

SOCIAL CONTAGION OF MEMORY IN YOUNG AND OLDER ADULTS

by

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## ABSTRACT

The current study examined age differences in the social contagion of memory paradigm developed by Roediger, Meade, and Bergman (2001). In the social contagion paradigm, participants are exposed to the erroneous memory reports of a confederate after viewing a series of schematically arranged household scenes. Age differences were examined at two levels. First, participant age was manipulated in order to determine whether older adults were more susceptible to socially encountered misinformation than young adults. Second, the age of the source of misinformation was manipulated to determine how perceptions of the source may influence contagion. The results indicated that suggestions of older adult confederates impact participants' memory reports less than the suggestions of young adults in free recall. However, the mechanism for this effect differs in terms of participant age. Young adult participants appear to discount the suggestions of older adult confederates, while older adult participants appear to devote less processing to the collaboration of the older confederate. Additionally, older adults were not more susceptible to social contagion than were young adults, even when given more time to view the stimuli.

## INTRODUCTION

False memory paradigms have typically examined memory errors of the individual rememberer in isolation; that is, these experiments have explored false memory effects in the absence of the influence of other individuals. While individual processes most certainly play a role in the development of false memories, a great deal of remembering also occurs in social contexts, as information is often recalled for the very purpose of communicating information to others. When we reminisce over a shared experience or when we impart unshared experiences with others, the goal of this reminiscence is typically to present an accurate view of the past. Unfortunately, this is not always the case, and when this shared information is erroneous, memory errors may be transmitted from one individual to another.

These memory distortions that occur as a result of erroneously recalled information from another person have been well documented in younger adults (Meade & Roediger, 2002; Roediger, Meade, & Bergman, 2001). However, little attention has been devoted to examining how susceptibility to socially-introduced misinformation may differ in terms of age. The purpose of the current study is to examine age differences in memory errors arising from social influences at two levels. First, age differences at the level of the rememberer will be examined to determine whether young and older adults are differentially impacted by socially encountered information. Second, the current study will explore how the age of the transmitter of incorrect information may influence adoption of erroneous items into individual memory reports. As reliance on social sources when constructing one's own memory report may depend on the perceived

credibility and/or salience of the source, the age of the individual providing errant information may systematically impact the development of false memories in the person with whom they are collaborating.

The effect of social influence on memory distortions is related to the misinformation effect (Loftus & Palmer, 1974). It is important to note, however, that the introduction of errant post-event information (PEI) in the typical misinformation paradigm may not accurately reflect the day-to-day remembering that occurs between individuals. While misinformation items encountered after an event may influence true memory distortion, Roediger, Meade, and Bergman (2001) argued that because this paradigm presents errant items in highly detailed and credible accounts of the witnessed event, participants may exhibit memory conformity simply because of the informative nature of the PEI. The fact that the effect can be eliminated or greatly reduced on a source monitoring test, in which participants are instructed to scrutinize the source of their memories, corroborates this account (Lindsay & Johnson, 1989). Furthermore, PEI in the misinformation paradigm is always delivered by an implied social source rather than a real social presence. In fact, a more powerful demonstration of social influence must enlist the recall of another rememberer whose memory is deemed to be just as fallible as the participant's.

To examine how false information introduced by another person infects individual memory reports, Roediger, Meade, and Bergman (2001) utilized a hybrid design of the standard misinformation procedure (Loftus & Palmer, 1974) and the typical normative conformity paradigm (Asch, 1952, 1956; Binet, 1900). In this paradigm, individuals

viewed a series of common household scenes alongside a fellow undergraduate confederate. Following the study session, participants engaged in a collaborative recall phase in which the participant and the confederate took turns recalling items from each scene. Critically, the confederate suggested several items during this collaboration that had not been presented in the scenes. These items were either high expectancy (e.g., the confederate suggested a *printer* in the desk scene) or low expectancy (e.g., a *rolodex* in a desk scene). Following the collaborative phase, the participant and confederate were separated, and participants were asked to again report their memory for the original scenes. This separation allowed for the researchers to examine memory conformity effects in the absence of social pressure. Importantly, Roediger et al. reported a robust social contagion of memory, in that participants recalled contagion items more frequently when they had been suggested by a confederate than when they had not. Notably, this effect was greater for high-expectancy than low-expectancy items, suggesting that the schematic consistency of the errant items influenced their acceptance in individual memory reports.

Subsequent research has replicated the powerful effect of social influence on memory. In a related paradigm (in which the effect of socially introduced misinformation is dubbed *memory conformity*), two naive participants unwittingly view different versions of the same event. While participants are led to believe that they have witnessed the same event, slight differences in perspective lead one collaborating participant to witness a particular critical detail, while the other participant views a new or different detail. This manipulation is implemented surreptitiously, so that participants are not aware that they

have viewed discrepant details. In fact, in one variation of the paradigm, participants view an event side by side, and are shown different critical details through the use of special glasses that conceal or expose certain aspects of the event (for a discussion of this technique, see Mori, 2003) Later, participants discuss the witnessed event. During this discussion, critical items witnessed by one person (but not the other) are often suggested, exposing participants to erroneous information in a similar fashion as in the social contagion paradigm (e.g., Allan & Gabbert, 2008; Bodner, Musch, & Azad, 2009; Gabbert, Memon, & Allan, 2003; Gabbert et al., 2004; Gabbert, Memon, and Wright, 2006, 2007; Garry et al., 2007; Mori & Mori, 2008; Skagerberg & Wright, 2008a, 2008b, 2009; Wright et al., 2008; Wright, Self, & Justice, 2000). When this exposure occurs, participants typically later report items suggested by their partner when they were not actually witnessed in the original event.

While these paradigms demonstrate a robust memory conformity effect (akin to social contagion), there are several paradigmatic differences between memory conformity and social contagion. First, in the memory conformity paradigm, the inconsistent details generated by the witnessed event result in contradictory, rather than additive information. Tousignant, Hall and Loftus (1986) posited that when encountering contradictory information, participants must first detect the discrepancy between the inconsistently recalled details, and then reject the discrepant information in order to eliminate a misinformation effect. As the misinformation provided in the social contagion paradigm is purely additive, the likelihood that such a “detect and reject” mechanism is operating is relatively small. Second, the memory conformity paradigm relies on the fact that

participants will introduce the witnessed critical items into their collaboration, and thus the baseline of the misinformation index (the total number of erroneous items recalled divided by the number of erroneous items suggested) varies across participants. The social contagion paradigm eliminates this varying baseline by exposing participants to a controlled number of erroneous suggestions. Finally, participants in the typical memory conformity paradigm do not complete a final source recognition task, calling into question whether the memory conformity evidenced in these paradigms reflects true memory distortion or another type of conformity (see Bodner, Musch, & Azad, 2009, for an exception).

