Providing negative feedback about the accuracy of details within scenes reduces appraisals of memory accuracy but does not affect appraisals of memory occurrence

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Providing negative feedback about the accuracy of details within scenes reduces appraisals of memory accuracy but does not affect appraisals of memory occurrence

By

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Providing negative feedback about the accuracy of details within scenes reduces appraisals of memory accuracy but does not affect appraisals of memory occurrence.

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ABSTRACT

Autobiographical memory is defined as an individual’s ability to remember events that have happened in the past and plays a pivotal role in one’s concept of self. The present study investigated the impact of different types of feedback on autobiographical memories resulting from stimuli presented in a laboratory setting. 48 undergraduate participants were exposed to video-recorded (N=30) and audio-recorded (N=30) scenes of an actress performing simple tasks. After a 1-week delay, participants received positive feedback (they were accurately told that they had correctly recollected a central detail from within two scenes) and negative feedback (they were inaccurately told that they had incorrectly recollected a central detail from within four scenes, and were either provided or not provided with an explanation as to what the correct answer allegedly was) about their memory. The negative feedback procedure (both with and without the explanation) produced a significant decrease in belief in accuracy ratings without influencing belief in occurrence ratings. The positive feedback procedure produced significant increases in belief in accuracy and belief in occurrence ratings. This study provided a controlled situation in which belief in accuracy and belief in occurrence appraisals could be manipulated simultaneously and provides further evidence of the proposed theoretical dissociation between belief in accuracy and belief in occurrence appraisals. This study reinforces the importance of distinguishing occurrence and accuracy when trying to understand the types of evidence and manipulations that influence current memory appraisals.
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CHAPTER 1

Introduction

The human brain possesses the remarkable ability to be able to remember previous experiences and to store the mental representations for retrieval at a later time. This ability is important for many reasons, especially since people make decisions and act based on what they remember from their past. In his Basic Systems model, Rubin (2006) suggests that multiple different underlying component processes are combined to produce distinct metacognitive appraisals (evaluative judgements about the quality and truth-status of remembered events). The model emphasizes two appraisals that are important for remembering: belief (hereafter referred to a belief in accuracy; Scoboria et al., 2014) which refers to the degree to which events, when retrieved, are perceived as corresponding to the way that the event was in fact experienced in the past; and recollection which is defined as the presence of a vivid mental representation for an event accompanied by a sense of re-experiencing the past.

One major form of memory is known as autobiographical memory, and it refers to the storage of memories for events that have happened to an individual (Rubin, 2006). This type of memory acts as an important archive of information which contributes to one’s concept of self (Rubin 1988). By remembering the things that have happened, autobiographical memory helps to shape one’s future thoughts, goals, and actions. Nairne and Pandeirada (2016) have proposed that memory systems have been optimized via evolution to process and retain fitness-relevant information. This way, people can learn and make decisions that will benefit them in the future.
Brewer (1996) has also defined autobiographical memory, stating that recollective memories are comprised of a belief that an event has occurred in the past, as including vivid imagery and feelings of re-experiencing, and that memories are accompanied by a sense of correspondence between recall and a previous state of affairs.

Rubin (1986; 1992) has stated that autobiographical memory is difficult to define. He proposed that the definition should not be set a priori but should reflect the “natural cleavages that researchers have found in nature” (Rubin, 1996). Baddeley (1992) defined autobiographical memory as the capacity for people to remember their own lives and Rubin (1996) adds that autobiographical memories include a narrative structure. He states that autobiographical memories are often recollected as stories rather than as fragmentary lists of attributes and that this narrative structure of memory is much like the narrative structure of other social encounters that include the exchange of information. This is due to the recall of autobiographical memories being a social experience, where they are often recalled as stories, and the way in which they are told tends to define the social group.

There is currently a large body of research that examines the distortion of autobiographical memories and there are numerous studies that demonstrate the reconstructive nature of remembering. People often remember events differently from the way in which they were initially perceived due to post-event influences, and sometimes remember experiences that may not have happened at all (Nash & Ost, 2016). For example, studies have shown that people can be compelled to falsely remember that they were born left-handed (Kelly, Amodio, & Lindsay, 1996), or that they spilled a bowl of punch on to the parents of the bride at a wedding (Hyman, Husband, & Billings, 1995).
These examples provide evidence that demonstrates how powerful suggestions are in creating novel false mental representations for past events.

The purpose of the current study was to further develop a controlled experimental situation (Scoboria & Korcsog, 2017) that allows researchers to examine how people react when receiving different types of feedback about existing memories for scenes presented in the lab. The goal of this research method is to permit simultaneous investigation of the effects of feedback on belief that events occurred (referred hereafter to as belief in occurrence; Mazzoni, Scoboria, & Harvey, 2010), and the effects of feedback on confidence in the recall of event details (hereafter referred to as belief in accuracy; Scoboria et al., 2014; Rubin, 2006). This would facilitate further study of the previously proposed theoretical dissociation between occurrence and accuracy appraisals (Scoboria et al., 2014; Scoboria, Talarico & Pascal, 2015; Scoboria, Nash, & Mazzoni, 2016; Scoboria & Pascal, 2016; Scoboria & Korcsog, 2017), by potentially further demonstrating that they can be measured and manipulated independently.

Memories can be Altered by Information Encountered after an Event

Bartlett (1932) was one of the first to make the claim that the content and the ways in which events are remembered are socially determined. The notion that memories can be systematically altered by information encountered after an event is known as the post event information (PEI) effect (Wright & Schwartz, 2010). On an everyday basis, one way that people can encounter post-event misinformation is when those who have shared the same experience discuss it with one another. Wright & Schwartz (2010) reported that participants’ memories for actions that they had performed in the lab could be affected by information that was reported by another person. These false memories
then occurred both when tested in the presence of the person who suggested the misinformation, and when tested individually. This demonstrates that memory reports are not always completely based in individual recall, and that sometimes memories can be reinforced, inhibited, or changed by what other people say. Because of this, it is evident that misinformation effects play a pertinent role in forensic contexts, since people can be falsely lead to believe facts based on another person’s recollection. Some details mentioned in conversation about a memory can be inconsistent either because one witness could have remembered something differently, has paid attention to different details, or could have made a mistake in their own account of an event (Paterson & Kemp, 2005). To describe this process, Wagenaar and Crombag (2005) introduced the concept of “collaborative storytelling”. They state that this collaborative storytelling is demonstrated as the mutual reinforcement of ideas, which can occur among people when they attempt to judge uncertain information. The authors illustrated their point by presenting a legal case where they proposed that when eyewitnesses were confronted with information that could not be verified by direct observation, they would use the judgements of others to help fill any uncertainties about their own memories.

Loftus, Miller, and Burns (1978) suggest that the information that is provided by others, that cannot be verified by direct observation, is combined into a witness’ memory of the event whether it is consistent or misleading to what they recall. This possible “misinformation acceptance” is especially believable when it contains a high degree of conviction about the new memories (Loftus & Hoffman, 1989). They also state that allowing the passage of time between the event and the recollection can cause the original memory to fade, making a person more vulnerable to suggestion (Loftus, Miller, &
Burns, 1978). The more time that passes, the more likely that a person will have uncertainties about their memories and could choose to depend on others’ judgements of what happened. Classic research by Ebbinghaus (1880) indicates that there is an exponential decrease in the level of memory retention after one day (33% of the information encoded is remembered), and by seven days memory retention levels off to a low point (25% of the originally encoded information is retrieved).

Because of this loss of access to retrieval of detailed information, people routinely discuss past experiences. Discussion and the incorporation of novel information provided by others can be costly in that the objective accuracy of memory reports can change (through processes such as collaborative inhibition, information sampling biases, and audience tuning) or be beneficial (due to processes such as transactive memory and collaborative facilitation) (Hirst & Echterhoff, 2012). After incorporating feedback from conversation into memory, people may not completely agree about the details within events, or even that the event under discussion occurred. Thus, people often provide feedback to others about part, or the entirety of memories.

