides depicting salient and non-salient objects. Twenty-two of the slides depicted non-salient kitchen utensils or tools (e.g. whisk, knife, screwdriver, hammer, etc.), four salient slides depicted objects that were obviously related to different categories (e.g. shoe, banana, radio, bouquet of flowers). Each slide was presented for 1.4 seconds. Following the slide show participants completed an old/new recognition test on a computer, but could only respond to each item once the alleged answers of the other participants had appeared on their screen. The three bogus responses were either unanimously correct, unanimously incorrect, or were split so that two of the three responses were incorrect.

The findings indicated that the co-witness information did influence participants' memory reports, but only with the non-salient items. Presumably participants had a weaker representation of these items in memory, and/or were less confident about these than they were about the highly memorable salient items. Where non-salient items appeared in the recognition test, participants often agreed with the unanimous majority response, even if this was errant. This conformity effect disappeared however when the co-witness responses were not unanimous. Walther et
al. (2002) suggest that this might be because the presence of a dissenter can give an individual the confidence to trust their own decisions rather than feeling a pressure to conform to the majority response. It suggests also that informational influence is responsible for the conformity effects found, as again participants are clearly using the group opinion to judge which is likely to be the correct answer, and disregarding this tactic when there is some doubt. A source monitoring test was not incorporated into the experimental design by the researchers, so it is not possible to tell the extent to which informational influence and source confusions are accountable for the findings.

Meade and Roediger (2002, Experiment 3) also investigated the effects of group pressure on memory. Participants studied a number of slides and then recalled as many details from them as they could, making remember/know judgements for each of their responses. Participants were then handed the alleged response sheets from five other (bogus) participants and were asked to read through them, determining for each one who had performed better on the recall task (themselves or the other participant). To ensure that participants actually encoded the items on the response sheets, they were instructed to circle those which they could remember recalling themselves earlier. The response sheets were used to introduce the misleading co-witness information. The researchers manipulated whether zero, one or four of the bogus participants had reported a particular errant item as having been present in the slides. Participants were then given a second recall task, identical to the first. Instructions were provided for participants, asking them to be as accurate as possible in recalling only items that had appeared in the scenes. Finally, participants were given a recognition/source monitoring test that required them to identify the source of a number of items including the misleading co-witness items and a number of lures (entirely new items).

The results showed that there was no difference in levels of conformity when the misleading information had been reported by one of the co-witnesses versus not being presented at all. A conformity effect was only found when four co-witnesses had reported the same errant item. The source monitoring test revealed that participants often misattributed the source of the co-witness information to the slides (regardless of whether it had been presented once or four times). This finding implies that encountering errant post-event information from a group of co-witnesses can
cause a true memory impairment. Thus informational influence is not wholly accountable for the conformity effect found.

One particular finding of Meade and Roediger's (2002, Experiment 3) inspired them to conduct a final study to explore a difference in the results of Experiment 3 and their previous two experiments. Specifically, the researchers observed that the conformity effect caused by encountering errant information from a single participant in Experiment 3 was not as strong as they had found it to be before. One obvious explanation for this concerns the fact that participants were aware of the responses of five other (hypothetical) participants. If only one out of five reported a misleading item, it is likely that this item of misinformation would be recognised as one that has not been supported by the other participants, and thus ignored (as was found). Meade and Roediger (2002) however favour an alternative interpretation, highlighting the probable cause as being the different methods used to present the co-witness information. For example, they suggest that misinformation encountered from an 'implied' co-witness (i.e., who is not actually present) might have less impact than misinformation encountered directly from an 'actual' co-witness. A final experiment was conducted specifically to investigate the effects of encountering misinformation from an actual versus an implied co-witness, outlined below.

Participants in Meade and Roediger's (2002) fourth experiment viewed slides of household scenes and then took part in a collaborative recall test where the participant and a co-witness (physically present or implied) took turns to recall items from the scenes. In the implied co-witness condition, where the co-witness was not physically present, participants alternated between recalling an item themselves and reading a response that had supposedly been recalled by a previous participant and written down on a response card. Some of the items reported by the co-witness were wrong. The same errant co-witness information was reported in both experimental conditions. Shortly after the collaborative recall phase, participants were given a second recall test to complete individually, where they were asked to recall as many items as possible from the slides, making remember/know judgements for each item. Participants were also given a recognition/source-monitoring test, the same as in Experiment 3 (described above).

The results showed a similar level of conformity to the errant information regardless of whether it had been presented by a co-witness who was physically
present or not. However, on the source monitoring test, participants were more likely to attribute the source of the errant co-witness information as having been present in a slide when the information had been presented by the ‘real’ (present) co-witness. Thus, source confusions are more frequent when the post-event information has been encountered in a face-to-face interaction. This finding might be related to source perception, for example, information encountered directly during a face-to-face interaction might be attended to more fully and deemed to be more credible than information from an absent and anonymous source. Although speculative, perhaps this extra (deeper) processing of the co-witness information makes it more difficult to later discriminate from the originally encoded information, hence the source confusions found. Speaking more generally, the important finding of Meade and Roediger’s (2002) is the fact that differences in the quality of co-witness influence were found dependent on whether an actual or implied co-witness imparted the post-event information. Once again, this highlights the importance of ecological validity in co-witness research so that reliable and valid experimental findings can be generalised to real life.

The following two studies have both investigated the impact of source credibility on subsequent memory conformity. In Hoffinan et al.’s study (2001), participants were seated in front of a screen. Every five seconds they heard the name of an object via a tape-recorder. Sometimes an accompanying picture of the object appeared on a screen immediately following the object name. Other times there was a blank screen, and participants were asked to create a mental image of the object. After a 48-hour delay participants returned for a reality monitoring test, where they were presented with the names of 72 objects and were asked to indicate whether each object had been seen before, whether it had been imagined, or whether it was a new item. Crucially, for some of the objects, participants were presented with information on their response sheet regarding a confederate’s response that either provided accurate or misleading information. Half of the participants were told that this response originated from a previous participant who was a university graduate student (the high-credibility condition). The other half were informed that the response was randomly generated by a computer (the low-credibility condition). In both conditions the participants were asked to make a mark next to the confederate’s response to indicate that they had looked at it before providing their own response.
However, they were told that they were free to ignore the information if they preferred.

The results showed that when the low-credibility source (generated by a computer) had indicated an inaccurate response, the performance of the participants was not deleteriously affected, and did not differ from baseline performance. Thus, the low-credibility responses were essentially ignored. However, when an inaccurate response was provided by the high-credibility source (a previous participant), performance dropped substantially from 62% accuracy (baseline) to only 42% accuracy.

The researchers conclude that the perceived credibility of the co-witness mediates the impact of conformity. However it could be argued that co-witness credibility was not manipulated at all. For example, participants were either presented with the hypothetical response of a previous participant, or with a computer-generated response which they were told was the computer equivalent of flipping a coin. Participants in this 'low-credibility' condition were not faced with another person's response at all, simply with useless information that they knew was meaningless and best to ignore. Thus, this condition essentially equates to a situation where no co-witness information is encountered at all, leaving their study as one which has investigated 'information from a co-witness source versus a non co-witness source', as opposed to a study that has manipulated co-witness credibility, as the authors have claimed.

Other research investigating source-credibility has, more realistically, compared the influential effects of receiving misinformation from one of two individuals that differ in perceived credibility. For example, Kwong See et al. (2001) showed participants (young adults) a slide show depicting a theft and then presented them with a narrative summarising the incident. Depending on experimental condition (high versus low credibility), this narrative was either introduced as being an account of the event as remembered by a 28 year old, or an 82 year old. In fact the narratives were the same, each including four items of misinformation. After reading the narrative participants were asked to provide their impressions of the witness by rating their perceived competence and honesty. The older witness was rated as being less competent, but more honest, than the young witness. This relatively lower rated competence of the older witness was associated with non-significant misinformation
effects. For the young eyewitness, higher ratings of perceived competence were significantly associated with a larger misinformation effect.

Unfortunately, because source monitoring instructions were not employed in the experiments conducted by Hoffman et al. (2001) or Kwong See et al. (2001), it is difficult to assess whether the participants in the high-credibility conditions were later reporting the items of misinformation because of informational influence, or because of a source confusion. Informational influence is perhaps the more appealing explanation for the misinformation effect found, as it reflects the belief that others are correct. When rating someone else’s perceived credibility to be high (as in Kwong See et al.’s study, 2001) it is understandable that this person might be perceived as being more knowledgeable than the individual rates themselves, and thus, they are likely to be conformed to. However, it is also possible that more attention and depth of processing (see Craik & Lockhart, 1972) is awarded to the post-event information provided by the highly credible source, which could subsequently lead to source confusion errors (as speculated about above). It would be interesting for future research to investigate this possibility.

To summarise, the studies that have been presented in this section have not always used ecologically valid stimuli or procedures, however, they do give an insight into when post-event information from a co-witness is likely to be particularly influential. A common finding is that any manipulation that serves to decrease a witness’ confidence in their memory of the stimulus material (e.g., allowing a relatively short encoding duration, varying item memorability, or the number of times an item of co-witness information has been presented) can increase an individual’s reliance on another source of information. Interestingly, informational influence is not solely responsible for the conformity effect that is often found. For example, experiments that have incorporated a source monitoring test in the experimental procedure have shown that encountering co-witness information can cause a genuine memory error, where individuals believe that the post-event information has actually been perceived during the initial stimulus-encoding phase.

4.5 Conclusion
There are not many situations where a witness can gain knowledge of a fellow witness' memory for a mutually experienced event. Examples of situations where this can occur have been discussed, for example, where witnesses are interviewed together, or where an interviewer reveals what another witness has recalled. However, as mentioned previously, it is not recommended police procedure to interview witnesses this way. It has been argued that a more natural and common way in which to encounter post-event information from a co-witness is where witnesses discuss their memories, thoughts and feelings together after an event has occurred, but prior to the police arriving at the scene. The co-witness literature that has been reviewed has shown that this method of encountering co-witness information is vastly under-researched. Furthermore, the majority of studies that have focused on this particular situation can often be criticised for their lack of ecological validity, meaning that caution should be taken when applying the findings to real-life behaviour. For example, the presentation of the co-witness information in laboratory-based experiments is often particularly artificial. This is obviously an important consideration after Meade and Roediger (2002) found qualitative differences in the type of conformity (e.g. due to informational influence, or source-confusion) that can arise simply by having an actual co-witness present to impart the post-event information versus providing the co-witness information to participants with no face-to-face interaction.

The experimental procedure that has been developed for the experiments comprising the present thesis draws upon the research reviewed here. In particular, inspiration has been taken from Wright et al.'s (2000, Experiment 2) manipulation that has demonstrated that it is possible to investigate co-witness information encountered during a discussion naturalistically and with no need for a confederate. Thus, there is no excuse for future co-witness studies to rely on non-ecologically valid methods to investigate this area of research. Details of the procedure that has been developed for the present research purposes is fully outlined in the following chapter, which also provides an overview of the experimental chapters.
Chapter 5

Introduction to the experimental chapters

The main aim of the present thesis is to investigate the effects of encountering misinformation from a co-witness during a discussion, with maximum ecological validity within a laboratory-based experiment. By drawing on the research presented in the introductory chapters (i.e., on misinformation, collaborative retrieval, and discourse analysis studies) it has been possible to design and develop an ecologically-valid procedure to enable this investigation. The procedure that has been developed is used throughout the present thesis (with the slight exception of Experiment 2), with differences between experiments principally in the stimuli used for encoding, i.e., each experiment has used different stimuli to encode to ensure that any observed effects are not dependent on the experimental materials used.

The following example captures the main elements of the procedure. Participants are tested in previously unacquainted pairs. At the start of the experiment participants are provided with stimuli to encode (for example, a simulated crime event shown on video). Unbeknownst to the dyad members, they are actually shown slightly different versions of the same event, where several items/actions/details are arranged that are unique to each version. Critically, this manipulation allows different features of the (otherwise identical) event to be observed by each dyad member. Participants are then asked to recall the event, either alone, or by discussing their memories with the other dyad member. A second individually-completed recall test is then administered to participants to investigate the effects of the co-witness discussion on each dyad members’ subsequent memories for the originally encoded event. Verbal and written instructions for this recall task ask participants to think back to what they had seen, and to do so as if they are real witnesses providing information for the police. These memory reports can then be examined for evidence of ‘memory conformity’, i.e., the extent to which participants who have discussed their memories of a mutually witnessed event have incorporated unseen (co-witness) details into their memory reports.

This particular procedure to study the effects of co-witness discussion on subsequent memory reports has several advantages. First, the fact that dyad members
experience slightly different versions of the same basic stimuli resembles a real situation where there are natural differences in the observations people make and in the details they remember. It also allows the experimenter to know exactly what has, or has not, been witnessed by each dyad member, thus making it easier to check the accuracy of each participants’ final recall report.

Second, this manipulation, where dyad members experience different versions of the same event, allows each dyad member to unwittingly introduce misleading items of post-event information to their partner during the co-witness discussion. This arrangement not only allows the misinformation to be imparted, and encountered, naturally, but it also significantly diminishes the likelihood of experimenter effects. For example, in experiments where the post-event information is presented by the experimenter, participants may assume that this information is correct and reliable, and/or feel obliged to report it at test (see Ebbesen, 2001). In comparison, presenting misinformation during a co-witness discussion is a more naturalistic source of encountering post-event information, therefore the procedure developed for the present thesis is less prone to experimenter effects, and more ecologically valid.

Third, the final recall test is also ecologically-valid in that cued and free recall tests have been selected over forced-choice recognition tests as a method of memory assessment. For example, Ebbesen (2001) found that an examination of police and investigative interviews in the real world suggests that witnesses are usually asked in a relatively free-recall procedure what they saw and heard. Furthermore, recall typically relies on consciously controlled mental processes, whereas recognition involves a larger component of automatic processes (see Jacoby, 1991), thus, recall tests are less prone to guessing or response biases than recognition tests (Belli, Lindsay, Gales & McCarthy, 1994).

The recall instructions used in the present thesis ask participants to report what they remember seeing, as accurately as possible. This source monitoring instruction is not as blatant as often used in misinformation experiments employing source monitoring instructions. For example, Lindsay’s (1990) ‘opposition’ instructions mentioned in Chapter 2 tell participants not to report any information that they can recall as being part of the post-event information, as any such answers would be wrong. Thus, participants following opposition instructions will not report
a detail if they remember that it was in the post-event information, even if they genuinely remember that detail from the original event. Although this instruction is useful in establishing whether the original information is still available in memory, it is not suitable for the present research purposes because it would be unrealistic to inform a participant that everything their partner has said is wrong. Moreover, it does not resemble recall instructions given to real eyewitnesses. In contrast, the ecologically valid recall instructions used in the present thesis should be able to provide a realistic likelihood of memory conformity to be determined, i.e. as might be expected to occur in real life. Experiments 3, 4 and 5 also employ specific source-monitoring instructions to investigate the extent to which unseen items are errantly being reported at test due to source misattributions.

The following five experimental chapters each provide full details regarding the experiments that have been conducted. Experiment 1 employs the procedure outlined above to investigate the effect of discussion on memory. Experiment 2 explores the differential effects that alternative sources of post-event information (i.e., discussion with a co-witness versus reading a post-event narrative) can have on memory. Experiments 3, 4 and 5 investigate possible factors that might underlie the memory conformity effect (e.g., individual differences in personality and memory ability). In addition, these three experiments explore the extent to which source confusions or informational influence can account for the memory conformity effect. Specific experimental findings are discussed at the end of each chapter. In addition, the general discussion summarises and comments upon the applied and theoretical implications of the main findings.
Chapter 6

Experiment 1: Memory Conformity: Can eyewitnesses influence each other's memories for an event?

6.1 Introduction

The aim of this initial experiment is to investigate the effect that co-witness discussion can have on memory, employing the novel procedure outlined in the previous chapter. To briefly recap, dyads witness the same video-taped event, but unbeknownst to them, from different vantage points. The event is discussed prior to an individual recall test. Specifically, Experiment 1 investigates the extent to which witnesses errantly report unseen details that were encountered during the co-witness discussion. To investigate the potentially serious consequences of memory conformity the two versions of the event differed such that an opportunistic theft is seen to be committed from one witness's vantage point only. From the other witness' viewpoint a student is simply seen returning a book to an office. Of interest will be to see how many participants believe the student to be guilty following a discussion with a co-witness who had seen her commit the crime, or vice-versa.

This initial study most closely resembles the work of Wright et al. (2000, Experiment 2) who showed pairs of participants the same storybook depicting a theft, except that half saw an accomplice with the thief and the other half did not. As a development of Wright et al.'s experiment, the present study used videos filmed from two different witness vantage points to mimic a realistic eyewitness situation. Two items were unique to each viewpoint, as opposed to a single item being unique to one version only in Wright et al.'s study. Furthermore, the present study tests participants' memories using free and cued-recall questions, rather than using forced-choice recognition questions.

As a further extension to the existing co-witness literature, Experiment 1 explores age differences in susceptibility to co-witness information. Prior co-witness studies have exclusively used young adults (typically college students), but the present study has included an older age sample from the local community (aged 60-80 years). This age group may be particularly prone to memory conformity as a
consequence of age-related memory decline (Moscovitch & Winocur, 1992). For example, as mentioned in Chapter 4, a relationship between memory for an encoded event, and susceptibility to misinformation effects, has been found by a number of eyewitness researchers (e.g., Liebman et al., 2002; Loftus et al., 1992; Tomes & Katz, 1997). Thus, older adults might be expected to have a poorer memory for the event than younger adults, and therefore show a higher rate of memory conformity. Furthermore, older adults are often aware that certain memory abilities decline with age, so tend to be less confident about trusting their own memory (Stevens, Kaplan, Ponds, Diederiks & Jolles, 1999). Having less confidence in one’s own memory might entail greater reliance on other sources of information. Dixon (1992; 1996; see also Craik, 1986) proposed that in everyday life older adults compensate for memory decline by using external memory aids. Collaboration with other individuals has been recognised as a common compensatory mechanism for older adults (Dixon, 1996; Thompson & Conway, 2001).

In addition, ageing is associated with increases in ‘source confusion’ that may exacerbate the distorting effect of misinformation (Johnson et al., 1993; Schacter, Kihlstrom, Kasznia & Valdiserri, 1993). However, the existing eyewitness literature is inconsistent with regard to age-related changes in susceptibility to post-event misinformation. Mitchell et al. (2003) explored age differences in source monitoring performance using a standard misinformation paradigm and found that older adults ($M = 76$ years) were more likely than young adults ($M = 19$ years) to say that they saw information that was actually only suggested to them. Older adults were also found to be more confident in their source misattributions than were younger adults. Similarly, Karpel, Hoyer and Toglia (2001) found that older adults ($M = 73$ years) were more likely than young adults ($M = 19$ years) to falsely report items that had only been suggested to them, with high confidence that they had been seen (see also Cohen & Faulkner, 1989; Loftus, Levidow & Deunsing, 1992). In contrast, Searcy, Bartlett and Memon (2000) found no significant differences in the susceptibility of young ($M = 24$ years) and elderly adults ($M = 69$ years) to misinformation (see also Bornstein, Witt, Cherry & Greene, 2000; Coxon & Valentine, 1997). The inconsistent effect of ageing on susceptibility to misinformation clearly warrants further investigation.
In summary, Experiment 1 aims to investigate the effect of co-witness discussion on memory. Following Wright et al. (2000) it is hypothesised that participants who discuss an event with a co-witness will later errantly report items that were not personally witnessed when asked to recall only that which they have seen themselves. In addition, the experiment investigates age differences in memory conformity effects. Despite previous inconsistent findings within the eyewitness literature, it is hypothesised that older adults will be more susceptible to co-witness influence than young adults due to age-related memory deficits, mentioned above.

6.2 Method

6.2.1 Participants and Design

Sixty students from the University of Aberdeen (18–30 years; \( M = 20; \ SD = 2.48 \)) and 60 older adults recruited from the local community (60–80 years; \( M = 69; \ SD = 6.09 \)) were tested. All participants were given a series of vision tests (Snellen chart, standard reading test, contrast sensitivity chart) and proved to be above an acceptable level of eyesight deemed necessary for taking part in the experiment. The older participants underwent the Memory Impairment Screen (MIS, Buschke et al., 1999). This is a screening tool designed to identify individuals who should be considered for further evaluation for possible Alzheimer's disease or other forms of dementia. A cut off score of 4 or less suggests impairment and warrants appropriate diagnostic assessment. The mean score in the current study was 7.6 (Range = 5 to 8). Thus no older participants were excluded.

The study employed a 2 (condition: individual recall; co-witness recall) X 2 (age group: young; old) between-subject design.

6.2.2 Materials

Simulated crime event. The event was a short film of a female student entering an unoccupied university office to return a borrowed book. Two video clips were filmed, each lasting one minute and 30 seconds. Both clips contained exactly the same sequence of events, but were filmed from different angles so as to simulate different witness perspectives. This manipulation allowed different features of the
event to be observed from each perspective. For example, from perspective ‘A’ (but not perspective B) it is possible to read the title of the book that the student is carrying, and also observe that she throws a note into a dustbin when leaving the room. From perspective ‘B’ (but not perspective A) the student is seen checking the time on her watch, as well as committing an opportunistic crime (sliding a £10 note out of a wallet and putting it into her own pocket). All other actions and events that occur are common to both perspectives.

6.2.3 Procedure

Participants took part either individually or in previously unacquainted pairs, depending on experimental condition. Upon arrival participants were seated in front of a television monitor and asked to watch a short video as part of a memory test. Half the participants in the individual condition saw perspective A, and half saw perspective B. Participants in the co-witness condition were led to assume they were seeing the same video clip as their co-witness, though each saw a different perspective. A screen was used to obstruct the view of the other co-witness while the video was being shown (there was no sound). A brief unrelated filler task (five minutes) kept each witness occupied while the other viewed the video clip.

Shortly after the video presentation, witnesses engaged in either a memory discussion, or memory rehearsal phase (dependent on condition). Questionnaires were given to participants to help structure this task. Instructions given at the beginning of the questionnaire requested participants to put themselves in the position of being a real witness, and to treat the task as an opportunity to think over the event before the police arrive. Participants in the individual recall condition completed the questionnaire alone. Those in the co-witness condition were asked to complete this task with another witness by discussing the event together and providing the most accurate collaborative notes as possible. The questionnaire items included a request for a free recall of the sequence of actions and events from the video, as well as answers to seven more specific questions about the event (e.g., “What was the colour of her bag?”).

When the questionnaire was completed, participants engaged in a series of unrelated filler tasks which occupied 45 minutes of their time. The main recall test
was then administered in the form of a questionnaire. This time all participants completed the task individually. Instructions were provided for participants to think back to what they could remember witnessing in the event, and to report their answers accurately as if they were real witnesses providing information for the police. Participants were asked to provide a free recall account of the video, and to answer a further eight questions (incorporating four neutral questions and four ‘critical’ questions). The critical questions comprised two questions pertaining to information that was only visible from Perspective ‘A’ (e.g. ‘What was the title of the book that the girl was carrying?’) and two items that were only visible from Perspective ‘B’ (e.g. ‘What jewellery was the girl wearing?’). There was also a final question asking participants to state whether or not they could provide any evidence of the girl’s guilt, or innocence, from what they had witnessed on the video. Following each of the questions, participants were asked how confident they were with the answer they had provided. They responded using a seven point Likert scale (1 = not very confident).

In a post-test manipulation check participants were asked if they had been suspicious as to the purpose of the study and whether in the co-witness condition they suspected they had seen a different event to that seen by their co-witness. None of the participants indicated that they had been aware of the manipulation.

6.2.4 Coding

A checklist containing 39 items of information about the sequence of actions and events that took place in the videos was constructed for scoring purposes (see Appendix 1). Free-recall data was coded according to whether it was a correct item of information, an incorrect item of information, or an ‘extra’ item of information encountered from a co-witness. Correlational analysis showed a significant level of agreement between two independent coders based on a random sample of ten transcripts ($r(10) = .97, p<.01$).
6.3 Results

6.3.1 Research questions

Data analysis focused on the following questions: First, do witnesses supplement their own memories of an event with information gained from a co-witness? If that is the case, in this study co-witnesses will have erroneously incorporated unseen items of information learnt from their co-witness in a test of recall. Second, do the witnesses who have not seen the crime occur come to believe the girl is guilty after discussing the event with a co-witness who has seen the theft take place? Third, are older adults more susceptible to memory conformity than younger adults?

6.3.2 Co-witness influence

Responses given during the recall phase (free recall and cued-recall questions) were coded to see how many witnesses had included at least one critical (unseen) detail. If a critical item had been included in the free-recall then it was ignored if mentioned again in response to the cued-recall questions, so that it was not counted twice. Participants from the individual condition served as a control group.