Although memory conformity and social contagion effects may ostensibly demonstrate the same phenomenon, the cause of these errors across paradigms may be fundamentally different. Specifically, Wright et al. (2009) suggested that erroneous reporting of socially introduced misinformation may reflect responding to three types of influences. The first, normative conformity, reflects the decisional process in which the social costs and benefits of responding are made. For example, when a collaborating partner recalls a discrepant item, participants may choose to agree with that erroneous item in order to avoid the social cost of disagreement, even though it is known to be false. The second route, informative conformity, occurs when participants knowingly report erroneous items because they assume them to be true due to judgments regarding the collaborating partner's credibility. If the collaborator is assumed to be accurate, motivated, or better able to recollect details than the participant, the participant may assume a suggested item is true, even when it is not personally recollected. Critically, in

both the case of normative and informative conformity, participants do not actually remember having witnessed the item in question. Rather, social pressure and/or judgments of the collaborator's ability influence reporting of these items. Both of these factors may operate in the memory conformity paradigm, as participants often respond in the presence of each other, and are not asked to indicate the sources of their memories. However, the third route of errant reporting occurs in the absence of social pressure, and persists even when attention is called to source information. This final route, of most interest for the current study, is true memory distortion. In this case, individuals report erroneous items because they are believed to have appeared in the original event, which reflects a source monitoring error.

Memory distortions that arise from social influence may reflect source monitoring errors, in that participants incorrectly attribute the source of the erroneous item to the original event (cf. Meade and Roediger, 2002). The source monitoring framework proposes that in addition to memory items themselves, information regarding the source of information (i.e. where information was learned, in what context, and other unique identifiers) is also encoded (Johnson, Hashtroudi, & Lindsay, 1993). When constructing a memory report, the probability that participants will include a particular item in their memory reports depends largely on the differentiation of source material, as well as the decision criterion used to determine how much source information is necessary to attribute an item to a particular source. For example, participants in the social contagion and memory conformity paradigms must differentiate items presented in the original event and items suggested by their partner. For suggested items that are highly plausible

or semantically related to the original event (as in the social contagion and memory conformity paradigms), the ability to discriminate source becomes more difficult, and participants may mistakenly attribute erroneous suggested items to having occurred in the original event, demonstrating memory distortion.

Research examining source monitoring in the social contagion and memory conformity paradigms have examined how calling attention to the source of contagion items may reduce the frequency of false memories. Meade and Roediger (2002), using the standard social contagion procedure, asked participants to complete a source recognition test in which items were to be attributed to the scenes themselves, the confederate, both, or neither. This procedure allowed participants to differentiate between remembering the suggested item in the collaborative recall (i.e., a correct source attribution) or in the scenes themselves (i.e. an incorrect source attribution and evidence for memory distortion). In fact, when given the opportunity to differentiate between different sources of memories, participants still demonstrated a social contagion effect. That is, even when given the option to correctly attribute contagion items to the confederate, participants still claimed that the suggested items had been present in the scenes, and this occurred even in the face of an explicit warning (Meade & Roediger, 2002, Experiment 1). This effect was also replicated in the memory conformity paradigm (Bodner et al., 2009). The data from both the social contagion and memory conformity paradigms initially appear incongruous with results obtained in the misinformation paradigm, in which calling attention to source can eliminate the impact of errant details (Lindsay & Johnson, 1989). However, the presence of social sources of misinformation

may increase the potency of misinformation items, making source confusions more probable.

In general, if a participant encounters an incorrect item during collaboration with another person, the physical social presence of the other person may influence the initial characteristics associated with the item at encoding, thus influencing the ultimate decision criterion used at retrieval. When a confederate or fellow participant suggests incorrect information during recall, the details associated with that information may be less differentiable from a participant's own suggestions, especially because that source is deemed to be similar to the individual who hears that information (i.e., as motivated and as fallible as oneself). To illustrate this effect, the social contagion paradigms and memory conformity paradigms have both examined how the physical presence of a collaborator may be critical in determining memory distortion. Meade and Roediger (2002, Experiment 4) demonstrated that while a virtual confederate was just as potent in inducing social contagion on a recall test, this effect did not persist on a final recognition test. On this final test, a physically present confederate was more likely to induce memory distortions, reflected in inflated attributions of contagion items to the scenes. In contrast, Bodner et al. (2009) found that participants who read or heard another participants' erroneous responses were equally likely to report items on a recall test as well as attribute those items to having been present in the original witnessed event on a final source monitoring test. However, Bodner et al. still tested individuals in pairs in their *read* condition, whereas in Meade and Roediger's experiment, the virtual confederate was never physically present in the laboratory. Allan and Gabbert (2009)

have found that the memory conformity effect is more powerful on a recognition test when the confederate is present rather than absent during the encoding process, even when the errant PEI is identical between groups. This finding suggests that the physical presence of another individual is critical in determining source monitoring errors for contagion items, perhaps because the contextual and perceptual details associated with recalling aloud with another may make source discrimination more difficult (cf. Meade & Roediger, 2002). It is also possible that because a participant's collaborator is also ostensibly a like-minded peer, participants may focus less attention on discriminating between items produced during collaboration, as they assume that the confederate is accurately recalling items from the scenes.

While past research has examined individuals when they collaborate with another person similar to themselves (e.g., of one's own age), it is unclear how collaboration with a person who appears more or less fallible than the participant may impact the degree of memory conformity. To examine how perceptions of the confederate may drive the social contagion effect, the current study examined how individuals in the social contagion paradigm adopt suggested information from either a young adult or an older adult confederate. According to source monitoring theory, if young adults collaborate with an older participant, the apparent difference in age (and presumably memory ability) may increase the salience of information encountered during collaboration, thus increasing the amount of contextual details available to young adults that may make source confusions less likely. In addition, stereotypes regarding decline in memory ability in older adults are pervasive (Levy, 1996), and in both the misinformation and memory conformity

literatures, perceived credibility of the source of errant information appears to play a role in determining how individuals report information on a memory test (Gabbert, Memon, & Wright 2007; Hoffman et al., 2001; Kwong See, Hoffman, & Wood, 2001; Skagerberg & Wright, 2008a; Skagerberg & Wright, 2009; Underwood & Pezdek, 1998).

Most relevant is a study by Kwong See et al. (2001), that used the standard misinformation procedure, and gave narratives to participants that were ostensibly either from an 82-year-old woman or a 28-year-old woman. While the overall misinformation effect did not differ by witness age in an analysis of variance, a regression analysis revealed that the older adult witness was seen as less accurate, reliable, and less likely to have a good memory, and that this mediated the impact of misinformation. This finding suggests that perceptions of credibility and competence in older adults may influence how one reports information on a memory test. If the presumptions regarding an implied older adult's detailed narrative translate to an in-vivo turn-taking recall period, contagion effects from older adult should be diminished. Specifically, the hypothesis for the current study is that contagion items suggested by older adults will be incorporated less often in subsequent memory reports, and that this reduction in contagion for older adult confederates will be greater for young adults than for older adults, given the propensity for older adults to disregard contextual details when reporting items on a memory test (cf. Norman & Schacter, 1997).