Studying social conversations about memory is important because these instances can have a large influence on memory recall and on the accuracy of memory reports (Echterhoff & Hirst, 2009). Certain speaker and listener qualities, and prior conversational recollections, can also combine to affect the content of memory reports (Pasupathi, 2001). Feedback provided about memories even has the potential to alter rememberers’ beliefs about whether or not events actually occurred (Scoboria, Boucher, & Mazzoni, 2015). These researchers examined reasons that people provided for choosing to reduce or relinquish their beliefs in the occurrence of autobiographical
memories. They found that many recollective and non-recollective sources of information can influence decision making about the occurrence of autobiographical events. The authors also note that alterations to belief in the occurrence for vivid memories can be based on inferential decisions, which are triggered by a variety of external forms of evidence, and notably by many different varieties of social feedback received from other people.

Clark, Nash, Fincham and Mazzoni (2012) studied the effects of social feedback on belief in occurrence and recollection for false memories for actions performed in the lab. Participants were instructed to imitate actions performed by an experimenter and were videotaped while doing so. Later, they were presented with a doctored video showing the experimenter performing actions that the participant never imitated. This produced high levels of false belief in occurrence and false recollection for these actions, and when belief and recollection ratings were taken again following debriefing about the doctored actions, belief ratings decreased more than recollection ratings. Thus, social feedback had a greater impact on the strength of the participants’ belief in occurrence for the false doctored events rather than for strength of recollection.

People can sometimes resist feedback provided by others about the occurrence of events, and resist altering their belief in the occurrence for an event even in the face of direct social contradiction (Sheen, Kemp, & Rubin, 2001). In some cases, however, people do reduce belief in occurrence in the face of social contradiction. This is demonstrated in nonbelieved memories, which are memories for events that people have reduced their belief that the event occurred; but the event continues to be experienced as having vivid recollective features (for example, vivid associated mental simulation is
accompanied by a subjective sense of re-experiencing the past) despite this reduction of belief in occurrence (Scoboria et al., 2014). Nonbelieved memories are associated with lower belief in occurrence and belief in accuracy ratings than believed memories (Scoboria & Pascal, 2016; Scoboria, Nash, & Mazzoni, 2017).

**Defining Belief in Accuracy and Belief in Occurrence**

There are at least two specific belief appraisals regarding the veridicality of remembering events that are discussed in the literature: Belief in occurrence, which is defined as the truth attributed to the occurrence of a past event (Mazzoni, Scoboria, & Harvey, 2010), and belief in accuracy, which is the belief in the degree to which what is recollected corresponds to the actual details of a prior event (Rubin, 2006). Recollection refers to the experiencing of a vivid episodic mental representations for events (Rubin, 2006). Measures of belief in occurrence, recollection, and belief in accuracy have been found to be empirically distinct (Scoboria, Talarico, & Pascal, 2015). Different sources of information and processes influence each of these appraisals, and the strength of the relationships between them varies depending on the type of autobiographical event(s) under study. In research studies when people are asked to report memories for past events, they tend to retrieve and describe believed memories that are strong in recollection, belief in occurrence, and belief in accuracy (Brewer, 1996; Scoboria & Talarico, 2013; Scoboria et al. 2014).

Appraisals of memory accuracy are thought to arise from cognitive processes that are distinct from those that produce recollection (Rubin, 2006). Distinct underlying influences have been established for judgements of occurrence, recollection, and accuracy (Scoboria & Pascal, 2016). Rubin, Schrauf and Greenberg (2003) provide data
that indicates recollection is predicted by perceptual imagery (visual, auditory), and emotional content of events, whereas accuracy is predicted by knowledge of event setting. Thus, accuracy and recollection appraisals arise from at least partly distinct underlying mechanisms. For example, recalling a vivid nonbelieved memory can result in a high belief in accuracy rating since the memory is vividly recollected, but without accompanying high belief in occurrence ratings since the memory is no longer completely believed to have genuinely occurred in the past.

**Feedback Can Affect Ratings of Event Occurrence**

Autobiographical memories provide the basis for forming a personal temporal schema (Larsen & Conway, 1997), which is one of the reasons why they are important to one’s sense of self. Because of this, individuals are sometimes reluctant to relinquish the ownership of a personal memory when told that the memory did not occur. Sheen, Kemp, and Rubin (2001) define disputed memories as memories for which there is a disagreement about who the memory belongs to. In their study, they examined an instance in which two twin sisters possessed a disputed memory about being sent home from school for wearing a skirt that was too short. Both sisters claimed that the event had happened to them and not the other, and they agreed that the event could have only actually happened to one of them. Sheen, Kemp, and Rubin (2001) suggest that people hold tightly onto memories that are central to defining who they are and that tie them to their sense of their own personal histories.

Two studies by Scoboria, Otgaar, & Mazzoni (2018) examined the effects of disconfirmatory social feedback made to correctly recalled memories for actions
performed in a laboratory setting. Challenging memories for correctly recalled actions (telling people that they did not perform actions that they did in fact perform) was associated with lower belief in occurrence and recollection ratings on average compared to non-challenged control items, with occurrence ratings affected to a greater extent than ratings of recollective features. They reported that challenges that were presented during the test caused more instances of memory defense, whereas challenges that occurred after the test produced more instances of reduction. Instances of memory defense occur when participants discount the feedback that they receive and maintain belief in occurrence, thus defending their memory. Reduction happens when participants show some degree of reduced belief in occurrence for a memory. The authors stated that what a person remembers and what they choose to report are at least partially determined by the reason that this remembering occurs in the first place, which is frequently affected by social factors. People sometimes find it difficult to completely relinquish belief for strongly-believed memories (Scoboria, Boucher & Mazzoni, 2014), but occasionally it occurs. It is generally difficult since people tend to rely on their memories, and when they are told that they have remembered something incorrectly, it may lead them to question or even second guess their ability to remember events. As previously discussed, autobiographical memories are extremely important to one’s concept of self (Rubin, 1988), and so changes to belief for strong and personally central autobiographical memories may lead to changes in self-views.

Scoboria, Nash, and Mazzoni (2016) noticed that while people tend to rate their belief for their nonbelieved memories as weaker than their original recollection, many nonbelieved memories continue to maintain some degree of belief in occurrence. A
variety of studies have placed the study of nonbelieved memories in relation to research on more typical believed autobiographical memories and to the phenomenon of false memory formation (Scoboria et al., 2014; Scoboria, Boucher, & Mazzoni, 2014; Otgaar, Scoboria & Mazzoni, 2014). Some studies have examined the creation of nonbelieved memories under laboratory conditions, which is necessary to gain experimental control and understand the conditions under which nonbelieved memories come to be; Otgaar, Scoboria & Smeets (2013); Scoboria, Otgaar & Mazzoni (2018). These studies have further demonstrated that belief in the occurrence for existing memories can be affected by feedback from others.

**Feedback can Affect Memory for Details**

As previously mentioned, one characteristic of autobiographical memory is that it is often influenced by social input (Echterhoff & Hirst, 2009). A study by Merckelbach, van Roermund, and Candel (2006) demonstrated that when a participant was accompanied by a confederate, they were more likely to incorporate this confederate’s recollection into their recall of a scene. The authors were particularly interested in examining the effects of providing misinformation that added incorrect details versus misinformation that denied correct details. Drawing on Loftus, Levidow, and Duensing (1992)’s discrepancy detection principle, which states that a person’s recollections are more likely to change if they do not detect the discrepancies between the original event and the misinformation, they proposed that it is generally easier to implant incorrect details into memory reports than it is to lead individuals to remove correct details. This is due to the fact that removing details requires providing misinformation that contradicts recollected details. Adding incorrect details can be done using misinformation that is
consistent with the script of the scene. Merckelbach, van Roermund and Candel (2006) report that denying correct details is as powerful as suggesting incorrect information.

These results are consistent with those of Wright (2001) and Gabbert (2006) who both proposed that misinformation that stems from a witness encountering a confederate who provides information that is inconsistent with what the participant recalls, can serve to erase details from memory thus altering subsequent reports. This social pressure that stems from someone unfamiliar disagreeing with the memory may cause a witness to decide to not report details that they may have otherwise included when providing their report in isolation. These authors also state that as far as free recall of details goes, suggesting erroneous details and/or denying correct details seem to possess a similar potential to alter memory.

