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Chatting in the Face of the Eyewitness: The Impact of Extraneous Cell-Phone Conversation on Memory for a Perpetrator

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Cell-phone conversation is ubiquitous within public spaces. The current study investigates whether ignored cell-phone conversation impairs eyewitness memory for a perpetrator. Participants viewed a video of a staged crime in the presence of 1 side of a comprehensible cell-phone conversation (meaningful halfalogue), 2 sides of a comprehensible cell-phone conversation (meaningful dialogue), 1 side of an incomprehensible cell-phone conversation (meaningless halfalogue), or quiet. Between 24 and 28 hr later, participants freely described the perpetrator’s face, constructed a single composite image of the perpetrator from memory, and attempted to identify the perpetrator from a sequential lineup. Further, participants rated the likeness of the composites to the perpetrator. Face recall and lineup identification were impaired when participants witnessed the staged crime in the presence of a meaningful halfalogue compared to a meaningless halfalogue, meaningful dialogue, or quiet. Moreover, likeness ratings showed that the composites constructed after ignoring the meaningful halfalogue resembled the perpetrator less than did those constructed after experiencing quiet or ignoring a meaningfulness halfalogue or a meaningful dialogue. The unpredictability of the meaningful content of the halfalogue, rather than its acoustic unexpectedness, produces distraction. The results are novel in that they suggest that an everyday distraction, even when presented in a different modality to target information, can impair the long-term memory of an eyewitness.

Keywords: distraction, cell phones, eyewitness memory, dialogue, halfalogue
Within modern society, engaging in cell-phone conversation is known to have adverse consequences on cognition, particularly in relation to driver accuracy (Strayer & Johnston, 2001) and pedestrian behavior (Stavrinos, Byington, & Schwebel, 2011). For a passive bystander, others’ halfalogues (halves of conversations such as a cell-phone conversation whereby only one speaker can be heard) are rated as more noticeable and intrusive than are dialogues (i.e., complete conversations, as in when one can hear both sides of the conversation; Monk, Fellas, & Ley, 2004). Moreover, cognitive performance can be differentially affected by halfalogues and dialogues. For example, Emberson, Lupyan, Goldstein, and Spivey (2010; see also Galvan, Vessal, & Golley, 2013) found that ignoring a halfalogue compared with a dialogue produced disruption to performance on a visual monitoring (tracking) task and a choice reaction task. Although the existing evidence has suggested that overhearing half of a cell-phone conversation is enough to reduce performance on a concurrent, attentionally demanding task, there has been no attempt to investigate the potential impact of ignoring cell-phone conversations on the recall of complex visual information in more applied tasks such as following the witnessing of a (staged) crime.

Typically, existing work on distraction via background sound has found impairment of short-term memory (STM) for sequences of visually presented items (e.g., Hughes, Vachon, & Jones, 2005), but no study has shown impairment of long-term memory (LTM) when sound is presented during the encoding of visual material. Certainly, from what is known about auditory distraction, it should be the case that background sounds that cause attention to be withdrawn from the prevailing task will impair encoding of visual events and therefore the later ability to recall those events from LTM. One type of auditory distraction has been attributed to attentional diversion and occurs when the sound draws the attentional focus away from the prevailing mental activity (such as when an unexpected acoustic deviation is detected; e.g., the “m” in the irrelevant sequence “k k k k k k m k k k”; Hughes, Vachon, & Jones, 2007). Another type of auditory distraction is attributable to interference-by-process (Jones & Tremblay, 2000). Essentially, performance impairment ensues when there is a conflict between processes engaged to perform the focal task and processes applied involuntarily to the sound.

According to the attentional diversion standpoint, overhearing half of a conversation during study could impair encoding and therefore later recall from LTM at test because attention is directed involuntarily toward the sound due to a “need-to-listen.” This need-to-listen is driven by the tendency to predict the semantic content of the inaudible half of the conversation (Monk et al., 2004; Norman & Bennett, 2014). Attentional diversion can also occur due to rudimentary processing of the acoustic features of the ignored speech (Hughes et al., 2007). The unexpected onset and offset of the voice within one side of a phone conversation could produce a violation of the expectancy of auditory events within the sound stream, causing a disengagement of attention away from the focal task and impoverished recall of visual events. This “attentional capture” produced by the unpredictable onsets and offsets of a cell-phone conversation would be synonymous with the finding that unexpected changes in the pattern of auditory stimulation (e.g., the “m” in the irrelevant sequence “k k k k k k k k k k”) impairs STM for a sequence of visually presented items (e.g., Hughes et al., 2005, 2007; Vachon, Hughes, & Jones, 2012). Therefore, both the need-to-listen and attentional capture accounts suggest that distraction is produced via attentional diversion.