Furthermore, the present study examined age differences in social contagion at the level of the rememberer. Older adults generally demonstrate global declines in episodic memory performance, as well as an increased susceptibility to false memories across a

variety of paradigms (Balota, Dolan, & Duchek, 2000; Dywan & Jacoby, 1990; Jacoby et al, 2005; Norman & Schacter, 1997). Of critical interest to the current study is whether older adults may be more or less susceptible to socially suggested false memories. Given that older adults demonstrate an impaired ability to discriminate source information relative to young adults, they may be more susceptible to both misinformation effects and social contagion (Hashtroudi, Johnson, & Chrosniak, 1989). For example, in the false fame paradigm, older adults are more likely to attribute the familiarity of a previously studied nonfamous name to that name being famous (Dywan and Jacoby, 1990). However, this detriment does not reflect an inability to discriminate source per se, but a decreased likelihood of spontaneously doing so. When explicit attention is drawn to the possible sources of familiarity, age differences are eliminated, suggesting that older adults can enlist contextual details to make memory decisions if they are so instructed (Multhaup, 1995).

While one might assume that this deficit in utilizing source monitoring ability should translate to increased misinformation effects in older adults, the empirical evidence is equivocal. While evidence sometimes suggests that older adults are indeed more susceptible to misinformation effects (Cohen & Faulker, 1989; Mitchell, Johnson, & Mather, 2003; Roediger & Geraci, 2007), some studies have found the opposite (Marsh, Balota, & Roediger, 2005; Marche, Jordan, & Owre, 2002), and others have found no age differences in suggestibility to misinformation (Chan, Thomas, & Bulevich, 2009; Coxon & Valentine, 1997). While the reasons for these empirical discrepancies are unclear, one might conclude that age-related declines in source monitoring alone cannot

account for age differences in susceptibility to misinformation effects.

Research on age differences in social memory paradigms has also yielded mixed results. Work in the area of collaborative inhibition has demonstrated the frequency of false memories in collaborating older adults may be largely dependent on procedural factors. Ross et. al. (2008) found that when spouses collaborated in a free-for-all discussion, false memories were reduced for older adults relative to younger adults. Most importantly, this reduction in false memories was driven by an error correction mechanism, in which collaborating spouses not only corrected erroneous responses, but withheld information that may be incorrect. In contrast, Meade and Roediger (2009) found the opposite age effect, in that older adults demonstrated increased false memories following collaboration with an unknown peer. It is important to note, however, that Meade and Roediger utilized a turn-taking procedure rather than the free-for-all discussion employed by Ross et al, which precludes spontaneous error correction by a collaborator. Thus, it appears that when the likelihood for error correction is small (i.e. when dyads are unacquainted and when the collaborating process is more strict), older adults should demonstrate increased false memories. Finally, Meade & Roediger examined age differences in false memory following a prior collaboration, while Ross et al. examined age differences in false memory during collaboration. In the current study, we are interested in the effect of prior collaboration on individual memory, and thus, we would predict that older adults should demonstrate greater false memory than young adults.

Within the memory conformity paradigm, two patterns of age differences have

emerged. First, Gabbert, Memon, and Allan (2003) found no age differences in memory conformity between young and older adults. However, subsequent research demonstrated that young adults were more susceptible to memory conformity than older adults, suggesting that age differences in that paradigm may mirror the myriad of results found for the misinformation effect (Gabbert et al., 2004). Critically though, each of these studies has systematically confounded participant age with confederate age. That is, each age group has always been paired with an age-matched peer. Given the hypothesis that older adults may be less likely to influence memory conformity, this confound may drive the age differences observed at the level of the participant. The current study will examine these two variables independently in order to determine how participant age and confederate age interact.

Considered together, prior work on aging and false memory suggests that across individual and collaborative false memory paradigms, procedural factors may determine how older adults incorporate incorrect information encountered after a witnessed event. In the current study, we employed a turn-taking procedure with both same-age and mixed-age confederates and we examined false memory following prior collaboration. Thus, we predict that older adults will demonstrate increased false memories relative to young adults following collaboration (as in Meade and Roediger, 2009), and that this effect will be moderated by the age of the confederate, such that suggestions from a fellow older adult will be adopted by older adult participants less often. For young adults, we expect a similar pattern across confederate ages, such that young adult participants will be more likely to adopt contagion items from older adult confederates

than young adult confederates.

The final factor of interest for the current study is that of original learning. Within the social contagion paradigm, stimulus duration has affected the likelihood of adoption of contagion items, such that after shorter stimulus durations, contagion effects are increased. This finding suggests that poorer memory for the original event may lead participants to look to outside sources to supplement their memory reports. Given the fact that older adults generally demonstrate poorer recall performance, it stands to reason that older adults would demonstrate increased susceptibility to contagion effects if recall were not equated (cf. Ross et al., 2008). What is unclear is how likely young and older adults are to report social contagion items when original memory for the scenes is equated. If age differences in the social contagion paradigm can be attributed to poorer recall overall, this difference may not reflect an age difference per se, but rather a sensitivity of the effect to original learning previously demonstrated in young adults (Meade & Roediger, 2002; Roediger et al., 2001). Therefore, we attempted to equate original learning in the current study to examine age differences in social contagion beyond overall recall performance (see Jacoby, 2005 for related logic). Critically, age differences observed in the memory conformity paradigm did not take original learning into account, making age differences (or lack thereof) difficult to interpret. By allowing older adults more time to view our stimuli, we could examine how social contagion differs in terms of age independently of recall ability. Based on previous research demonstrating increased false recall in older adults, we predict that even if original learning is equated, older adults will evidence an increased impact of social contagion.

The present study was a replication of the original social contagion paradigm (Roediger, Meade, and Bergman, 2001), with two critical differences. We manipulated both the age of the source of contagion items as well as the age of the rememberer in order to examine age differences in susceptibility to social contagion. By crossing participant age with confederate age, we were able to disentangle these two variables to examine true age differences at the level of the participant. We also attempted to equate original learning at two stimulus durations in order to examine how recall for veridical items affects adoption of contagion across age groups.

## METHOD

Participants

The participants were 97 Montana State University undergraduates and 86 older adults recruited from the Bozeman, MT community. Twenty-five young adults and 14 older adults were excluded from the analyses. Two participants (both young adults) were excluded for being non-native English speakers and two participants (both young adults) were excluded on the basis of cheating on the recall test. Two participants in the young adult condition were non-traditional students who were closer in age to our older adult group (i.e. greater than 40 years old), and were also excluded. Seven participants (one older adult, six younger adults) were excluded because they expressed suspicion regarding the experimental manipulation, and twenty participants were excluded on the basis of confederate or experimenter error. In the case of the former, most errors represented only a slight deviance from the procedure in the delivery of contagion items (e.g., the confederate introduced contagion items at positions 3 and 5 of recall rather than 4 and 6). While Roediger, Meade, & Bergman (2001) demonstrated that the order of delivery did not affect contagion, we took a conservative approach to participant exclusion. The majority of these errors occurred when the confederate was an older adult (9 out of 10 errors). Finally one older adult participant had recently come from a pupil dilation procedure, and was unable to see the stimuli, while two older adults failed to recall six items in each of the scenes during the collaborative recall phase. Following these exclusions, the experimental group consisted of 72 younger adults (age range, 18-35 years;  $M = 20.73$ ) and 72 older adults (age range, 65-103;  $M = 74.45$ ),  $t(141) = 60.10$ ,

$SEM = 0.88, p < .001$ . All relevant demographic information is presented in Table 1. All young adults ( $N = 71$ ) save one were in the range of 18-25 years, and our singular 35-year old participants' data did not deviate from the average for his group. Thus, his data are retained in the analysis. The mean score for older adults on the Shipley vocabulary test (Shipley, 1946) was 35.08, and was significantly higher than that of younger adults ( $M = 28.63$ ),  $t(141) = 9.46, SEM = 0.67, p < .001$ . Older adults were on average more educated ( $M = 16.13$  years) than younger adults ( $M = 13.13$  years) as well,  $t(141) = 9.10, SEM = 0.33, p < .001$ . Finally, older adults scored slightly lower than young adults on the MMSE; however this difference is not concerning given that all participants tested within the clinically normal range,  $t(141) = 5.20, SEM, = 0.19, p < .001$ . No differences emerged between young and older adults on the memory anxiety questionnaire,  $t < 1$ . These data are presented in Table 1. Young adults participated for partial fulfillment of a course requirement while older adults were compensated \$10 for participating.