Table 6.1 shows that both young and older participants in the co-witness condition incorporated information in their recall test that they could only have known about as a result of discussing the event with the co-witness (for example, the girl stealing £10). Chi-square analysis confirmed a significant association between experimental condition and the number of critical (unseen) 'co-witness' items of information reported for both younger and older age groups ($\chi^2 (1) = 32.31; p < .001$, and, $\chi^2 (1) = 34.74; p < .001$, respectively), with participants in the co-witness condition being significantly more likely to incorporate at least one critical (unseen) item into their recall. This confirms the hypothesis that witnesses will supplement their own memories of an event with information gained from a co-witness. No significant difference in memory conformity was found between the two age groups ($\chi^2 (1) = 0.08; p = .500$). Hierarchical loglinear (HILOG) analysis revealed that there was no significant interaction between condition and age group in relation to memory conformity ($\chi^2 (1) = .004, p = .95$).
Table 6.1. *Number of participants including at least one (unseen) co-witness detail in the final (individual) recall test*

<table>
<thead>
<tr>
<th></th>
<th>Were co-witness items included in the final individual recall test?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YES</td>
</tr>
<tr>
<td><strong>Individual Recall Condition</strong></td>
<td></td>
</tr>
<tr>
<td>Young Participants</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>21</td>
</tr>
<tr>
<td>Old Participants</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>22</td>
</tr>
</tbody>
</table>

It was important to know whether critical co-witness items from one perspective were included more often than those from the other perspective, as a crime was depicted in one view and not the other. The data (within the co-witness condition only) were checked to see if participants witnessing the event from one perspective (Perspective A) were more susceptible to co-witness influence than those witnessing it from the other perspective (Perspective B). No relationship between witness view and susceptibility to co-witness influence was found ($\chi^2 (1) = 2.05; p = .126$) Thus participants were equally as likely to influence each other regardless of which perspective the event had been witnessed from.

Following each of the eight questions in the recall phase, participants in the co-witness condition were asked to indicate how confident they were regarding the accuracy of their response using a seven point Likert scale ($1 = $not very confident). The relationship between subjective ratings of confidence and accuracy was examined across the question items in the recall test on the basis that comparing between individuals' responses using a within-subjects measure is more informative.
and robust than using a between-subjects measure (Perfect, 2002). As mentioned previously, the eight questions comprised four ‘critical’ questions (two of which pertaining to information that had not been personally witnessed), and four ‘neutral’ questions. For the younger participants, a paired-samples t-test revealed that mean confidence ratings significantly decreased when co-witness information had been incorporated as a response to a critical question, in comparison to the mean confidence ratings regarding accurate answers given to neutral questions (Ms = 5.0 and 4.2 for neutral and critical responses respectively; t (18) = 2.27, p = .037). Thus, young adults were less confident in the accuracy of their response when co-witness information was used to answer a question. However, the older adults were equally as confident about the accuracy of their response regardless of whether or not it incorporated co-witness information (Ms = 5.3 and 5.0 for neutral and critical questions respectively; t (15) = 0.62, p = .546).

6.3.3 Attributions of guilt

All participants were asked whether or not they could provide any evidence of the student's guilt based on what they had witnessed on the video to see whether participants who had not witnessed the theft take place would come to believe that the girl in the event was guilty of the crime following discussion with a co-witness. Only those participants who had not witnessed this crime were included in the analysis.

Chi-square analysis revealed a significant association between experimental condition and (unfounded) assumptions of guilt amongst the young participants, $\chi^2 (1) = 5.40$, p = .025. A similar result was found for the older adults, $\chi^2 (1) = 15.00$, p < .001. Taken together, this shows that 60% of all our participants who had not seen the student commit a crime came to believe she was guilty after discussing the event with a co-witness who had seen her steal some money.

Interestingly, a similar trend was found in the opposite direction for young participants who did witness the crime, i.e., one third of young participants who saw the crime committed reported that the student was not guilty of stealing after discussing the event with a co-witness who had not seen the crime (see figures in parentheses, Table 6.2). Chi-square analysis, using data from young participants who
did witness the crime, revealed a significant difference between the assumptions of guilt made by each experimental condition ($\chi^2(1) = 6.0, p = .021$).

Table 6.2. Number of participants reporting the student was guilty when they had seen no proof. (Those who did see the student commit the crime are included in parentheses for comparison purposes)

<table>
<thead>
<tr>
<th>Guilty of Stealing?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 (15)</td>
<td>13 (0)</td>
</tr>
<tr>
<td>Individual Recall Condition</td>
<td>8 (10)</td>
<td>7 (5)</td>
</tr>
<tr>
<td>Co-Witness Recall Condition</td>
<td>0 (15)</td>
<td>15 (0)</td>
</tr>
<tr>
<td>Individual Recall Condition</td>
<td>10 (15)</td>
<td>5 (0)</td>
</tr>
</tbody>
</table>

6.3.4 Effects of age and discussion on memory accuracy

The number of items of information correctly reported by young and older adults were calculated to see whether there were any differences in memory performance between the two experimental conditions (see Table 6.3 for means).

There was no main effect of experimental condition ($F<1$), indicating that the conformity effect does not simply reflect a deficit in memory for the event. However, a main effect of age group was demonstrated ($F(1, 113) = 6.65; MSE = 122.81; p = .011$) with the young participants recalling significantly more details than the older participants ($M_s = 18.00$ and 15.95 respectively). No interaction between age group and experimental condition was apparent ($F<1$). When examining the number of incorrect items of information about the event that had been reported, no significant
main effects were found (for age group or experimental condition). Neither was there a significant interaction between these factors (all $F's < 1$).

Table 6.3. Number of correct items reported by age group and condition

<table>
<thead>
<tr>
<th></th>
<th>Individual Recall Condition</th>
<th>Co-Witness Recall Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young Participants</td>
<td>18.07</td>
<td>17.93</td>
</tr>
<tr>
<td></td>
<td>(3.86)</td>
<td>(4.32)</td>
</tr>
<tr>
<td>Old Participants</td>
<td>15.79</td>
<td>16.11</td>
</tr>
<tr>
<td></td>
<td>(4.54)</td>
<td>(4.47)</td>
</tr>
</tbody>
</table>

Further analysis, within the co-witness condition alone, investigated whether there were any differences in the number of correct items reported between those participants who had, or had not, been influenced by their co-witness. Point-biserial correlations indicated no relationship between susceptibility to co-witness influence and the number of correct items reported for either young ($r_{pb}(30) = .113$, $p = .552$) or older adults ($r_{pb}(28) = -.014$, $p = .943$).

6.4 Discussion

Combining data from both younger and older adults, it was found that a significant proportion (71%) of witnesses who had discussed an event with a co-witness reported items of information that they had acquired during the course of the discussion. Furthermore, 60% of participants in the co-witness condition reported that the girl was guilty of a crime they had not actually witnessed taking place. No difference in the level of memory conformity between the two witness perspectives was found, thus participants were equally as likely to influence one another regardless of which witness perspective had been seen. This indicates that the 'unique' items of information in each event were comparable in their likelihood of being raised in conversation, and later reported by the other witness. In addition, the
participants were not suspicious that they had been shown different versions of the event. Thus, these results demonstrate a robust memory conformity effect (similar in magnitude to that shown by Wright et al., 2000) in a realistic, simulated eyewitness situation.

No differences in memory conformity were found between the two age groups. However, age differences did emerge in the amount of correct items of information reported about the event, and in the pattern of confidence ratings given as answers to the cued recall questions. Older adults recalled significantly fewer correct details in comparison with the younger age group, replicating previous findings indicating that older adults tend to recall a lower proportion of content compared to younger adults (Frieske & Park, 1999; Park, 1998). However, in the current study, even though older adults had a poorer memory they were no more susceptible to memory conformity than were younger adults (see also Coxon & Valentine, 1997; Searcy et al., 2000). This suggests that conformity effects are not purely a consequence of a poor memory for the event. This conclusion is supported by two other findings from the present study; there were no differences in the number of correct event-items recalled between the co-witness and control conditions, or between those who were and were not influenced within the co-witness condition alone. Possible explanations for the memory conformity effect will be considered later after the main findings have been discussed in more detail.

The attribution made by some participants that the student in the video committed a theft suggests that information obtained from a co-witness may lead a witness to embellish their memory reports, despite the potentially serious implications this could have. Of those participants who had not witnessed the theft, more than half were willing to make an attribution of guilt after discussing the event with a co-witness who had seen the money being stolen. Thus, a discussion with a co-witness (who believed the girl to be guilty) was enough to convince a majority of participants that she was a thief. It cannot be forgotten, however, that one third of young participants who had seen the crime committed reported that the student was not guilty after a discussion with a co-witness who had not seen the theft. Thus, influence can occur in either direction. In real life both the conviction of an innocent person, and the freedom of a guilty person, are serious concerns. The current findings show that a simple discussion between two individuals with opposing viewpoints can
alter judgements in both directions. This was not true, however, of the older adults. It is difficult to comment on this as there is currently a lack of studies focusing on adult age differences in social influence.

So what can be said on the basis of the existing data about the mechanisms responsible for the memory conformity effect in younger and older adults? Before considering this question it is important to rule out some confounding factors that could have contributed to the effect found. For example, as discussed in Chapter 2, the role of task demands must be considered when examining any kind of misinformation effect. Previous research has shown that forced choice recognition tests (offering the original information and the post-event information as the two alternative responses) can elicit a misinformation effect that arises solely as a result of task demands rather than a genuine memory impairment (e.g., McCloskey & Zaragoza, 1985). The current study, however, used open-ended questions and free-recall requests as these place fewer potentially biasing restrictions on a person's responses (Fisher & Geiselman, 1992). Furthermore, participants were asked to think back to the video and report the original information that had been seen, as if providing a statement for the police. These measures were included to minimise task-demands.

It was hypothesized that older adults may be more susceptible to co-witness influence than young adults due to age-related memory decline (e.g. Schacter et al., 1993). However, this was not observed. It is possible that the sample of older adults recruited for the study were not representative of the normal population of 60-80 year olds in that they were particularly healthy and active (e.g., posters to recruit older adults for the present study had been sent to 'over 60's' walking clubs, fitness classes, bowling clubs, etc). For example, Stevens et al. (1999) have found that physical and mental activity is associated with a preservation of cognitive and memory performance. Thus, perhaps the memory decline of the older adults in the present study was minimal, hence the lack of significant age differences in memory conformity. In support of this interpretation is recent research by Butler, McDaniel, Dornburg, Roediger and Price (in press) who found that susceptibility to misinformation is associated with frontal lobe functioning. Older adults with frontal lobe decline, assessed using a composite score from performance on a battery of five neuropsychological tests of frontal lobe function, were particularly susceptible to
misinformation. In contrast, older adults with high frontal lobe function performed virtually as well as young adults in terms of the amount of misinformation reported at test (Butler et al., in press). Thus, it is not ageing per se that is associated with susceptibility to post-event information, but an age-related decline in frontal lobe function. This finding might account for the lack of differences in memory conformity found between young and older adults in the present study, as well as the inconsistent findings of previous misinformation studies investigating age-related differences, outlined in the introduction.

One possible account of the memory conformity effect is that it is a result of normative or informational influence (Deutsch & Gerard, 1955). As mentioned in Chapter 4, normative influence reflects an individual's need for social approval and can result in immediate compliance, where a participant publicly agrees with the co-witness information without actually believing it. In Experiment 1, this explanation is unlikely as the final recall test was completed individually and privately. Informational influence reflects an individual's desire to be accurate. Here, the co-witness information is likely to be reported at test because it is believed to be true, however, this does not mean that the co-witness information has overwritten the individual's own memory in any way. Memory conformity might also be a product of source confusion (Johnson et al., 1993; Zaragoza & Lane, 1994).

In the current experiment it is difficult to separate any effects arising from informational influence from those due to source misattribution. However, the subjective confidence ratings, given by participants after they have answered each of the questions in the final recall test, give some indication about how confident participants are about reporting (unseen) co-witness information in comparison with reporting details that had been seen. Of particular interest is the difference in confidence ratings given by young and older adults, as these imply that co-witness information might be (errantly) reported at test for qualitatively different reasons. For example, ratings from the young participants revealed that when information acquired from a co-witness was used to answer a question the mean confidence rating was significantly lowered in comparison to accurate answers. Thus, younger participants may have been aware that they were using information that they could not remember witnessing themselves, suggesting that the co-witness information might have been reported due to informational influence. In contrast, older adults
were equally as confident in the accuracy of their responses whether they had, or had not, used co-witness information to help answer a question. Previous studies of eyewitness memory that have used an older age-group have also found older adults to be more confident in their erroneous responses as opposed to younger adults (e.g., Mitchell et al., 2003).

The source monitoring framework (outlined in Chapter 2) offers an interpretation of how people might assign a confidence rating to the accuracy of a memory. To recap, it proposes that individuals use memory characteristics as cues to determine the source of a memory (see Johnson et al., 1993). Older adults are poorer at source monitoring than young adults (Schacter et al., 1993). For example, Norman and Schacter (1997) found that older adults show less differentiation than do young adults in their reports of memorial characteristics for true and false memories (see also Karpel et al., 2001; Mitchell et al., 2003). Hence, perhaps this is why the older adults in the present study did not differ in their confidence regarding accurate and inaccurate items of information reported at test, i.e., they misattributed the co-witness information to the originally encoded event, or simply could not specify the source of the information recalled, and thus were confident to supply this (errant) information at test.

6.5 Summary of main findings

Experiment 1 employed a novel procedure to explore the effects of encountering misleading post-event information from a co-witness as naturalistically as possible for a laboratory based study. A memory conformity effect was found following discussions between co-witnesses who had seen the same crime event from different angles. Specifically, it was shown that witnesses often claimed to remember details that they had not seen themselves, but which their co-witness had seen and had mentioned in the discussion. Following the success of simulating a realistic eyewitness situation, it is now possible to employ a similar experimental procedure to explore memory conformity between co-witnesses further. As reviewed in Chapter 4, much of the existing co-witness literature has relied on the ‘implied’ presence of a hypothetical co-witness. Experiment 2 will therefore explore whether misinformation
effects following co-witness discussion (as in Experiment 1) exceed those produced by non-social sources of influence more typically employed in co-witness research.
Chapter 7

Experiment 2: Examining the effects of socially (vs. non-socially) encountered misinformation

7.1 Introduction

Experiment 1 employed a procedure that allowed co-witnesses to impart and encounter misinformation within a face-to-face interaction, and demonstrated that memory conformity occurs when witnesses discuss an event with one another prior to their memory being tested. As mentioned previously, sharing our memories with others is a natural everyday activity, thus the potential to encounter misinformation this way is considerable. However, with a few exceptions, existing co-witness research has introduced misinformation to participants in several decidedly 'non-social' ways (see Chapter 4). For example, the co-witness information has been presented without the actual presence of a co-witness, either via the experimenter telling participants what a previous participant has recalled (e.g., Corey & Wood, 2002), or where the responses of previous participants are deliberately noted on a recall test (e.g., Betz et al., 1996), or presented as a post-event narrative supposedly written by a previous participant (e.g., Kwong See et al., 2001). The literature has shown that these methods of presenting the co-witness information can negatively influence memory reports for an event.

The ecological validity of the procedure used in Experiment 1, in comparison to previous co-witness studies, has obvious benefits in that the findings can be generalised to real life with more confidence. However, there is another reason to distinguish between co-witness studies that have investigated the effects of encountering post-event information from a co-witness naturalistically (i.e., using a real co-witness to impart misinformation) versus using an alternative method (i.e., that does not involve a face-to-face interaction). For example, as mentioned in Chapter 4, Meade and Roediger (2002, Experiments 3 & 4) found that an 'implied' (non-present) co-witness was not as influential as a 'real' (present) co-witness imparting misinformation (Meade & Roediger, Experiment 3), and that participants were more likely to misattribute an item of misinformation to being part of the
originally encoded stimuli when a 'real', rather than an 'implied', co-witness made the suggestion (Meade & Roediger, Experiment 4).

Meade and Roediger's (2002) research implies that co-witness research that has not used a 'real' co-witness to impart post-event information might have underestimated the level of influence a co-witness can have on an individual's memory. Crucially, this might be because less ecologically-valid co-witness research (i.e., that has not used a 'real' co-witness) has failed to consider factors that could prove important to understanding co-witness influence. For example, the fact that post-event information is encountered directly from another person might actually encourage memory conformity. Grice (1975) states that people generally assume that information exchanged during the course of a normal discussion is truthful and accurate (see also Swann, Giuliano & Wegner, 1982). Moreover, people may often want to appear to be in agreement with others, to appear more likeable (see Tajfel & Turner, 1986). Furthermore, the very medium of the post-event narrative, i.e., text, cannot convey important information that is inherent in social discourse such as non-verbal influences (e.g. eye-contact, facial expressions, etc.) or subtle social cues (e.g. perceived credibility, trustworthiness, confidence, etc.) that may impact upon a person's acceptance of information. The potential for experimenter-induced bias provides a good and pertinent example of such (unintentional) non-verbally introduced effects that can alter results in line with the experimenter's expectations (see Rosenthal, 1969). To explore this issue further, Experiment 2 will focus specifically on whether misinformation encountered during a co-witness discussion results in a larger memory conformity effect than misinformation encountered within a post-event narrative from a co-witness who is no longer present. Following Meade and Roediger's (2002) findings, it is hypothesised that people will be more susceptible to post-event information if it is encountered in a social interaction.

In addition, Experiment 2 explores age differences in susceptibility to post-event information encountered from a real or implied co-witness. Based on the findings of Experiment 1 it is predicted that there will be no difference in memory conformity between young and older adults when encountering misinformation from a 'real' co-witness. However, older adults are expected to be more influenced in this condition than when encountering misinformation from a post-event narrative. This is because (in addition to the factors suggested above) it has been recognised that
collaboration with others is often used by older adults as a compensatory mechanism for dealing with perceived or real memory decline (Dixon, 1996; Thompson & Conway, 2001). One possible side-effect of this compensatory mechanism is that older adults are susceptible to post-event information encountered during collaborative recall more so than post-event information encountered via some non-social source, such as reading a narrative.

As mentioned in Chapter 5, each experiment within the present thesis has used different stimuli to encode so that any effects found are not dependent on the materials used. A new simulated crime-event is therefore used in Experiment 2, which is approximately the same length as the event used in Experiment 1, however it is more complex in that more characters are involved. Experiment 2 predicts that older adults will exhibit a poorer memory for the crime-event than young adults, i.e., they will recall significantly fewer items of event information. This is based on the findings of Experiment 1, however previous researchers have also found that older adults tend to report fewer details than younger adults when recalling content (e.g., Frieske & Park, 1999; Park, 1998).

In summary, Experiment 2 aims to explore the differential effects that alternative sources of post-event information can have on recall for a witnessed event. All experimental factors will be held constant across participants, apart from the source of misinformation they encounter, to investigate whether post-event information is more 'potent' when encountered as part of a discussion than as part of a written narrative. It is hypothesised for young and older adults that post-event information encountered as part of a face-to-face social interaction with a co-witness will be more likely to distort memory reports than a post-event narrative that is said to have originated from a co-witness who is no longer present.

7.2 Method

7.2.1 Participants and Design

A total of 210 participants were tested. Of the 210 participants, 108 were undergraduate students from the University of Aberdeen (17-33 years; M = 20.39; SD = 3.5), taking part in return for course-credit. The remaining 102 participants were older adults recruited from the local community (58-80 years; M = 68.92; SD =
who were paid for their contribution to the study. All participants were given a series of vision tests (Snellen chart, standard reading test, contrast sensitivity chart) and proved to have above an acceptable level of eyesight deemed necessary for taking part in the experiment. The older participants underwent the Memory Impairment Screen (MIS, Buschke et al., 1999). As mentioned in Experiment 1, this is a screening tool designed to identify individuals who should be considered for further evaluation for possible Alzheimer's disease or other forms of dementia. A cut off score of 4 or less suggests impairment and warrants appropriate diagnostic assessment. The mean score in the current study was 7.8 (Range = 5 to 8). Thus no older participants were excluded.

The study employed a 3 (condition: biased confederate; biased narrative; control) X 2 (age-group: young; old) between subjects design.

7.2.2 Materials

Event. A simulated robbery (1 minute, 25 seconds) was filmed at a Blockbuster Video store. The characters in the event included two robbers, one employee, and one customer. No weapons were involved.

Recall Measures. A cued recall questionnaire containing twenty questions about the event (see Appendix 2) was given to participants before and after the manipulation phase. Of these twenty questions, four related to the items of misinformation given in the experimental manipulation (in the biased-confederate and biased-narrative conditions). These four questions could be answered with details witnessed in the event or with the misinformation. The remaining sixteen questions were neutral, and could be answered with details from the event only.

7.2.3 Procedure

Participants took part individually. Those participants in the biased-confederate condition completed the experiment with a confederate whom they believed to be another participant. Participants were always matched with confederates from the same age group as themselves. The confederates were trained to act as though they
were a genuine naïve participant who had never before met the experimenter nor completed the experiment.

On arrival, participants were seated in front of the television monitor and asked to watch a short video. In the biased-confederate condition, the participant and confederate watched the video together. Ten minutes of filler tasks followed. Participants were then given the 20-item cued-recall questionnaire to complete (described above), and were asked not to guess at any answer. No time limits were imposed. On completion, participants completed a further 20 minutes of filler tasks before the manipulation phase.

Participants in the biased-narrative condition were asked to read through a typed post-event narrative containing a summary of the event seen earlier on video. They were informed that the narrative was an account given by a previous participant within the same age group as themselves. The narrative described the event, but did not contain details that could be used to answer any of the 16 neutral items in the cued-recall questionnaire. Crucially, four items of misinformation were embedded within the narrative, suggesting that:

1) the employee was stacking shelves at the beginning of the video (whereas in fact he was standing by the till),
2) the main robber handed the bag of stolen money to his accomplice before leaving the store (in fact this does not happen),
3) the main robber was wearing a leather jacket (in fact he was wearing a cloth jacket with two white stripes),
4) the main robber’s accomplice had a gun (in fact he had nothing in his hands at all).

Participants were allowed to read through the narrative at their own pace. In response to questions (e.g. “Did this happen?”), the experimenter re-iterated that the narrative was simply a previous participant’s account and that no further information could be provided.

Participants in the biased-confederate condition were instructed that they had a short amount of time to discuss the video together as a pair (i.e., with the confederate). The confederate was trained to disclose the same information, and
misinformation, as was present in the biased post-event narrative. In the face of disagreement from the real participant, the confederate was instructed to simply state “Oh, well I thought I saw…(the repeated relevant item of misinformation)” rather than pursue an argument about what actually happened. If the participant talked about items that were relevant to the 16 neutral questions the confederate was trained to listen without comment, and then steer the conversation back to event details that were of no relation to the recall test.

The narrative used in the control condition was the same as in the biased post-narrative condition, but with the four items of misinformation omitted. As such, the content was accurate, but could not be used to answer any of the cued-recall questions.

When the manipulation phase was complete, participants engaged in a further 20 minutes of filler tasks before being given the same 20 item cued-recall questionnaire once again. Participants were instructed to answer the questions with details recalled from the video. This instruction was written at the top of the questionnaire as well as being emphasised by the experimenter. Once again, participants were reminded not to guess at any of the answers. Finally, a manipulation check was given. Participants were asked if they had guessed the true purpose of the experiment, to which no one expressed suspicion. Furthermore, those in the biased-confederate condition were typically surprised to learn that the confederate was not actually a true participant.

7.2.4 Coding

The 20 item cued-recall questionnaire given prior to the manipulation phase was scored in terms of the number of neutral questions correctly answered (thus the maximum score possible is 16). At the second completion of this questionnaire (post manipulation phase) the 16 neutral questions were scored as before, and a ‘misinformation score’ was calculated by counting how many of the four critical questions had been answered with misinformation. The ‘misinformation score’ could be broken down into two ‘sub-scores’ regarding answers that had changed from the original response given in the first recall questionnaire, and answers that had been
added after no response had originally been provided (see Table 7.1), so that changes and additions could be looked at separately in the analyses.

Table 7.1. Examples of pre and post manipulation responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-manipulation response</th>
<th>Post-manipulation response</th>
</tr>
</thead>
<tbody>
<tr>
<td>What was the employee doing at the beginning of the film?</td>
<td>“Working behind the till”</td>
<td>“Stacking shelves”</td>
</tr>
<tr>
<td>Who had the bag containing the money when the robbers left the shop?</td>
<td>No answer provided</td>
<td>“The main robber handed the bag to the robber by the door”</td>
</tr>
</tbody>
</table>

Inter-rater reliability checks, based on a random sample of ten transcripts, showed a significant level of agreement between two independent coders for the accuracy scores in Recall 1 (r = .93), Recall 2 (r = .95), and for the ‘misinformation’ scores (r = 1.00).

7.3 Results

7.3.1 Research questions

The analyses of memory conformity and memory accuracy focused on two issues: First, are witnesses more likely to conform to post-event information encountered during a discussion (socially) than acquired from a written narrative (non-socially)? Second, is the pattern of results achieved replicated within the sample of older adults?

7.3.2 Memory conformity

Data from the control group were initially explored to check that critical items were not reported in this condition. By chance, participants had reported a single critical item on two occasions that had neither been witnessed nor encountered as post-event
information. In comparison to control group data, participants in the biased-confederate and biased-narrative conditions reported significantly more items of misinformation. See Table 7.2 for the mean number of misinformation items (out of four) reported by age group and condition. Data from the control group were omitted from further analyses, which focused on differences between the two experimental groups.