According to the interference-by-process view, only tasks that require retention of serial order information should be vulnerable to distraction via changing-state sound (i.e., sound sequences that demonstrate abrupt changes in their acoustic properties; e.g., “c t g u”; Beaman & Jones, 1997). However, in contrast to the distraction produced by interference-by-process, attentional diversion orders occur regardless of the task processes involved (Hughes et al., 2007; Vachon, Labonté, & Marsh, 2016). Therefore, if a half-conversation produces an attentional diversion effect, then disruption should manifest in complex cognitive tasks regardless of whether it involves serial STM. Witnessing and remembering an event is an example of such a task: Witnesses encode complex visual and/or auditory information that must be maintained so that it may later be recalled. Any distraction during the event may prevent eyewitnesses from encoding details that would later help to retrieve information from LTM, impacting negatively on their memory for event and person details.

The Current Study

The current study’s primary aim was to determine whether a to-be-ignored halfalogue negatively impacts on the LTM of an eyewitness to a staged crime. Attention was manipulated during the encoding of the crime event. Participants witnessed a video of a staged crime, prior to which they were told to ignore one of the following that occurred during the video: a full conversation (meaningful dialogue), a cell-phone conversation (meaningful halfalogue) in a language they spoke, a spectrally rotated cell-phone conversation (incomprehensible to the participant and hence a “meaningless halfalogue”), or no sound (quiet). Between 24 and 28 hr later, the same participants described the perpetrator’s face from the staged-crim video in as much detail as possible and constructed a computer-generated likeness of the perpetrator (a composite). Finally, the participants were presented with a sequential lineup (cf. Stelbay, Dysart, Fulero, & Lindsey, 2001) of nine static facial photographs that included the perpetrator and eight distractor faces that were similar to that of the perpetrator in overall visual appearance. For each facial photograph, the participants were required to rate on a scale of 1–7 how certain they were that the identity depicted was the person they witnessed in the staged-crim video they viewed the previous day. These tasks were selected due to their ready use within police investigation (Frowd et al., 2013). Following this initial wave of experimentation, a set of independent judges rated the similarity of composites generated in each of the conditions (meaningful dialogue, meaningful halfalogue, meaningless halfalogue, and quiet) to the perpetrator.

Given the demonstrable effect that unexpected auditory stimulation can have on simple attentional tasks (Emerson et al., 2010) regardless of the processes that underpin performance of the primary task (Hughes et al., 2007), it was expected that ignoring a halfalogue would result in greater distraction than would ignoring a dialogue (and witnessing the staged crime in quiet; e.g., Emerson et al., 2010). Within this setting, distraction could manifest via recall of fewer correct facial details about the perpetrator, impaired ability to identify the perpetrator from the sequential lineup, and the production of composites that bear weak
resemblance to the perpetrator. It is important to note that our inclusion of a meaningless halfalogue offered an opportunity to tease out whether any unique distraction produced by the halfalogue could be attributable to a need-to-listen, whereby the semantic properties of the task-irrelevant speech draws attention from the primary task (Monk et al., 2004; Norman & Bennett, 2014), or to attentional capture, whereby an unexpected physical change in the auditory environment (such as the sudden onset of speech) is responsible for the withdrawal of attention from the focal task (e.g., Hughes et al., 2005, 2007).

Method

Participants

Ninety-six students at the University of Central Lancashire (71 female) between the ages of 20 and 31 years (M = 23.5, SD = 3.21) took part in the main empirical study. Participants were recruited via opportunity sample. All participants spoke English as their first language and reported normal (or corrected-to-normal) vision and normal hearing. Twenty-four participants were allocated to each of the four sound conditions in the experiment. Nine participants did not return for the second part of the study and were replaced. A further 20 participants (14 female) between 21 and 37 years of age (M = 25.9, SD = 4.9) were recruited for the rating phase.