Table 1. Mean scores on the Mini Mental State Exam (MMSE), Shipley Vocabulary Test, mean age, years of education, and mean score on the Memory Anxiety Questionnaire (Scale 1-5) for young and older adults. Standard deviations are in parentheses.

	Age	Education	MMSE	Shipley	Anxiety
Young adults	20.73 (3.25)	13.13 (1.41)	29.53 (0.77)	28.63 (4.70)	2.92 (0.57)
Older adults	74.45 (6.80)	16.13 (2.39)	28.57 (1.40)	35.08 (3.25)	3.01 (0.67)

### Materials

The materials used in the experiment were six common household scenes originally developed by Roediger, Meade, and Bergman (2001). The scenes (toolbox, bathroom,

kitchen, bedroom, closet and desk) contain an average of 23.8 items of both high- and low-expectancy. The expectancies were determined in a pilot study by Roediger et. al (2001), in which participants were required to generate items in response to a scene label. Two high- and two low-expectancy items were then excluded from the photos to be used as contagion items. These contagion items were then later suggested by the confederates as having been present in the scene. The scenes were presented using PowerPoint 2003 software, and scenes were separated from each other by a screen displaying the label for the upcoming scene for two seconds.

Participants also completed a set of filler addition problems and were required to generate memory responses on individual cued-recall sheets. The source recognition test was used as in Meade and Roediger (2002), and included 18 previously studied items from the scenes, the 12 contagion and control items (of both high and low expectancy) from each scene, and six unrelated items not present in any of the scenes.

A final series of questionnaires were used to examine population differences between age groups and included the Shipley Vocabulary Scale (Shipley, 1946), the Mini Mental State Exam (Folstein et al., 1975), a demographics questionnaire, and a Memory Anxiety Scale (adapted from Davidson, Dixon, & Hultsch, 1991 as in Huff, Meade, & Hutchison, in press).

### Procedure

Experimental sessions consisted of only one participant and one confederate, who was always male. The mean age of the young adult confederates was 21 years; the mean age of the older adult confederates was 75 years. The confederate was seated behind the

participant, facing in the same direction. This seating configuration was used to ensure that participants did not see anything that might alert their attention to the deception. Prior to scene presentation, the participant and confederate were instructed to pay attention to each scene as their memory for the items in the scene would later be tested. Both confederate and participant viewed the slides of the six scenes in the same fixed order: toolbox, bathroom, kitchen, bedroom, closet and desk. Young adults in the fast condition viewed these scenes for 5 seconds each, while older adults in the fast condition viewed each scene for 15 seconds. In the slow condition, young adults viewed the scenes for 15 seconds each while older adults viewed the scenes for 45 seconds. Thus, both young and older adults were given three times as long to view the slides in the slow condition relative to the fast condition, and presentation rate was matched for the slow young and fast older adult conditions. In addition to the visual labels preceding each scene, the experimenter also gave a verbal label of the scene (i.e. “the toolbox scene”). After viewing all six slides, both participant and confederate were given a filler task of addition problems to solve for 4 min.

Following the filler task, the participant and the confederate participated in a turn-taking collaborative recall phase. The recall of the scenes occurred in the same order as the original presentation, and the participant and confederate alternated recalling six items each from each of the six scenes. In the event that participants could not remember the required six items in the scene, the experimenter gently encouraged them to continue even if they were not entirely certain an item had been presented. During this collaborative recall phase, the confederate recalled items that had actually been presented

in the scenes as well as items that were not presented. These unrepresented items served as contagion items, and were suggested by the confederate in three of the scenes. For each of the three contagion scenes, one low- and one high-expectancy item were delivered. These items were always delivered in the fourth and sixth position. The order of expectancy was counterbalanced, such that the low- expectancy item in each scene preceded the high-expectancy items for half of the participants. For the remaining three scenes, only correct items were suggested, and the contagion items in these scenes served as a within-participants (and between-participants) control condition. Thus, we examined reporting of items when they had been suggested by the confederate and when they had not. The contagion scenes were counterbalanced across participants.

Confederates were required to adhere to a strictly defined script. For the collaborative recall phase, confederates were given a “cheat sheet” containing the items to be delivered, which also appeared as a slide on their computer. For each item, two or three alternative items were also displayed in the event that the participant had already recalled that particular item. During training sessions, both younger and older adult confederates were instructed to recall these items as naturally as possible, and to attempt to match the participant’s level of recall, so as not to arouse suspicion. For example, if a participant was struggling to recall items from a scene, the confederate would also feign to struggle. Furthermore, the importance of the delivery of the correct items in the correct positions was emphasized. Despite this emphasis, both young and older adults occasionally made an error in the position of the delivery contagion items (e.g. saying the items at positions four and five). When this occurred, the participant’s data were

discarded and replaced.

Upon completion of the collaborative recall phase, the participant and confederate were told that they were to take an individual written recall test, and were placed in separate rooms to recall the items on their own. At this point, the confederate's role in the experiment was completed, and he was free to either read or sit quietly in an adjacent room. All participants were told to recall as many items as they could remember from the original scenes, and were given two minutes to recall these items for each scene. Furthermore, participants were asked to indicate whether they *remembered* or *knew* whether each written item had been in the scene. This remember/know procedure was based on instructions used by Gardiner (1988), Rajaram (1993), and Tulving (1985). Participants were told that remember responses indicated that they recollected something specific about an item (e.g. noted something about the item or the way it looked), while know responses indicated that the participant did not necessarily recall anything specific about having seen the item but was still certain the item had been present. As in Roediger et. al., (2001), "guess" judgments were excluded from this experiment as participants were instructed to recall only those items they thought were in the scenes. While the participant was completing the free recall for each scene, the experimenter left the room and entered the adjacent room, ostensibly to deliver the same recall test to the confederate.

After the free recall task, participants were given a 36-item source recognition test that required them to indicate the source of each item on the test. Specifically, participants were asked to indicate whether they remembered each item on the

recognition test from the scene, the other participant, both (by marking both “scene” and “other participant”) or neither. As mentioned previously, half of the items on the recognition task were items that were presented in the scenes while the other half served as lures. Six of these lures were contagion items suggested by the confederate, and six were control items that had never been suggested. The remaining six items were unrelated to the scene and served as filler items. Participants were given as much time as was necessary to complete the task.