Table 7.2. Mean number of misinformation items (out of four) reported by age group and condition (standard deviations in parentheses)

<table>
<thead>
<tr>
<th></th>
<th>Control Condition</th>
<th>Biased-Narrative</th>
<th>Biased-Confederate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young Adults</td>
<td>0.1 (0.2)</td>
<td>1.5 (1.3)</td>
<td>2.2 (1.3)</td>
</tr>
<tr>
<td>Older Adults</td>
<td>0 (0)</td>
<td>1.1 (1.1)</td>
<td>1.4 (1.2)</td>
</tr>
</tbody>
</table>

A Univariate ANOVA was performed to examine the average number of misinformation items (out of four) reported by condition (biased-confederate, biased-narrative) and age group (young, old). A main effect of condition was revealed \( F (1, 136) = 5.65; \text{MSE} = 8.54; p = .019 \), where participants (young and old combined) were more influenced in the biased-confederate condition than the biased-narrative condition \( (M's = 1.77 \text{ and } 1.27, \text{ respectively}) \). Calculating the odds ratio revealed that the odds of reporting misinformation was 1.70 times higher for participants in the biased-confederate condition rather than the biased-narrative condition.

A main effect of age group was also found \( F (1, 136) = 8.71; \text{MSE} = 13.17 \ p = .004 \), with young participants reporting significantly more misinformation than older participants overall \( (M's = 1.82, \text{ and } 1.21, \text{ for young and old participants respectively}) \). No significant interaction was apparent between age group and condition \( (p = 34; F < 1) \).
7.3.3 Changes and additions

The items of misinformation reported in Recall 2 were further analysed to see how many answers had changed from the original response given in Recall 1, and how many answers had been added following no response being given originally in Recall 1 (please refer back to Table 7.1 for examples of each). Within the biased-narrative condition, 40.0% of responses had changed from an original response. In the biased-confederate condition 57.1% of responses had been changed. Thus, participants were more likely to change an original response when in the biased-confederate condition as opposed to the biased-narrative condition ($F(1, 138) = 9.14; MSE = 7.31; p = .003$). No differences between the experimental conditions were found in relation to the number of additions that had been made ($M's = 51.4$ and $53.3$ for the biased-narrative condition and the biased-confederate condition respectively; $F < 1$).

7.3.4 Memory accuracy

Accuracy was measured using the number of correct responses given to the 16 neutral questions in the cued-recall questionnaire. Recall 1 (pre-manipulation stage) and Recall 2 (post-manipulation stage) were initially examined individually (see Table 7.3 for the mean accuracy scores).

A Univariate ANOVA, with the number of correct responses to the 16 neutral questions in Recall 1 as the dependent variable, found a main effect of age-group ($F(1, 204) = 60.10; MSE = 280.16; p < .001$), where younger adults were more accurate overall ($M's = 10.05$ and $7.74$ for younger and older adults respectively). No main effect of experimental condition was found, and there was no significant interaction between age group and experimental condition ($F's < 1$).

The same analysis for Recall 2 revealed a significant interaction between age group and experimental condition ($F(2, 204) = 6.31; MSE = 26.79; p = .002$). Older adults were significantly less accurate than young adults in the control and biased-narrative conditions, however, those in the biased-confederate condition performed at a level that did not significantly differ to younger adults ($F(1, 68) = 2.83; MSE = 13.92; p = .10$). Thus it seems that discussion with a confederate actually aided the memory performance of older adults.
Table 7.3: Mean number of accurate details (out of 16) reported in Recall 1 and 2, broken down by age and experimental condition (standard deviations in parentheses)

<table>
<thead>
<tr>
<th></th>
<th>Recall 1</th>
<th></th>
<th>Recall 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Biased Narrative</td>
<td>Biased Confed.</td>
<td>Control</td>
</tr>
<tr>
<td>Young adults</td>
<td>10.19</td>
<td>9.86</td>
<td>10.08</td>
<td>11.44</td>
</tr>
<tr>
<td></td>
<td>(2.07)</td>
<td>(2.17)</td>
<td>(1.89)</td>
<td>(1.96)</td>
</tr>
<tr>
<td>Older adults</td>
<td>7.65</td>
<td>7.41</td>
<td>8.15</td>
<td>8.35</td>
</tr>
<tr>
<td></td>
<td>(2.30)</td>
<td>(2.02)</td>
<td>(2.49)</td>
<td>(2.24)</td>
</tr>
</tbody>
</table>

When comparing performance in Recall 1 to that in Recall 2, both young and older adults were found to report significantly more correct responses when answering the questions for the second time ($F_{(1, 105)} = 62.37; MSE = 75.85; p < .001$, and $F_{(1, 99)} = 64.53; MSE = 70.59; p < .001$, for young and older adults respectively). No interaction between performance on the recall questionnaires and experimental condition was found for the young adults ($F < 1$). However, this interaction was significant for the older adults ($F_{(2, 99)} = 14.68; MSE = 16.06; p < .001$) indicating that older adults in the biased confederate group performed significantly better in Recall 2 than those in the other two experimental groups (as mentioned previously).

7.4 Discussion

Significant differences in susceptibility to post-event misinformation originating from a social versus a non-social source were observed. Thus, the main hypothesis was confirmed, for both the young and the older groups, that socially encountered misinformation would distort memory reports more than non-socially encountered
misinformation. It is important to note that the memory accuracy results from Recall 1 (pre-manipulation) show equivalent memory performance between participants receiving either social or non-social forms of misinformation. This finding indicates that the more substantial effect of the socially encountered misinformation at Recall 2 was not due to any pre-existing group differences in memory.

Similar conclusions have recently been drawn by Meade and Roediger (as mentioned in the introduction), using a recognition test rather than a recall test. Thus Experiment 2, and the findings of Meade and Roediger (2002), show that the effect of misinformation depends on how it is encountered. This raises a serious issue, for example, it has already been highlighted that very few studies within the eyewitness literature have imparted misinformation during a face-to-face interaction. The findings here (along with Meade & Roediger's, 2002) suggest that studies which have employed other means to impart co-witness information, for example presenting misleading information from a fictitious co-witness, with no interaction (e.g., Betz et al., 1996), may considerably underestimate the level of distortion produced by social interaction. This underlines the importance of ecological validity in laboratory-based studies of social influence upon eyewitness memory. Perhaps more critically, the increase in the level of memory conformity following a face-to-face interaction with a co-witness might indicate that less ecologically-valid co-witness research has failed to address some relevant factors that might be present in a real-life eyewitness situation. As mentioned in the introduction, there might be factors that 'enhance' the effects of misinformation in a social setting, which previous co-witness studies have not identified because they have not used a 'real' co-witness.

Before discussing the findings further it is relevant to emphasise one last point regarding the potency of misinformation encountered via discussion with a co-witness. The analysis of the changes versus additions from Recall 1 to 2 (e.g., changing a given response in Recall 1 to one which incorporates misinformation in Recall 2, versus adding the misinformation as a response in Recall 2 when no response had originally been reported in Recall 1) revealed that participants were significantly more likely to change a response when the misinformation had been encountered during the face-to-face interaction, as opposed to being read. Arguably, changes in responses from Recall 1 to 2 represent a more powerful demonstration of
memory conformity than response additions, because the latter could reflect forgetting of specific details that would bring the misinformation into dispute. The fact that more changes were made in the biased-confederate condition further supports the hypothesis that misinformation presented socially has a greater, and qualitatively different, influence on memory reports.

Why are individuals more susceptible to misinformation encountered during a face-to-face interaction than misinformation embedded within a post-event narrative? Possible contributing factors were suggested in the introduction. In addition, it is possible that individuals are more likely to make source errors regarding the original and post-event information following an active discussion about an event versus passively reading a narrative describing an event. For example, as mentioned in Chapter 2, Zaragoza and Lane (1994) claim that the process of reactivating originally encoded information whilst processing misleading post-event information allows the post-event information to acquire memory characteristics that are highly similar to those accompanying memories of the originally encoded event. This can lead to a representation in memory of the suggested item that is qualitatively similar to that of an actual memory of an originally perceived detail, thus increasing the chances of source errors being made at test, and post-event information being reported by mistake. Zaragoza and Lane (1994) claim that reading a post-event narrative does not require reactivating the original memory in order to complete the task, and therefore the memory characteristics relating to the original and post-event sources of information are likely to remain sufficiently different to facilitate source monitoring judgements at test. In contrast, discussing an event with a co-witness requires the individuals to reactivate the originally encoded memory to enable any kind of meaningful discussion to take place. Thus characteristics relating to memories from each source are likely to become similar. Relating this to the current study, it would be expected that post-event misinformation is more likely to be reported at test following a discussion about the event rather than reading a narrative about the event, and that is exactly what was found.

Unfortunately, the current study did not ask participants to specify the source of the information provided at test. Thus, it is not possible to say to what extent the co-witness information was being reported at test because of a true source confusion. Zaragoza and Lane (1994) claim that source misattributions are more common when
the originally encoded information has been reactivated during the processing of the misleading post-event information (as just discussed). However, the results of Experiment 2 are unable to provide direct support for this in the absence of source judgement data. Even though the instructions for participants at test were to answer the questions with details recalled from the video (i.e., asking participants for information from the original source only), it is possible that post-event information was sometimes errantly reported either because of a source confusion, or because participants had a desire to be accurate and believed the information from the co-witness was correct, suggesting informational influence (as mentioned in Chapter 4). The following experiments in the thesis will employ a source-monitoring test whereby participants are asked to identify the source for each item of information they report at test. This will allow a more informed discussion of why co-witness information is errantly reported by participants.

Regarding memory accuracy for event details, it was found that all participants (across all conditions) improved in Recall 2 compared to Recall 1 (suggesting hypermnesia, see Roediger & Payne, 1985). However, older adults particularly benefited from being able to discuss the event with the confederate. For example, the memory performance of older adults improved following a discussion of the event, despite the fact that the confederate did not impart any information that could be used to answer the neutral questions in the recall test. In fact, the performance of older adults in the biased confederate condition improved to the extent that it did not differ from the younger adult group. Thus, the act of collaboration appears to provide older adults with support, enabling their performance to improve (see also Craik, Byrd & Swanson, 1987, for a discussion of the benefits of environmental support for older adults). In contrast, Experiment 1 did not find that the recall performance of older adults paralleled that of the younger adults following co-witness discussion. For example, in the previous experiment, although older adults did recall more event details in the co-witness condition than in the control condition, the difference in recall performance was not significantly different to controls, and was significantly worse than young adults. Further research on how discussion can aid memory performance for older adults would be worthwhile, especially because researchers (e.g. Dixon, 1996; Thompson & Conway, 2001) have found that memory collaboration can provide cognitive support that is
able to compensate for an individual's age-related memory losses (as mentioned in the introduction). However, this is not an issue that will be explored further in the present thesis.

A finding that has been replicated from Experiment 1 is that susceptibility to misinformation does not seem to bear a simple relationship to memory for the original event. For example, in Experiment 2 older adults were less likely to report the misinformation even though their memory for the event was poorer in comparison with younger adults. Conversely, younger adults were more likely to report misinformation despite being significantly more accurate about event details overall. The notion of peer pressure may be apt for interpreting why the younger adults were more influenced by the misinformation than older adults, i.e. younger adults may have a particular concern with being accepted and in agreement with other persons, a factor that seems to be relatively strong in this age group compared to older adults (see Borsari & Carey, 2001, for a review of why young adults succumb to peer pressure).

One limitation of Experiment 2 is the use of confederates to act as co-witnesses. Although it was considered a necessity to employ confederates to impart the same post-event information to all participants within the biased-confederate condition, there are some drawbacks. First, the discussions between the participants and the confederates are unlikely to have been as 'natural' as if two participants had been discussing their memories of an event together (as in Experiment 1). This is because the confederates were trained to mention certain items of misinformation, and to avoid talking about accurate information that could be used to answer any of the neutral questions. The confederates were skillful at maintaining a natural sounding conversation, however, the fact that they were restricted in the information they discussed could reduce the ecological validity of the situation. Second, it is possible that the results found in the biased-confederate condition were dependent on the confederates that were employed. For example, the confederates were probably perceived to be quite credible and believable by the participants, as they were comfortable talking about their memories for the event, and spoke fairly confidently about what they claimed to have seen. In contrast, if the confederates had portrayed themselves as being unconfident about their memory for the event then it is likely
that they would have been perceived as less credible, and this might have had a direct bearing on how influential they would be (see Chapter 4).

7.5 Summary of main findings

In summary, the present findings demonstrate the potent influence upon memory of misinformation conveyed to an eyewitness in the ‘natural’ context of a discussion. When conveyed socially in this way the misinformation not only distorts the accuracy of an eyewitness report, it also produces systematic but spurious correspondences between witness reports. The relative strength of the misinformation effect demonstrated here, and the obvious forensic problem produced by witnesses who conform, makes for an unfortunate combination. All the more unfortunate because in the forensic setting it is often the case that witnesses who have just seen a crime are likely to discuss their experience with one another (Paterson & Kemp, in press).

Now that it has been demonstrated that memory conformity does occur following a naturalistic co-witness discussion (Experiment 1), and that this memory conformity effect is particularly strong following a face-to-face interaction with a co-witness in comparison to encountering co-witness information in the form of a post-event narrative (Experiment 2), the next logical progression is to investigate why co-witness information is sometimes errantly reported at test (i.e., the extent to which informational influence or source confusions can account for the memory conformity effect), and to explore whether some individuals are more susceptible to memory conformity than others (i.e., by investigating individual differences between those who are, and are not, susceptible to co-witness influence). Experiment 3 will address these issues by incorporating a source monitoring test and a number of personality and cognitive individual difference measures, which are outlined in the following chapter. Results from this study will hopefully provide the initial step in understanding the factors underlying the memory conformity effect. To facilitate the specific focus of the investigation in Experiment 3, age differences in memory conformity between young and older adults will no longer be explored.
Chapter 8

Individual Difference Measures

8.1 Introduction

One of the aims of Experiment 3 is to explore whether there are any individual differences in terms of 1) personality, 2) discourse characteristics, or 3) memory ability, that are associated with memory conformity. These three categories are all relevant to consider in an investigation of possible factors underlying the memory conformity effect. For example, exploring individual differences in personality is deemed relevant because of the intrinsic social element of the experiment, i.e., the interaction between the co-witnesses during the discussion about the event. Similarly, examining individual differences in discourse characteristics observed during the co-witness discussions (e.g., how many words are spoken, how often individuals dispute their partner's memory, etc) is particularly pertinent to address because it is feasible that susceptibility to memory conformity is associated with some factor(s) originating from the interaction between the co-witnesses. Last, individual differences in memory ability is a factor that could be related to memory conformity simply because the ultimate task for an eyewitness is reliant on having a good memory. Experiments 1 and 2 have not found a relationship between memory for the encoded event and susceptibility to misleading post-event information. However, additional measures of memory ability (e.g. working memory capacity) will be incorporated that might prove more fruitful.

The purpose of this chapter is to review the measures that will be employed in Experiment 3 to identify individual differences in personality, discourse characteristics, and memory ability. Most of these measures have been chosen because previous eyewitness research has found them to be related to susceptibility to misleading information (see Eisen & Lynn, 2001; Schooler & Loftus, 1993, for reviews). More importantly, the majority are pertinent to the context of a discussion between co-witnesses, where some degree of influence may either be exerted over another person, or where resistance to such influence may need to be exercised.
8.2 Personality Factors

8.2.1 Compliance

Compliance can be defined as 'yielding to others' (Gudjonsson, 1989). This act of public agreement does not have to be accompanied by any kind of private agreement. Thus, it is essentially the same as conformity resulting from normative behaviour (Deutsch & Gerard, 1955), defined in Chapter 4. The two main components of compliant behaviour are an eagerness to please, and a desire to avoid conflict and confrontation (Gudjonsson, 1989; see also Cialdini & Goldstein, 2004, for a review).

In the domain of eyewitness memory research it might be expected that highly compliant individuals will accept misinformation because they want to be seen to be in agreement with the post-event information that is encountered. However, compliance is generally associated with immediate misinformation acceptance, and so this behaviour might not be found in studies that incorporate a delay, or that give participants a recall test to complete in private. In some of the studies reported in Chapter 4 (for example, Schneider & Watkins, 1996), it is likely that participants were simply complying with the errant co-witness information, as they were tested immediately after hearing the misinformation, and in the presence of the co-witness. However, no measure of compliance was taken to purposefully explore the relationship between the acceptance of the co-witness information and a tendency to comply.

Experiment 3 will employ Gudjonsson’s Compliance Scale (GCS; Gudjonsson, 1989) to see if highly compliant individuals are more likely to accept misinformation supplied by a co-witness than individuals who do not score highly on the compliance scale. Unfortunately no reference can be found in the eyewitness literature to misinformation studies that have used the GCS. However, studies have investigated the relationship between acquiescence and susceptibility to misinformation (e.g. Eisen, Morgan & Mickes, 2002).

Acquiescence refers to a tendency to agree, regardless of the content that is being agreed with. Thus it is similar to compliance, and in fact the two correlate significantly (Gudjonsson, 1989). Eisen et al. (2002) examined the relationship between acquiescence and the immediate acceptance of misinformation. Participants arrived to take part in the experiment and were given a series of tasks to complete,
including a measure of acquiescence. One week later, participants returned for the second part of the experiment, which contained an unexpected memory test about the events that had taken place in the previous session. The memory test was in the form of a questionnaire that included 24 misleading questions. Eisen et al. (2002) found that acquiescence was positively related to errors on the misleading questions. Specifically, participants who displayed high scores on the measure of acquiescence were also more likely to agree with the misinformation incorporated into the misleading questions in the memory test. This association between acquiescence and the immediate acceptance of misinformation is intuitive; individuals who have a tendency to agree with things that they do not really believe are perhaps also likely to accept misleading suggestions that they saw things that they do not really recall seeing.

8.2.2 Self-Esteem

Self-esteem refers to an individual’s self-image in relation to how one values and has confidence in themselves (O’Brien & Epstein, 1988). In the social influence literature, early studies have found that conformity and attitude change are related to self-esteem. For example, McGuire (1968) found that individuals with low self-esteem often changed their mind in response to persuasion attempts because of a desire for social approval from others. Stang (1972) and Zellner (1970) have also found that those with low self-esteem (vs. high) are generally easier to influence. In the eyewitness literature, Singh and Gudjonsson (1984) have shown that individuals with low self-esteem are more susceptible to misinformation. Bless and Strack (1998) propose that this is because people with low self-esteem are less likely to rely on their own subjective recollections than individuals with high self-esteem who have more confidence in themselves and their abilities. Consequently, people with low self-esteem are more likely to trust external cues (such as post-event information) when remembering an event.

In relation to this interpretation, it is likely that individuals with low self-esteem are particularly susceptible to informational influence, where there is a desire to be correct and the post-event information might be trusted more than the individual’s own recollections. Some experimental findings of studies reviewed in
Chapter 4 suggested that misinformation was reported at test because of informational influence (for example, Kwong See et al.'s, 2001, experiment on source credibility). However, no test of self-esteem was incorporated into the experimental procedures and so the suspected relationship between self-esteem and the tendency to report misinformation due to informational influence cannot be confirmed. In response to this, Experiment 3 will administer the Multidimensional Self-Esteem Inventory (MSEI; O'Brien & Epstein, 1988) to examine the relationship between self-esteem and susceptibility to misinformation.

8.2.3 Introversion-Extraversion.

Introversion-extraversion is one of Eysenck's major personality dimensions, the others being neuroticism and psychoticism (Eysenck, 1970; 1981). Introversion refers to a tendency to reflect on one's own experiences. Introverts are often described as being reserved, enjoying solitary pursuits and avoiding social involvement. In contrast, extraversion refers to a tendency to focus on the social world, with extraverts tending to be sociable and out-going.

It is claimed that these overt behavioural differences have a biological basis (Eysenck, 1970). In short, introverts are typically over-aroused, which has the effect of increasing the intensity of any sensory stimulation reaching the cortex. This can lead introverts to avoid arousing stimuli. In contrast, extraverts are chronically under-aroused which reduces the intensity of any sensory stimulation reaching the cortex. As such, they attempt to raise their levels of arousal by seeking arousing stimuli and engaging in stimulating activities that introverts are keen to avoid (Eysenck, 1970). Relating this to an eyewitness situation, Schooler and Loftus (1993) suggest that introverts might be more susceptible to misinformation because they are more easily aroused by the original stimulus event than extraverts, causing them to form a less stable memory representation which might be more susceptible to the influence of post-event information. Schooler and Loftus (1993) provide no evidence for this suggestion, however, a more recent study by Porter, Birt, Yuille and Lehman (2000) found that introverts are susceptible to the development of false memories following a misleading suggestion. Participants were classified as developing a complete false memory if they reported remembering the suggested event and incorporated all of the
suggested misinformation into the memory. If only some of the suggested information was recalled, the participant was classified as having a partial false memory, and if no aspects of the false incident were recalled, participants were classified as having no false memory. Porter et al. (2000) found that participants who experienced a complete false memory were more introverted, as measured by the NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1985, 1992) than those who experienced only a partial false memory.

In contrast, Liebman, McKinley-Pace, Leonard, Sheesley, Gallant, Renkey et al. (2002) found a relationship between a facet of extraversion (activity) and misleading suggestions, as measured by Gudjonsson’s Suggestibility Scale (GSS 2; Gudjonsson, 1987). Specifically, suggestibility was higher for individuals who were less active. However, this solitary facet on the extraversion dimension, as measured by the Revised NEO Personality Inventory (NEO-PI R; Costa & McCrae, 1992), is one of 20, and no other facet was associated with suggestibility. Thus, it cannot be concluded from this research that extraverts are more susceptible to misinformation than introverts. In general, although the potential relationship between introversion/extraversion and susceptibility to misinformation has been of interest to eyewitness researchers, the available findings are far from conclusive.

Experiment 3 will incorporate Eysenck’s Personality Questionnaire – Revised, Short Scale (EPQ-R, Short Scale; Eysenck, Eysenck, & Barrett, 1985) as one of the individual difference measures of personality. This measure is commonly used to assess people’s level of introversion-extraversion. Although the findings of previous research have been conflicting, it is expected that in the context of a co-witness discussion, introverts will be less likely to assert themselves in both recounting their own memories for the stimulus event to another person, and in disputing their co-witness’ memory reports if they contradict their own recollections. Experiment 3 will explore whether this difference in behaviour is observed, and whether introverts are more susceptible to misinformation than extraverts as a consequence.
8.3 Discourse characteristics

Experiment 3 will investigate individual differences in 'discourse characteristics', i.e., differences in the way individuals interact within a discussion. Previous research that has content-analysed discussions has been discussed in Chapter 3. For example, Edwards and Middleton (1986) investigated how people recall an experience together, and found that people 'negotiate' memories by influencing each other's recollections. The researchers found this to be most clearly marked where disagreements occurred. In light of this finding, the transcribed discussions from Experiment 3 will be coded in relation to which member of the pair has mentioned an item of misinformation (i.e., that was not seen by their partner), and how this information was received (i.e., whether or not it was disputed). A check to see whether the misinformation is later reported in a final (individual) recall test will help determine whether there is a relationship between these types of transaction and a susceptibility to misinformation. In addition, a count will be taken of the number of words spoken by each member of the pair to see if there are any differences in a tendency to dominate a conversation, and whether this is related to the subsequent reporting of misinformation.

8.4 Memory ability

8.4.1 Event memory

It is intuitive to expect that individuals with a poor memory for an encoded event might be particularly susceptible to misleading post-event information. In support of this, a number of researchers have found a relationship between memory accuracy and susceptibility to misinformation (see Liebman et al., 2002; Loftus et al., 1992; Tomes & Katz, 1997). In contrast, however, Experiments 1 and 2 of the present thesis failed to demonstrate this relationship. The lack of consensus between research findings, in particular, the counter-intuitive findings from Experiments 1 and 2, warrant further investigation. For this purpose, Experiment 3 will continue to explore the relationship between memory for the encoded event and susceptibility to memory conformity. In addition, memory ability will be assessed with two further measures (see below) that are less task-specific.
8.4.2 Working memory capacity

Working memory refers to a short-term memory process that is involved with on-line monitoring or control of information (Baddeley, 1986). Jaschinski and Wentura (2002) investigated how working memory capacity relates to the effect of misinformation on memory. Participants viewed a simulated crime event and later received misinformation about it before being given a recall test. Working memory capacity was assessed using the operation-word span test (Turner & Engle, 1989). Here, participants performed a dual-task, where the main task was to remember single words, and the secondary task was to simultaneously (with the presentation of each word) judge whether a mathematical equation was true or false. After a certain number of presentations (2-7), participants were asked to recall as many words as possible. Working memory capacity was calculated as being the number of words recalled (out of 87) during the test procedure.

Jaschinski and Wentura (2002) found that participants with a large working memory capacity were less susceptible to the misinformation. The authors suggest that this is because people with greater memory capacity build detailed and coherent mental models of events during the encoding phase. Thus, they are able to reject misinformation because they either recognise that it contrasts with their own memory, or because their mental model that represents the event is already detailed and so additional information is ignored (Jaschinski & Wentura, 2002). Motivated by this finding, Experiment 3 has selected the Self-Ordered Pointing Task (SOPT; Shimamura & Jurica, 1994) as a measure of working memory capacity.