Apparatus and Materials

Four versions of the same video of a staged crime that differed only with regard to the auditory background were used. The versions consisted of the following: quiet, a meaningful halfalogue (one side of a cell-phone conversation between two female speakers presented in the participants’ native language), a meaningless halfalogue (the sound presented for the meaningless halfalogue but spectrally rotated to render it incomprehensible), and a meaningful dialogue (two sides of the same cell-phone conversation presented as meaningful halfalogue). The same cell-phone conversation was therefore used for both the meaningful halfalogue and the meaningful dialogue conditions, with the former being created by deleting one of the speaker’s voices. In the halfalogue version, there were nine pauses that ranged between 1.4 and 7.7 s (M = 3.14, SD = 2.08). The video and the cell-phone conversation lasted for 1 minute, and the onset of this conversation coincided with the onset of the video. The video depicted a man in his early 20s entering a corner shop and attempting to steal money from an unoccupied cash register—which could not be forced open—before making good his escape with several packets of cigarettes.

The topic of the phone conversation was based on a BBC news article about the nation’s favorite children’s book and was digitally recorded and sampled with a 16-bit resolution at a sampling rate of approximately 44.1 kHz using a broadcast quality Dictaphone in an anechoic chamber. Halfalogues were created by silencing the voice of one of the speakers within the auditory file. The spectrally rotated halfalogue was created by spectrally inverting the speech recording around 2 kHz (as in Scott, Rosen, Beaman, Davis, & Wise, 2009). Spectrally rotating speech involves transforming the high-frequency energy into low-frequency energy and vice versa. Spectrally rotated speech is almost identical to normal speech (Scott et al., 2009). For example, variations in SPL across time and the duration of pauses between words and sentences are fairly equal. However, rotated speech is meaningless because it is incomprehensible.

The four versions of the same video (with different audio backgrounds) were created by embedding the audio onto the video using Windows Live Movie Maker. Both normal speech and rotated speech were presented over stereo headphones at approximately 69 dB (LAeq) as measured with an artificial ear. The computer program PRO-fit (Version 3.5; Frowd et al., 2014) was used to generate the facial composites. PRO-fit is a feature-based system that involves presenting the witness with facial features (e.g., hair, eyes, nose, mouth) that match the face that the witness has previously described (for an overview, see Frowd et al., 2014). This stage is described in more detail in the Procedure section.

Procedure

In the first session, participants viewed a staged-crime video in the context of one of the four sound conditions that they were randomly allocated to with equal sampling. They were seated at a distance of approximately 60 cm from the PC monitor in a testing cubicle and wore headphones. They were instructed to ignore any background sound, to know that they would not be asked anything about the sounds during the experiment, and to focus on studying the video. Participants were asked to return between 24 and 28 hr later, but the nature of the second visit was not revealed at this time.

In the second session, we revealed that a composite of the perpetrator witnessed in the staged-crime video would be required. Participants were told that the goal of creating the composite was to produce an accurate portrayal of the perpetrator’s face so that another person could recognize the face as such. Participants were told that they would first describe the appearance of the face and then construct a composite of it. They were also told that there was no time limit to complete the face composite construction procedure (for existing articles explaining the detailed procedure for undertaking the face-recall interview and PRO-fit construction, see, e.g., Frowd et al., 2013). In brief, participants were asked to think back to the time when the perpetrator had been seen, visualize the face, and then to try to recall as much detail about it as possible without guessing. The experimenter wrote down information that the participants recalled in relation to the face in this free-recall format. Participants were then informed that a composite would be constructed of the face using PRO-fit. The experimenter entered details from the face-recall phase into the description details of PRO-fit. This generated the different features for the described face. If participants were not satisfied with a feature, then its size or location was adjusted or it was exchanged for another feature. Once participants reported that the best likeness had been achieved, the face was saved to a disk as the composite.