The final series of tasks consisted of the Mini Mental State Exam (MMSE), the Shipley Vocabulary Scale, a demographics questionnaire, and the Memory Anxiety questionnaire. Following completion of the experiment, all participants were thanked and fully debriefed.

## RESULTS

False Recall

The false recall results for both high- and low-expectancy contagion and control items are shown in Table 2 for both young and older adult participants with a young or older confederate. As there was no main effect of duration nor any interactions involving this variable, the data in this table are collapsed across the duration manipulation. The first two columns represent the overall proportion of contagion and control items reported, as well as the proportion of high- and low-expectancy items recalled in each condition. The final column represents the overall contagion effect, and is the difference of the proportion of contagion and control items recalled. All results reported statistically significant meet the criterion of  $p < .05$  unless otherwise specified.

The results of a  $2 \times 2 \times 2 \times 2 \times 2$  mixed ANOVA on false recall yielded a main effect of contagion, such that contagion items were falsely recalled more often after being suggested by a confederate than when they were not suggested,  $F(1,136) = 97.30$ ,  $MSE = 0.04$ ,  $p < .001$ . Additionally, a main effect of expectancy emerged, such that high-expectancy items were reported more often than low-expectancy items,  $F(1,136) = 112.12$ ,  $MSE = 0.05$ ,  $p < .001$ . The previous two effects replicate previous findings from the social contagion of memory paradigm (Roediger, Meade, and Bergman, 2001; Meade and Roediger, 2002).

Examination of Table 2 also suggests that the contagion effect is reduced when the errant information is suggested by an older confederate. The analysis revealed a

significant Confederate Age  $\times$  Participant Age interaction [ $F(1,136) = 4.67, MSE = 0.06, p = .033$ ], an Item Type  $\times$  Confederate Age interaction [ $F(1,136) = 12.41, MSE = 0.05, p = .001$ ], and an Expectancy  $\times$  Participant Age interaction [ $F(1,136) = 6.86, MSE = 0.05, p = .01$ ]. These two-way interactions were qualified by a three-way interaction between item type, expectancy, and confederate age,  $F(1, 136) = 4.28, MSE = 0.04, p = .041$ . Post-hoc  $t$ -tests revealed that for young adult participants, the reduction in the contagion effect from the young confederate ( $M = .51$ ) to the older confederate ( $M = .31$ ) was driven by a reduction in the high-expectancy contagion items,  $t(70) = 3.24, SEM = 0.06, p = .002$ . Such a reduction did not occur for low-expectancy items ( $M$ 's = .21 and .12),  $t(70) = 1.34, SEM = 0.06, p = .17$ . For control items, no difference emerged for either high-expectancy [ $t(70) = 0.18, SEM = 0.05, p = .86$ ] or low-expectancy items [ $t(70) = 1.02, SEM = 0.02, p = .31$ ]. This finding suggests that the baseline for reporting schematically consistent items did not differ for young adults regardless of confederate age, and this reduction in the contagion effect when the confederate was an older adult was driven by decreased reporting of high-expectancy contagion items.

For older adults, however, the difference between high-expectancy items across young ( $M = .41$ ) and older adult confederates ( $M = .34$ ) was not significant, [ $t(70) = 1.00, SEM = 0.07, p = .32$ ], nor was the difference between low-expectancy contagion items from the young ( $M = .19$ ) to older confederate ( $M = .18$ ), [ $t(70) = 0.34, SEM = 0.05, p = .74$ ]. In contrast, for control items, there was a significant increase in the reporting of high-expectancy control items when older participants were paired with an older adult confederate ( $M = .20$ ) rather than a young adult confederate ( $M = .08$ ),  $t(70) = 2.75, SEM$

= 0.04,  $p = .008$ . Older adults' reporting of low-expectancy control items did not differ across confederate age,  $t < 1$ ,  $M's = .05$  and  $.06$ . Thus, while an overall reduction in the contagion effect was observed for both age groups when the confederate was an older adult, this reduction differs in terms of participant age. It appears that young adults discount the suggestions of older adults, and this discounting occurs primarily for high expectancy items. However, older adult participants paired with an older confederate increased their baseline production of high-expectancy items in the control condition, while the reporting of contagion items was equivalent when older adult participants were paired with either-aged confederate.

Table 2. Mean proportion of false recall for high- and low-expectancy contagion and control items. The average between the high- and low-expectancy items represents the overall contagion and control scores. Standard deviations are indicated in parentheses.

	Contagion	Control	Contagion Effect
<b>Young adults</b>			
Young confederate			
Overall	.36	.13	.23
High	.51 (.25)	.22 (.23)	
Low	.21 (.30)	.03 (.09)	
Older confederate			
Overall	.22	.12	.10
High	.31 (.26)	.23 (.21)	
Low	.12 (.20)	.01 (.06)	
<b>Older adults</b>			
Young confederate			
Overall	.31	.07	.24
High	.41 (.30)	.08 (.18)	
Low	.20 (.20)	.05 (.12)	
Older confederate			
Overall	.26	.13	.13
High	.34 (.28)	.20 (.17)	
Low	.18 (.26)	.06 (.14)	

### Remember/Know Judgments

Participants also indicated whether they remembered or knew each item that they reported on the individual recall test. Table 3 presents the mean proportion of remember and know responses for contagion items only. Remember and know responses were analyzed separately to determine the effects of contagion, expectancy, participant age, and confederate age. As the analysis of overall false recall yielded no effect of stimulus duration, these analyses were collapsed across our duration manipulation so that the remember/know data reported in Table 3 correspond to the proportion of false recall reported in Table 2. For the remember responses, a  $2 \times 2 \times 2 \times 2$  mixed ANOVA revealed a main effect of contagion,  $F(1,140) = 31.35$ ,  $MSE = 0.03$ ,  $p < .001$ , indicating that participants were more likely to indicate that they remembered a contagion item when it was suggested by a confederate than when that same item was not suggested. There was also a main effect of expectancy,  $F(1,140) = 14.90$ ,  $MSE = 0.03$ ,  $p < .001$ , replicating the expectancy effect found in overall false recall; participants were more likely to say they remembered high-expectancy than low-expectancy items. A two-way interaction emerged between confederate age and participant age, [ $F(1,140) = 6.42$ ,  $MSE = 0.04$ ,  $p = .01$ ], as did a three-way interaction between expectancy, confederate age, and item type [ $F(1, 140) = 3.84$ ,  $MSE = 0.02$ ,  $p = .05$ ]. Post-hoc  $t$ -tests revealed that for high-expectancy contagion items, as in the overall false recall analysis, young adults were less likely to report an item with a remember response when the confederate was an older ( $M = .08$ ), rather than a young adult ( $M = .19$ ),  $t(70) = 2.29$ ,  $SEM = .03$ ,  $p = .026$ . No other differences emerged, suggesting that the reduction in the reporting of remembered

contagion items from an older confederate occurred only for young adults, and only for items that were high-expectancy. For older adults, however, there was a significant reduction in the reporting of high-expectancy control items when paired with a young confederate ( $M = .02$ ) rather than an older confederate ( $M = .12$ ),  $t(70) = 2.70$ ,  $MSE = 0.04$ ,  $p = .009$ . This finding is consistent with the overall analysis of false recall in older adults as well, and is reflective of the fact that contagion items (especially high-expectancy) become more salient to older adults when suggested by a younger rather than an older adult. This increase in item salience presumably leads to a decrease in control reporting of high-expectancy items. In terms of the decisional criterion used in source monitoring theory, when an item or set of items is made more salient (as when they are suggested by a young adult), the criterion for reporting an item will be adjusted such that less salient items will be reported less often. Thus, the increased salience of young adult's suggestions may modulate older adult's decision criterion at test.