Numerous studies have shown that different types of social input can also cause errors in eyewitness testimonies. In a classic study by Loftus, Miller and Burns (1978), it was demonstrated that when witnesses observe an event and they are provided with incorrect information following their observation, their memory for the event could be influenced. In this study, participants were presented with an array of slides depicting an automobile accident in which there was either a red stop sign or a yellow yield sign at the intersection. After seeing these slides, participants were asked to answer a series of questions about what they had seen. One of the questions contained either consistent or misinformation regarding the type of sign at the intersection. Participants that were asked the questions containing the erroneous information were found to be significantly less accurate in their memory of the event. These results are indicative of the participant falling prey to the misinformation effect, in which the questionnaire had essentially
altered their memories for the details within the event, demonstrating that feedback can affect participants’ memory for details.

The Distinction between Central and Peripheral Details

It is important to understand which details within memory reports may be more likely to be affected by feedback. In the eyewitness literature, it is often claimed that not all the details within witnessed scenes are remembered equally well. It has been suggested by multiple researchers (Christianson 1992; Heuer & Reisberg, 1992) that the memory for the gist (central details) of an event is better in comparison to memory for less relevant details that are less consistent with event scripts (peripheral details). Defining central and peripheral details is sometimes difficult because these details are determined by the goal and the context dependence of the scene. Context dependence refers to the phenomenon in which it is easier to retrieve memories when the retrieval context is similar at the time of encoding and retrieval (the ‘encoding specificity principle’; Tulving & Thompson, 1973) In one study, Godden and Baddeley (1975), instructed divers to learn lists of words in two environments: On dry land and underwater. They found that the divers best remembered words that were recalled in the same context that they were encoded.

In their Fuzzy Trace Theory, Brainerd and Reyna (2001) suggest that verbatim and gist aspects of memories exhibit a dissociation both during storage and during retrieval. This indicates that there is an important distinction in abstraction between things that are more “central” and “peripheral” to events. Some researchers have suggested a practical approach to the problem of identifying central and peripheral details.
within events. Since a definition that is appropriate for all contexts and situations is likely impossible, it becomes necessary to pick an interpretation of the event or a scene that is natural and appropriate to the people involved in the situation (Heuer & Reisberg, 1990). Central and peripheral details are determined by the ability of the detail to affect the meaning associated with the event. Details that, if changed, can result in fundamental change in the basic meaning of the event are considered to be central, whereas details that have no real impact on the meaning of an event are considered to be peripheral (Yegiyan & Lang, 2010).

For the purpose of this study, central details were determined to be anything to do with the central meaning or actions of the scene, whereas peripheral details were defined as details that did not contribute to the central actions. For example, in a scene “a girl making her bed”, central details included as the presence of the bed and that the actress moved a blanket and pillows. An example of a more peripheral details included the colour of the bedroom walls (a detail that, if changed, would have little impact on the overall meaning of the scene).

**Feedback May Differentially Affect Belief in Accuracy and Belief in Occurrence**

As previously mentioned, belief in occurrence, belief in accuracy, and recollection are theoretically distinct appraisals that contribute to the experience of autobiographical remembering (Scoboria, Talarico, & Pascal, 2014). There have been a number of studies that have demonstrated that belief in accuracy and belief in occurrence can be measured separately (for example, Scoboria & Pascal 2016; Scoboria, Boucher &
Mazzoni, 2014), but there have been few studies in which the distinction has been demonstrated experimentally.

Scoboria, Nash and Mazzoni (2016; Study 2) reported that nonbelieved memories vary in the extent to which belief in occurrence versus belief in accuracy appears to have been affected by the development of the nonbelieved memory. Nonbelieved memories are generally characterized by a degree of reduction in belief in occurrence, but some NBMs are characterized by higher and others by lower belief in accuracy. When examining different sub-types of nonbelieved memories, Scoboria, Nash & Mazzoni (2017) were able to sub-divide “classic” nonbelieved memories and “grain of doubt” nonbelieved memories based on relatively high or low belief in accuracy ratings. Classic nonbelieved memories were characterized by strong recollection associated with substantially lower autobiographical belief, whereas grain of doubt nonbelieved memories were comprised of belief in occurrence ratings that were substantially higher than classic nonbelieved memories. These findings further demonstrated that belief in the occurrence and belief in the accuracy for the same memory can differ, further documenting their distinction. This research on naturally occurring nonbelieved memories is correlational, so research is needed to bring experimental control in order to better understand the conditions under which different manipulations affect belief in occurrence versus belief in accuracy ratings.

Recently, this gap in the literature in which no one had developed a method to allow for experimental control over the occurrence and content (details within) remembered events when exploring both event occurrence and event details when a person’s memory is challenged has been filled. Many laboratory-based experimental
approaches that have been frequently used to examine memory are limited because they
do not allow for the natural narrative structure and narrative coherence that characterizes
autobiographical memories (Rubin, 2006). Many laboratory-based approaches to
studying memory use simple stimuli, such as word cues, that do not necessarily elicit
reports with the narrative structure or level of detail that is associated with genuine
autobiographical memories.

Scoboria and Korcsog (2017) created stimuli that contained a greater degree of
narrative structure by recording 60 scenes of an actress performing simple tasks. By
doing this, it allowed all participants to be exposed to the same scenes, providing
experimental control when exploring both ratings of event occurrence and ratings of the
accuracy of event details when feedback about memory reports was later provided. They
found that when people are challenged about event occurrence but are provided positive
feedback about event details, belief in occurrence ratings decreased but belief in accuracy
ratings remained unchanged. When participants were challenged (given negative
feedback) about scene details but given positive feedback about scene occurrence; belief
in accuracy ratings decreased and belief in occurrence ratings increased.

The current study aimed to further examine this dissociation by focusing on
providing feedback about the accuracy of participants’ descriptions of specific scene
details, with the goal of providing further evidence that the appraisals of occurrence and
accuracy are distinct and influenced by at least partially non-overlapping underlying
processes.
Auditory Memory is Inferior to Visual Memory Accuracy

It has been demonstrated that visual memory for scenes is very robust (Shepard, 1967; Pezdek et al., 1989). Cohen, Horowitz and Wolfe (2009) explored whether an analogous ability exists within the auditory domain. Participants listened to a series of audio recordings with no visual stimuli, or to audio recordings with pictures associated to them and then were asked to distinguish old visual and auditory clips from new ones. In every situation, whether it was a complex auditory scene such as talking in a pool hall or an isolated auditory scene such as a dog barking, auditory memory was systematically inferior to visual memory when the clip was paired with a picture. Based on presentation of auditory and visual lists of words, Penney (1988) reported that visual presentation produced higher recall and recognition than auditory presentation. These results agree with the separate streams hypothesis (Milner & Goodale, 1992), which states that there are different kinds of input processes for auditory and visual items.

A study by Pezdek and Stevens (1984) suggests that information that is seen as a video is more salient and easier to remember than auditory information. They determined this by exposing children to experimental segments in which audio and video stimuli were and were not from the same segment, the video was presented alone, the audio was presented alone, or a mismatched condition in which video or audio were presented with a mismatched video or audio segment. In the mismatched conditions (segments in which audio and video were not from the same segment) they determined that memory was reduced for auditory information more-so than visual information by use of comprehension and recognition tests. Because of this, they state that video information is
more salient and memorable than auditory material, and thus conclude that visual information is easier to remember than auditory information.

**Current Research**

The preceding literature review demonstrates the impact that social feedback can sometimes have on memory for events. When memories are challenged, the social input can lead to changes in belief in the occurrence and/or belief in the accuracy ratings for the memory.

The first research question asked is whether providing different types of feedback about memory for the details within experimentally presented scenes will lead to differing changes in belief in occurrence and belief in accuracy scores.