Following completion of the composite, participants undertook the sequential lineup task. They were given a sequential presentation of facial photographs of nine identities that comprised the target (perpetrator), and eight foils that resembled the target in overall appearance. Using a 7-point Likert scale ranging from 1 (guess) to 7 (certain), participants were asked to indicate the certainty with which they considered that each facial photograph was the same identity as the person they witnessed in the staged-
crime photographs were presented was pseudorandom: Although the foils were presented in a random order for each participant, the target was presented in either Position 4 or Position 5 within the sequence. Participants were reminded that there was no time limit to complete the sequential lineup task. The time taken to complete the face composite construction and sequential lineup task varied between 25 and 45 min.

Once all of the composites had been constructed, other participants were asked to rate the likeness of each of the composites compared to a frontal shot of the target (perpetrator) using a 7-point Likert scale ranging from 1 (very-poor likeness) to 7 (very-good likeness). Participants provided ratings for 96 composites (the 24 composites generated from within each sound condition). Composites were presented individually, each one next to the photograph of the target on a page in an A4 booklet. The presentation order of the composites was random for each participant.

Design

The main empirical study (compared to the composite rating task) employed a between-subjects design whereby the independent variable was sound condition, with four levels: quiet, meaningless halfalogue, meaningful halfalogue, and meaningful dialogue. For the face-recall part of the study (usually undertaken as part of a cognitive interview), the dependent variable was facial descriptor type, which had three levels: correct details, incorrect details, and subjective details (see further explanation later). For the sequential lineup component of the task, the independent variable was identity and had two levels: target (i.e., perpetrator) or foil, and the dependent variable was the confidence rating given to the target face and the mean rating given to the eight foils (collapsed). Finally, for the set of participants who independently rated the similarity of the composites to the target, the design was fully repeated measures, whereby the within-subject factor was sound condition (again quiet, meaningless halfalogue, meaningful halfalogue, and meaningful dialogue) and the dependent variable was the similarity of each composite to the target rated on a scale of 1–7 (described earlier).

Results

Verbal Recall

The quality of the face descriptions given by the participants within each sound condition was analyzed by two individuals. Following the procedure used by Meissner, Brigham, and Kelley (2001), a correct description was generated by the two raters for the perpetrator’s face, and a decision was reached between the two raters as to which details would be classed as correct. Details in the descriptions were coded as correct, incorrect, or subjective. Subjective details were those that could not be verified directly (e.g., inferences about personality, or similarity to a well-known celebrity or family member). Interrater agreement was high, Cohen’s $\kappa(72) = .87, p < .001$ (Cohen, 1988). Contradictory scorings were resolved through discussion. The mean number of correct and incorrect features listed per condition can be seen in Figure 1. The mean number of correct descriptors provided was lower in the meaningful halfalogue condition compared to the meaningless halfalogue, meaningful dialogue, and quiet conditions. No difference between means was apparent for incorrect descriptors. Only five details were classified as subjective descriptors across all four conditions, and because of this, subjective descriptors were excluded in the further analysis.

A 4 (sound condition: meaningful dialogue vs. meaningful halfalogue vs. meaningless halfalogue vs. quiet) × 2 (facial descriptor type: correct response vs. incorrect response) mixed factor analysis of variance (ANOVA) carried out on the mean number of face descriptors recalled revealed a main effect of facial descriptor type, $F(1, 92) = 47.70, MSE = 6.61, p < .001$, with more correct than incorrect descriptors recalled ($\eta^2_p = .34$), but no main effect of sound condition, $F(3, 92) = 2.09, MSE = 2.62, p = .11, \eta^2_p = .06$. The Facial Descriptor Type × Sound Condition interaction was significant, $F(3, 92) = 2.80, MSE = 6.61, p = .043, \eta^2_p = .084$. A simple-effects analysis (least significant difference [LSD]) revealed that correct facial descriptors were more frequent than incorrect facial descriptors for the quiet condition ($p < .001$), meaningful dialogue condition ($p < .001$), and meaningless halfalogue condition ($p < .001$) but not for the meaningful halfalogue condition ($p = .35$). Moreover, correct descriptors were less frequent in the meaningful halfalogue condition compared with the quiet condition ($p = .004$), meaningful dialogue condition ($p = .012$), and meaningless halfalogue condition ($p = .005$). There was no difference between the means for the quiet and meaningless halfalogue conditions ($p = .95$), quiet and meaningful dialogue conditions ($p = .70$), and meaningless halfalogue and meaningful dialogue conditions ($p = .75$). Moreover, there was no difference between conditions with respect to the frequency of incorrect information provided ($p > .1$ for all comparisons). Therefore, a to-be-ignored halfalogue, provided it is meaningful, presented during the witnessing of the staged-crime video diminished the quality of face description given the next day.