For know responses, as in the remember responses, significant main effects of contagion [ $F(1, 140) = 41.89$ ,  $MSE = 0.03$ ,  $p < .001$ ] and expectancy [ $F(1, 140) = 74.85$ ,  $MSE = 0.03$ ,  $p < .001$ ] emerged. A main effect of Participant Age was also significant, such that older adults reported slightly fewer items with know responses ( $M = .10$ ) than young adults ( $M = .14$ ),  $F(1, 140) = 5.13$ ,  $MSE = .05$ ,  $p = .025$ . An Expectancy  $\times$  Participant Age interaction also emerged, [ $F(1, 140) = 4.49$ ,  $MSE = 0.03$ ,  $p = .037$ ], as did an Item Type  $\times$  Confederate Age interaction, [ $F(1,140) = 4.26$ ,  $MSE = 0.03$ ,  $p = .042$ ]. A final interaction between expectancy and item type was also observed,  $F(1,140) = 3.88$ ,  $MSE = 0.03$ ,  $p = .051$ . Post-hoc  $t$ -test were used to decompose these interactions,

and revealed that young adults were more likely to report high-expectancy items with know responses overall ( $M = .22$ ) than were older adults ( $M = .15$ ),  $t(142) = 2.49$ ,  $SEM = 0.03$ ,  $p = .01$ . There was no difference between participant ages on low-expectancy items ( $M$ 's = .06 and .05, respectively),  $t < 1$ . Second, across the young and older adult confederates, there was a significant reduction in the reporting of know responses for contagion items ( $M$ 's = .20 and .14, respectively),  $t(142) = 2.07$ ,  $SEM = 0.03$ ,  $p = .04$ . There was no difference overall in the reporting of control items regardless of confederate age ( $M$ 's = .07),  $t < 1$ . Finally, there was a significant difference between high- and low-expectancy contagion items ( $M$ 's = .25 and .09, respectively),  $t(143) = 6.30$ ,  $p < .001$ , as well as significant difference for the high- and low-expectancy control items ( $M$ 's = .12 and .02 respectively), indicating an asymmetrical crossover interaction, in which the difference between high- and low-expectancy items was larger for the contagion condition than for the control condition.

Table 3. Mean proportion of remember and know responses given for falsely recalled contagion items only as a function of participant age and confederate age. Standard deviations are in parentheses.

	High Expectancy	Low Expectancy
<b>Young adults</b>		
Young confederate		
Remember	.19 (.26)	.08 (.18)
Know	.31 (.30)	.14 (.24)
Older confederate		
Remember	.08 (.16)	.05 (.14)
Know	.24 (.27)	.06 (.16)

Table 3 continued.

**Older adults**

Young confederate		
Remember	.16 (.20)	.10 (.19)
Know	.26 (.26)	.09 (.15)
Older confederate		
Remember	.16 (.22)	.13 (.23)
Know	.19 (.26)	.06 (.16)

Veridical Recall

A  $2 \times 2 \times 2$  mixed ANOVA was conducted to determine the effect of duration, confederate age, and participant age on veridical recall (contagion and expectancy manipulations were not included, as these applied only to false recall). These results are displayed in Table 4. Even though older adult participants studied each scene for three times longer than young adults (15 vs. 5 seconds for the fast condition, 45 vs. 15 seconds for the slow condition), older adults demonstrated poorer veridical recall,  $F(1, 136) = 18.44$ ,  $MSE = 0.004$ ,  $p < .001$ . However, this analysis also revealed a main effect of duration, in which participants who were given more time to view each scene demonstrated an increase in correct recall  $F(1, 136) = 50.33$ ,  $MSE = 0.004$ ,  $p < .001$ . Therefore, even though original learning was not equated between young and older adults, this divergence of veridical recall in terms of our durational manipulation still allows us to examine the impact of veridical recall on the acceptance of contagion items. Furthermore, as duration did not impact contagion, we can conclude that differences observed between young and older adults at the level of false memory did not depend on original learning.

Finally, an interaction between confederate age and participant age emerged in veridical recall  $F(1, 136) = 4.95$ ,  $MSE = 0.004$ ,  $p = .028$ . Veridical recall was lower for young adults after collaborating with an older ( $M = .26$ ) rather than a young ( $M = .30$ ) confederate [ $t(70) = 2.27$ ,  $SEM = 0.02$ ,  $p = .026$ ], while veridical recall did not differ for older adults when paired with a young or older confederate [ $t(70) = 0.41$ ,  $SEM = 0.02$ ,  $p = .683$ ]. While this interaction is somewhat surprising, Meade and Roediger (2002, Experiment 1) demonstrated that when given an explicit warning regarding the veracity of material encountered during collaboration, participants develop a more conservative criterion for responding, and exclude all (even veridical) suggested items. Given the finding that young adults discount contagion items suggested by older adults, this reduction in veridical recall may reflect discounting of the older confederate's true suggestions. In other words, young adults were likely to discount both false and veridical items suggested by older adult confederates.

Table 4. Proportion of correct recall in terms of participant age, confederate age, and stimulus duration. Standard deviations are in parentheses.

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	<u>Duration</u>		
	<u>5 s</u>	<u>15s</u>	<u>45s</u>
Young adults			
Young confed	.26 (.05)	.34 (.06)	
Older confed	.21 (.07)	.31 (.07)	
Older adults			
Young confed		.19 (.05)	.27 (.08)
Older confed		.21 (.06)	.27 (.07)

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### Source Recognition

Performance on the source monitoring test is displayed in Table 5, and shows each type of response (seen in the slide only, spoken by the other participant only, both seen in the slide and spoken by the other participant, or neither seen in the slides nor spoken by the confederate) given for both contagion and control items. For contagion items, the correct response was “confederate only,” as these items were never presented in the scenes, but were only suggested during the collaborative recall, and the correct response for control items was “neither,” as these items were never presented in the context of the experiment. False recognition was defined as the proportion of items that participants erroneously attributed to the scenes, regardless of whether participants had also indicated that the item had been spoken by the other participant. This total false recognition for contagion and control items is displayed in the third and eighth rows of Table 5, respectively. A  $2 \times 2 \times 2 \times 2$  mixed ANOVA was performed on the false recognition scores to determine the effects of stimulus duration, participant age, and confederate age on the contagion effect. A significant main effect of contagion emerged,  $F(1, 136) = 13.48$ ,  $MSE = 0.06$ ,  $p < .001$ , demonstrating that the impact of the confederate’s suggestions persisted even when participants were instructed to scrutinize the source of remembered information. No other significant effects emerged. In other words, the discounting of older adult confederates did not appear in source recognition as it did in recall, even though the contagion effect still persisted. Additionally, there were no age differences in overall false recognition.