8.4.3 Dissociative tendencies

Dissociation can be defined as “the lack of normal integration of thoughts, feelings, and experiences into the stream of consciousness and memory” (Bernstein & Putnam, 1986, p727). It is most commonly assessed with the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986). The DES can be used to measure pathological dissociators as well as non-pathological individuals who display some level of dissociative traits.
In relation to susceptibility to misinformation, Putnam (1997) has found that individuals with dissociative tendencies often find it difficult to determine the source of their memories. This is because the feeling of detachment between experiences and memory makes it difficult for dissociative individuals to confidently say whether a particular memory reflects their actual personal experience, or whether the memory has originated from another source. This can lead dissociative individuals to have a low confidence in their recollections (Putnam, 1997). A lowered confidence in memory, coupled with a tendency to forget the source of the memory, suggests that people with dissociative tendencies would be particularly susceptible to misinformation.

Recently, a number of eyewitness experiments have found a positive relationship between dissociation and suggestibility using different paradigms (e.g., false memory implantation, Hyman & Billings, 1998; Porter et al., 2000; imagination inflation, Heaps & Nash, 1999; Paddock, Joseph, Chan, Terranova, Loftus & Manning, 1998). However, a literature search was unable to find a study investigating dissociation using a classic misinformation paradigm. Experiment 3 will use a revised version of the DES, called the DES Comparative (DES-C; Wright & Loftus, 1999), to explore whether individuals with dissociative tendencies are particularly susceptible to misinformation encountered from a co-witness. The DES-C was specifically designed to assess individual differences in dissociation within a non-clinical population. Thus it is ideal for the purposes of Experiment 3. It is hypothesised that high-scorers on the DES-C will be more likely than low-scorers to report items of misinformation encountered from a co-witness in a subsequent test of memory for the original stimulus event.

8.5 Conclusion

In summary, the aim of Experiment 3 is to investigate whether any individual differences in personality, discourse characteristics, or memory ability are associated with memory conformity. The individual difference measures, reviewed above, have been selected (from the vast number of individual difference measures available) based on previous eyewitness research findings, and because they address factors
that are potentially important in gaining an insight into how memory conformity occurs and/or who is most susceptible.
Chapter 9

Experiment 3: Investigating personality, discourse characteristics, and memory ability in relation to memory conformity

9.1 Introduction

Experiments 1 and 2 have both found evidence of memory conformity between co-witnesses who discussed a mutually witnessed event. Specifically, when asked to recall an event participants often errantly reported items that they had heard from their co-witness but had not actually seen themselves. Furthermore, participants were more likely to errantly report unseen items when they had encountered this information socially, during a face-to-face interaction with a co-witness, than when the information was encountered non-socially, from a co-witness who was not actually present. Experiment 3 will employ the same procedure as Experiment 1, where each member of a dyad witnesses a different version of the same event which is subsequently discussed. Unlike Experiment 1, no pre-set questions will be used to help direct the discussion. Instead, participants will simply be asked to discuss their memories for the event with no restrictions imposed, so that the co-witness discussions are as natural as possible.

One aim of Experiment 3 is to investigate why people report details that they have not personally witnessed at test. As detailed in Chapter 4, when asked about a witnessed event people might report post-event information because of a genuine memory error, where the post-event details are errantly attributed to the original memory. Alternatively, post-event information might be reported at test because of normative or informational influence. In this situation post-event information is reported for social desirability reasons, or because of an aspiration to be correct, despite an awareness that it is not an original memory. It is important to try and distinguish between these reasons for errantly reporting post-event information at test because they have different applied and theoretical implications. For example, if participants are aware of the source of the post-event information, and yet still choose to report it at test as a result of informational influence, then this would be a forensically important finding because it suggests that witnesses may be able to omit
post-event information from their memory report if necessary. This finding would also be theoretically interesting because it would give an insight into how memory reports are affected by social influences, and raises questions about possible boundary effects, e.g., the relationship between source credibility and informational influence. Alternatively, if source errors were found to be primarily accountable for post-event information being reported at test, the forensic implications would be particularly concerning as this would suggest that individuals are not able to distinguish a true memory from a suggested detail. From both a theoretical and applied perspective, this particular finding would be interesting because it would add to the body of literature on source monitoring abilities, and help understand the situations under which source confusions are most likely to occur.

To explore the extent to which witnesses report unseen items at test due to informational influence or because of a source confusion, participants in Experiment 3 will be asked to identify the source of each item of information that they have reported in their free-recall of the event. Participants will be asked to read through their free-recall of the witnessed event, and then to circle any items of information originating from the co-witness discussion rather than from the video, i.e., that they remember hearing from their co-witness, but not actually seeing themselves. In contrast, participants will be asked to leave unmarked all details that they remember seeing in the video. Participants will also be asked to underline any details for which the source can no longer be remembered. By exploring the accuracy of people's source judgements the study will be able to reveal the extent to which co-witness information is errantly reported because it is believed to have been seen, versus being reported for reasons that do not suggest a memory error.

A second aim of Experiment 3 is to explore whether there are any individual differences between people who do, and do not, report details that they have not personally witnessed. For this, individual differences in personality, discourse characteristics, and memory ability will be measured to see if any are associated with memory conformity. To explore discourse characteristics, the co-witness discussions will be audio-taped, transcribed and content analysed. As mentioned in the previous chapter, the transcriptions will be coded in relation to which member of the pair has mentioned an item of misinformation (i.e., a detail that was not seen by their partner), and how this information was received (i.e., whether or not it was
disputed). A check to see whether this co-witness information is later reported in the
final (individual) recall test will help determine whether there is a relationship
between these types of transaction and a susceptibility to memory conformity.

In summary, Experiment 3 focuses on why people report unseen co-witness
details at test by investigating the extent to which people are able to correctly
identify the source of these details. Further, Experiment 3 will explore whether there
are any differences in terms of personality, memory ability, or discussion
characteristics, that are associated with memory conformity. A control group was not
deemed necessary for the present research purposes as the experiment focuses on
investigating why the memory conformity effect occurs rather than demonstrating a
memory conformity effect per se.

9.2 Method

9.2.1 Participants

A total of 28 participants were tested (14 previously unacquainted pairs). These were
undergraduate students from the University of Aberdeen participating in return for
course-credit (17-24 years; \( M = 19.21; SD = 1.45 \)).

9.2.2 Materials

Simulated crime event. The event depicted a man committing a series of crimes,
beginning with an opportunistic car break-in and progressing to a house break-in.
Two versions of this event were filmed, each lasting 2 minutes and 55 seconds. To
introduce items of misinformation, and to encourage disagreement, each member of
the pair watched a slightly different version of the event (as in Experiment 1). Each
version contained exactly the same sequence of actions and events, but differed in
four critical ways (outlined in Table 9.1). Each member within a pair saw two critical
items that their co-witness had not seen in their version of the event. Participants
either saw a critical piece of information (e.g., the thief putting on a hat before
leaving the house), or they did not see this critical action (i.e., the thief simply left
the house without putting a hat on).
Table 9.1. The four critical items in version A and B

<table>
<thead>
<tr>
<th>Version ‘A’</th>
<th>Version ‘B’</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Thief steals £20 from purse in car.</td>
<td>(i) Thief does not steal anything from purse in car.</td>
</tr>
<tr>
<td>(ii) Thief steals a <em>mobile phone</em> from the living room.</td>
<td>(ii) Thief does not steal a <em>mobile phone</em> from the living room.</td>
</tr>
<tr>
<td>(iii) Thief looks at the CDs but <em>does not knock them to the floor</em>.</td>
<td>(iii) Thief purposefully <em>knocks CDs off the desk</em>.</td>
</tr>
<tr>
<td>(iv) Thief <em>does not put on a hat</em> before leaving the house.</td>
<td>(iv) Thief puts on a <em>white</em> woolly hat before leaving the house.</td>
</tr>
</tbody>
</table>

Individual difference measures

Full details of the individual difference measures were provided in Chapter 8. Table 9.2 includes a summary of the personality and cognitive measures selected for Experiment 3.

Table 9.2. Battery of individual difference measures to be used in Experiment 3

<table>
<thead>
<tr>
<th>TEST</th>
<th>BRIEF DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissociative Experiences Scale – Comparative (Wright &amp; Loftus, 1999)</td>
<td>The DES-C is a self-report measure of dissociative experiences, specifically designed for use with a non-clinical population. A high score indicates dissociative behaviour.</td>
</tr>
<tr>
<td>Eysenck Personality Questionnaire – Revised (Short Scale) (Eysenck, Eysenck, &amp; Barrett, 1985)</td>
<td>The EPQ-R (short scale) provides a measure of three key dimensions of personality (introversion/extraversion, neuroticism and psychoticism), of which introversion/extraversion is of interest for Experiment 3. A high score represents a more extroverted personality and a</td>
</tr>
</tbody>
</table>

100
lower score a more introverted personality.

**Gudjonsson’s Compliance Scale** *(Gudjonsson, 1989)*  
The GCS is a self-report measure comprising 20 items. Items are based on their conceptual and theoretical relevance to compliant behaviour. A high score on the GCS indicates a higher tendency to comply with another individual.

**Multidimensional Self-Esteem Inventory** *(O’Brien & Epstein, 1988)*  
The MSEI is a self-report inventory which provides measures of the components of self-esteem, as well as an overall self-esteem score. High scores on the MSEI are associated with high self-esteem.

**Self Ordered Pointing Task** *(Shimamura & Jurica, 1994)*  
The SOPT is a test of memory performance which relies on high level working memory processes. A low score indicates good performance.

### 9.2.3 Procedure

All participants took part in previously unacquainted pairs. On arrival they were informed that their memory for a short video would be tested after a number of tasks had been completed. It was explained that some of the tasks would be completed in a different order to their partner so as to be more time efficient. Immediately the participants were separated. One member of the pair remained at the table to work through a (filler) task that needed to be administered by the experimenter. The other participant was seated in front of a television at the opposite side of the room to watch the event on video. The participant watching the video was asked to stop and rewind the video once it had finished. Unknown to either participant, the first person watching the video actually viewed Version ‘B’ which was in the second position on the videotape (following Version ‘A’). Thus, once the video had re-wound to the beginning of the tape the second participant was able to view Version ‘A’. This set
up enabled each dyad member to view a different version of the event while being under the impression that they had both seen the same.

Once both participants had completed the filler task and viewed the videotaped event, they were given the DES-C and the MSEI to work through individually and at their own pace. This typically took around 20 minutes. On completion the following instructions were given verbally by the experimenter, "Please think back to the video-taped event that you saw at the beginning of the experiment. For the purpose of this study can you put yourselves in the position of being a real witness and pretend that the crimes you saw actually did take place, and that you will have to provide a statement detailing what you remember. Prior to giving a statement you have the opportunity to discuss your memories of the event, and the thief, with each other in as much detail as possible. Please take this task seriously. There is no time limit." The experimenter left the table while the co-witness discussion was taking place, and did not return until the discussion appeared to have finished, and the participants had confirmed this was so.

Dyad members then took it in turns to work through the SOPT which was administered by the experimenter, and the EPQ-R (short scale) which could be completed independently. On completion participants were given a free-recall test about the event to complete individually. Immediately following the recall test participants worked through the GCS before being given written instructions for the source monitoring task. The instructions asked participants to re-read their free-recall answers and identify the source of each item of information that they had reported. Specific instructions asked participants to circle the details originating from their co-witness, i.e., that they remembered hearing from their co-witness, but not actually seeing themselves. In contrast, participants were asked to leave unmarked the details that they did remember seeing in the video. Participants were also asked to underline the details for which they could no longer remember the source. There was no time limit for this task.

When both participants had completed the experiment they were debriefed, and asked whether they had guessed that they had actually seen different videos. No one claimed to have been suspicious.
9.2.4 Coding

Coding the discussions. All experiments were audio-taped, and the co-witness discussions transcribed. First, the number of words spoken by each participant was recorded. The transcribed discussions were then coded in relation to whether a dispute had, or had not, arisen following it being mentioned in the discussion. A response was considered to be a dispute when the information heard was either questioned or argued against, as in the following example:

A. ...oh, he put the mobile in his pocket.
B. No he didn’t, he didn’t take it.
A. See I thought he did. And umm... I thought he stole the mobile.
B. He didn’t.

A response was considered not to have been disputed when the information was ignored, not commented upon, or even (in a few cases) agreed with. For example:

A. ...and I think he put, he put a hat on.
B. Oh yeah.
A. A cream hat.
B. I can’t remember what else he took.

Coding the recall questionnaires. A checklist containing 35 items of information about the sequence of actions and events that took place in the event was constructed for scoring the free-recall responses (see Appendix 3). The responses were coded in relation to a) the number of correct items of event information, b) the number of incorrect items of event information, and c) the number of 'co-witness' items (i.e., reporting a critical item that their partner had seen and mentioned in the discussion as opposed to a critical item that had been seen themselves). Inter-rater reliability checks, based on a random sample of ten transcripts, showed a significant level of agreement between two independent coders for the number of correct event details (r...
Chapter 9: Experiment 3

= .92), incorrect event details (r = .82), and co-witness items (r = 1.00), reported in the free-recall test.

9.3 Results

9.3.1 Research questions

Data analyses focuses on the following questions. First, does memory conformity occur, and are participants aware of reporting co-witness items at test? Second, are any of the individual difference measures associated with memory conformity? Third, can the analysis of the transcribed discussions be used to predict which, if either, person in the pair conforms in the final free-recall session?

9.3.2 Does memory conformity occur?

Each member within the dyads witnessed two critical items that were unique to the version of the event they had viewed (please refer back to Table 9.1). Thus, in the co-witness discussions, each member had an opportunity to unwittingly introduce two items of misinformation into the conversation. If all 28 participants mentioned both critical items that they had seen during the co-witness discussions, then misleading co-witness information would be encountered a total of 56 times in the experiment. Of course, no control could be exerted upon whether both of the critical items would actually be mentioned by each participant. The analysis of the transcribed discussions revealed that critical items were mentioned 60.7% of the time (34 times out of a possible 56). Fifty-six percent of these critical items (19 out of 34) were later errantly reported in the individual recall tests. Thus, a memory conformity effect was observed. On average, each dyad member reported 1.3 critical items that they had seen, and incorrectly reported 0.7 critical items that their partner had seen. The following analyses focus only on the critical items that were mentioned in the co-witness discussions.

As outlined in the procedure, participants were asked to identify the source of the information they had provided in their free recall of the event. Table 9.3 presents a summary of the source judgements for the correct and incorrect (co-witness) critical items reported. The data show that the majority of correct critical items
reported at test are accurately attributed to the video, and are never errantly attributed to the co-witness source. Despite the small frequencies regarding errant (unseen) critical items that are reported at test, the data suggest that these are also often accurately attributed to the correct source (i.e., the co-witness). However, errors regarding the source of the errant items are more frequent than claiming that the source can no longer be remembered.

Table 9.3. Source judgements given to the correct and incorrect (co-witness) critical items reported at test (proportions in parentheses)

<table>
<thead>
<tr>
<th>Source judgement</th>
<th>'Saw it on video'</th>
<th>'Co-witness told me'</th>
<th>'Can’t remember'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(errant critical item reported)</td>
<td>7 (.37)</td>
<td>9 (.47)</td>
<td>3 (.16)</td>
</tr>
<tr>
<td>Not influenced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(correct critical item reported)</td>
<td>41 (.87)</td>
<td>0 (.00)</td>
<td>6 (.13)</td>
</tr>
</tbody>
</table>

9.3.3 Individual differences in personality and memory ability

Overall, 18 of the 28 participants (64.3%) errantly reported at least one critical item at test. A series of Pearson correlations explored whether there were any relationships between scores on the individual difference measures and the number of errant details reported at test. Correlations between the individual difference measures and the number of correct and incorrect source judgements regarding the errant details were also explored. Table 9.4 shows that the number of critical items reported at test is correlated with high compliance, low self-esteem and high working memory capacity (indicated by a low score on the SOPT). A positive correlation was also found between compliance and the number of incorrect source judgements made about the errant critical items reported at test.
### Table 9.4: Correlations between individual difference measures, memory conformity and source judgements

<table>
<thead>
<tr>
<th></th>
<th>Number of errant critical items reported at test</th>
<th>Number of correct source judgements made about errant critical items</th>
<th>Number of incorrect source judgements made about errant critical items</th>
</tr>
</thead>
<tbody>
<tr>
<td>DES-C</td>
<td>( r = .21 ) ( p = .30 )</td>
<td>( r = .15 ) ( p = .47 )</td>
<td>( r = .18 ) ( p = .37 )</td>
</tr>
<tr>
<td>EPQ-R</td>
<td>( r = -.22 ) ( p = .27 )</td>
<td>( r = -.24 ) ( p = .24 )</td>
<td>( r = -.25 ) ( p = .20 )</td>
</tr>
<tr>
<td>GCS</td>
<td>( r = .56^{**} ) ( p &lt; .01 )</td>
<td>( r = .22 ) ( p = .28 )</td>
<td>( r = .44^{*} ) ( p = .02 )</td>
</tr>
<tr>
<td>MSEI</td>
<td>( r = -.38^{*} ) ( p = .04 )</td>
<td>( r = -.07 ) ( p = .72 )</td>
<td>( r = -.19 ) ( p = .34 )</td>
</tr>
<tr>
<td>SOPT</td>
<td>( r = -.39^{*} ) ( p = .04 )</td>
<td>( r = -.28 ) ( p = .15 )</td>
<td>( r = -.18 ) ( p = .37 )</td>
</tr>
</tbody>
</table>

DES-C = Dissociative Experiences Scale – Comparative; EPQ-R = Eysenck’s Personality Questionnaire, revised (short scale); GCS = Gudjonsson’s Compliance Scale; MSEI = Multi-dimensional self-esteem inventory; SOPT = Self-ordered pointing task.

** = Correlation is significant at the 0.01 level
* = Correlation is significant at the 0.05 level.

** 9.3.4 Analysis of transcribed discussions**

All co-witness discussions were transcribed and analysed to see whether there were any observable differences within the discussions that differentiated between
participants who did, or did not, report an errant (co-witness) critical item at test. No differences were found in relation to the number of words that had been spoken (M's = 214.2 and 193.6 for those who were, or were not, misled respectively; F < 1).

Whether or not a critical item was disputed by the recipient of the information was also investigated. Overall, participants were unlikely to challenge their partner when he or she mentioned a critical item in the discussion phase (58.8% did not challenge the critical information heard, v.'s 41.2% who did). Figure 9.1 shows whether an errant (co-witness) critical item was reported at test in relation to whether or not it was disputed in the discussion.

Figure 9.1. Flowchart outlining the pattern of influence from the discussion phase to the recall phase (frequencies in parentheses)

Chi square analysis showed no significant association between whether a critical item was disputed in the discussion, and whether it was later reported at test, ($\chi^2 (1) = 1.43$, p = .18). However, the fact that a critical (unseen) item was disputed
suggests that the recipient had detected the discrepancy between the original event and the post-event information. Why then are co-witness items errantly reported at test by participants who had previously disputed them in the co-witness discussion? Table 9.5 helps to answer this question by showing the accuracy of the source judgements, made about the co-witness items errantly reported, for those who previously had, or had not, disputed the item in the co-witness discussion. It is clear that the majority of participants who had disputed a critical item prior to (errantly) reporting it at test were aware of the correct source of the information, and did not claim to have seen it in the video. In contrast, where a co-witness item had not been disputed, and was subsequently reported at test, the source was most often incorrectly attributed to the video.

Table 9.5. Source judgements given to incorrect (co-witness) critical items reported at test as a function of whether or not the item had been disputed in the discussion (proportions in parentheses)

<table>
<thead>
<tr>
<th>Source judgement</th>
<th>Influenced (errant critical item reported)</th>
<th>Disputed item in discussion</th>
<th>Did not dispute item</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Saw it on video'</td>
<td>2 (.20)</td>
<td>5 (.56)</td>
<td></td>
</tr>
<tr>
<td>'Co-witness told me'</td>
<td>7 (.70)</td>
<td>2 (.22)</td>
<td></td>
</tr>
<tr>
<td>'Can’t remember'</td>
<td>1 (.10)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9.3.5 Memory accuracy for neutral event items

As mentioned previously, free recall responses were coded in relation to the number of correct and incorrect items of information recalled about the event. This analysis did not include any of the ‘critical’ co-witness items. There was no difference in memory accuracy between participants who had viewed either Version 'A' or Version 'B' of the event, for either the number of correct or incorrect items of
information about the event that had been reported ($F's < 1$). See Table 9.6 for means.

Table 9.6. Mean number of accurate and inaccurate details reported at test (standard deviations in parentheses)

<table>
<thead>
<tr>
<th></th>
<th>Version 'A'</th>
<th>Version 'B'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Accurate details reported at test</td>
<td>19.3 (2.2)</td>
<td>19.4 (3.7)</td>
</tr>
<tr>
<td>Number of Inaccurate details reported at test</td>
<td>1.4 (1.3)</td>
<td>2.0 (2.3)</td>
</tr>
</tbody>
</table>

Further analysis investigated whether there was any relationship between the number of accurate event details recalled at test and the number of errant co-witness details reported at test. There was a non-significant correlation ($r = .04$), suggesting that susceptibility to co-witness influence is not related to memory for the event, as measured by the number of accurate event details recalled. Participants who had not been influenced by their co-witness reported an average of 19.5 (SD = 2.1) accurate event details at test, and participants who were influenced (i.e., reported at least one unseen detail at test) recalled an average of 19.3 (SD = 3.6) accurate event details at test.

9.4 Discussion

Experiment 3 investigated the extent to which people report unseen co-witness items at test because of informational influence or a genuine source confusion. In addition, individual differences in personality, discourse characteristics, and memory ability were assessed to explore whether any were associated with susceptibility to co-witness influence.

Memory conformity did occur following co-witness discussions, with participants reporting items at test that they had heard about from their co-witness, but had not seen themselves. The source judgements showed that 37% of the time participants who reported an errant (co-witness) detail claimed that the detail was
part of the originally perceived event. This finding suggests that genuine source confusion errors can occur as a consequence of co-witness discussion. Why were participants sometimes unable to distinguish between what was seen and what was heard? The most likely explanation is that the memory characteristics associated with the memories from each source were qualitatively similar, thus making source monitoring decisions more difficult (Johnson et al., 1993; Lindsay et al., 2004). As mentioned previously, encountering post-event information whilst discussing an event with a co-witness discussion might actually encourage a similarity in memory characteristics between memories from the two sources because the original memory is accessed whilst the post-event information is being encountered, thus allowing the original and post-event information to develop similar qualities (Zaragoza & Lane, 1994). The finding that unseen items are sometimes errantly reported at test because of a source misattribution is particularly concerning because it implies that individuals genuinely believe they have seen something that they have not. The potentially serious implications of this in a forensic setting were highlighted in the introduction (see also Chapter 4).

However, source misattributions were not solely accountable for the reporting of unseen items. The source judgement data revealed that co-witness items were errantly reported at test, despite an awareness of the source of this information, 47% of the time. Why were these unseen items errantly reported at test despite an instruction to only report items remembered from the video? Informational social influence is a plausible explanation for this finding. As mentioned previously, informational influence can occur when individuals look to others to determine what is correct. This occurs most often when we are not sure of the correct choice or answer, and/or when we believe that others know better than us (Cialdini, 1993). In the current experiment, it is likely that participants sometimes heard their partner mention a detail that they could not remember from the video themselves, and then chose to report this (unseen) item at test because they genuinely believed their partner to be correct. In support of this is the finding that participants still reported an unseen item when they had previously disputed it in the co-witness discussion.

This finding implies that errors resulting from informational influence could be eliminated with strict instructions on the recall test, such as Lindsay's 'logic of opposition' procedure (1990). To recap, this procedure specifically instructs
participants to assume that all of the post-event information is errant, and thus not to base any of test responses on information encountered after the originally encoded event. This instruction is powerful in revealing the extent to which post-event information has genuinely affected an individual's ability to report original details only. However, the logic of opposition procedure is unsuitable for the current experiments as it would be unrealistic to tell participants that all information encountered from their co-witness is errant when both witnesses have encoded largely the same original event. Perhaps instructions asking witnesses to assume that all post-event information 'that they do not remember seeing themselves' is errant would be sufficient to eliminate memory conformity effects resulting from informational influence. The current experiment, however, employed recall instructions that are likely to be used by police investigators (i.e., asking participants to report the details that they remember seeing), and found that this instruction does not deter individuals from reporting post-event details despite an awareness that they have not actually been seen.

In addition to investigating the accuracy of source judgements, Experiment 3 explored whether there were any individual differences in selected personality traits, discourse characteristics and/or memory ability, between participants who were or were not susceptible to memory conformity. Focusing first on individual differences in personality, it was found that the number of errant (co-witness) details reported at test correlated with high compliance and low self esteem. However, no relationship was found between memory conformity and introversion/extraversion. Compliance was measured using the GCS (Gudjonsson, 1984). The relationship found between compliance and memory conformity seems intuitive, for example, compliance is associated with a desire to avoid conflict and so the co-witness items encountered during the co-witness discussion might have been accepted without argument. However, as mentioned previously, compliance is usually associated with immediate misinformation acceptance in the presence of others, and yet the free recall test in the current experiment was completed individually and after a short delay. Furthermore, compliance can occur without requiring any level of private agreement, and yet in the current study high compliance scores correlated with source judgement errors, indicating that the unseen co-witness items were being reported at test because of a true source confusion as opposed to being reported because of social pressures to
comply. Thus, the relationship between compliance and memory conformity found here does not have the straightforward interpretation one would expect. It is possible that compliant individuals actively agreed with their co-witness regarding items that they had not actually seen when discussing the event, rather than challenging this information, and that this behaviour somehow contributed to the incorporation of the post-event information into the original memory, perhaps in the way suggested by Zaragoza and Lane (1994), discussed above. This could then account for the subsequent source judgement errors regarding the unseen details.