The second, more central hypothesis of this study is that targeting belief in accuracy appraisals for specific event details will lead to changes in overall accuracy ratings for autobiographical events but will not affect occurrence ratings. It is expected that by providing disconfirmatory feedback to participants about their recollection of specific scene details, that belief in accuracy ratings will decrease more than in Scoboria and Korcsog’s (2017) protocol, in which belief in accuracy was targeted by telling participants that they remembered either more than 90% or less than 50% of the details from target scenes correctly. By focusing on specific details in this study, it is hypothesized that any ambiguity associated with stating “more than 90%” and “less than 50%” will be eliminated, since there was a possibility that participants could have interpreted these messages as “10% wrong” or “50% right” in their study. This should strengthen the effect on belief in accuracy ratings by providing more absolute feedback about detail accuracy.
The third hypothesis is that when participants receive negative feedback (when they are told that they incorrectly recollected a central detail) with no explanation about targeted details, belief in accuracy ratings would decrease and belief in occurrence ratings would not be affected. When participants receive negative feedback with an explanation (e.g., the sandwich had mustard not ketchup) belief in accuracy ratings should decrease to a greater extent than if no explanation is given. This is because prior research on the misinformation effect (Loftus et al., 1978) has demonstrated that people tend to incorporate plausible details into their memories for scenes, thus making the feedback more believable. As well, it is also hypothesized that when video recorded scene details are challenged the decrease in belief in accuracy ratings will be less than when auditory scene details are challenged. This is because participants tend to remember video-recorded scenes more than audio-recorded scenes (Scoboria & Korcsog, 2017).

CHAPTER 2

Method A: Pilot Study

Participants

19 participants were recruited through the Participant Pool at the University of Windsor for the study piloting (79% female, 74% Caucasian; $M_{age} = 22.84$, $SD = 8.65$, range 18-56). All participants received academic credit for completing the study. All participants apart from those who had visual or auditory impairments were eligible to participate.
Measures and Materials

**Belief in occurrence.** Two items derived from Scoboria, Talarico, & Pascal (2015) were included to assess belief in occurrence before and after the participant was challenged about their memory for the details within the targeted scenes (see Appendix C). The items are measured using 7-point Likert-style scales and are averaged to calculate the scale score.

**Belief in accuracy.** Two items derived from Scoboria, Talarico, & Pascal (2015) were included to assess belief in accuracy (see Appendix C) prior to and following feedback. The items are measured using 7-point Likert-style scales and are averaged to calculate the scale score.

**CSIV.** The Circumplex Scale of Interpersonal Values (Locke, 2000) measures trait tendencies regarding need for power and affiliation in relationships. Participants responded to 32 items on 10-point scales, indicating the degree to which they act in that manner in social situations. A high score on this scale means that the participant is highly confident in the particular interpersonal trait in question, and items are scored on a scale of (0) “I am not at all confident that…” to (10) “I am absolutely confident that…”. A sample item includes “I can express myself openly”. This measure was included as a filler activity and for exploratory purposes.

**Distress Tolerance.** The 14-item Distress Tolerance scale by Leyro, Bernstein, Vujanovic, McLeish, and Zvolensky (2011) measures the perceived capacity to tolerate distress from a multidimensional framework. A high score on this scale indicates that the participant does not tolerate distress well, and items are scored on a scale of (1) “Strongly disagree” to (5) Strongly agree. A sample item includes “Feeling distressed or upset is
unbearable to me”. This is true for all items except #6 “I can tolerate being distressed or upset as well as most people” which will be reverse-coded. This measure is included as a filler activity and for exploratory purposes.

**Tolerance for disagreement.** This validated 15-item Tolerance for Disagreement Scale by Teven, McCroskey and Richmond (1998) measures the degree to which an individual can tolerate other people disagreeing with what the individual believes to be true. A high score on this scale for items 1, 2, 5, 7, 8, 14, and 15 indicates that the participant is tolerant to disagreement, whereas a high score on this scale for items 3, 4, 6, 9, 10, 11, 12, and 13 indicates the participant is not tolerant to disagreement. Items are scored on a scale of (1) “Totally disagree” to (5) “Totally agree”. The sample items include “disagreements are generally helpful” and “I don’t like to be in situations where people are in disagreement”. This measure is included as a filler activity and for exploratory purposes.

**Event Recordings**

A JVC Everio GZ-HM200 Dual SD High Definition Camcorder was used to record the videos used in this study, and an ASUS Zenbook UX303UA-DH51T Intel i5 computer was used to record all of the sound recordings used in this study. Each scene depicts the same actress, a 15-year old girl, who gave permission for the recordings to be used. The scenes were kept relatively similar, meaning that they all consisted of an actress doing something that was easy to understand, and she wore the same clothing in each scene. Each scene is less than 35 seconds long, and all are relatively simple; consisting of a minimum of four steps. All items used in the scenes were common household objects. A list of all scenes presented is included in Appendix A and B, with a
sample being “making a sandwich”. A sample of what one of the scenes looked like is found in Figure 1, and a transcription of the text from one of the auditory scenes is provided in Appendix F. Sixty scenes were presented to each participant, 30 as silent videos and 30 as audio recordings.

Procedure

**Session 1.** After consenting to participate, the participant was seated in front of a computer with headphones and watched 30 silent videos and listened to 30 audio recordings of scenes of an actress performing routine activities (see Appendix A). These recordings alternated randomly between video and audio scenes until all 60 scenes were presented, and there were two possible conditions in which the video and audio recordings were counterbalanced (participants in condition A received one set of 30 audio and 30 video recordings, and participants in condition B received the opposite set of audio and video recordings). The participant was told that the audio recordings were a prior participant’s description of what was happening in the scene they were watching, and to close their eyes and imagine the scene unfolding.

**Session 2 (one week after Session 1).** The second session was divided into two parts: (1) The initial recognition phase and (2) The feedback phase. During the initial recognition phase, participants completed a memory recognition test composed of 90 items (the 60 scenes in Appendix A that were actually presented and the 30 distractor scenes in Appendix B). First, they were read a brief description of a scene and were asked if the scene was presented to them during Session 1 (for example, “were you presented with a scene of a girl making a sandwich in session 1?”). If the participant responded ‘yes’, they were asked if the scene was watched as a video or heard as an audio
description; the participant was then asked to give a detailed description about what they remembered from the scene. The researcher recorded the entire initial recognition phase and informed the participant that their recording was only to be used to check their responses and that no one apart from the researchers would hear their responses. Participants then rated all scenes on belief in occurrence and belief in accuracy.

After the initial recognition phase, the researcher informed the participant that they needed to leave to prepare materials for the next part of the study. During this 15-minute time period, the participant completed the filler measures (Distress Tolerance; Tolerance for Disagreement; CSIV).

The researcher then returned and provided feedback about a sub-set of 10 items from the test. This portion of the pilot study was identical to Scoboria and Korcsog (2017) and was not used for subsequent analyses. The ten items were randomly selected from amongst those that participants correctly recollected as presented during session 1. For two items, the participant was told that they were correct in saying that they saw the scene as a video and remembered more than 90% of the details correctly (+/+). For two items, the participant was told that they were incorrect and did not actually see the event as a video, but that they remembered 90% or more of the details correctly from the audio recording of the scene (-/+). For two items the participant was told that they correctly identified the event as being presented as a video, but that they recalled at least half of the details incorrectly (+/-). For two items the participant was told that they did not see the event as a video, and that they recalled at least half of the details incorrectly (-/-). There were also two control items in which the researcher did not provide feedback.
Participants re-rated belief in occurrence and belief in accuracy immediately after each item was re-presented.

After the completion of the study, participants were read a debriefing statement and the researcher explained the purpose of the study and why deception was necessary. The participant was informed of which items the researcher had deceived them for, that the recordings were not actually from a prior participant, and that this study does not indicate anything about the accuracy of their memory in general.

After completing this piloting procedure, the audio recordings of the event descriptions were transcribed to text in order to determine which details were most often accurately recalled by participants in preparation for the main study.