Sequential Lineup Task

For the lineup task, the ratings reflecting the certainty that the identity was the same as the target in the video previously were...
addressed by comparing the mean rating given to the foil faces with the rating given to the target. Figure 2 shows the mean confidence ratings for the foil identities (collapsed across identities) and the target for each of the four sound conditions. The confidence ratings were clearly greater for the target in the quiet, meaningful dialogue, and meaningless halfalogue conditions compared to the meaningful halfalogue condition. However, confidence ratings assigned to foil identities appears to differ little between conditions.

A $4 \times 2$ (sound condition × identity: target or foil) mixed-factorial ANOVA performed on mean confidence ratings revealed a main effect of identity, with higher confidence ratings for the target than for foils, $F(1, 92) = 250.12, MSE = 1.91, p < .001$, $\eta^2_p = .73$, but no main effect of sound condition, $F(3, 92) = 1.90, MSE = 1.70, p = .14, \eta^2_p = .06$. However, there was a significant Sound Condition × Identity interaction, $F(3, 92) = 3.50, MSE = 1.91, p = .019, \eta^2_p = .10$. A simple-effects analysis (LSD) revealed that the mean confidence rating given to the target was lower in the meaningful halfalogue condition compared to the quiet condition ($p = .010$), the meaningful dialogue condition ($p = .042$), and the meaningful halfalogue condition ($p = .019$). There was no significant difference between the quiet and meaningful dialogue conditions ($p = .58$), quiet and meaningless halfalogue conditions ($p = .81$), or the meaningful dialogue condition and the meaningless halfalogue conditions ($p = .75$). Therefore, a meaningful to-be-ignored halfalogue presented concurrently with the mock-crime video reduced the confidence with which the target was chosen from a lineup the next day.

**Composite Likeness Ratings**

Figure 3 shows the means for the likeness scores given by the raters for the 24 composites within each of the four sound conditions.

![Composite Likeness Ratings](image)

**Figure 3.** Mean likeness ratings awarded to the composites in the presence of a photograph of the target as a function of sound condition (1 = very poor likeness, 7 = very good likeness). Error bars represent the standard error of the mean.

To summarize, ignoring half of a cell-phone conversation, providing it is meaningful, was shown to impair the long-term memory (LTM) of the participant eyewitnesses. That the accuracy of eyewitness LTM—as measured through recall of facial descriptors, identification from a lineup, and composite accuracy—is susceptible to disruption via the presence of intermittent conversational background speech is important to acknowledge given the prominent role that eyewitnesses play in many criminal cases. Composite images serve two purposes. On presentation within the media, they can generate leads from the general public to aid criminal investigations. They are also used as a reference from which criminal investigators can narrow likely suspects that may already be on file. Therefore, inaccuracies in eyewitnesses’ memory—and subsequent composite quality—can potentially lead to
false identifications (and arrests) and the pursuit of erroneous leads.