The observed relationship between low self-esteem and memory conformity is more simple to interpret. For example, encountering misleading post-event information in a face-to-face interaction, as in the current study, might make participants with low self esteem particularly susceptible to co-witness influence as they might perceive their own memory or opinion to be less accurate or valuable than their partner’s. As mentioned in Chapter 8, Bless and Strack (1998) propose that individuals with low self-esteem are more likely to trust external cues than their own subjective recollections when remembering an event, because they have less confidence in themselves.

In relation to individual differences in discourse characteristics, it was found that memory conformity was not related to the number of words spoken by each dyad member in the co-witness discussions, nor was it affected by whether a co-witness critical item was disputed or not by the recipient of the information. Participants only disputed their partner’s claims to have seen an item that had not been seen themselves 41% of the time. It is feasible that participants did not always dispute the information their co-witness claimed to have seen because they simply believed that they had missed this particular detail from the video, perhaps due to a lapse of attention. Alternatively, participants might have been paying attention to the video, but were reluctant to dispute what their partner had said because they wanted to ensure a co-operative interaction, and to avoid appearing impolite or antagonistic (e.g., Hardin & Conley, 2001). Moreover, the social psychology literature has shown that appearing similar to, and in agreement with, others makes you appear more likeable (e.g., Tajfel & Turner, 1986).

Investigating whether there were any differences in discourse characteristics and memory conformity was largely exploratory. However, disputes within the co-
witness discussions were focused upon following Edwards and Middleton's (1986) research employing discourse analysis techniques to investigate collaborative remembering. As mentioned previously, Edwards and Middleton (1986) found that individuals attempted to influence one another's recollections most often when disagreements occurred. In support of this, Experiment 3 found that memory conformity occurred despite whether or not a dispute arose in the discussion about what was actually seen. The source judgements relating to the errant critical items reported at test suggest that informational influence is responsible for co-witness items being reported following the item being disputed when encountered in the discussion. In contrast, source errors appear to account for co-witness items being errantly reported at test when this item was not disputed when encountered in the discussion. This difference is interesting, and worthy of further investigation, because it suggests that when a discrepancy between the original memory and the post-event information is detected, individuals may still report post-event information at test, but are aware of the source of this information, and so presumably could disregard it if necessary (discussed above, see also Loftus et al., 1992). However, caution should be applied with this interpretation, as the sample of data that it is based on is small.

One finding that has been consistent across all experiments reported so far in the present thesis is the lack of association found between memory conformity and memory for the encoded event (as measured by the number of accurate neutral event items reported at test). This suggests that co-witness influence occurs despite having a good memory for what was seen, which is not too dissimilar to the finding that individuals errantly report co-witness items at test despite disputing them in the discussion (see above). Perhaps then, encountering misinformation from a co-witness is influential for reasons that are unrelated to memory, as discussed previously in Experiment 2.

The relationship between memory conformity and high working memory capacity (indicated by a low score on the SOPT, Shimamura & Jurica, 1994) is counter to the logical assumption that individuals with poor memory ability would be most susceptible to recall errors about an event. For example, Jaschinski and Wentura (2002) proposed from their findings (see Chapter 8) that individuals with high working memory capacity are able to hold both the original and post-event
information in memory to be able to detect any discrepancies between the two. There are no clear explanations for this unexpected finding, and it is sensible for it to be replicated before an interpretation is offered.

In general, Experiment 3 has revealed some interesting findings in relation to who might be susceptible to memory conformity, and why unseen co-witness items are errantly reported at test. Experiment 4 will aim to replicate the findings of Experiment 3, using the same procedure and individual difference measures. A more informed discussion of the conclusions drawn so far regarding individual differences in memory conformity can then be undertaken. Rather than being an exact replication of the current study however, Experiment 4 will attempt to increase the number of disputes that occur in the co-witness discussions to explore whether an increase in disputes effects the level of subsequent memory conformity. To achieve this, Experiment 4 will manipulate the encoded stimuli so that participants see contradictory critical items (e.g., the thief putting on a blue hat versus a white hat), rather than the additional critical items used in the current study (e.g., the thief putting on a blue hat versus not putting on a hat at all). It is possible that if the misinformation contradicts a detail that was present in the event, rather than merely adding to the details actually presented in the event, participants would be more likely to dispute their co-witness’ recollections regarding what was seen. For example, past research (e.g., Loftus, 1979) has shown that participants are resistant to misinformation when it contradicts a detail seen in an event. Contradictory details allow participants to evaluate the post-event information in relation to their original memory for the event, thus making it easier to detect a discrepancy between originally encoded items and the post-event information. In contrast, it is possible that discrepancies are less easy to detect with additive misinformation.

9.5 Summary of main findings

In summary, Experiment 3 has demonstrated a memory conformity effect between participants who discussed their memories about a simulated crime event prior to the free recall test. Participants often reported items at test that they had encountered during the co-witness discussion rather than seeing themselves. Susceptibility to co-witness influence was associated with high compliance, low self esteem, and
(counter-intuitively) with high working memory capacity. A source monitoring test revealed that errant co-witness items were sometimes reported at test because of a genuine source confusion, and other times were reported despite an awareness that they had not been seen, thus suggesting that informational influence was responsible. The following experiment will attempt to replicate these findings, but will use an event that incorporates contradicting critical items, as opposed to additional critical items that only one dyad member sees.
10.1 Introduction

The experiments reported so far in the present thesis have all incorporated additional items of post-event information (e.g., the thief putting on a blue hat versus not putting on a hat at all). Experiment 4 will manipulate the encoded stimuli so that participants encounter contradictory critical items (e.g., the thief wearing either a blue hat or a white hat). Exposing co-witnesses to contradicting details is intended to make it easier for participants to detect a discrepancy between what they have seen themselves and what their partner claims to have witnessed (e.g., Loftus et al., 1992). Thus, if a critical item is recalled in the discussion by one dyad member then (if it is detected) this should be a point of dispute for the recipient. Experiment 4 will explore whether an increase in disputes affects the level of subsequent memory conformity in comparison to that found in Experiment 3.

In real life witnesses could encounter either type of post-event information, i.e., an additional piece of information or a detail that contradicts an original memory. Therefore, it is valid to examine the relative influence of additive versus contradictory misinformation on subsequent memory recall. However, a literature search revealed only one study that has directly addressed this issue. Frost (2000, Experiment 2) showed participants slides depicting a crime, followed by a narrative containing two additive, and two contradictory, items of misinformation. Participants then answered questions about the original event following a delay of either ten minutes or one week. Remember/remember judgements were made for each response (see Tulving, 1985). Frost found no difference in susceptibility to the additive or contradictory items of misinformation following a short or long delay. At short delay, both types of misinformation were more frequently associated with ‘know’ judgements, indicating that the detail was believed to have been represented, but was not vividly remembered. However, after a week’s delay participants were more likely to errantly claim that they ‘remembered’ (i.e., vividly recalled) the misinformation.
from the original event when it was a detail that added to the event rather than contradicting a detail from the event. Experiment 4 will explore whether these findings are supported in the present research by comparing memory conformity effects and source judgements in the current study, with those found in Experiment 3.

Because dyad members will be exposed to contradicting critical items, either one could mention the item that they have seen before their partner has mentioned their (contradictory) item. Thus, a new coding category will be introduced for Experiment 4, recording which dyad member has mentioned their critical item first. Whether or not this critical item is disputed by the recipient will then be recorded as it was in Experiment 3. In addition, Experiment 4 will employ the same measures as used in Experiment 3 to investigate whether any individual differences in personality, discourse characteristics or memory ability, are associated with memory conformity. The results will be compared with those of Experiment 3 to see if the previous findings are replicable.

10.2 Method

10.2.1 Participants

A total of 32 participants were tested (16 previously unacquainted pairs). These were undergraduate students from the University of Aberdeen participating in return for course-credit. One pair was excluded from analysis after expressing suspicion about the experimental manipulation. Thus, data from 30 participants were included (18-22 years; M = 18.47; SD = .94).

10.2.2 Materials

Simulated crime event. The crime event used in Experiment 3 was edited to create two new versions, each lasting 2 minutes and 55 seconds. To introduce items of misinformation, and to encourage disagreement, each member of the pair watched a slightly different version. For Experiment 4 the differences were always such that one witness saw a particular detail (e.g., the thief put on a blue hat), and the other saw a contradicting detail (e.g., the thief put on a white hat). The two versions of the event contained exactly the same sequence of actions and events but differed in four
critical ways (see Table 10.1). Pilot testing confirmed that the contradicting details were equally well remembered.

Table 10.1. The four critical items in version C and D

<table>
<thead>
<tr>
<th>Version ‘C’</th>
<th>Version ‘D’</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Thief steals £20 from purse in car.</td>
<td>(i) Thief steals a credit card from purse in car.</td>
</tr>
<tr>
<td>(ii) Thief steals a mobile phone from the living room.</td>
<td>(ii) Thief steals a watch from the living room.</td>
</tr>
<tr>
<td>(iii) Thief purposefully knocks CD’s off the desk.</td>
<td>(iii) Thief purposefully knocks computer disks off the desk.</td>
</tr>
<tr>
<td>(iv) Thief puts on a blue woolly hat before leaving the house.</td>
<td>(iv) Thief puts on a white woolly hat before leaving the house.</td>
</tr>
</tbody>
</table>

### Individual difference measures

The same individual difference measures were used as in Experiment 3, please refer back to Chapter 9 for details.

10.2.3 Procedure

The same procedure as Experiment 3 was followed, though participants viewed versions C or D of the simulated crime event (rather than versions A and B), see Table 10.1.

10.2.4 Coding

The discussions and free recall data were coded following the same procedures as before. Inter-rater reliability checks, based on a random sample of ten transcripts, showed a significant level of agreement between two independent coders for the number of correct event details ($r = .98$), incorrect event details ($r = 1.00$), and co-witness items ($r = 1.00$), reported in the free-recall test.
10.3 Results

10.3.1 Research questions

As with Experiment 3, data analyses focused on the following questions. First, does memory conformity occur, and are participants aware of reporting co-witness items at test? Second, are any of the individual difference measures associated with memory conformity? Third, can any of the content categories identified within the transcribed discussions be used to predict which, if either, person in the pair conforms in the final free-recall session?

10.3.2 Does memory conformity occur?

Each member within the dyads witnessed four critical items that were unique to the version of the event they had viewed (see Table 10.1). Thus, in the co-witness discussions (average length = 2 minutes, 6 seconds) each member had an opportunity to (unwittingly) introduce four items of misinformation into the conversation. If all 30 participants mentioned all four of the critical items that they had seen in the co-witness discussions, the misleading co-witness information would be encountered a total of 120 times in the experiment. Of course, no control could be exerted upon whether all four of the critical items would actually be mentioned by each participant. The analysis of the transcribed discussions revealed that critical items were raised in conversation 30.8% of the time (37 times out of a possible 120). Fifty-four percent of these critical items (20 out of 37) were later errantly reported in the individual recall tests. Thus, a memory conformity effect was observed. On average, each dyad member reported 2.0 critical items that they had seen, and incorrectly reported 0.7 of the critical items that their partner had seen. The following analyses focus only on the 37 critical items that were mentioned in the co-witness discussions.

As outlined in the procedure, participants were asked to identify the source of the information they had provided in their free recall of the event. Table 10.2 presents a summary of the source judgements given for the correct and incorrect (co-witness) critical items reported. Whether an errant (unseen) or correct (seen) critical item had been reported, there was a tendency to attribute the source of this item to
the video. Thus, the small amount of data available suggest that source errors account for the majority of errant co-witness items being reported at test.

Table 10.2. Source judgements given to the correct and incorrect (co-witness) critical items reported at test (proportions in parentheses)

<table>
<thead>
<tr>
<th>Source judgement</th>
<th>‘Saw it on video’</th>
<th>‘Co-witness told me’</th>
<th>‘Can’t remember source’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(errant critical item reported)</td>
<td>11 (.55)</td>
<td>5 (.25)</td>
<td>4 (.20)</td>
</tr>
<tr>
<td>Not influenced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(correct critical item reported)</td>
<td>36 (.75)</td>
<td>0 (.00)</td>
<td>12 (.25)</td>
</tr>
</tbody>
</table>

10.3.3 Individual differences in personality and memory ability

Overall, 17 of the 30 participants errantly reported at least one critical item at test. A series of Pearson correlations explored whether there were any relationships between scores on the individual difference measures and the number of errant details reported at test. Correlations between the individual difference measures and the number of correct and incorrect source judgements regarding the errant details were also explored. Table 10.3 shows that the number of critical items reported at test is positively correlated with dissociative behaviour and low working memory capacity (indicated by a high score on the SOPT). A positive correlation was also found between working memory ability and the number of correct source judgements made about the errant critical items reported at test, and between dissociative behaviour and the number of incorrect source judgements made about the errant critical items reported at test.
Table 10.3. Correlations between individual difference measures, memory conformity and source judgements

<table>
<thead>
<tr>
<th></th>
<th>Number of errant critical items reported at test</th>
<th>Number of correct source judgements made about errant critical items</th>
<th>Number of incorrect source judgements made about errant critical items</th>
</tr>
</thead>
<tbody>
<tr>
<td>DES-C</td>
<td>$r = -0.48^{**}$</td>
<td>$r = -0.30$</td>
<td>$r = -0.44^*$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.01$</td>
<td>$p = 0.12$</td>
<td>$p = 0.02$</td>
</tr>
<tr>
<td>EPQ-R</td>
<td>$r = 0.07$</td>
<td>$r = 0.05$</td>
<td>$r = 0.06$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.71$</td>
<td>$p = 0.80$</td>
<td>$p = 0.75$</td>
</tr>
<tr>
<td>GCS</td>
<td>$r = 0.35$</td>
<td>$r = 0.20$</td>
<td>$r = 0.16$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.06$</td>
<td>$p = 0.29$</td>
<td>$p = 0.40$</td>
</tr>
<tr>
<td>MSEI</td>
<td>$r = 0.16$</td>
<td>$r = 0.08$</td>
<td>$r = 0.10$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.40$</td>
<td>$p = 0.68$</td>
<td>$p = 0.60$</td>
</tr>
<tr>
<td>SOPT</td>
<td>$r = 0.39^*$</td>
<td>$r = 0.45^*$</td>
<td>$r = 0.09$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.04$</td>
<td>$p = 0.01$</td>
<td>$p = 0.64$</td>
</tr>
</tbody>
</table>

DES-C = Dissociative Experiences Scale - Comparative; EPQ-R = Eysenck's Personality Questionnaire, revised (short scale); GCS = Gudjonsson's Compliance Scale; MSEI = Multi-dimensional self-esteem inventory; SOPT = Self-ordered pointing task.

** = Correlation is significant at the 0.01 level
* = Correlation is significant at the 0.05 level.

10.3.4 Analysis of transcribed discussions

All co-witness discussions were transcribed and analysed to see whether there were any observable differences within the discussions that differentiated between participants who did, or did not, report an errant (co-witness) critical item at test. No differences were found in relation to the number of words that had been spoken ($M$'s = 188.4 and 192.1 for those who were, or were not, influenced respectively; $F < 1$).
Chapter 10: Experiment 4

The transcribed discussions were then content analysed. The content categories that were identified comprised a) whether or not a critical item was disputed by the recipient of the information, and b) a recognition of who mentioned the critical item first. Figure 10.1 illustrates the relationship between the content categories and whether or not participants later (errantly) reported a co-witness item. Overall, participants were unlikely to challenge the critical items in the discussion phase (62.2% did not challenge the critical information heard, vs. 37.8% who did). However, whether or not they later became influenced by a co-witness was dependent on whether they had mentioned the critical item first themselves or not (see Figure 10.1). For those participants who were the first to mention a critical item, there was only a single instance (out of 37) where a participant later changed their mind about what they had seen and reported what their co-witness had seen instead.

Figure 10.1. Flowchart outlining the pattern of influence from the discussion phase to the recall phase (frequencies in parentheses)

Was there a dispute after a critical item had been mentioned in the discussion?

YES 38% (14)

NO 62% (23)

Did you report what your co-witness had said in the recall phase if you had mentioned the item first?

YES 7% (1)

NO 93% (13)

Did you report what your co-witness had said in the recall phase if you had not mentioned the item first?

YES 29% (4)

NO 71% (10)

Did you report what your co-witness had said in the recall phase if you had not mentioned the item first?

YES 0% (0)

NO 96% (22)

Did you report what your co-witness had said in the recall phase if you had not mentioned the item first?

YES 65% (15)

NO 13% (3)

Not mentioned 4% (1)

Not mentioned 22% (5)
Logistic regression analysis was performed with 'Influenced by co-witness?' (yes/no) as the outcome variable, and the two predictors: 'Mentioned critical item first?' (yes/no) and 'Disputed critical item?' (yes/no). Results indicated that participants were more likely to become influenced when they had not been the first to mention a critical item ($\chi^2 (1) = 25.90, p<.001$) than when they had been the first to mention a critical item. The odds of being influenced were 38 times higher if a critical item had not been mentioned first. The remaining predictor variable ('Disputed critical item?') had a small and non-significant effect on the model ($\chi^2 (1) = 2.74, p = .098$). The interaction between the predictor variables was also non-significant ($\chi^2 (1) = 1.69, p = .194$).

Despite finding that whether or not a critical item was disputed was not related to subsequent memory conformity, it is still interesting to examine the accuracy of the source judgements regarding these items. There were only five instances where a disputed co-witness item was later errantly reported at test. Here, one item was errantly misattributed to the event, two were correctly attributed to the co-witness source, and the source was not known for the remaining two items. Of the 15 co-witness items that were errantly reported at test following no dispute when encountered in the discussion, ten were errantly misattributed to the event, three were correctly attributed to the co-witness source, and the source was not known for the remaining two items.

10.3.5 Memory accuracy for neutral event items

Free recall responses were coded in relation to the number of correct and incorrect items of information recalled about the event. This analysis did not include any of the 'critical' co-witness items. There was no difference in memory accuracy between participants who had viewed either Version ‘C’ or Version ‘D’ of the event, for either the number of correct or incorrect items of information about the event that had been reported ($F's < 1$). See Table 10.4 for means.
Table 10.4. *Mean number of accurate and inaccurate details reported at test (standard deviations in parentheses)*

<table>
<thead>
<tr>
<th></th>
<th>Version 'C'</th>
<th>Version 'D'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Accurate details</td>
<td>19.9 (4.0)</td>
<td>18.7 (5.4)</td>
</tr>
<tr>
<td>reported at test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Inaccurate details</td>
<td>1.1 (.7)</td>
<td>1.3 (1.2)</td>
</tr>
<tr>
<td>reported at test</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Further analysis investigated whether there was any relationship between the number of accurate event details recalled at test and the number of errant co-witness details reported at test. There was a non-significant correlation ($r = -.08$), suggesting that susceptibility to co-witness influence is not related to memory for the event, as measured by the number of accurate event details recalled. Participants who had not been influenced by their co-witness reported an average of 18.5 ($SD = 4.3$) accurate event details at test, and participants who were influenced (i.e., reported at least one unseen detail at test) recalled an average of 19.8 ($SD = 5.1$) accurate event details at test.

10.4 Discussion

Experiment 4 was designed to replicate and extend Experiment 3. The aims were largely the same; to investigate whether people report unseen co-witness items at test (despite an instruction not to) because of a genuine source confusion, or with an awareness that the item had not been seen. In addition, the experiment investigated whether any individual differences in personality, discourse characteristics, or memory ability, were associated with memory conformity. One change was implemented, where dyad members were shown *contradicting* critical items within the simulated crime event as opposed to having *additional* critical items that only one dyad member sees (as in Experiment 3). This allowed an extra content category to be incorporated into the analysis of the transcribed discussions, i.e., recording which dyad member mentioned their critical item first, in addition to whether or not this critical item was disputed by the recipient.
It was predicted that by having contradicting critical items in Experiment 4, participants would find it easier to detect a discrepancy between the original and post-event information, thus increasing the number of disputes. However, the number of disputes in each experiment was approximately the same (41% in Experiment 3, and 38% in Experiment 4). Furthermore, participants encountering post-event information from their co-witness later errantly reported this at test approximately the same amount of time in each experiment (56% of the time in Experiment 3, and 54% of the time in Experiment 4). This supports Frost’s (2000) research, mentioned in the introduction, i.e., that participants’ susceptibility to misinformation was the same following either contradictory or additive misinformation being encountered.

However, despite the similar level of memory conformity found in Experiments 3 and 4, a comparison of the source judgement data suggested that co-witness critical items were being errantly reported for different reasons in each experiment. For example, in the current study, source errors (i.e., misattributing the co-witness information to the original event) accounted for 55% of the contradictory co-witness items being errantly reported at test. In comparison, source errors accounted for 37% of the additional co-witness items being errantly reported at test in Experiment 3. Furthermore, correct source judgements (i.e., correctly attributing the post-event information to the co-witness) were made only 25% of the time in Experiment 4 when contradictory post-event information had been encountered, compared with 47% correct source judgements in Experiment 3. Thus, source errors are more common, and informational influence less common, when the post-event information contradicts an item of originally encoded information as opposed to adding to it.

It is difficult to directly compare these results with Frost’s (2000, Experiment 2) research, because he used ‘remember/know’ judgements, rather than source judgements, to investigate the qualities of the misinformation errantly reported at test. In the short delay condition, which most resembles the current research, Frost found that ‘know’ responses (i.e., believing that a detail was presented in the event, but not vividly remembered) were more frequent than ‘remember’ responses (i.e., believing that a detail is vividly remembered from the event) regarding items of misinformation errantly reported at test. However, there was no difference in remember or know judgements made about the additional or contradictory items of
misinformation. Thus, it could be concluded that they have qualitatively similar effects. This was not supported in the present research, as differences in source judgements were found following additive or contradictory misinformation being presented and later reported at test.

The fact that more source errors were found in Experiment 4, following contradictory post-event information being encountered, was surprising because of the intuitive belief that contradictory details would be more salient than additional details, and therefore easier to detect as discrepant post-event information (e.g., Loftus et al. 1992). However, it is possible that increased saliency makes the item more accessible in memory. Source judgements are often made heuristically (i.e., based on qualities such as salience), leading to an increase in source errors (e.g., Johnson et al., 1993). It is also possible that recipients of contradictory post-event information engage in more extensive thought processing regarding the information, including a consideration of whether or not it is correct. This elaborative thought might encourage the post-event information to acquire similar memory characteristics to those associated with the originally encoded information, again increasing the likelihood of subsequent source confusions (e.g., Zaragoza & Lane, 1994). Before speculating upon this finding too strongly however, it is acknowledged that the source judgements discussed here relate only to the errant co-witness details that are reported at test, and thus are not based on a large amount of data. The pattern of results found should therefore be interpreted with caution.

Very little consistency was found between Experiments 3 and 4 in relation to examining whether any individual differences of personality or memory ability were associated with memory conformity. For example, in Experiment 3 memory conformity was associated with high compliance, low self esteem and high working memory capacity. However, in the current experiment memory conformity was associated with dissociative behaviour and poor working memory capacity. Thus, not only have the original significant findings failed to be replicated, but new significant relationships have emerged that were not found initially in Experiment 3. It is natural to expect variation between samples, thus perhaps the scores on the individual difference measures have varied to the extent that significant relationships found in one experiment, have failed to reach significance in the other. The only finding that was replicated, and in fact has been replicated consistently in all of the experiments
presented so far, was the lack of association between participants’ memory for the
event and subsequent memory conformity. The fact that susceptibility to co-witness
influence does not seem to bear a simple relationship to memory for the encoded
event suggests that memory conformity is influenced by factors other than one’s
memory. This idea is supported by Experiment 2, which found that socially
encountered misinformation was more ‘potent’ than non-socially encountered
misinformation, thus suggesting that susceptibility to co-witness influence is also
influenced by factors inherent in a face-to-face social interaction (please refer back to
Chapter 7 for a discussion).

Despite the problems encountered with the individual difference measures
regarding the lack of consistency in findings between Experiments 3 and 4, an
interesting finding did arise through the content analysis of the co-witness
discussions. As mentioned in the introduction, because dyad members encountered
contradicting critical items, either one could mention the item that they had seen
before their partner mentioned their (contradictory) item. Thus, the current
experiment recorded which dyad member mentioned their critical item first, in
addition to whether or not this critical item was disputed by the recipient. It was
found that memory conformity could be predicted in relation to who had been the
first to mention the critical item that they had seen. Those who were the first to
mention a critical item within a discussion were highly unlikely to reconsider what
had been seen even when their memory was disputed by their co-witness. In contrast,
those who were recipients of (mis)information regarding a critical item were likely to
become influenced. However, no differences were found in the number of words
spoken by dyad members who were, or were not, influenced by their partner,
suggesting that it was not simply participants dominating the discussions who were
the most influential (and the least likely to become influenced themselves). In the
current experiment, because each dyad member saw equivalent (yet contradicting)
critical items in the event it was possible for either one to mention the item they had
seen before their partner mentioned theirs, suggesting that the roles of ‘influencer’
and ‘influenced’ are highly dependent on which dyad member happens to mention
their item first.