**Determining Central Details to be Challenged**

Research assistants transcribed participant descriptions of scenes word-for-word. For each scene, all participant descriptions were read, and key details that were mentioned across participants were noted. These details were judged to be central to the storyline of the scene and could not have been about the actress’s appearance since this remained constant throughout all 60 scenes. Central details were defined as details that pertained to the storyline of the scene, that were most often mentioned by participants when they described the scene. For example, in the scene of a girl making a sandwich, anything to do with the act of making the sandwich could have been counted. A minimum of 3, and a maximum of the 4 most often mentioned central details were noted in preparation for the feedback portion (Part 2) of the study. For this scene, 44% of participants in the pilot study mentioned ketchup on the sandwich, 78% of participants mentioned cheese, and 33% mentioned ham. See table 1 for additional examples of
details that were selected. If mentioned, these are examples of details about which participants could receive feedback. Each target detail was paired with an alternative detail that could be included as an explanation as to what the correct answer when negative feedback about the detail was provided. The alternative details were all plausible, that fit with the storyline of the scene. For instance, an example of an alternate detail to ‘ketchup’ was ‘mustard’, because it is a condiment that could have easily been put on a sandwich instead.
Table 1.

*Examples of central details*

<table>
<thead>
<tr>
<th>Scene Prompt</th>
<th>Target Detail #1</th>
<th>Target Detail #2</th>
<th>Target Detail #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A girl dressing a doll</td>
<td>Doll had blonde hair (57%)</td>
<td>Sitting at a table (71%)</td>
<td>Skates (29%)</td>
</tr>
<tr>
<td>A girl bowling</td>
<td>On table (50%)</td>
<td>Three different colours of pins (13%)</td>
<td>Missed the pins the first time (30%)</td>
</tr>
<tr>
<td>A girl brushing and braiding her hair</td>
<td>Bathroom (56%)</td>
<td>In front of mirror (56%)</td>
<td>Braid down the right side (0%)</td>
</tr>
<tr>
<td>A girl making a salad</td>
<td>Lettuce (83%)</td>
<td>Cheese (67%)</td>
<td>Bowl (67%)</td>
</tr>
</tbody>
</table>

*Note.* This table depicts some examples of the target details chosen for each scene prompt. There were 3-4 target details provided for each scene, and the percentage of participants that mentioned these details during the pilot study is provided in the brackets.
Method B: Challenging Target Details

Participants

48 participants were recruited through the Psychology participant pool for the main study (81% female, 63% Caucasian; $M_{age} = 22.23$, $SD = 5.50$, range 18-43). All participants received academic credit for completing the study. All participants apart from those who had visual or auditory impairments were eligible to participate.

Measures and Materials

Except as otherwise described, the materials and measures were the same as those used for the Pilot study.

Procedure

Session 1. After consenting to participate, the participant was seated in front of a computer with headphones and was asked to watch a series of 30 silent videos and to listen to 30 audio recordings of scenes of an actress performing routine activities (see Appendix A). The mode of presentation was counterbalanced among participants. The recordings alternated randomly between video and audio scenes until all 60 scenes were presented. The participant was told that the audio recordings were a prior participant’s description of what was happening in the scene they were watching, and to close their eyes and imagine the scene unfolding.

Session 2 (one week after session 1). Session 2 was divided into two parts: (1) The initial recognition phase and (2) The feedback phase.
During the initial recognition phase, participants completed a recognition test composed of 90 items (30 presented in Part 1 as video, 30 audios, and 30 presented in Part 1 as audio, and 30 distractor items not presented in Part 1). First, they were read a brief description of a scene and were asked if the scene was presented during Session 1. If yes, they were asked if the scene was watched or heard; the participant was then asked to give a detailed description about what they remembered from the scene. The researcher noted details (those determined during the pilot study) that had been accurately recalled from the scene. The researcher stated that they were recording this part of the study to ensure that it was plausible that they would be able to provide feedback about details during the feedback phase. The participant was then asked to rate belief in accuracy and belief in occurrence for that scene.

After the memory test, the researcher then left the room for 15 minutes and informed the participant that this was so that they could prepare materials for the next part of the study. During this time, the participant completed the filler measures (Distress Tolerance; Tolerance for Disagreement; CSIV).

The researcher then returned and provided feedback about a sub-set of 8 items from the test. For 2 items (one presented as a video, and one presented as an audio recording), participants were told that they correctly recalled a certain detail (chosen from correctly recollected details from initial recognition phase). For example, “you said that the doll was wearing a pink dress, and you were correct.” For 2 items that were correctly recalled (one presented as a video, and one presented as an audio recording) participants were told that they incorrectly recalled a certain detail but will not be given feedback about what the correct answer is. For example, “in the scene of a girl dressing a doll, you
said that the doll was wearing a pink dress, you were incorrect.” For 2 items that were correctly recalled (one presented as a video, and one presented as an audio recording), participants were told that they incorrectly recalled a certain detail and were given feedback about what the correct answer was. For example, “in the scene of a girl dressing a doll, you said that the doll was wearing a pink dress, you were incorrect. The doll was wearing a blue dress.” For these scenes, the pre-determined alternative details were used as the explanation in order to keep the feedback constant among participants. There were 2 control items in which the researcher did not provide feedback. Please see figure 2 for the exact script of the different types of feedback. Participants then re-rated the belief in occurrence and belief in accuracy items immediately after each item was re-presented. If participants did not accurately recollect enough audio-recorded scenes, the researcher challenged additional correctly identified video-recorded scenes.

After the completion of the study, participants were read a debriefing statement and the researcher explained the purpose of the study and why deception was necessary. The participant was informed of which items the researcher told them that they were incorrect in their memory for, that the recordings in session 1 were not actually from a prior participant, and that this study does not indicate anything about the accuracy of their memory in general.

CHAPTER 3

Results

Positive and negative feedback about the accuracy and the source of recall were examined for scenes that were seen as a video between groups. The analysis included the
examination of the contrasts between pre- and post-scores within the groups of items that received the feedback, and between the items that received feedback and the control items.

**Analysis of Belief in Accuracy Ratings for Video Scenes**

Belief in accuracy scores are presented in Table 2 and in Figure 3. There were no statistically significant differences between the within-subjects groups prior to the manipulation. Ratings for the control items did not significantly change upon re-rating; Mean difference = .03 [95% CI -.18, .22]; \( d = .02 \).

When given positive feedback about a detail, belief in accuracy ratings increased significantly by an average of 0.54 [95% CI .33, .77]; \( d = .41 \). When given negative feedback about a detail but no feedback about the correct answer, belief in accuracy ratings decreased significantly by an average of -0.97 points [95% CI -.57, -1.33]; \( d = -.72 \). When given negative feedback about a detail and an explanation about what the correct answer, belief in accuracy ratings decreased by an average of -.98 points [95% CI -.56, -1.41]; \( d = -.65 \).

**Analysis of Belief in Occurrence Ratings for Scenes Presented as a Video**

Belief in occurrence scores are provided in Table 3 and in Figure 3. There were no statistically significant between group differences prior to the manipulation. Belief in occurrence ratings for the control items did not change upon re-rating; mean difference = 0.04 [95% CI -.23, .26]; \( d = 0.03 \).

When participants were given positive feedback about correctly recalling a detail, belief in occurrence scores increased significantly by 0.41 points [95% CI .22, .63]; \( d = .46 \). When participants were given negative feedback about a detail but were not given an
explanation as to the correct answer, belief in occurrence scores did not change significantly, mean difference of -0.22 [95% CI, -.61, .09]; $d = -.20$. When given negative feedback about a detail and an explanation, belief in occurrence scores did not change significantly; Mean difference = -0.14 [95% CI, -.56, .24]; $d = -.11$. 
Table 2.  
Belief in accuracy scores before and after feedback for scenes presented as a video.

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>Average Scores Before Feedback</th>
<th>Average Scores After Feedback</th>
<th>Average Change Score [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>5.46</td>
<td>5.49</td>
<td>0.03 [-.18, .22]</td>
</tr>
<tr>
<td>Positive</td>
<td>5.49</td>
<td>6.04</td>
<td>0.54* [.33, .77]</td>
</tr>
<tr>
<td>Negative</td>
<td>5.38</td>
<td>4.41</td>
<td>-0.97* [-.57, -1.33]</td>
</tr>
<tr>
<td>/No Explanation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>5.65</td>
<td>4.67</td>
<td>-0.98* [-.56, -1.41]</td>
</tr>
<tr>
<td>/Explanation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Types of feedback are denoted by positive (+) and negative (-) feedback, and statistically significant change in pre-post ratings are denoted by an asterisk (*).
Table 3.