It is emerging that extraneous background speech can impair face memory in several ways. One way, for example, is through disruption of subvocal verbalization. It has become reasonably well accepted that spontaneous verbal codes are created for faces (Schooler, 2002). Indirect evidence that participants verbally rehearse descriptions of faces within STM, and that such rehearsal ordinarily facilitates face recognition performance, comes from studies preventing subvocal verbalization by the use of articulatory suppression, a technique that requires participants to utter some repeated sounds (e.g., “ba ba ba”). Articulatory suppression impairs face recognition (Nakabayashi & Burton, 2008, Experiment 1; Nakabayashi, Burton, Brandimonte, & Lloyd-Jones, 2012; Wickham & Swift, 2006), whereas manual tapping—assumed to be as attentionally demanding as articulatory suppression without preventing verbalization—does not (e.g., Nakabayashi & Burton, 2008, Experiment 3; Wickham & Swift, 2006). Whereas articulatory suppression potentially eliminates the use of subvocal rehearsal, extraneous changing-state speech (sound sequences that are acoustically changing [e.g., “c t g u”] compared to unchanging, steady-state speech [e.g., “c c c c”]) disrupts subvocal rehearsal due to processing conflict (see Jones, Madden, & Miles, 1992). Consistent with the view that changing-state speech disrupts subvocal rehearsal and that subvocal rehearsal is used spontaneously to facilitate unfamiliar face learning, Marsh et al. (2016) have found that extraneous changing-state speech (randomly presented strings of letters), compared to steady-state speech (a string of the same letter repeated), presented during a 6-s exposure to a target face impairs recognition of that face from a lineup. However, that such interference is entirely independent of the semantic content of the speech suggests that the disruption is consistent with an interference-by-process view of distraction (Jones et al., 1992). Here, the preattentive processing of the serial order of changes within sound interferes with the similar, deliberate process of subvocally rehearsing information derived from the visual modality in serial order.

In the context of the current study, however, we favor an attentional diversion account (Hughes et al., 2007; Monk, Fellas, & Ley, 2004) over the disruption of subvocal rehearsal account for three reasons. First, participants did not know in advance that face recall, composite construction, and lineup identification would be required subsequently. Therefore, the participants may not have rehearsed facial details explicitly. Second, perhaps counterintuitively, the subvocal rehearsal process appears to utilize configural as opposed to featural information (Nakabayashi, Lloyd-Jones, Butcher, & Liu, 2012), which, according to Schooler (2002), involves information concerning the face’s global percept, including the spatial layout among its facial features. If disruption of subvocal rehearsal were the cause of face memory impairment, then it would appear quite counterintuitive that PRO-fit, a feature-based system (due to its requirement for recall of individual, isolated features and recognition of features in the context of the whole face) could capture the distraction effect. Third, since to-be-ignored meaningful dialogue speech—which presumably contains sufficient changing-state information to disrupt serial rehearsal (Jones et al., 1992) and, in fact, more change than within halfalogues—failed to produce disruption, it is unlikely that the action of the meaningful to-be-ignored halfalogue speech is attributable to the disruption of subvocal rehearsal.

Moreover, in the context of attentional diversion accounts (e.g., Hughes et al., 2007; Monk et al., 2004) the results of the experiment were unequivocal in providing support for the need-to-listen account of the halfalogue effect (Monk et al., 2004; Norman & Bennett, 2014) over an attentional capture account (cf. Hughes et al., 2005, 2007). The halfalogue effect appeared only when the background speech material was meaningful. Because both the meaningful and meaningless (rotated) halfalogue speech were equated in terms of their acoustic complexity and temporal unpredictability, that only the meaningful halfalogue produces impairment refutes the idea that the halfalogue produces disruption due to the acoustic unexpectedness (and hence attentional capture) attributable to the physical characteristics of sound (cf. Hughes et al., 2005). That the halfalogue effect is dependent upon the presence of semantic properties within the sound demonstrates that it is a form of distraction that differs from that attributable to acoustic unexpectedness (Hughes et al., 2005, 2007; Vachon, Hughes, & Jones, 2012). In the context of the current study, it appears that the meaningful halfalogue produces attentional diversion whereby the need-to-listen engendered by the tendency to want to predict or complete the missing part of the conversation causes an impoverished encoding of details about the perpetrator, thereby impairing face recall and recognition. Although the task of face description, face construction, and target identification from a lineup are usually carried out in this sequence in the real world, it is possible that these tasks may influence each other. For example, describing the target could have influenced the composite construction, and the composite construction may have influenced target identification.
in the lineup. Therefore, impoverished memory for the target produced by the meaningful half analogue could have knock on effects at several loci within the procedures undertaken with the eyewitness.

Although it is perhaps intuitive that masking or otherwise interfering effects of additional environmental sounds such as voices may impede recognition and recall of a perpetrator’s voice (cf. Stevenage et al., 2013), it is perhaps less intuitive that stimulation from a specific modality (auditory) should impair processing of information that is derived from another modality (visual). However, the present findings unequivocally demonstrate that cell-phone conversation (meaningful half analogue) breaks through selective attention and impairs LTM even if participants know that the sounds contain no information that is relevant to the prevailing task (cf. Marsh et al., 2015) and therefore should be ignored.