On the whole disputes were uncommon (as found in Experiment 3), despite
the intention behind using contradictory items of misinformation to increase the
number of disputes. Therefore, dyad members who mentioned a critical item before their partner were unlikely to encounter any post-event information themselves (regarding that particular detail). However, even when the recipient of the post-event information did challenge what was seen, thus introducing post-event information themselves, there was only a single occasion where the person to recall the critical item first in the discussion later reported the item their partner had seen at test. Perhaps participants who were first to mention an item of information felt reluctant to change their mind over what was seen (even in the face of a dispute from their partner) because of a 'commitment effect'. This refers to a natural tendency people have to behave in ways that are consistent with something they have said, or a stand they have taken (Cialdini, 1993).

It is possible however, that the relationship between response order and memory conformity is not causal, and there are independent underlying factors that influence both being the first to report an item of information, and being influenced. For example, in the co-witness discussions about the event people might have reported their clearest memories first, thus expressing them confidently before their partner has mentioned what he/she remembers. Encountering this confidently stated post-event information might, in turn, be very influential for the recipient, thus leading to memory conformity. Thus 'confidence' might be one possible factor underlying the observed relationship. Possible factors underlying the relationship between response order and memory conformity will be examined further in Experiment 5.

10.5 Summary of main findings

To summarise, Experiment 4 found a memory conformity effect, where participants reported items at test that they had encountered from their co-witness as opposed to seeing themselves. Errant (co-witness) critical items were reported because of source confusions more so than they were in Experiment 3. Thus, qualitative differences were found regarding the post-event information reported at test, dependent on whether it was an item of contradictory or additive misinformation. There was a lack of consistency between Experiments 3 and 4 regarding the individual difference measures that were found to be associated with memory conformity. However,
analysing the transcribed co-witness discussions revealed an interesting, and unexpected, relationship between response order and memory conformity. As mentioned previously however, finding a relationship does not imply causation. It is possible that the association between response order and conformity may be spurious, each being influenced by other variables. This finding warrants further investigation in order to clarify how people become influenced during a discussion. Experiment 5 will investigate the relationship found between response order and memory conformity further by exploring whether there are factors that affect both who is likely to respond first in a discussion and who is susceptible to memory conformity, and thus might underlie the relationship found between the two.
Chapter 11

Experiment 5: Investigating the relationship between response order and memory conformity

11.1 Introduction

Experiment 5 will focus specifically on the association found in the previous experiment between response order and subsequent memory conformity. This relationship is worthy of further investigation because it suggests that memory conformity is directly influenced by encountering misinformation before reporting one's own recollections. However, as discussed in Experiment 4, it is possible that this is not a causal relationship, but one which has arisen through a factor that has influenced both who is likely to respond first in a discussion, and who is susceptible to memory conformity. Experiment 5 will attempt to identify such an underlying factor. For this purpose, some new individual difference measures have been selected, once again exploring differences in personality, discourse characteristics, and memory ability. These new measures (reviewed below) seem appropriate because they potentially relate to both response order and memory conformity, and thus might be able to account for the observed relationship between the two.

11.1.1 Personality measures

Field dependence/independence

The term ‘field dependence’ or ‘field independence’ is used to describe the extent to which individuals rely on either internally generated or externally supplied information. Field dependent individuals are more reliant on externally supplied information, and are non-selective in their information acceptance. In comparison, field independent individuals rely more heavily on internally generated information, and tend to be selective in their information uptake (Witkin, Dyk, Paterson, Goodenough & Karp, 1962). Eyewitness researchers have found that because field dependent individuals depend more on externally derived information, they tend to be particularly suggestible. For example, Singh and Gudjonsson (1992) found that
field dependence was related to errors on misleading questions. Similarly, Blagrove, Colemorgan and Lambe (1994) found that field dependence correlated significantly with suggestibility (yield) scores on Gudjonsson's Suggestibility Scale (1989).

Experiment 5 will use the Group Embedded Figures Task (GEFT, Witkin, Oltman, Raskin & Karp, 1971) to measure field dependence/independence. This is a perceptual test that involves locating a previously seen simple shape in a more complex background that is designed to obscure it. Using the GEFT, field dependence is associated with a difficulty in locating the shape, simply because of a 'dependence' on the external cues surrounding it. Experiment 5 will investigate whether field dependent individuals are less likely to mention a critical item first in a discussion because of their reliance on external support, and conversely, whether field independent individuals, who are more self-reliant on internal cues, might be more likely to mention a critical item first. Furthermore, based on the research mentioned above, it is predicted that field dependent individuals will be more susceptible to memory conformity than field independent individuals.

**Agreeableness**

The NEO-Five Factor Inventory (NEO-FFI, Costa & Macrae, 1985) has replaced Eysenck's Personality Questionnaire-Revised (Short Scale) (EPQ-R, Eysenck et al., 1985) because it is able to measure introversion/extraversion, as well as an additional personality trait (agreeableness) that the EPQ-R does not measure, but that might relate to both response order and memory conformity.

In short, the NEO-FFI measures five basic personality factors, of which two are of interest to the current study, namely extraversion/introversion (discussed in Chapter 8) and agreeableness. Agreeableness refers to the tendency to get along with others, and is composed of two major components - trust and compliance (Costa & Macrae, 1985). Thus, it is fair to predict that individuals scoring highly on agreeableness might be more susceptible to memory conformity than individuals scoring low on this personality factor. For example, it has been found that agreeableness is most apparent in a social setting, such as a face-to-face interaction (Eisen et al., 1998). A review of the eyewitness literature revealed that agreeableness has been found to relate to immediate susceptibility to misinformation, as
demonstrated by responses given to misleading questions (Eisen et al., 1998). However, no reference could be found to an investigation regarding the relationship between agreeableness and delayed acceptance of misinformation. Experiment 5 will investigate this by exploring whether highly agreeable individuals are more susceptible to co-witness influence than are low agreeable individuals. The relationship between agreeableness and response order will also be investigated.

**Self-monitoring**

Self-monitoring refers to an individual's ability and motivation to regulate behaviour so that it fits the requirements of a social situation (Snyder & Gangestad, 1986). Individuals differ in their self-control of expressive behaviour (Snyder, 1974). For example, high self-monitors tend to be aware of their behaviour, and make attempts to regulate it accordingly by looking for cues in the situation to guide them in how to behave. In contrast, low self-monitors are less attentive to the appropriateness of their behaviour, and use their own values and motives to guide their behaviour (Michener, Delamater & Schwartz, 1986). Based on these observed differences between high and low self-monitors it seems reasonable to predict that high self-monitors, who are dependent on social cues to shape their behaviour, will be more susceptible to memory conformity than low self-monitors.

A review of the eyewitness literature found two studies that have examined the relationship between self-monitoring and susceptibility to misinformation, one of which found a relationship between the two (Lassiter, Stone & Weigold, 1988), and one which did not (Tomes & Katz, 1997). Despite the non-significant association between self-monitoring and susceptibility to misinformation found by Tomes and Katz (1997), the current experiment predicts that high self-monitors might be more likely to conform to the person with which they are interacting than low self-monitors. This is because the misinformation in Experiment 5 will be encountered during a face-to-face discussion with a co-witness, and high self-monitors are particularly sensitive to adjusting their behaviour to match those with whom they are interacting.

It is also possible that there will be a difference between high and low self-monitors in their 'discussion styles', i.e., perhaps high self-monitors will be more
reserved in reporting what they remember about a mutually encoded event or scene, and be keen to let their partner take control of the situation before actively participating themselves. This theorising is speculative at present, however the current experiment will explore the relationship between self-monitoring and response order in the dyadic interactions.

11.1.2 Discourse characteristics

Interuptions

The relationship between response order and memory conformity found in Experiment 4 provoked a further literature search to see if any other studies had reported a similar finding. Although none were found, the search did unveil some interesting research on the relationship between interruptions and influence. For example, Ng, Bell and Brooke (1993) coded for interruptions in their research on persuasive communication within small group interactions, finding that individuals who achieved their speaking-turn by interrupting the current speaker were perceived to be more influential by the other members of the group. Ng et al. (1993) suggest that by interrupting the most, an individual can prevent others from speaking, thus exercising conversational control.

Interruptions can be either successful or unsuccessful. Successful interruptions are coded when a speaker is prevented from completing an utterance, while the interrupter completes an utterance. Unsuccessful interruptions are coded when either the speaker who is being interrupted is not prevented from completing an utterance, or the attempting interrupter does not complete an utterance (see Roger, Bull & Smith, 1988). Researchers (e.g. McLaughlin, 1984, Smith-Lovin & Brody, 1989) have found that successful interruptions are associated with the manifestation of a dominant personality. However, Ng, Brooke and Dunne (1995) found that perceived influence correlated positively with both successful and unsuccessful interruptions. Thus, it is the act of interrupting, or attempting to interrupt, the speaker that is important rather than whether the attempt was successful or unsuccessful. They suggest that this is because speaking turns achieved by interrupting the speaker draw attention to the interrupter, thus making what they say particularly salient.
In Ng et al.'s research (1993, 1995) influence was determined by giving participants a post-discussion influence ranking task, where they were asked to rank each member in the group (including themselves) in terms of how influential they were considered to be in determining the final group decision. Thus, no measure was taken of whether participants had actually become influenced by a group member. Experiment 5 will examine the relationship between interruptions (successful and unsuccessful) and influence by looking at actual demonstrations of influence, measured by the number of times an errant (co-witness) item is reported at test.

11.1.3 Memory ability

Metamemory

Experiment 5 has replaced the SOPT (Shimamura & Jurica, 1994), which was a test of working memory, with a metamemory questionnaire. Metamemory can be defined as the systematic study of a person's subjective knowledge and beliefs about their own memory ability (Hertzog & Hultsch, 2000). It is possible that believing that your memory is good (or bad) has more relevance to how susceptible you are to co-witness influence, than actual memory performance (e.g., as measured by event memory, that has not been found to relate to memory conformity in any of the experiments presented so far).

A number of self-report questionnaires measuring subjective beliefs about memory have been developed. Some that are widely used include the 'Metamemory in Adulthood Questionnaire' (MIA, Dixon & Hultsch, 1983, 1984; Dixon, Hultsch, & Hertzog, 1988), the 'Memory Functioning Questionnaire' (MFQ, Gilewski, Zelinski & Shaie, 1990), and the 'Memory Self-Efficacy Questionnaire' (MSEQ, Berry, West & Dennehy, 1989). Studies employing metamemory measures such as these have rather disappointingly shown that they have limited predictive validity, i.e., self-reported memory functioning is often not correlated with actual memory performance (see Hertzog & Hultsch, 2000; Rabbit & Abson, 1990). Hertzog, Park, Morrell and Martin (2000) claim that this is because memory questionnaires tend to focus on context-free domains of memory whereas memory behaviours occur in specific contexts. In other words, the existing measures lack 'behavioural specificity'. Their own research has shown that individuals are capable of accurately
reporting memory efficacy provided the questions are specific to the behaviours in question (see also Herrmann, 1982).

With this in mind, Experiment 5 will investigate the relationship between response order, memory conformity, and metamemorial beliefs, using the Aberdeen Metamemory Questionnaire (AMQ, Memon, Hope & Gabbert, 2002). This was developed specifically for use within an eyewitness context as a measure of people’s beliefs about their eyewitness memory ability. The AMQ comprises five sections including general memory ability, susceptibility to suggestibility, source monitoring ability, memory for faces, and memory for events, of which the first three sections are relevant for the present experiment. It is predicted that individuals who are not very confident in their memory ability will be less likely to mention a critical item first in a discussion, and more likely to succumb to memory conformity, than individuals who are confident about their memory.

11.1.4 Summary

In summary, Experiment 5 will examine the relationship between response order and memory conformity further by exploring whether any individual differences in personality, metamemory or discussion characteristics underlie the observed association. A number of new individual difference measures have been introduced for this purpose (see Table 11.3 in the Method section for an overview and brief description of each).

A further change to Experiment 5 is the decision to increase the number of contradicting critical items from four to eight. The purpose of this is simply to enhance the chances of critical items being reported in the discussion, and at test. This will allow a more thorough investigation of response order, memory conformity, and source monitoring judgements. Presenting participants with all eight contradicting items in a single event was considered unwise however, as it might have aroused suspicions about the experimental manipulation. Instead, four pictures of busy scenes (e.g., a kitchen scene, a town-centre scene) were adapted from Forbes and Venneri (2003) as stimuli to encode. Two versions of each picture have been created, each of which includes two details that contradict details seen by the other dyad member (e.g., a green car vs. a yellow car). Dyad members encode a different
version of each of the pictures and subsequently discuss them on four separate occasions over the duration of the experiment. Increasing the number of critical items would not have been so easily achieved using a video-taped event because it would have been both awkward and suspicious to organise the experimental procedure so that each dyad member watched a different video-taped event on four separate occasions.

11.2 Method

11.2.1 Participants

A total of 68 participants were tested (34 previously unacquainted pairs). These were undergraduate students from the University of Aberdeen participating in return for course-credit. Two pairs were excluded from analysis, one pair after expressing suspicion about the experimental manipulation, and the second because their discussion was too quiet to be transcribed. Thus, data from 64 participants were included (17 - 36 years; M = 18.8; SD = 2.7).

11.2.2 Materials

Pictures. Four pictures of different scenes adapted from Forbes and Venneri (2003) were used as stimuli to encode. These are complex scenes containing a large number of details regarding actions, descriptions, characters, objects, etc (see Appendix 4). Two versions of each picture were created that were largely the same, but differed in two ways (see Table 11.1). The critical differences were designed so that dyad members see contradicting details (e.g. either a yellow car or a green car). Each member of a pair will see a different version of each of the four pictures. Thus, over four pictures dyad members will encounter eight critical details that contradict a detail their partner has seen.
Table 11.1. *Outline of the critical differences between the two versions of each picture*

<table>
<thead>
<tr>
<th>Picture</th>
<th>Version ‘A’</th>
<th>Version ‘B’</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, Kitchen Scene</td>
<td>a) 2 cups and a plate near the sink</td>
<td>a) 2 cups and a teapot near the sink</td>
</tr>
<tr>
<td></td>
<td>b) Tree visible through kitchen window</td>
<td>b) House visible through kitchen window</td>
</tr>
<tr>
<td>2, Town Centre Scene</td>
<td>a) Man up ladder painting window frame</td>
<td>a) Man up ladder washing window</td>
</tr>
<tr>
<td></td>
<td>b) Man walking his dog</td>
<td>b) Woman walking her dog</td>
</tr>
<tr>
<td>3, Living Room Scene</td>
<td>a) Rug visible in bottom left of picture</td>
<td>a) Coffee table visible in bottom left of picture</td>
</tr>
<tr>
<td></td>
<td>b) Woman holding a cigarette</td>
<td>b) Woman holding a glass of red wine</td>
</tr>
<tr>
<td>4, Busy Crossroad</td>
<td>a) Grocers shop on street corner</td>
<td>a) Florists on street corner</td>
</tr>
<tr>
<td>Scene</td>
<td>b) Yellow car with baby in the back</td>
<td>b) Green car with baby in the back</td>
</tr>
</tbody>
</table>

A pilot test (N = 19) was conducted to make sure the contradicting details in each scene were equally well remembered. Participants viewed the four pictures (either version ‘A’ or ‘B’) for 30 seconds, followed by a recall test with instructions to report as many details as possible about the picture just viewed. Table 11.2 shows the number of times each of the critical items were reported in the recall test.
Table 11.2. *Number of times each of the contradicting critical items were recalled in the pilot test*

<table>
<thead>
<tr>
<th>Critical items from Version 'A'</th>
<th>Number of times mentioned first</th>
<th>Critical items from Version 'B'</th>
<th>Number of times mentioned first</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree</td>
<td>7</td>
<td>House</td>
<td>5</td>
</tr>
<tr>
<td>Plate</td>
<td>7</td>
<td>Teapot</td>
<td>7</td>
</tr>
<tr>
<td>Painter</td>
<td>7</td>
<td>Window cleaner</td>
<td>5</td>
</tr>
<tr>
<td>Man with dog</td>
<td>5</td>
<td>Woman with dog</td>
<td>7</td>
</tr>
<tr>
<td>Woman with cigarette</td>
<td>8</td>
<td>Woman with wine</td>
<td>8</td>
</tr>
<tr>
<td>Rug</td>
<td>5</td>
<td>Table</td>
<td>5</td>
</tr>
<tr>
<td>Yellow car</td>
<td>3</td>
<td>Green car</td>
<td>3</td>
</tr>
<tr>
<td>Grocers</td>
<td>5</td>
<td>Florist</td>
<td>8</td>
</tr>
</tbody>
</table>

**Individual difference measures**

Table 11.3 includes a summary of the six individual difference measures selected for Experiment 5.

Table 11.3. *Battery of individual difference measures to be used in Experiment 5*

<table>
<thead>
<tr>
<th>Test</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aberdeen Metamemory Questionnaire</td>
<td>The AMQ was devised for use within an eyewitness context as a measure of people’s beliefs about their own memory. Three sections are of interest to the current study (general rating of memory ability, susceptibility to suggestibility, source monitoring ability). A low score indicates a positive belief or confidence in one’s memory ability.</td>
</tr>
<tr>
<td>(Memon, Hope &amp; Gabbert, 2002)</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 11: Experiment 5

Dissociative Experiences Scale – Comparative
(Wright & Loftus, 1999)

The DES-C is a self-report measure of dissociative experiences, specifically designed for use with a non-clinical population. A high score indicates dissociative behaviour.

Group Embedded Figures Task
(Witkin, Oltman, Raskin & Karp, 1971)

The GEFT is a measure of field dependency. The test involves the participant being shown a complex design and then a simple shape. The participant is asked to find the simple shape in its embedded form within the complex shape. A high score is associated with field independence. A low score is associated with field dependency.

Gudjonsson’s Compliance Scale
(Gudjonsson, 1989)

The GCS is a self-report measure comprising 20 items. Items are based on their conceptual and theoretical relevance to compliant behaviour. A high score on the GCS indicates a higher tendency to comply with another individual.

NEO – Five Factor Inventory
(Costa & McCrae, 1985)

The NEO-FFI is a 60 item, self-report questionnaire that provides a reliable and valid measure of five domains of adult personality, of which three are of interest for the current study (agreeableness, conscientiousness, extraversion). Participants are asked to respond to each of the 60 statements using a five point scale ranging from 'strongly disagree' to 'strongly agree'. A high score denotes high agreeableness, etc.

Revised Self-Monitoring Scale
(Snyder & Gangestad, 1986)

The Revised SMS is an 18 item true-false test developed to measure self-monitoring tendencies. Low scores indicate the respondent is a relatively low self-monitor, and vice-versa.
11.2.3 Procedure

Participants were tested in pairs, after signing up to take part in the experiment with someone they did not previously know. Brief information about the study was given before the experiment started, telling participants that they would be taking part in a picture memory study and that over the course of the experiment they would be shown four different pictures that they would be asked to recall jointly and individually. The procedure is summarised in Table 11.4.

Table 11.4. Experimental procedure for Experiment 5

<table>
<thead>
<tr>
<th>Sequence of tasks</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>View Picture 1</td>
<td>Picture 1 is placed face-down in front of each participant. Each participant’s picture is the same except for the two critical pieces of information that differ in each version (outlined in Table 11.1). Participants are asked to turn the picture over to view it on the experimenter’s command, and then to place it face-down again once an alarm indicates that 30 seconds has passed.</td>
</tr>
<tr>
<td>First half of DES-C</td>
<td>Participants work through half of the DES-C individually.</td>
</tr>
<tr>
<td>Co-witness discussion about Picture 1</td>
<td>Dyad members are instructed to jointly recall the picture they had just studied by discussing the picture in as much details as possible until neither member of the pair can remember anything further.</td>
</tr>
<tr>
<td>Individual free-recall</td>
<td>Participants are given an individual recall test. Instructions here ask participants to think back to the picture they had just viewed, rather than just to the discussion about the picture, and to report the details that they can remember seeing. No time limits are imposed.</td>
</tr>
<tr>
<td>Second half of DES-C</td>
<td>Participants work through the second half of the DES-C individually.</td>
</tr>
<tr>
<td>View Picture 2</td>
<td>Picture 2 is then studied for 30 seconds in the same way as before, with each dyad member seeing a different version.</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>First half of NEO-FFI</td>
<td>Participants work through the first half of the NEO-FFI individually.</td>
</tr>
<tr>
<td>Co-witness discussion about Picture 2</td>
<td>Same instructions as before.</td>
</tr>
<tr>
<td>Individual free-recall</td>
<td>Same instructions as before.</td>
</tr>
<tr>
<td>Second half of NEO-FFI</td>
<td>Participants work through the second half of the NEO-FFI individually.</td>
</tr>
<tr>
<td>View Picture 3</td>
<td>Picture 3 is then studied for 30 seconds in the same way as before, with each dyad member seeing a different version.</td>
</tr>
<tr>
<td>Revised SMS</td>
<td>Participants work through the Revised SMS individually.</td>
</tr>
<tr>
<td>Co-witness discussion about Picture 3</td>
<td>Same instructions as before.</td>
</tr>
<tr>
<td>Individual free-recall</td>
<td>Same instructions as before.</td>
</tr>
<tr>
<td>GEFT</td>
<td>Written instructions for the GEFT are provided, and participants work through the task accordingly.</td>
</tr>
<tr>
<td>View Picture 4</td>
<td>Picture 4 is then studied for 30 seconds in the same way as before, with each dyad member seeing a different version.</td>
</tr>
<tr>
<td>AMQ</td>
<td>Participants work through the AMQ individually.</td>
</tr>
<tr>
<td>Co-witness discussion about Picture 4</td>
<td>Same instructions as before.</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td><strong>Individual free-recall</strong></td>
<td>Same instructions as before.</td>
</tr>
<tr>
<td><strong>Source monitoring task</strong></td>
<td>Participants follow written instructions asking them to read through their four written accounts of the four pictures that have been viewed and identify the source of each item of information that they have reported. Specific instructions ask participants to <em>circle</em> the details that they remembered discussing, but not actually seeing, themselves. In contrast, participants are asked to <em>leave</em> the details that they remember seeing. Participants are also asked to <em>underline</em> the details for which they could no longer remember the source.</td>
</tr>
</tbody>
</table>

| **GCS** | Participants work through the GCS individually. |

### 11.2.4 Coding

All experimental sessions were audio-taped. The four discussions within each session were then transcribed and coded in relation to which member of the pair had been the first to mention a critical item, and whether or not this item was disputed.

In addition, the number of successful and unsuccessful interruptions that each participant made within the discussions was recorded. Interruptions were defined as instances of simultaneous speech in which the utterance of the first speaker was disrupted by the second speaker. Following Ng et al. (1993), interruptions were coded as *successful* if the second speaker (the interrupter) disrupted the first speaker's utterance while completing his or her own utterance (e.g., see below). Interruptions were coded as *unsuccessful* if the interrupter did not complete his or her utterance (e.g., see below).
### Successful Interruption

<table>
<thead>
<tr>
<th>S1:</th>
<th>The boy on the stool</th>
<th>is about to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2:</td>
<td>They like wearing blue! The girl’s wearing blue, the woman’s wearing blue.</td>
<td></td>
</tr>
</tbody>
</table>

### Unsuccessful Interruption

<table>
<thead>
<tr>
<th>S1:</th>
<th>The girl was wearing brown shorts and a blue top.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The woman was wearing a blue dress</td>
<td>with an orange dish towel. There were blue curtains.</td>
</tr>
<tr>
<td>S2:</td>
<td>and she had...</td>
</tr>
</tbody>
</table>

(Note: In both extracts ‘|’ marks the start of overlapping speech)

#### 11.3 Results

#### 11.3.1 Research questions

Data analyses focused on the following questions. First, does memory conformity occur, and are participants aware of reporting co-witness items at test? Second, is the relationship between response order and memory conformity replicated? Third, are any personality traits, metamemory beliefs, or differences in discussion characteristics associated with response order and/or memory conformity?

#### 11.3.2 Analysis of the co-witness discussions

**Does memory conformity occur?**

In total, each participant witnessed eight critical items that were unique to the pictures they had viewed. Thus, in the co-witness discussions about the pictures, each dyad member had an opportunity to (unwittingly) introduce eight items of misinformation into the conversation. If all 64 participants mentioned each of the eight critical items that they had seen during the co-witness discussions, then misleading co-witness information would be encountered a total of 512 times in the experiment. Note that no control could be exerted upon whether all eight of the
critical items would actually be mentioned by each participant. Critical items were initially mentioned in the discussions 210 times (see Table 11.5 for a breakdown of how many times each of the critical items were mentioned first). Participants disputed the critical item mentioned by their partner 68 times, mentioning the contradicting critical item that they had seen themselves 57 times. Thus, in total participants were exposed to 267 misleading critical items (i.e., 210 mentioned first, plus 57 mentioned second) within the co-witness discussions (out of a possible 512).