Belief in occurrence scores before and after feedback for scenes presented as a video.

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>Average Scores Before Feedback</th>
<th>Average Scores After Feedback</th>
<th>Average Change Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>6.23</td>
<td>6.27</td>
<td>0.04 [-.23, .26]</td>
</tr>
<tr>
<td>+</td>
<td>6.34</td>
<td>6.75</td>
<td>0.41* [.22, .63]</td>
</tr>
<tr>
<td>Negative/No Explanation</td>
<td>6.37</td>
<td>6.15</td>
<td>-0.22 [-.61, .09]</td>
</tr>
<tr>
<td>Negative/Explanation</td>
<td>6.38</td>
<td>6.24</td>
<td>-0.14 [-.56, .24]</td>
</tr>
</tbody>
</table>

*Note: Types of feedback are denoted by positive (+) and negative (-) feedback, and statistical significance are denoted by an asterisk (*).
Recognition Accuracy

Accuracy of recognition for the presentation of visual scenes was strikingly better than recognition of audio-recorded scenes (see Table 4). On average, participants correctly identified video recorded scenes as “seen” in 53% of cases. This means that on average, participants correctly identified on average 15.92 (condition A) and 15.83 (condition B) out of the 30 video-recorded scenes that were prompted in Part 1 of Session 2 of the study. In order to receive feedback, participants had to correctly recognize at least 4 video-recorded scenes (stating correctly that the scene was presented as a video), and then correctly identify one of the targeted central details in their description of the scene. Two participants correctly identified just 3 scenes as “seen” and mention one of the targeted central details in their description of the scene. Both participants did not receive the positive feedback condition. Their data was included in the analyses for the other conditions, for which data was available.

On average, participants correctly recognized audio recorded scenes as previously “heard” in just 15% of cases. They correctly recognized 4.88 (condition A) and 3.91 (condition B) audio recorded scenes on average out of the 30 prompts that were given in part 1 of session 2 of the study. Just 16 participants correctly recognized at least 4 audio-recorded scenes as “heard” during part 1 of the study and correctly identified one of the target details.

Participants were very accurate at determining that the non-presented scene prompts were in fact not presented (see Table 4). They correctly determined, on average, that these scenes had not been presented in 94% of cases, as demonstrated by the correctly
identifying 28.32 (condition A) and 28.17 (condition B) out of 30 possible not-presented scenes.

**Analysis of Audio-Recorded Scenes**

Because of the small number (16 out of 48) of participants that correctly recalled at least 4 audio-recorded scenes, challenges made to audio-recorded scenes were examine, but due to the small sample size available no conclusions were made. Positive and negative feedback about the accuracy and the source of recall were examined for scenes that were heard as an audio-recording between groups. The analysis included the examination of the contrasts between pre- and post-scores within the groups of items that received the feedback, and between the items that received feedback and the control items.
Table 4.

*Recognition accuracy.*

<table>
<thead>
<tr>
<th>Type of Scene</th>
<th>Condition A (# correct/30)</th>
<th>Condition B (# correct/30)</th>
<th>Average (# correct/30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video</td>
<td>15.92 (53%)</td>
<td>15.83 (53%)</td>
<td>15.88 (53%)</td>
</tr>
<tr>
<td>Audio</td>
<td>4.88 (16%)</td>
<td>3.91 (13%)</td>
<td>4.40 (15%)</td>
</tr>
<tr>
<td>Not Presented</td>
<td>28.32 (94%)</td>
<td>28.17 (94%)</td>
<td>28.25 (94%)</td>
</tr>
</tbody>
</table>

*Note:* Average number of correctly identified scenes during Part 1 of Session 2, prior to providing feedback to participants. Condition A and B designate which counterbalanced order of video and audio recordings they were presented.
Analysis of Belief in Accuracy Ratings for Scenes Presented as an Audio Description

Belief in accuracy scores are presented in Table 5 and in Figure 4. There were no statistically significant differences between the within-subjects groups prior to the manipulation. Ratings for the control items did not significantly change upon re-rating, Mean difference = .09 [95% CI -.62, .80]; $d=.085$.

When given positive feedback about a selected detail within the scene, belief in accuracy ratings increased by an average of 1.25 [95% CI .68, 1.82]; $d=.84$. When given negative feedback about a selected detail within a scene with no feedback about the correct answer, belief in accuracy ratings did not significantly change, and had an average difference of 0.19 points [95% CI -.39, .77]; $d = .12$. When given negative feedback about a selected detail within a scene, that included an explanation about what the correct answer was, belief in accuracy ratings did not significantly change, and had a mean difference of -.50 points on the scale [95% CI, -1.3, .30]; $d = .30$. 
Table 5.
Belief in accuracy scores before and after feedback for scenes presented as an auditory description.

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>Average Score Before Feedback</th>
<th>Average Score After Feedback</th>
<th>Average Change Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>4.44</td>
<td>4.53</td>
<td>0.09 [-.62, .80]</td>
</tr>
<tr>
<td>+</td>
<td>4.42</td>
<td>5.67</td>
<td>1.25* [.68, 1.82]</td>
</tr>
<tr>
<td>-/No Explanation</td>
<td>3.63</td>
<td>3.81</td>
<td>0.19 [-.39, .77]</td>
</tr>
<tr>
<td>-/Explanation</td>
<td>4.44</td>
<td>3.94</td>
<td>-0.50 [-1.3, .30]</td>
</tr>
</tbody>
</table>

Note: Types of feedback are denoted by positive (+) and negative (-) feedback, and significance is denoted by an asterisk (*).
Analysis of Belief in Occurrence Ratings for Scenes Presented as an Audio Description

Belief in occurrence scores for the two rating items are provided in Table 6 and in Figure 4. There were no statistically significant differences between the within-subjects groups on belief in occurrence ratings prior to the manipulation. Belief in occurrence ratings for the control items did not change upon re-rating. Mean difference = 0.03 [95% CI, -.41, .47]; $d = 0.02$.

When subjects were given positive feedback about the accuracy of their recollection, belief in occurrence scores increased by 0.84 [95% CI, .29, 1.39]; $d = .72$. When participants were given negative feedback about the accuracy of their recollection but were not given an explanation as that what the correct answer was, belief in occurrence scores did not change significantly and had a mean difference of 0.53 [95% CI, -.05, 1.11]; $d = .36$. As well, when participants were given negative feedback about the accuracy of their recollection and were given an explanation as to why, belief in occurrence scores did not significantly change. Mean difference = 0.44 [95% CI, -.27, 1.15]; $d = .48$. 

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Table 6.  
Belief in occurrence scores before and after feedback for scenes presented as an auditory description.

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>Average Scores Before Feedback</th>
<th>Average Scores After Feedback</th>
<th>Average Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>5.41</td>
<td>5.44</td>
<td>0.03 [-.41, .47]</td>
</tr>
<tr>
<td>+</td>
<td>5.78</td>
<td>6.63</td>
<td>0.84* [.29, 1.39]</td>
</tr>
<tr>
<td>-/No Explanation</td>
<td>5.22</td>
<td>5.78</td>
<td>0.53 [-.05, 1.11]</td>
</tr>
<tr>
<td>-/Explanation</td>
<td>5.81</td>
<td>6.25</td>
<td>0.44 [-.27, 1.15]</td>
</tr>
</tbody>
</table>

Note: Types of feedback are denoted by positive (+) and negative (-) feedback, and significance is denoted by an asterisk (*).
Summary of Findings

In summary, when participants receive negative feedback about the accuracy of their memory for scenes presented as a video, belief in accuracy scores significantly decreased but belief in occurrence scores were not affected. There were no significant differences in the effect between the two types of negative feedback provided about the accuracy of specific details (challenge with or without an explanation as to the correct response). Providing positive feedback about accuracy (telling participants they were correct about a central detail) significantly increased belief in occurrence and belief in accuracy scores.