Next, correct source attributions for contagion items were examined. In this case,

participants correctly identified that contagion items had been spoken by the ostensible other participant, and did not identify those items as having been present in the studied scenes. A  $2 \times 2 \times 2$  between-participants ANOVA was conducted on the contagion items to examine correct source attributions in terms of duration, participant age, and confederate age. A significant Participant Age  $\times$  Confederate Age interaction [ $F(1,136) = 4.20$ ,  $MSE = 0.04$ ,  $p = .042$ ] demonstrated that while young adults showed no difference in correct source monitoring for contagion items across the two confederate ages [ $t < 1$ ], older adults showed increased correct source attributions for these items when the confederate was a young ( $M = .37$ ), rather than an older adult ( $M = .20$ ), [ $t(70) = 2.28$ ,  $SEM = 0.07$ ,  $p = .026$ ]. This finding corroborates our argument that while younger adults discount contagion items suggested by older adults in recall, older adults are less sensitive to an older confederate's suggestions. The reduced correct source attributions of contagion items demonstrated by older adults when paired with a fellow older adult again suggests that relatively less processing may be devoted to the responses of older adult confederates. To explore this issue further, misses for contagion items (i.e., responding that contagion items had not been presented in the context of the experiment) were examined, revealing a similar pattern as in the correct source attributions. Examination of Table 5 suggests that older adults were more likely to respond that contagion items had never been encountered in the experiment when those items were suggested by older adults than when suggested by young adults ( $M$ 's = .22 and .12, respectively). The analysis revealed a marginal interaction between participant age and confederate age, mirroring the effect evident for correct source attributions [ $F(1, 136) = 3.03$ ,  $MSE = 0.02$ ,

$p = .084$ ]. While this effect is only marginal, this effect in conjunction with the pattern observed in the correct source attributions indicates that younger adult confederates may be a more salient source of misinformation for older participants.

Finally, we analyzed correct recognition (attributing veridical items to the scenes) using a  $2 \times 2 \times 2$  between-participants ANOVA. As in correct recall, duration impacted correct recognition, such that participants given more time to view the scenes were able to recognize more of the studied items,  $F(1, 136) = 10.20$ ,  $MSE = 0.04$ ,  $p = .002$ . Additionally, a main effect of participant age emerged, such that older adults were more likely to correctly recognize studied items than were younger adults,  $F(1, 136) = 4.08$ ,  $MSE = 0.04$ ,  $p = .045$ . While this finding may seem somewhat surprising given the deficits older adults demonstrated in veridical recall, this improvement may reflect a bias to respond “scene” to studied items simply because they are schematically related to the studied scenes, and not because they recollect having seen the items.

Table 5. Mean proportion of veridical and false recognition for contagion and control items. YC denotes young confederates, and OC denotes older confederates. Standard deviations are in parentheses.

	<u>Young Adults</u>		<u>Older Adults</u>	
	YC	OC	YC	OC
	<u>Contagion Items</u>			
Slide only	.19 (.19)	.24 (.25)	.32 (.31)	.41 (.29)
Both slide and confederate	.36 (.34)	.27 (.30)	.20 (.27)	.16 (.21)
Total false recognition	.55 (.34)	.51 (.41)	.52 (.36)	.57 (.29)
Confederate only	.30 (.30)	.35 (.34)	.37 (.35)	.20 (.27)
Neither slide nor confederate	.15 (.12)	.14 (.16)	.12 (.15)	.22 (.14)

Table 5 continued.

	<u>Control Items</u>			
Slide only	.34 (.28)	.40 (.28)	.32 (.26)	.43 (.33)
Both slide and confederate	.08 (.19)	.04 (.08)	.05 (.09)	.06 (.17)
Total false recognition	.42 (.27)	.44 (.29)	.37 (.27)	.49 (.32)
Confederate only	.05 (.11)	.04 (.08)	.04 (.08)	.05 (.11)
Neither slide nor confederate	.53 (.27)	.52 (.30)	.60 (.26)	.49 (.31)

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## DISCUSSION

The current experiment examined age differences in social contagion both at the level of the participant and at the level of the confederate. First, the present study replicated Roediger, Meade, and Bergman's (2001) finding that erroneous information encountered in a social context leads to potent memory distortion. Second, this effect was largely driven by high-expectancy items. From a source monitoring perspective, post-event misinformation that is highly semantically similar to the studied stimuli were more likely to create source confusions, and the high levels of erroneous reporting observed in the high expectancy items confirmed this hypothesis (Johnson, Hashtroudi, & Lindsay, 1993). To the extent that an item may come to mind during retrieval or that an item is highly plausible (e.g., a *printer* vs. a *rolodex* in the desk scene), source monitoring will be more difficult. Above this simple main effect of expectancy, the fact that the following findings were driven by changes in reporting of high-expectancy items corroborates this account, and suggests that the social contagion effect occurs because of source monitoring errors.

Importantly, the current study examined age differences at the level of the individual rememberer in the social contagion paradigm. Critically, no participant age differences were observed in false recall, contrary to evidence from other paradigms that older adults should demonstrate increased false memories relative to young adults (Balota, Dolan, & Duchek, 2000; Dywan & Jacoby, 1990; Jacoby et al, 2005; Norman & Schacter, 1997). Given the equivocal nature of age differences in susceptibility to misinformation, however, this finding was not entirely unexpected. While some studies

(e.g., Cohen & Faulker, 1989; Mitchell, Johnson, & Mather, 2003; Roediger & Geraci, 2007) have found the predicted pattern of age differences in the misinformation paradigm (i.e., have demonstrated increased false memories in older adults relative to young adults), some have found no difference between young and older adults (e.g., Chan, Thomas, & Bulevich, 2009; Coxon & Valentine, 1997). However, we qualify this statement by mentioning that while a main effect of age was not observed, our confederate age manipulation affected young and older adult participants differently. While older adults were not more likely to demonstrate an increase in social contagion overall, age differences did emerge in source monitoring, judgments of remembering, and in the reporting of control items.

Young adult participants demonstrated a decreased reporting of high-expectancy contagion items in both the overall false recall analyses, as well as in items reported with a remember response. Furthermore, young adult participants appeared to discount even some veridical suggestions from the older adult confederate, indicating a criterion shift in which young adult participants exclude the entire report of the older adult confederate. Finally, young adults were equally likely to recognize the correct source of contagion items regardless of confederate age, indicating that the reduction in reporting of contagion items in recall was not due to increased source confusions for items that were suggested by the young adult confederate.

Older adult participants, however, demonstrated a very different pattern. While no differences emerged in the reporting of contagion items across the two levels of confederate age, an increased proportion of control items reported in the age-matched

condition suggested that the suggestions of older adult confederates were less salient. To corroborate this finding, older adult participants were significantly less likely to correctly attribute contagion items to the older confederate, and were more likely to report these items as never having been encountered at all.