Table 11.5. Number of times each of the contradicting critical items was mentioned first in the co-witness discussions

<table>
<thead>
<tr>
<th>Critical items from Version ‘A’</th>
<th>Number of times mentioned first</th>
<th>Critical items from Version ‘B’</th>
<th>Number of times mentioned first</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree</td>
<td>19</td>
<td>House</td>
<td>11</td>
</tr>
<tr>
<td>Plate</td>
<td>17</td>
<td>Teapot</td>
<td>12</td>
</tr>
<tr>
<td>Painter</td>
<td>17</td>
<td>Window cleaner</td>
<td>16</td>
</tr>
<tr>
<td>Man with dog</td>
<td>5</td>
<td>Woman with dog</td>
<td>12</td>
</tr>
<tr>
<td>Woman with cigarette</td>
<td>13</td>
<td>Woman with wine</td>
<td>16</td>
</tr>
<tr>
<td>Rug</td>
<td>12</td>
<td>Table</td>
<td>11</td>
</tr>
<tr>
<td>Yellow car</td>
<td>11</td>
<td>Green car</td>
<td>8</td>
</tr>
<tr>
<td>Grocers</td>
<td>10</td>
<td>Florist</td>
<td>20</td>
</tr>
</tbody>
</table>

Memory conformity and source judgements

Of the 267 critical items mentioned in the co-witness discussions, 44% (117 out of 267) were later errantly reported in the final free recall test, despite an instruction to report only what was seen. On average, each participant correctly reported 3.9 critical details that they had seen, and incorrectly reported 1.8 critical items that they had not seen, in the final free recall test. No differences were found between Versions A and B of the four pictures in relation to whether the correct, or incorrect,
critical item was reported at test (F's < 1). This implies that there was no tendency for participants to be more influenced by one critical item over the contradicting item.

As in Experiments 3 and 4, participants were asked to identify the source of the information they had provided in their free reports about the pictures they had seen. Table 11.6 presents a summary of the source judgements given for the correct and incorrect (co-witness) critical items reported.

Table 11.6. Source judgements given to the correct and incorrect (co-witness) critical items reported at test (proportions in parentheses)

<table>
<thead>
<tr>
<th>Source judgement</th>
<th>'Saw it in the picture'</th>
<th>'Co-witness told me'</th>
<th>'Can't remember'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(errant critical item reported)</td>
<td>55 (.47)</td>
<td>52 (.44)</td>
<td>10 (.09)</td>
</tr>
<tr>
<td>Not influenced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(correct critical item reported)</td>
<td>138 (.92)</td>
<td>0 (.00)</td>
<td>12 (.08)</td>
</tr>
</tbody>
</table>

Response order and memory conformity

Experiment 4 found a relationship between response order and subsequent memory conformity. Thus, response order was initially investigated here by exploring whether there was any individual differences between dyad members in their tendency to respond first, i.e., whether there was a tendency for some dyad members to always (versus rarely) mention the critical item that they had seen before their partner had mentioned their own. The proportion of time dyad members report a critical item first was calculated.
A mean of 0.5 was expected despite the amount of variation in responding first between dyad members. For example, whether a dyad member reports their critical item first 10% of the time (versus 90% by their partner), or whether each dyad member reports a critical item first the same amount of time (i.e., 50/50), the mean for each dyad member in both cases would be 0.5 despite the differences in actual response order behaviour. Thus, looking at the mean alone could mask cases where one dyad member responded first for almost all (versus very few) of the critical items. As expected, the mean was 0.5 (SD = 0.2). The small standard deviation indicates that there was not a lot of individual variation in response order behaviour, i.e., dyad members tended to mention critical items that they had seen first approximately the same number of times, rather than one member ‘dominating’ the discussions.

Data were then checked to see if the relationship between response order and memory conformity, found initially in Experiment 4, was replicated. Figure 11.1 shows how the content categories from the co-witness discussions (first to mention critical item ‘yes/no’; critical item disputed ‘yes/no’) relate to whether a co-witness critical item is later errantly reported at test or not.

Logistic regression analysis was performed with 'Influenced by co-witness?' (yes/no) as the outcome variable, and the two predictors: 'Mentioned critical item first?' (yes/no) and 'Disputed critical item?' (yes/no). Results indicated that participants were more likely to become influenced then they had not been the first to mention a critical item ($\chi^2 (1) = 59.31, p < .001$) than when they had been the first to mention a critical item. The odds of being influenced were 6.2 times higher if a critical item had not been mentioned first. The remaining predictor variable ('Disputed critical item?') had a non-significant effect on the model ($\chi^2 (1) = 1.06, p = .30$). The interaction between the predictor variables was also non-significant ($\chi^2 (1) = 2.23, p = .14$).
Figure 11.1. Flowchart outlining the pattern of influence from the discussion phase to the recall phase (actual participant numbers in parentheses)

Was there a dispute after a critical item had been mentioned in the discussion?

- **YES** 32% (68)
  - Did you report what your co-witness had said in the recall phase if you had mentioned the item first?
    - **YES**
      - 35% (24)
        - Not reported at test - 10% (7)
    - **NO** 54% (37)
      - Not reported at test - 15% (10)

- **NO** 68% (142)
  - Did you report what your co-witness had said in the recall phase if you had not mentioned the item first?
    - **YES**
      - 0% (0)
        - Not reported at test - 9% (13)
    - **NO** 91% (129)
      - Not reported at test - 29% (42)

Interruptions and memory conformity

The number of successful and unsuccessful interruptions made throughout the co-witness discussions, and the number of errant (co-witness) critical items reported at test, were investigated to see if there was a relationship between interruptions and susceptibility to memory conformity. On average, participants made 1.64 successful interruptions (range = 0-11), 0.20 unsuccessful interruptions (range = 0-3). A negative correlation was found between the number of *successful* interruptions made and the number of errant (co-witness) details reported at test ($r (64) = -0.25$, $p = .04$). Thus, participants who are less inclined to interrupt, are more likely to later report an unseen (co-witness) critical item, and vice-versa. No relationship was found between
the number of *unsuccessful* interruption attempts, and number of errant (co-witness) details reported \((p = .21)\), suggesting that the relationship between interruptions and memory conformity is dependent on the interruption being successful.

### 11.3.3 Individual differences in personality and metamemory

Overall, 53 of the 64 participants errantly reported at least one critical item at test. A series of correlations explored whether there were any relationships between scores on the individual difference measures and 1) the number of critical items mentioned first in the co-witness discussions, 2) the number of critical details errantly reported at test, and 3) the number of correct and incorrect source judgements regarding the errant details. Table 11.7 (see page 149) shows that the number of times a critical item is mentioned first is positively correlated with the Group Embedded Figures Task (indicating field independence). No further significant correlations were found.

### 11.3.4 Memory accuracy for neutral picture details

Free recall responses were coded in relation to the number of correct and incorrect items of neutral information recalled about the pictures. This analysis did not include any of the 'critical' co-witness items. There was no difference in memory accuracy between participants who had viewed either Versions ‘A’ or ‘B’ of the pictures, for either the number of correct or incorrect items of information that had been reported \((F's < 1)\). See Table 11.8, page 150, for means.

Further analysis investigated whether there was any relationship between the number of accurate picture details recalled at test and the number of errant co-witness details reported at test. There was a non-significant correlation \((r = .01)\), suggesting that susceptibility to co-witness influence is not related to memory for the pictures, as measured by the number of accurate neutral details recalled. Participants who had not been influenced by their co-witness reported an average of 82.3 \((SD = 14.6)\) accurate details at test, and participants who were influenced (i.e., reported at least one unseen detail at test) recalled an average of 82.6 \((SD = 27.6)\) accurate details at test.
Table 11.7. Correlations between scores on individual difference measures, response order, memory conformity, and source judgements

<table>
<thead>
<tr>
<th></th>
<th>Critical items mentioned first</th>
<th>Errant critical items reported</th>
<th>Errant source judgements</th>
<th>Correct source judgements</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMQ - general</td>
<td>r = .02</td>
<td>r = -.05</td>
<td>r = .11</td>
<td>r = -.09</td>
</tr>
<tr>
<td></td>
<td>p = .90</td>
<td>p = .72</td>
<td>p = .40</td>
<td>p = .47</td>
</tr>
<tr>
<td>AMQ - suggestibility</td>
<td>r = .10</td>
<td>r = -.13</td>
<td>r = .02</td>
<td>r = -.07</td>
</tr>
<tr>
<td></td>
<td>p = .45</td>
<td>p = .31</td>
<td>p = .89</td>
<td>p = .60</td>
</tr>
<tr>
<td>AMQ - source memory</td>
<td>r = -.09</td>
<td>r = -.02</td>
<td>r = .21</td>
<td>r = -.11</td>
</tr>
<tr>
<td></td>
<td>p = .60</td>
<td>p = .87</td>
<td>p = .10</td>
<td>p = .40</td>
</tr>
<tr>
<td>DES-C</td>
<td>r = .01</td>
<td>r = -.03</td>
<td>r = .05</td>
<td>r = -.04</td>
</tr>
<tr>
<td></td>
<td>p = .93</td>
<td>p = .83</td>
<td>p = .71</td>
<td>p = .73</td>
</tr>
<tr>
<td>GEFT</td>
<td>r = .26*</td>
<td>r = .08</td>
<td>r = .10</td>
<td>r = .03</td>
</tr>
<tr>
<td></td>
<td>p = .04</td>
<td>p = .53</td>
<td>p = .44</td>
<td>p = .79</td>
</tr>
<tr>
<td>GCS</td>
<td>r = -.07</td>
<td>r = -.06</td>
<td>r = -.09</td>
<td>r = -.05</td>
</tr>
<tr>
<td></td>
<td>p = .57</td>
<td>p = .65</td>
<td>p = .46</td>
<td>p = .67</td>
</tr>
<tr>
<td>NEO-FFI - extraversion</td>
<td>r = -.05</td>
<td>r = .23</td>
<td>r = .05</td>
<td>r = .06</td>
</tr>
<tr>
<td></td>
<td>p = .69</td>
<td>p = .07</td>
<td>p = .68</td>
<td>p = .66</td>
</tr>
<tr>
<td>NEO-FFI - openness</td>
<td>r = -.06</td>
<td>r = -.16</td>
<td>r = .08</td>
<td>r = -.11</td>
</tr>
<tr>
<td></td>
<td>p = .64</td>
<td>p = .22</td>
<td>p = .55</td>
<td>p = .37</td>
</tr>
<tr>
<td>NEO-FFI - agreeableness</td>
<td>r = -.03</td>
<td>r = .01</td>
<td>r = .10</td>
<td>r = -.11</td>
</tr>
<tr>
<td></td>
<td>p = .81</td>
<td>p = .92</td>
<td>p = .45</td>
<td>p = .39</td>
</tr>
<tr>
<td>NEO-FFI - conscientiousness</td>
<td>r = -.08</td>
<td>r = -.04</td>
<td>r = -.07</td>
<td>r = -.03</td>
</tr>
<tr>
<td></td>
<td>p = .55</td>
<td>p = .69</td>
<td>p = .61</td>
<td>p = .80</td>
</tr>
<tr>
<td>Revised SMS</td>
<td>r = .07</td>
<td>r = .10</td>
<td>r = -.06</td>
<td>r = .06</td>
</tr>
<tr>
<td></td>
<td>p = .59</td>
<td>p = .43</td>
<td>p = .66</td>
<td>p = .62</td>
</tr>
</tbody>
</table>

(Note: AMQ = Aberdeen Metamemory Questionnaire, DES-C = Dissociative Experiences Scale – Comparative, GEFT = Group Embedded Figures Task, GCS = Gudjonsson Compliance Scale, NEO-FFI = NEO Five-Factor Inventory, Revised SMS = Revised Self Monitoring Scale).

** = Correlation is significant at the 0.01 level

*= Correlation is significant at the 0.05 level.
Table 11.8. Mean number of accurate and inaccurate details reported at test (standard deviations in parentheses)

<table>
<thead>
<tr>
<th></th>
<th>Version 'A' of pictures</th>
<th>Version 'B' of pictures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of accurate</td>
<td>80.5 (26.4)</td>
<td>84.8 (25.3)</td>
</tr>
<tr>
<td>details reported at test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of inaccurate</td>
<td>3.6 (2.6)</td>
<td>3.4 (3.0)</td>
</tr>
<tr>
<td>details reported at test</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11.4 Discussion

Experiment 5 once again found evidence of memory conformity, where memory reports of dyad members became similar to one another's following a discussion. In the current study 53 out of 64 participants reported at least one critical item that their partner had seen instead of reporting the item that they had seen themselves. The source monitoring judgements indicated that errant details were being reported because of a source misattribution 47% of the time. This figure is similar to the 55% source confusions found in Experiment 4. Thus, discussions between co-witnesses clearly can lead to contaminated evidence. Furthermore, the unseen items that are errantly reported are often misattributed to the original source, thus implying that participants believe that they have actually witnessed the details.

The relationship between response order and memory conformity, found initially in Experiment 4, was replicated in the current experiment. Specifically, the first dyad member to mention a critical item that they had seen (i.e., that contradicts an item seen by the other dyad member) is not only most likely to influence their partner, but is also resistant to being influenced themselves. For example, even when a critical item is recalled in the discussion and then disputed by their partner, individuals are unlikely to report the item that their co-witness claims to have seen at test.

Before discussing this relationship further it is worth highlighting that there were no critical items whereby one alternative (e.g. a green car) was more 'salient'
than the contradicting detail (e.g. a yellow car), i.e., more likely to be reported first and more influential because of its distinctiveness or memorability. Pilot testing showed that the contradicting critical items were remembered equally as well. Moreover, the analysis of the co-witness discussions showed that the contradicting critical items were mentioned first approximately the same number of times. Thus, the relationship between response order and memory conformity is not dependent on the chosen critical items, and has now been demonstrated in two experiments, each employing different stimuli.

Memory conformity was also found to be associated with another 'discussion characteristic', i.e., interruptions. Ng et al. (1993, 1995) have previously found that individuals who interrupt are perceived to be particularly influential, however, they have never demonstrated an association between interruptions and an actual demonstration of influence. Thus, the current findings support and compliment this prior research. One difference, however, is that Ng et al. (1995) found perceived influence to correlate positively with both successful and unsuccessful interruptions, whereas the current research only found a relationship between successful interruptions and memory conformity. This difference might have arisen because of the differences in group size used. For example, Ng et al. (1995) investigated small group interactions with 4-6 participants in each group. In this situation, interruption attempts – whether successful or unsuccessful – were probably be interpreted by other group members as an active effort to gain conversational control. Thus, it is the act of attempting to make an interruption that was perceived as important by the other group members, irrespective of whether the attempt was successful. In contrast, a dyadic interaction involves only two individuals, therefore an interruption attempt by one dyad member that is unsuccessful (e.g., the attempting interrupter does not manage to complete their utterance) would mean that the speaker (i.e., the other dyad member) maintains conversational control and probably perceives the unsuccessful attempt to interrupt as a failure. Thus the finding that unsuccessful interruptions are not associated with memory conformity within dyadic interactions is therefore not necessarily at odds with Ng et al.'s (1995) findings where small group interactions were the focus.

The primary aim of Experiment 5 was to explore whether there were any individual difference factors that related to both response order and memory
conformity, and thus might underlie the association found between the two. Individual difference measures were selected that were thought to be promising candidates in that they could potentially contribute to differences in discussion characteristics as well as often already having been found to relate to susceptibility to misinformation in prior eyewitness research. However, not one measure related to both response order and memory conformity. In fact, of all the measures employed the only significant correlation indicated that field independent individuals reported more critical items first than did field dependent individuals. This association was predicted speculatively in the introduction, i.e., it was considered that field independent individuals might be more likely to mention details, including critical items, first in the co-witness discussions because they are more independent and self-reliant on internal cues than are field dependent individuals.

Despite predictions, none of the remaining individual difference measures were related to response order. One reason for this might be that there was very little variability found between individuals in the tendency to be the first to mention a critical item. I.e., dyad members tended to mention critical items first approximately the same number of times rather than one member ‘dominating’ the co-witness discussions. The fact that dyad members reported critical items first approximately equally as often means that there is little variation to account for, thus reducing the chances of finding significant correlations with other measures (D. Wright, personal communication, June 10th, 2003).

It was disappointing that none of the selected individual difference measures were found to be associated with memory conformity, especially because previous eyewitness research had sometimes found relationships between the measures employed and susceptibility to misleading post-event information. So, does this mean that personality factors are not responsible for the relationship between response order and memory conformity? Before ever being able to draw such a conclusion it must be acknowledged that there are many measures of individual differences in personality traits, and although serious consideration was given to the measures that were selected, it is still possible that a personality trait that has not yet been identified underlies the relationship between response order and memory conformity.
Although many of the selected individual difference measures were not found to be related to memory conformity, Experiment 4 and 5 found that certain perceived behaviours that could be used to form an impression of someone (e.g., being the first to recall information, or being more likely to interrupt) were related to memory conformity. For example, within dyadic interactions interruption attempts probably play a fairly instrumental role in person perception. An individual who frequently interrupts would probably be perceived as someone who is confident about what they are talking about. In support of this, Ng et al. (1993; 1995) suggest that interruptions may be perceived as a surface manifestation of individual characteristics such as power or dominance, i.e., although power or dominance differences are not addressed directly within conversation, they can be deduced from conversational behaviours, such as the amount a person interrupts. People may use this information to judge how confident a speaker is, which in turn could relate to how influential they are. Hence the finding in the current study that individuals who successfully interrupt most are the least susceptible to memory conformity, and vice-versa. Thus, it is possible that a social variable such as the role of ‘person perception’ underlies memory conformity. This idea will be expanded upon in the General Discussion, along with suggestions for investigating this in future research.

11.5 Summary of main findings

Experiment 5 investigated whether any individual difference factors were found to underlie the relationship between response order and memory conformity. None of the measures employed were able to account for the observed association, however, this does not mean that there isn’t a variable that is responsible for the observed relationship between the two. An alternative explanation is that memory conformity is not associated with any individual traits (e.g., introversion, poor memory ability), but with a social factor (e.g., person perception), that has not yet been investigated in the context of a co-witness study. This possibility, along with other plausible candidates that might be found to underlie the memory conformity effect, will be discussed in the following chapter.
12.1 Introduction

The present thesis developed a novel and ecologically-valid procedure to investigate the effects of discussion between co-witnesses on subsequent memory accuracy for a mutually experienced event. Across five experiments, dyad members each viewed a slightly different version of the same video (or picture), thus witnessing certain details that were unique to their version. The encoded stimuli were then discussed prior to a free recall test that was completed individually. The procedure allowed for two co-witnesses to have a naturalistic discussion about what was seen whilst unwittingly introducing, and encountering, misleading post-event information, all under controlled conditions in a laboratory-based experiment. This deliberately mimics a real life situation where witnesses may come into contact and discuss their memories prior to being interviewed by the police. Furthermore, it resembles the highly plausible situation where there are discrepancies among witnesses perhaps because one observed something differently or made a mistake. The experiments comprising the present thesis improve and develop previous co-witness studies where less ecologically-valid means of imparting, and encountering, co-witness information have typically been used (reviewed in Chapter 4). The main findings of the experiments comprising the thesis will be summarised below prior to a general discussion of both the theoretical and applied implications.

12.2 Summary of main findings

A consistent finding across the five experiments was that participants often errantly reported at least one unseen detail in their recall test that had been encountered during a discussion with a co-witness, despite receiving instructions to only report what had been seen. This finding was reliable across the range of different stimuli used in each experiment (different video-taped events and pictures), and when the misleading co-witness information took the form of either an additional detail (one
that had not been seen) or a contradicting detail (a change to something that had been seen). Despite predictions, no difference in susceptibility to memory conformity was found between young and older adults, even though older adults exhibited a poorer memory for the encoded event. In fact, a consistent finding across all experiments was that susceptibility to co-witness influence does not seem to bear a simple relationship to memory for the encoded stimuli. This implies that memory conformity is influenced by factors other than one's memory for what was seen.

Supporting this idea is the finding that post-event information encountered socially (via a face-to-face discussion with a co-witness), was more influential than misinformation encountered non-socially (via a written report). Importantly, this finding suggests that research investigating co-witness influence without the physical presence of a co-witness might be underestimating the level of influence a co-witness can have on subsequent memory reports. This reinforces the importance of ecological-validity in laboratory-based studies of co-witness influence. Perhaps more critically, the finding implies there might be factors that enhance the effects of post-event information when encountered in a social interaction (see Experiment 2 for a discussion). Thus, it is possible that previous co-witness research, using 'implied' co-witness presence, has failed to address some relevant factors that are present in a real-life eyewitness situation.

A second finding (from Experiment 3, and replicated in Experiments 4 and 5) sheds some light on why participants were reporting items at test that they had not seen themselves. Participants were given a source test for the items of information reported in free recall, where they were asked to re-read their free-recall reports and to circle any details originating from their co-witness, i.e., that they could remember discussing, but not actually seeing, themselves. In contrast, participants were asked to leave unmarked all the details that they could remember seeing themselves. Participants were also asked to underline any details for which they could no longer remember whether the source. The results Experiments 3, 4, and 5 are summarised in Table 12.1.
Table 12.1. *Source judgements relating to (unseen) co-witness items errantly reported at test in Experiments 3, 4 and 5*

<table>
<thead>
<tr>
<th>Source judgements</th>
<th>Errant source (video/picture)</th>
<th>Correct source (co-witness)</th>
<th>'Can’t remember source'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment 3</td>
<td>.37</td>
<td>.47</td>
<td>.16</td>
</tr>
<tr>
<td>Experiment 4</td>
<td>.55</td>
<td>.25</td>
<td>.20</td>
</tr>
<tr>
<td>Experiment 5</td>
<td>.47</td>
<td>.44</td>
<td>.09</td>
</tr>
</tbody>
</table>

Table 12.1 shows that participants frequently misattributed post-event information encountered in the co-witness discussion to the originally encoded source. In this situation it is unlikely that witnesses could disregard the items of post-event information when providing evidence to the police or in court, because of a subjective belief that these details had actually been seen. However, Table 12.1 also shows that participants often errantly reported details with a full realisation that they had not actually been seen, but had originated from the co-witness discussion, suggesting that individuals often choose to use information encountered from others when recollecting a mutually experienced event. The implications of these findings are discussed fully in section 12.3.2 (below).

A third main finding relates to the predictors of memory conformity. A number of individual difference measures of personality and memory ability were administered in Experiments 3, 4 and 5, however, the findings were largely inconclusive as few were reliably associated with susceptibility to memory conformity. An analysis of the transcribed co-witness discussions, however, revealed a different story. Experiments 4 and 5 both found a relationship between response order and memory conformity. Specifically, it was found that the first dyad member to report a critical item that they had seen, that contradicted a detail seen by their partner (e.g., a green car versus a yellow car), was highly resistant to influence, and almost always reported the correct critical item at test even when their memory had been disputed by their co-witness. In contrast, dyad members who were not the first to mention the critical item that they had seen, and therefore heard their co-witness...
report information that differed to their own memory, were likely to become influenced and subsequently report what their partner had seen as opposed to what they had seen. Whether the association between response order and memory conformity is a causal relationship was discussed in Chapters 10 and 11. An alternative interpretation is that discourse characteristics (e.g., response order, interruptions) can be observed and used to form an impression of the speaker (e.g., confident, dominant) which could then influence how likely one is to conform to that person. This is discussed further in section 12.3.3, below.

12.3 Discussion of main findings

12.3.1 Introduction and chapter outline

To put the implications of the present research into context it is useful to begin the general discussion by recapping briefly on its applied relevance. As mentioned in the introduction (see Chapter 1), studies using real life data have found that police investigations often involve more than one witness (e.g., Valentine et al., 2003; Wright & McDaid, 1996). A further study relying on archival data found that 86% of cases involved witnesses who knew one another before the crime was committed (Flowe & Ebbesen, 2001). Furthermore, a survey completed by individuals who had previously given eyewitness evidence found that when there is a co-witness present, most people (86%) report discussing the event with the co-witness (Paterson & Kemp, in press). Thus, the natural assumption that eyewitnesses will talk to one another about the unusual event that they have witnessed is supported by evidence that this does happen. It has been argued, therefore, that one of the most common and natural ways for eyewitnesses to encounter post-event (mis)information is through the simple act of discussing what was seen with a fellow witness. The possibility of contamination following co-witness discussion has been considered recently in a number of high profile court cases (e.g., the Oklahoma Bombing Trial, 1995; the Jill Dando murder enquiry, 2001). Although there is no certainty that the corroborative evidence provided by the witnesses in these real-life cases was in fact ‘contaminated’, the present research has been able to show that memory conformity, following co-witness discussion, can produce ‘false’ corroboration. A thorough understanding of the memory conformity effect is therefore warranted.
The following discussion of the main experimental findings focuses first on the source judgements regarding the erroneously reported post-event information encountered within the co-witness discussions. This is followed by a discussion of factors that could possibly underlie the memory conformity effect. The individual difference measures of personality and memory ability are commented upon, however, special attention is awarded to the findings regarding the analysis of the co-witness discussions, with a main focus on the relationship found between response order and memory conformity. Ideas for future research are suggested throughout these sections. The chapter ends with a consideration of the generalisability of the experimental findings, prior to an overall conclusion of the thesis as a whole.

12.3.2 Source judgements

Of both applied and theoretical interest is to determine the extent to which post-event information is errantly attributed to the originally witnessed event. As mentioned above, source judgement errors occurred often, implying that participants believed a detail had been part of the originally encoded event or picture, when it had not. This kind of source confusion has serious consequences in a forensic situation (e.g., inaccurate testimony, biased evidence, false corroboration between witnesses, etc). It is therefore important to consider why errant source judgements were so frequent in the present research.