When participants received negative feedback about the accuracy of their memory for scenes presented as an auditory description, neither belief in accuracy nor belief in occurrence significantly changed. Providing positive feedback about accuracy significantly increased both belief in occurrence and belief in accuracy scores. However, due to the low number of participants who were challenged for auditory scenes, no conclusions can be made.

CHAPTER 4

Discussion

This study aimed to further demonstrate the theoretical dissociation between belief in occurrence and belief in accuracy appraisals when people are challenged about their memory for events presented under controlled laboratory conditions with scenes designed to contain a narrative structure. Scoboria and Korcsog (2017) provided the first controlled demonstration of this dissociation, and through the current study the goal was to provide further evidence for this distinction by looking at the effects of feedback about
specific event details on belief in accuracy and belief in occurrence ratings. The results of this study revealed significant decreases in belief in accuracy scores when participants were challenged about their memories for the details within scenes, but these challenges did not affect belief in occurrence scores.

**The Dissociation of Belief in Accuracy and Belief in Occurrence**

In Scoboria and Korcsog (2017), participants were given different types of feedback about event occurrence and memory accuracy. When given positive feedback about occurrence and negative feedback about the accuracy of their memories, an increase in belief in occurrence and a decrease in belief in accuracy ratings resulted. When participants were given negative feedback about belief in occurrence and positive feedback about the accuracy of their memory, belief in occurrence ratings decreased and there was no significant change in belief in accuracy ratings. These findings were the first to suggest that belief in accuracy and belief in occurrence could be manipulated in opposite directions based on predictions about the type of information that theoretically contributes relevant to each judgement. These findings coincide with those of Scoboria, Nash and Mazzoni (2016; Study 2) in which they demonstrated that belief in occurrence and belief in accuracy are affected differently for nonbelieved memories.

The current study aimed to also examine one potential limitation in Scoboria and Korcsog’s (2017) methodology in which participants were told that they didn’t see a scene, but they heard it to demonstrate a challenge to belief in occurrence. This was a limitation because the items intended to measure belief in occurrence instead targeted source monitoring (visual versus auditory information) rather than belief in occurrence. In the current study, participants did not receive feedback about event occurrence at all,
so belief in occurrence was not expected to change under any condition. As well, in the prior study participants were told that they either remembered more than 90% or less than 50% of the details within a scene correctly, leaving room to interpret these values as 10% wrong or 49% or less of the details correct. To address this potential limitation, the current study targeted central scene details in order to provide participants with more direct feedback regarding scene accuracy.

The Outcomes of Negative Feedback

It was hypothesized that when participants receive negative feedback about the accuracy of their description of the scene, (they were told that they recalled a central detail incorrectly), that belief in accuracy ratings would decrease, and that belief in occurrence ratings would remain unchanged. This was in fact the case: When participants received negative feedback about a certain central detail that they had mentioned, belief in accuracy ratings significantly decreased, and belief in occurrence scores remained statistically the same. In this study there were two types of negative feedback that participants received; negative feedback with no explanation and negative feedback with an explanation. The reason for this was to examine the hypothesis that when given an explanation about what the correct answer was, belief in accuracy scores should decrease further, since it provides a plausible detail to fill the gap that the negative feedback had left. It was found however, that providing this detail did not influence belief in accuracy scores any further than when participants were not given an explanation.

The Outcomes of Positive Feedback

It was hypothesized that when providing positive feedback about memory accuracy, belief in accuracy and belief in occurrence scores would increase. The reason
for this is because by telling the participant that they were correct in their recollection of a certain detail within a scene, it solidifies any doubt that the scene existed. The findings demonstrated that both belief in accuracy scores and belief in occurrence scores did in fact increase.

**Strengths and Limitations**

This study was designed to target central details within scenes with the goal of causing fluctuations in belief in accuracy ratings after different types of feedback. This goal was achieved, demonstrating that the details chosen for feedback were likely central in representing the gist of the scene, which is how Christianson (1992) and Heuer & Reisberg, (1992) define central details. It is theorized here that because these details accurately represented the gist of the scene, there was a significant decrease in belief in accuracy scores when the details were challenged.

The most notable limitation of this study was the lack of memory accuracy for auditory scenes. For most participants, it was impossible to provide feedback about auditory scenes because there were not enough of them that were remembered from part 1 of the study (15% accuracy across both conditions). This replicates Scoboria and Korcsog (2017), where participants were only accurately recalling audio-presented scenes as presented (as audio) in 21.5% of cases. Because of the low recollection rate, audio-recorded scenes were not included in the findings of this study. Another limitation of the study is that although the target details that were chosen seemed to decrease belief in accuracy ratings, choosing one detail within a scene arguably does not direct participants to appraise the entire scene. In the prior protocol (Scoboria & Korcsog, 2017), participants were told that they remembered more than 90% or less than 50% of the
details within scenes correctly. This method lead to a larger decrease in scores (-1.58 points on average), suggesting that the effect associated with this method of challenging memory accuracy is stronger.

Another limitation of the study was that the sample of participants was 81% female. One study by Pauls, Petermann, and Lepach (2013) suggests that women tend to outperform men on auditory memory tasks, whereas males have a higher performance on visual memory tasks. This could suggest that due to the low number of male participants in this study, the findings may not be generalizable to the entire population. It would be helpful in the future to have a larger sample size, so as to have a larger number of male participants to determine whether or not there is a significant difference between the genders.

**Future Directions and Implications**

By use of both Scoboria and Korcsog’s (2017) study and the current study, it is now clear as to which types of feedback more effectively target belief in accuracy and belief in occurrence. Potential future directions include providing feedback about accuracy that encompasses the entire scene rather than just one detail deemed to be central, and feedback about occurrence that more directly challenges whether scenes were presented (“the scene was/was not presented”). These methods are needed to fill the limitations within this study and in Scoboria and Korcsog (2017), in order to most accurately target belief in accuracy and belief in occurrence appraisals in a laboratory setting.

This study has therefore provided further evidence that belief in occurrence and belief in accuracy can be dissociated when providing negative feedback about central
scene details. Future studies should address the issue of the audio-recorded scene inaccuracy to more completely demonstrate this dissociation across multiple sensory modalities. This could be remedied by perhaps including fewer scenes in total, or by conducting studies that include only audio recorded scenes. The audio-recorded scenes could also include a text transcription to be read while the actress is speaking to provide another form of encoding.

Additionally, future directions for this line of research could include further manipulation of belief in the occurrence and belief in accuracy of the recollected scenes. In order to manipulate occurrence, it would be interesting to see whether or not occurrence scores would be affected if a distractor, such as a series of beeps, was added to the encoding phase of the study. This may provide lower initial belief in occurrence ratings and could make it more plausible to participants that they did not see scenes that they actually did see. This could also affect pre-feedback belief in accuracy scores since while distracted, they may not be paying attention as closely to the details of the scene.

**Conclusions**

Past research has described the dissociation between belief in accuracy and belief in occurrence but has not done so in a controlled environment that uses stimuli with narrative structure that resembles natural autobiographical memories. This study utilized Scoboria and Korcsog’s (2017) method in which simple scenes were presented to participants in a controlled environment. This permitted the examination of belief in accuracy and belief in occurrence appraisals before and after external feedback was provided about correctly recalled scenes.
Previously, there has been a lack of research regarding the use of narratively
structured procedures that consist of the participant being exposed to controlled
storylines. Both Scoboria and Korcsog (2017) and the current study have allowed for the
examination of appraisals about entire events at the same time as appraisals within
events, thus paving the way to fill the gaps of the previously mentioned experimental
approaches.
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Figure 1. Examples of simple scenes presented to the participant as a video. The top four pictures represent the scene “a girl doing dishes”, the middle four represent “a girl hitting a baseball with a bat” and the bottom four represent “a girl making a sandwich”.
**Feedback about scene details**