Overall, it appears that participants of all ages were less likely to report suggestions delivered by older adult confederates, but this effect was due to slightly different mechanisms depending on the age of the participant. Young adults seem to have discounted suggestions of the older confederate, so much so that some veridical suggestions were also eliminated from memory reports. This is consistent with Meade and Roediger's (2002) findings that an explicit warning results in a criterion shift during recall, in which participants attempt to exclude all items encountered collaboratively and do not engage in item-specific monitoring of items encountered during collaboration when reporting their memories for the scenes. Furthermore, young adults discounted the erroneous suggestions of the older confederate not only in overall false recall, but in items reported as remembered, indicating that older adults' responses impact phenomenology as well. Finally, young adults were equally likely to correctly attribute contagion items to the young and older confederate on a final source monitoring test. This finding is particularly informative, and demonstrates that reduced reporting of contagion items for young adults is not dependent on recollection of source itself, but instead is dependent on the perceived credibility of the source. It appears that young adults may deem older adult confederates a less credible source of memory information, and discount their reports accordingly.

Older adults, however, demonstrated a more unexpected pattern. Instead of reducing the reporting of contagion items when paired with an older adult confederate, older adult participants with their same aged peers appeared to devote relatively less processing to suggested items, as evidenced by increased reporting of control items. This increase in baseline reporting of the schematically consistent items then reduced the overall impact of suggestions from an older adult confederate. This finding is consistent with the notion that older adults may rely on increased schematic processing when constructing a memory report (Huff, Meade, & Hutchison, in press). However, when paired with a young adult confederate, older adults reported fewer control items, which may perhaps reflect an increased salience of younger adults' suggestions. This pattern suggests that when older adults are paired with an older confederate, older adults rely more on schematic processing to generate items, and the impact of the confederate's suggestion is relatively small when compared to this baseline. In contrast, when older adults were paired with the young adult confederate, baseline reporting of control items was reduced, increasing the overall contagion effect, and suggesting that items delivered by a young adult confederate may become more salient to older adults. Final support for this assumption comes from the source monitoring test. When paired with an older adult confederate, older adults were more likely to correctly attribute contagion items to the confederate only, and were more likely to indicate never having experienced the suggested items in the experiment at all, although we add that this final finding was of marginal significance. However, when paired with a young confederate, older adults demonstrated enhanced correct source monitoring ability, signifying that the erroneous

suggestions of a younger collaborator may be more salient.

Furthermore, the pattern of false recall in the mixed-age dyads (i.e., young adults paired with an older adult confederate and older adults paired with a young adult confederate) suggests that collaborating with a confederate who is different in age from the participant may make that confederate's suggestions more salient. While work on mixed-age dyads in collaborative memory is scant if not nonexistent, research in the problem-solving literature has suggested that mixed-age interactions may be unusual for both parties (Siegel & Gregora, 1985). Siegel and Gregora reported that when young and older adults completed a problem solving task together, they engaged in more task discussion, including task affirmation, than either same-age groups. In the present study, the presence of an other-aged confederate may have made his suggestions more distinctive. Thus, for young adult participants, the additional availability of source information regarding the older confederate's suggestions may lead them to discredit their collaborator, and withhold responding with the confederates suggestions on a later recall test. For older adults, however, the more-salient suggestions of the young adult confederate may lead to *increased* reporting of the suggested items, ostensibly because the young adult may be a more credible source of memory information.

Therefore, we conclude that while the contagion effect was reduced for both ages when the confederate was an older adult, this reduction reflects the operation of different processes in each age group. However, this reduction in the contagion effect for older adult confederates did not persist on the final source recognition task. In fact, across the age levels of the participant and confederate, the contagion effect was statistically equal.

This dissociation between recall and source recognition suggests that social contagion is equally powerful across participant and confederate ages in terms of true memory distortion (which results from source monitoring errors), but that confederate age differentially impacts the likelihood of incorporating suggested items on an initial recall test.

By systematically manipulating both confederate age and participant age, we have circumvented the confound present in Gabbert et al.'s (2003, 2004) work on age differences in memory conformity. In their paradigm, older adults demonstrated both equal and less suggestibility to memory conformity. In both cases, though, young and older participants were paired only with an age-matched peer. In the present experiment, we demonstrated that the impact of erroneous suggestions depends on confederate age. Given the fact that confederate age plays a role in both young and older participants' contagion effect, Gabbert et al.'s (2004) findings that older adults are less suggestible than young adults may have reflected the same process observed in our older adult age-matched pairs in the current study.

While the current study suggests that older adults may be equally susceptible to social contagion regardless of stimulus duration, we must add that our older participants still demonstrated overall poorer recall, despite giving older adults three times as long to view the scenes as young adults. While we did not equate original learning in our young and older participants, we do not consider this problematic for our findings for two reasons. First, there are conditions in which older adults demonstrated equal veridical recall and young adults. Veridical recall was equated between older adults paired with

both ages of the confederate and young adults paired with an older confederate in both durational conditions, as seen in Table 4. However, false recall in these conditions differed in terms of participant age and confederate age, despite equated veridical recall. Second, our durational manipulation did impact veridical recall, but this durational manipulation did not enter into any main effects or interactions when examining false recall. If the false recall of both young and older adult participants was dependent on original learning, the duration manipulation would have been expected to produce increased false recall at the short duration. In fact, such a difference was not observed.

This finding that stimulus duration did not affect false recall, especially when examining young adults paired with a young confederate, is somewhat surprising. This condition was a direct replication of Meade and Roediger (2002, Experiment 2). In their study, young adults given less time to view the scenes demonstrated an increased contagion effect (.32 vs. .20 for the 5- and 15-second conditions, respectively). While we had no a priori hypotheses regarding the durational manipulation for young adults paired with an older confederate or older participants in general, we had expected to replicate previous findings for our age-matched young adult participants. However, a procedural manipulation in the current study may have impacted the effect of duration on false recall. We modified the original procedure in one critical way: following each scene, we included a slide with the name of the upcoming scene for two seconds. It is possible that this addition allowed participants to episodically consolidate the previously viewed scene, decreasing the impact of scene duration on false recall and recognition.

Overall, we have demonstrated that false recollections are indeed infections, in that items erroneously reported in a social context may contaminate the memory reports of individuals who hear these suggestions. More importantly, however, the impact of suggestion is substantially reduced when these suggestions come from an older adult. While this finding was not unexpected, it is somewhat concerning, especially if this discounting translates to veridical suggestions of older adults as well. From another perspective, our study suggests that incorrectly recalled information delivered by a younger adult may be more likely to go unnoticed simply because of their age status, which is also somewhat concerning. These differences are also not likely due to any other confounds due to the use of a younger adult confederate, such as tone of voice, pitch, or volume. In fact, young adults participants were equally likely to recognize the source of contagion items, regardless of whether the suggested items came from a young or older confederate. Finally, regardless of participant age, we have demonstrated that perceived credibility of the source of information may impact false recall in our paradigm, and have replicated previous work in the memory conformity paradigm suggesting that older adults are not more suggestible to social contagion than young adults.

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