To our knowledge the current results are novel in demonstrating that extraneous speech presented during encoding can produce adverse effects on LTM for complex visual information: the appearance of a human face. Therefore, the findings illustrate the importance of considering the auditory environment when assessing the reliability of eyewitness memory. Moreover, these findings have implications far beyond the forensic context. Exposure to half of a conversation is a common occurrence that can impact negatively on one’s memory for complex visual information. Our results show that this irrelevant auditory information cannot simply be ignored and as such has the potential to interfere with one’s processing of information in a wide range of daily activities.

References


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AUTHOR QUERIES

AUTHOR PLEASE ANSWER ALL QUERIES

AQau—Please confirm the given-names and surnames are identified properly by the colors.

= Given-Name,  = Surname

The colors are for proofing purposes only. The colors will not appear online or in print.

AQ1—Author: In the sentence beginning “According to the,” the “need-to-listen” term is left in quotation marks here but not elsewhere because we highlight special terms on only the first mention.

AQ2—Author: In the sentence beginning “Any distraction” and elsewhere, to avoid mixing singular nouns (e.g., eyewitness) with plural pronouns (e.g., their), such instances were rephrased, here to the plural.

AQ3—Author: The first heading was changed from the original Experiment to this following usual heading wording.

AQ4—Author: The sentence beginning “Participants witnessed” was rephrased a little for clarity. Does it convey the intended meaning?

AQ5—Author: In the sentence beginning “Ninety-six students,” and elsewhere, because we use “female” and “male” as only adjectives, they were changed where needed, here to the adjective use.

AQ6—Author: In the sentence beginning “For example,” please spell out SPL without the abbreviation, which doesn’t appear elsewhere.

AQ7—Author: In the sentence beginning “The four versions,” please provide a reference for the Windows software program where the bullets appear, following Example 56 on page 211 of the sixth edition of the APA manual if there are no authors.

AQ8—Author: In the sentence beginning “The computer program,” please provide a reference for the PRO-fit program where the bullets appear, following the explanation in the previous query if appropriate.

AQ9—Author: In the sentence beginning “This stage is described” and elsewhere, instances of “below” and “above” were rephrased to avoid possible incongruence between the meaning of the word and the layout of the text.

AQ10—Author: In the sentence beginning “They were given,” as written it sounds like a total of
17 identities (9 + 8). Is that correct? Or should it say something like “… (perpetrator), eight of which were foils that resembled the target to some extent in overall appearance”? (“to some extent” was included to avoid the implication that the foil images were equal the correct one.)

AQ11—Author: In the sentence beginning “Using a 7-point,” were “guess” and “certain” the exact words shown to participants? And were they lowercased? Please amend if needed.

AQ12—Author: In the sentence beginning “However, the present findings,” the date in the original Marsh, Demaine, et al. citation was changed from 2016 to 2015 to match the reference list entry, which is correct per online article. Is this correct? (Demaine isn’t needed because the other Marsh reference is for 2016.)

AQ13—Author: In the sentence beginning “Exposure to half” and the following one, instances of the editorial “we” (use of “our”) were changed to “one’s.”

AQ14—Author: Hughes, R. W., & Jones, D. M. (2005). Please cite in text or delete reference. If the first Hughes, Vachon, & Jones (2005) citation should be just Hughes & Jones (2005), be sure to change the first instance of Hughes et al. (2005) to all three names because it would be the first instance of it.


AQ16—Author: Scott, S. K., Rosen, S., Beaman, C. P., Davis, J. P., & Wise, R. J. S. (2009). “right and left” was changed to “left and right” per online article.

AQ17—Author: Strayer, D. L., & Johnston, W. A. (2001). Second author was changed from Johnson to Johnston per online article.

AQ18—Author: In the author notes: (1) Please insert the departments where the bullets appear in the first paragraph. (2) If any author has changed affiliation since the article was written, please provide the new department and institution in a new second paragraph, and if any is nonacademic, include the city and state/country. (3) Is there any thanks information to add?