<table>
<thead>
<tr>
<th>Positive (+)</th>
<th>In the scene _______, you were correct in saying __________. <em>hand over affect rating form</em>. Now, Please re-rate this scene.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative with no explanation (-/NE)</td>
<td>In the scene _______, you were incorrect in saying __________. <em>hand over affect rating form</em>. Now, Please re-rate this scene.</td>
</tr>
<tr>
<td>Negative with an explanation (-/E)</td>
<td>In the scene _______, you were incorrect in saying __________. The correct answer was __________. <em>hand over affect rating form</em>. Now, Please re-rate this scene.</td>
</tr>
<tr>
<td>Control (0)</td>
<td>Please rate the scene __________. <em>hand over affect rating form</em>.</td>
</tr>
</tbody>
</table>

*Figure 2. A pictorial depiction of the types of feedback given to the participants.*
Figure 3. This graph demonstrates the dissociation of belief in accuracy from belief in occurrence for scenes presented to participants as a video. The types of feedback are presented on the X-Axis, and the average changes of the pre- to post- scores are on the Y-Axis. 95% confidence intervals are included.
**Figure 4.** This graph demonstrates the effects of providing different types of feedback about participants’ accuracy of their recollections on appraisals of belief in accuracy and belief in occurrence for scenes presented as an audio description. The types of feedback are presented on the X-Axis, and the average changes of the pre- to post- scores are on the Y-Axis. 95% confidence intervals are included.
## APPENDICES

### Appendix A: Recorded Scenes

Each of these 60 scenes were under 35 seconds long and were comprised of at least 4 distinct steps. There was a video recorded version of each scene, and an audio recorded version in which a research assistant described aloud what they saw in each scene.

| 1. A girl making a sandwich | 31. A girl writing in a card |
| 2. A girl washing her hands | 32. A girl doing a craft |
| 3. A girl painting a picture | 33. A girl painting Christmas ornaments |
| 4. A girl styling a doll’s hair | 34. A girl cutting a snowflake out of paper |
| 5. A girl painting someone’s nails | 35. A girl making a paper airplane |
| 6. A girl doing a puzzle | 36. A girl sorting coins |
| 7. A girl placing numbers in a foam board. | 37. A girl flipping through a textbook |
| 8. A girl doing laundry | 38. A girl putting tape on a bird house |
| 10. A girl picking a flower | 40. A girl putting on a rollerblade |
| 11. A girl sealing a letter to mail it | 41. A girl brushing and braiding her hair |
| 12. A girl writing the numbers 0-10 on a piece of paper | 42. A girl making a salad |
| 13. A girl blowing up a balloon | 43. A girl making an ice cream sundae |
| 14. A girl opening a present | 44. A girl sealing a letter to mail it |
| 15. A girl putting on makeup | 45. A girl dancing |
| 16. A girl stretching | 46. A girl throwing a toy for her dog |
| 17. A girl brushing her teeth | 47. A girl kicking a soccer ball |
| 18. A girl making a coffee | 48. A girl making a phone call |
| 19. A girl dressing a doll | 49. A girl making her bed |
| 20. A girl eating dinner | 50. A girl bouncing on a trampoline |
| 21. A girl making something out of clay | 51. A girl making batter for a cake |
| 22. A girl chewing bubblegum | 52. A girl placing coloured beads on to a string |
| 23. A girl doing math problems | 53. A girl drawing on a pumpkin |
| 24. A girl doing exercises | 54. A girl placing coloured circular stickers on paper |
| 25. A girl lighting candles | 55. A girl drawing a rainbow |
| 26. A girl washing her face | 56. A girl making a dog do a trick |
| 27. A girl dealing playing cards | 57. A girl making tea |
| 29. A girl setting the table | 59. A girl doing a cartwheel |
| 30. A girl fixing a remote control | 60. A girl hitting a baseball with a bat |
Appendix B: Scenes that were Not Presented

These 30 scenes were randomly distributed within part 2 session 1’s total of 90 scenes. These scenes were not video or audio-recorded and were just meant to be used to increase the number of scenes participants were asked about.

| 1.  | A girl cutting her nails           |
| 2.  | A girl organizing her pencil case  |
| 3.  | A girl playing games on an iPad    |
| 4.  | A girl brushing a kitten           |
| 5.  | A girl washing a car               |
| 6.  | A girl sewing fabric               |
| 7.  | A girl planting a flower in a garden|
| 8.  | A girl making a gingerbread house  |
| 9.  | A girl flossing her teeth          |
| 10. | A girl drawing a family portrait   |
| 11. | A girl flying a kite               |
| 12. | A girl making a pillow fort        |
| 13. | A girl playing the piano           |
| 14. | A girl munching on cookies         |
| 15. | A girl opening and closing a window|
| 16. | A girl cleaning the bathroom sink  |
| 17. | A girl playing a board game        |
| 18. | A girl pumping air into the tires of her bike |
| 19. | A girl diving into a swimming pool |
| 20. | A girl stapling paper together     |
| 21. | A girl studying for a test         |
| 22. | A girl playing bingo               |
| 23. | A girl writing her name 3 times    |
| 24. | A girl tracing her hand on a piece of paper |
| 25. | A girl printing out pictures from a printer |
| 26. | A girl sharpening a pencil and writing with it |
| 27. | A girl using a calculator to solve a math problem |
| 28. | A girl hammering a nail into a piece of wood |
| 29. | A girl washing her windows with a squeegee |
| 30. | A girl putting on a sweater        |
Appendix C: Belief in Occurrence and Belief in Accuracy Items

Belief in Occurrence:

1. How likely is it that this scene was presented?

1 Definitely did not view; 7 Definitely viewed

2. It is true that this scene was presented.

1 Not at all true; 7 Completely true

Belief in Accuracy:

1. How confident are you that your memory for this scene is accurate?

1 Not at all confident; 7 Completely confident

2. What proportion of your memory for this scene is accurate?

1 Not at all accurate; 7 100% accurate
Appendix D: Participant Pool Advertisement

Title: Remembering Recorded Events

Duration: 2 hours

Bonus points: 2.5

Description: If you volunteer to participate in this study, we will ask you to watch or listen to simple scenes (such as “making a sandwich”). One week later, we will ask you will complete a test of your memory for the scenes. The first session will take one hour to complete, and the second session one hour, for a total of no more than two hours of your time.
Appendix E: Post-Study Debriefing

So that was the last question I had for you. I’m just going to tell you a little bit more about the study.

First of all, thank you for your participation. This study is examining how people make decisions about their memories for past events. While we might be tempted to think of our memories as fixed in our minds, research has shown that memories are continuously being influenced by new information and experiences that we have. This has led some researchers to study how people make decisions about memories when they encounter different types of information.

In this study, we are interested in seeing what people do when feedback is given that specific details within memories are incorrect. In this study there were two phases. First, you studied many different simple scenes – some you watched and some you heard.

The second phase, the memory test, occurred today. You may recall that after you completed the memory test there were a few times I gave you feedback that your memory for specific details within scenes was incorrect. For some of the memory test items, your memory may have been incorrect – you might have said you saw a detail within a scene that you did not see in the first phase. However, the feedback I gave you that your memory was incorrect during the second phase today was false. We are interested in seeing how people react to feedback that strong memories are incorrect. In this study, we are specifically examining how often people reject versus how often they accept the feedback, and whether features of the memory such as vividness predict that outcome.

So there was a type of deception in this research. For a small number of scenes that you correctly identified as being seen, the feedback I gave you was incorrect. We
apologize for the need for the deception, but there really is no way to study how people respond to feedback from others without sometimes contradicting accurate memories. This situation is a bit like when people who are close argue about what ‘really happened’ during a shared experience. Sometimes, some of the feedback we get from others is correct and sometimes it is not. The only way we can gain control of it for study in the lab here is to sometimes provide erroneous feedback.

Now that you know about the study, do you agree for us to keep the data that we collected?

Do you have any questions, or anything else that you would like to tell us about what it was like for you to participate in this study?

Thank you again for participating. [Arrange compensation; crediting of bonus points]
Appendix F: Example of Research Assistant’s Script for Audio Recording

“So there was a woman standing in a kitchen and she had a piece of bread and she was cutting it with a knife. Um, and then she uh, she had to pull it apart. A-and it wasn’t like totally even. And then uh, she had some stuff she was putting on it. So, I think there was meat and cheese, and then she had condiments so there was some ketchup. And, uh that was it. She made a sandwich.”
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