The source-monitoring framework (Johnson et al., 1993), reviewed in Chapter 2, is able to provide some explanations. To briefly recap, according to the source monitoring framework our memories contain various characteristics that provide clues to their origin. Memories from different sources tend to differ on average in the quantity and quality of the characteristics associated with them. Individuals use these differences in memory characteristics as heuristics to attribute their memories to a particular source. However, there is no single aspect of our memories that specifies the true source without fail, thus source misattributions can occur (Johnson et al., 1993). Research and theory on the accuracy of source monitoring has shown that source confusion errors increase when there is an overlap in the memory characteristics from two different sources (Henkel & Franklin, 1998; Markham & Hynes, 1993).
This finding is particularly relevant for the present research, as there is a large amount of contextual overlap between the encoding phase and the misinformation phase within the experiments. Both phases concern the witnessed stimuli, thus overlapping in terms of content. Furthermore, both phases take place close together in time, and in the same experimental environment. The similarities in the original and post-event information phases may contribute to the fact that a number of errant judgements were made when determining the source of each item of information reported at test in the present research. In real life a similar amount of contextual overlap might be expected. For example, co-witnesses are likely to talk about what they have just seen (content overlap), they are likely to do this immediately after the crime event (temporal overlap), and it is likely that this discussion occurs at the scene, whilst waiting for the police to arrive, rather than at a different location (environmental overlap).

While the source monitoring framework can account for a large proportion of errors in eyewitness research, Zaragoza and Lane (1994) found that participants were significantly more likely to make source monitoring errors when they were required to actively retrieve (i.e., 'reactivate') the originally encoded information whilst processing the misleading post-event information, than when the originally encoded information was not reactivated. This finding is particularly pertinent to the present research. For example, as mentioned in Chapter 7 (Experiment 2), it is entirely possible that discussing the details of an event with a co-witness is another form of encountering post-event information whilst actively retrieving the originally encoded memory. This might account for the fact that a larger memory conformity effect was found when encountering misinformation within a co-witness discussion, than when the same misinformation was encountered in a post-event narrative (NB, Zaragoza and Lane, 1994, assume that reading a narrative does not require activation of the original memory). Unfortunately, in Experiment 2 participants were not asked to make any source judgements regarding the information that they had reported. It would therefore be interesting to replicate Experiment 2 with an addition of a source test to see if support is found for Zaragoza and Lane's (1994) theorising in a co-witness experiment.

Why does the process of reactivating and reflecting back on the originally encoded information during a misinformation phase increase source confusions?
Zaragoza and Lane (1994) argue that it allows the post-event misinformation to acquire memory characteristics that are highly similar to those of the originally encoded information, thus the chance of source misattributions are significantly increased. This idea is supported by neuropsychological research on memory (re)consolidation (Nader, 2003; Nader, Schafe & LeDoux, 2000). Nader et al. (2000) conducted research with rats, finding that memory traces are subject to change, and that resurrecting a memory trace renders it flexible enough to alter before it is re-consolidated in long-term memory. This neuropsychological research is a relatively new demonstration of our memories being reconstructive. Sara (2000) argues that memory reconsolidation, or 'updating', research provides a more realistic explanation of how our memories function, and that the view of long-term memory acting as a dormant warehouse storing past experiences is outdated. For example, memories exist to recognise and make sense of our present experiences. Thus, our memories do not simply preserve the past, but integrate new learning with old learning. The purpose of reconsolidation is for activated memories to become updated, and 're-filed' in an optimum and beneficial way (Sara, 2000). Although the current research shows that if this happens when misinformation is present, the outcome is far from optimal.

Both the source monitoring framework and the neuropsychological research relating to memory reconsolidation suggest that encountering post-event information when an original memory is activated reduces the likelihood of the original memory being reported in a subsequent recall test. However, whereas the memory reconsolidation research implies that the original memory trace is updated or overwritten with the post-event information, the source monitoring framework suggests that it is possible for both the original and post-event memory trace to exist in memory (unless one is forgotten or was never encoded), and that post-event information is errantly reported at test when an errant source judgement (based on memory characteristics) is made. The present research is unable to determine whether the originally encoded details are still accessible for those participants who errantly report co-witness information at test, however, this has been the focus of some misinformation research (for a review see Ayers & Reder, 1998). Instead, the experiments comprising the present thesis have focused on the effects of co-witness
discussion and demonstrated that co-witness information reported at test is often errantly attributed to the originally encoded source.

Future co-witness research could investigate whether the original memory trace is still accessible by informing participants about the main experimental manipulation (i.e., telling dyad members that they have each encoded slightly different stimulus material), thus warning them that some information encountered from the co-witness might be wrong. Previous research has found that if a warning is presented immediately after participants encounter the misleading post-event information then it is possible to disregard the misinformation and report the original memory (Wright, 1993). However, if the warning is given two days after encountering the errant post-event information, participants are no longer able to successfully retrieve the original memory trace (Lindsay, 1990).

Source misattributions were not wholly responsible for the errant reporting of co-witness information at test. The source judgements relating to the co-witness details errantly reported in Experiments 3, 4 and 5 suggest that participants often reported a co-witness detail at test with a full realisation that the source of this information was the co-witness discussion, and that the detail had not actually been seen. This was despite receiving both verbal and written instructions to report details that they could remember seeing from the originally encoded event (or pictures). So, why do participants report details that they have not seen? As mentioned previously, informational influence is the most plausible explanation. Informational influence can occur when individuals experience subjective uncertainty, and are motivated to be accurate. Thus, participants might choose to report items of post-event information at test, because they believe it is correct. This situation resembles one which might have been faced by many of the participants in the present experiments. For example, not only might participants have questioned their own memory when hearing their co-witness’ differing recollections, but at test they would have been faced with the decision to either report their own memory (which they are now less confident about) or that of their co-witness (which might be true). Obviously, in such circumstances there are times where the co-witness information could be favoured and thus (errantly) reported.

From a forensic perspective, knowing which items of information had been acquired after the event had been witnessed, i.e., had not actually been seen, suggests
that they could be disregarded by the witness if necessary. Therefore, as long as individuals are able to state which details have originated from a source other than the perceived event, it would seem that this particular underlying cause of memory conformity is unproblematic. However, as mentioned previously, informational influence represents a true belief that the information being agreed with, and reported, is accurate (Cialdini, 1993). Thus, eyewitnesses might not omit this information unless specifically asked to, and it is possible that police officers are unlikely to ask witnesses to omit details.

It would be interesting for future co-witness research to manipulate participants' motivation to be accurate, to see how this affects memory conformity. Participants' response thresholds could be manipulated by emphasising either the importance of sensitivity or specificity. In a memory context, sensitivity refers to recalling accurate information and specificity refers to not recalling inaccurate information. To emphasise sensitivity, one group of participants could be told that they should report as much information as possible, and not to worry if they errantly recall something that was not there, i.e., if they think an item might have been present in a slide, they should recall the item. These participants should adopt a low threshold criterion for recalling items. To emphasise specificity, a second group of participants could be told that they should only report items that they can clearly remember and that they should not worry if they fail to report items, i.e., they should avoid recalling any items unless they are sure the item was in the slides. These participants should adopt a higher threshold criterion for recalling items. It is likely that memory conformity will be significantly reduced with the instructions emphasising specificity. Any memory conformity that is still found in this condition is likely to be the result of source confusions.

12.3.3 Factors underlying the memory conformity effect

Experiments 3, 4, and 5 employed a number of individual difference measures in personality, memory ability and discourse characteristics, to see if any were found to underlie the memory conformity effect (Experiments 3 and 4), and secondly to see if any were found to underlie the relationship found between response order and memory conformity (Experiment 5). The majority of these measures were selected
based on previous eyewitness research that had found them to be related to susceptibility to misinformation. On the whole the measures of personality and memory ability were largely inconclusive, and thus did not replicate past research (please refer back to Experiments 3, 4 and 5 for a discussion of the findings). It is possible that there is an individual characteristic (e.g., a specific personality trait) that is able to predict susceptibility to co-witness influence, but that was not measured by any of the individual difference measures employed in the current research. However, rather than debating what this might be, it may be more fruitful to focus on the analysis of the co-witness discussions, and the discourse characteristics that were found to be related to memory conformity (see below).

The relationship between response order and memory conformity has been replicated both within this thesis, and subsequently (Gabbert, Memon & Wright, in prep.). There are a number of feasible explanations for this relationship, one is that an individual's confidence in the accuracy of their own memory drops after hearing a fellow witness recall a detail that differs from one's own recollections. Supporting this theory is the work of Bless et al. (2001) who found that susceptibility to social influence could be directly influenced by increasing and decreasing uncertainty in participants' metacognitive knowledge. Participants with increased uncertainty in their memory (e.g., if the event was encoded under sub-optimal conditions) were more likely to accept misinformation (see also Bless & Strack, 1998).

In the current experiments, dyad members encoded similar stimuli for the same amount of time, and under the same conditions. Thus, relative confidence in memory was not experimentally manipulated. However, 'naturally occurring influences', such as hearing a co-witness' recollections before having the chance to report one's own (differing) memory, could also lead to differences in the certainty of one's memory. This could subsequently lead to differences in susceptibility to memory conformity (as was found). At present the hypothesis that response order affects confidence in one's memory is speculative, though not entirely unfeasible. For example, Luus and Wells (1994) found that eyewitness confidence in a line-up decision was malleable, and could be significantly lowered by feedback that a co-witness had made a different choice. Future experiments could attempt to bring the relationship between response order and memory confidence under experimental control, perhaps by manipulating response order in the co-witness discussions.
through the use of a confederate, and then asking participants to rate their confidence for the items that they have reported at test. A post-recall interview could specifically question participants about whether they noticed the contrasting co-witness information, how this made them feel about their own memory accuracy, what detail they chose to report at test and why, and whether they believed that the co-witness detail had originated from the perceived stimuli, etc.

A second explanation for the relationship between response order and memory conformity is not entirely independent of the explanation suggested above. It draws on the social psychology literature on attitude change and persuasion. This research shows that self-credibility, or confidence, is strongly related to susceptibility to influence (Cacioppo & Petty, 1980). Self-credibility can be assessed via comparison with others. If another individual is perceived to be more (or less) credible or knowledgeable than oneself, it can lead to a decreased (or increased) feeling of self-credibility. In relation to the current research, individuals who perceive their co-witness to be more credible than themselves might be more susceptible to co-witness influence, and vice-versa. Supporting this idea, Smith and Ellsworth (1987; see also Kwong See et al., 2001) found that stronger, and more persistent, misleading question effects were observed when the source of the misinformation was presented as an expert, than when the source was described in more neutral terms.

In the present research the participants had to gauge for themselves how credible their co-witness was, rather than having this information provided for them as an experimental manipulation. However, research suggests that it is natural to form impressions and opinions about others very quickly (see Uleman, Newman & Moskowitz, 1996b, for an overview of 'spontaneous trait inferences'). Credibility is likely to be assessed by observing how confident and knowledgeable a co-witness appears when discussing the event (or picture). For example, hearing a co-witness report a detail that differs from one’s own memory might lead them to be perceived as more credible, as the accuracy of one’s own memory is called into question. Therefore it is likely that misleading items of co-witness information will be conformed to. Of course, on the other side of the coin it is also possible that hearing a co-witness report an item of information that you know is wrong might lead them to be perceived as less credible than oneself, and therefore less likely to be conformed
Perhaps, the more conflicting information a co-witness mentions in a discussion, the less accurate (and therefore less credible) they are perceived to be (suggested by S. Chu, personal communication, May 10th, 2004).

As mentioned in Experiment 5, the number of successful interruptions made by an individual can also be used to determine how confident that person is (Ng et al., 1993, 1995). For example, Experiment 5 found that individuals who interrupt most are the least susceptible to memory conformity, and vice-versa. In support of the above theorising, our own most recent co-witness research has investigated the role of person-perception on susceptibility to memory conformity by asking participants to rate their co-witness (in comparison to themselves) on a number of Likert scales relating to perceived credibility, confidence, accuracy, etc. Results have shown that participants who errantly reported co-witness information at test tended to rate their co-witness as more credible and more confident than participants who were not influenced by their co-witness (Gabbert et al., in prep.).

Thus, it is possible that a social variable such as 'person perception' underlies the relationship found between response order and memory conformity. Future co-witness studies could investigate the role of person-perception in memory conformity to explore this hypothesis further. One way to do this would be to manipulate source credibility. Previous eyewitness research has explored people's susceptibility to misleading information dependent on the source, however, the studies tend to be fairly artificial in that descriptions of a person are often used to purposefully influence perceptions of source credibility, rather than investigating how this might occur more naturally in an actual face-to-face interaction with a person (please refer back to Chapter 4 for a discussion of this research).

An alternative explanation that is worthy of consideration is that a situational variable (rather than a personality variable) underlies the relationship found between response order and memory conformity. For example, certain situational variables could boost an individual's confidence in their memory (e.g., feeling attentive during encoding, having a good vantage point, seeing that another participant is worried about having a poor memory, etc). In a real-life setting where there are multiple witnesses to a crime there will often be actual or perceived differences in each person's confidence in their recollections that could affect whether their memories conform or not following a discussion about what was seen. For example, having an
inflated sense of confidence about the quality of one's memory could have a number of consequences within a co-witness discussion; First, it is possible that confident individuals mention a number of details before their partner reports what they can remember; Second, because the recollections are reported confidently, the recipient of the information might be particularly likely to consider that the co-witness is accurate and that their own memory is wrong; Third, even if the information is disputed, the individual is unlikely to be persuaded that they are wrong about what was seen because of their initial confidence in their memory. In support of this, Wright et al. (2000, Experiment 2) found that pairs tended to conform to the participant with the higher confidence.

One way to investigate the impact of a situational variable on subsequent memory conformity would be to experimentally manipulate people's confidence regarding what they have witnessed. For example, dyad members could encode different versions of the same event/pictures for the same amount of time (as in the current experiments), however they could be told that one had viewed the stimuli for twice as long as their partner. By manipulating perceived encoding duration, when actual encoding duration is the same, it would be possible to see if dyad members who believe their memory to be worse in comparison to their partner are less likely to report items first in the co-witness discussions and more susceptible to memory conformity.

12.4 Summary

In sum, five experiments have shown that memory conformity does occur following a discussion about mutually encoded stimuli. Post-event information encountered during the co-witness discussion is often errantly reported because of a source confusion. However, unseen details are also frequently reported with a full realisation that the co-witness was the source of this information. The current experimental findings have been unable to find support for any individual differences in personality or memory ability that are reliably associated with susceptibility to memory conformity. However, perhaps the relevant measure has not yet been identified. Two alternative explanations for the memory conformity effect have been proposed here. First, is that a 'social' factor underlies susceptibility to co-witness
influence. For example, whether or not an individual becomes influenced by post-event information from a co-witness might not have anything to do with the individual, but instead might depend on how 'believable, 'trustworthy', etc, the co-witness is perceived to be. This could impact upon how much attention is paid to the post-event information, how the information is subsequently processed, etc. A second feasible explanation is that memory conformity is mediated by a 'situational' variable. For example, an individual who feels unconfident about their memory for an event because of the amount of attention they paid, the view they had, etc., might be more susceptible to co-witness influence than someone who feels they can remember the event very well, because they had a good vantage point, etc.

If given the opportunity to conduct the experiments presented within this thesis once again (and with the benefits of hindsight), the following alterations would be made. First, the inclusion of a source test in Experiment 2 would have enabled Zaragoza and Lane's (1994) theory to be tested within a co-witness study, whereby more source errors would be expected when encountering post-event information during a co-witness discussion than when reading a narrative. Second, when investigating possible predictors of memory conformity in Experiments 3, 4 and 5, it would have been interesting to introduce a questionnaire at the end of the experiment asking participants to rate their partner in comparison to themselves on items such as confidence, credibility, etc. This would have provided data on person perception (as opposed to self perception) that might have correlated with memory conformity more so than the individual difference data that was collected. Third, if the co-witness discussions had been video-taped rather than audio-taped then additional content categories could have been identified and coded (e.g., eye-contact, body posture, mimicking, etc.), that again could feasibly be predictors of memory conformity, as were the content categories identified in the transcribed discussions. These missed opportunities would have provided additional, and potentially very informative, data that could have added to the present understanding of the memory conformity effect.

12.5 Real life applicability of the present research

A few factors concerning the real life applicability of the present research are worthy of discussion. First, the research is unable to replicate a forensic situation where there
are real-life implications associated with the memory reports provided by the witnesses. In a real situation the motivation to be accurate might be a lot higher, thus the level of memory conformity might be lower than found in the present studies. Unfortunately it is almost impossible to compare the level of conformity found in laboratory based experiments with the level of conformity found in real life, because in real life the factual details of the perceived event are usually unknown, or incomplete (even when there is CCTV footage). However, the real life examples outlined in the general introduction (see Chapter 1) suggest that, despite the potentially serious consequences at stake, memory conformity between witnesses does occur, and perhaps very frequently.

Another source of evidence also supports the claim that memory conformity between co-witnesses does occur in real life. This concerns the accuracy of statements provided by eyewitnesses to a traffic accident. Traffic police are trained to use maths and physics to either confirm or contradict eyewitness evidence such as estimations of speed, point of impact, etc. It is not uncommon for these techniques to show that eyewitness evidence can be unreliable. Of relevance to the present thesis is a statement given in the *Grampian Police Road Collision Investigation Manual* warning that witnesses who have discussed what they have seen are particularly unreliable. This is because witnesses can easily come to agree on ambiguous details (e.g., car speed, etc). This corroborative evidence is often proved to be false by the physical evidence collected by the traffic police investigators (G. Ritchie, personal communication, July 24th, 2003).

A second point to consider concerns the lack of real-life consequences of laboratory-based eyewitness research. For example, Ebbesen (2001) claims that the items of selected misinformation themselves are often inconsequential. He argues that misinformation used in eyewitness studies is more likely to implicate peripheral details than forensically relevant details, and therefore, the research is not very informative when applied to real life. This does not apply here however, as the misleading post-event information in the present studies have often concerned a forensically relevant detail. For example, in Experiment 1 many participants came to believe a girl was guilty of theft when they had no proof, following a conversation with a co-witness who had seen her commit a crime. In Experiment 2, the misinformation suggested that a robber had a gun when he did not. Furthermore, in
Experiments 3 and 4, the misinformation items concerned items that the thief had stolen, as well as an item of clothing that the thief was wearing. Thus, Ebbesen's claim that misinformation research is not generalisable, based on the inconsequential items of information selected by researchers, is not applicable to the present research. In sum, it can be confidently assumed that the present findings could be applied to a real-world situation. However, future research might discover that the main findings are mediated by factors that have not been investigated here (e.g. perceived source credibility, as discussed earlier).

12.6 Conclusion

Individuals discuss their memories with one another every day. Unusual experiences such as witnessing a crime are particularly likely to be discussed. The present research has shown that such a simple activity can expose individuals to post-event information that can subsequently influence one's original memory for what was actually seen. For example, each of the five experiments comprising this thesis have found that participants, assuming the role of eyewitnesses, frequently reported items at test that they had encountered during a discussion with a co-witness rather than perceiving themselves. This main finding, using the procedure developed here, has subsequently been replicated in several independent laboratories (K. Wilson and C. French, Goldsmiths College, London, personal communication, March 25th, 2004; P. Granhag, Goteborg University, Sweden, personal communication, March 16th, 2004; S. Musch and G. Bodner, University of Calgary, Canada, personal communication, August 27th, 2003; T. Ewen, Queen Margaret College, Edinburgh, personal communication, December 8th, 2003), thus providing additional support for the present research. Future co-witness experiments have been proposed to examine how situational or social factors might mediate the memory conformity effect. The experimental procedure that has been developed and employed throughout the present research is versatile enough to be used in these, and future studies.
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Appendix 1

Experiment 1

Checklist used for scoring free-recall responses, detailing the sequence of actions and events seen from each witness perspective
VIEW FROM DOOR

1. Girl goes towards door.
2. knocks.
3. Opens door and enters, saying “hello”.
4. Looks round behind the door.
5. Puts bag down on chair in front of her.
6. Walks back & looks out the door.
7. Checks the time on her watch.
8. Goes back to bag and opens it.
11. Picks up the notepad from the table.
12. Puts it back down again.
13. Walks to desk on RHS of the table.
14. Opens the RHS drawer, then closes it again.
15. Opens the LHS drawer.
16. Finds a pen and takes it out.
17. Picks up a wallet, from the drawer.
18. Glances towards the door.
19. Opens the wallet and looks inside.
20. Partially pulls out a ten pound note.
21. Shakes her head.
22. Puts the wallet back into the drawer.
23. Goes back to the table with the pen.
24. Writes a note on the notepad.
25. Tears of the pages.
27. Turns back to the drawer (which is still open).
28. Puts the pen back in.
29. Slides the ten pound note out of the wallet.
30. Closes the drawer.
31. Puts the money in her LHS jeans pocket.
32. Picks up bag and puts on shoulder.
33. Walks out door, pulling door shut.
34. Stops, then turns back.
35. Puts bag back on chair again.
37. Closes bag and puts back on shoulder.
38. Leaves the room.
39. Shuts the door behind her.
VIEW FROM ROOM

1. Hear a knock on the door.
2. Door opens.
3. Girl enters room, saying "hello".
4. She looks round behind the door.
5. Takes bag off her shoulder & places on chair in front of her.
6. Turns back towards the door, looking out.
7. Goes back to bag and opens it.
8. Takes out a book.
10. Closes bag.
11. Picks up the notepad from the table.
12. Puts it back down again.
13. Walks to the desk to the RHS of the table.
14. Opens the RHS drawer, then closes it again.
15. Opens the LHS drawer.
16. Finds a pen and takes it out.
17. Picks up a wallet.
18. Glances towards the door.
19. Opens the wallet & looks inside.
20. Partially pulls out a tenner.
21. Shakes head.
22. Drops wallet back in drawer.
23. Goes back to table with the pen.
24. Writes a note on the notepad.
25. Tears off the page.
27. Turns back to the drawer (which is still open).
29. Closes drawer.
30. Looks towards the door.
31. Picks up bag & puts on shoulder.
32. Walks out door.
33. Stops, then turns back.
34. Puts bag back on chair again.
36. Closes bag.
37. Screws up note.
38. Drops it in the bin.
39. Leaves room, closing door on way out.
Appendix 2

Experiment 2

Cued recall questionnaire containing twenty questions about the event
Please answer the following twenty questions with *details recalled from the video* that you were shown about the robbery of the video store. Please do not guess at any answer.

1. Did the employee open the till on his left or right first?
2. Which of the robbers entered the shop first?
3. What time of day did the robbery occur?
4. What was the customer wearing?
5. What was the employee doing at the beginning of the film?
6. What direction did the robbers run off in after leaving the shop?
7. How did the robbers disguise their faces?
8. How would you describe the robber's accents?
9. What was the main robber wearing?
10. What did the robbers do before leaving the shop?
11. What type of bag was handed to the employee?
12. Did the robber hand the bag to the employee with his left or right hand?
13. Who had the bag containing the money when the robbers left the shop?
14. Was there a CCTV camera in the store?
15. How was the customer attacked?
16. How did the main robber get the employee to hurry up?
17. What did the robber by the door have in his hand?
18. How would you describe the employee's hairstyle?
19. What was thrown by the main robber?
20. What colour hair did the robber by the door have?
Appendix 3

Experiment 3

Checklist used for scoring free-recall responses, detailing the sequence of actions and events from each version of the video
1. Walks towards camera.
2. Goes to white car, tries handle, finds it locked.
3. Tries adjacent bigger dark car, unlocked.
4. Gets in driver’s seat
5. Looks through contents of glovebox (through CDs). Takes nothing. Shuts it.
6. Picks up black leather bag from floor of passenger side and empties contents onto passenger seat.
7. Picks up black purse, opens it and steals a £20 note which he puts in his jeans pocket VS. does not steal anything.
8. Chucks purse on floor
9. Picks up keys and an envelope, and reads the address.
10. Looks around and leaves car with keys and envelope in his hands.
11. Walks to door (no 1). Looks in window, knocks and rings bell.
12. Uses keys to unlock door and enters house.
13. Turns light on
14. Goes to black jacket hanging on banister and finds wallet in one of the pockets which he checks through and then steals.
15. Jacket falls to floor
16. Goes to coffee table in living room, picks up a flip-top mobile phone (which he opens) and a watch.
17. Puts watch down on table and pockets mobile VS. puts mobile back down on table.
18. Goes to drawers in same room and looks through
19. Pockets and unidentifiable black object from second drawer
20. Looks in kitchen, but doesn’t enter
21. Runs upstairs
22. Tries door to boiler room first, closes door.
23. Enters bedroom with computer in and turns light on
24. Rifles through stuff on computer desk
25. Deliberately knocks small pile of CDs onto floor VS. looks at them but does not knock them over.
26. Enters another bedroom and turns light on
27. Sits down and empties contents of jewellery box onto chest of drawers
28. Pockets a string of pearls
29. Looks in cupboard in room, takes nothing, shuts door.
30. Runs back downstairs
31. Looks out window
32. Puts on dark blue beanie hat with orange stripe round it VS. does not put a hat on.
33. Zips up fleece
34. Looks out window again
35. Leaves the house, shutting the door behind him.
Appendix 4

Experiment 5

Versions A and B of the scenes
Kitchen scene
Appendix 4

Town centre scene
Living room scene