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The effect of encoding duration on implicit and explicit eyewitness memory

Rolando N. Carol^{a,*}, Nadja Schreiber Compo^b

^a Auburn University at Montgomery, Department of Psychology, Goodwyn Hall 210C, 7061 Senators Drive, Montgomery, AL 36117, United States

^b Florida International University, Department of Psychology, MMC, DM 288, 11200 S.W. 8th Street, Miami, FL 33199, United States

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ABSTRACT

The present study investigated the effect of encoding duration on implicit and explicit eyewitness memory. Participants ($N = 227$) viewed a mock crime (brief, 15-s vs. long, 30-s vs. irrelevant/control) and were then tested with both implicit and explicit memory prompts or with explicit memory prompts only. Brief-encoding participants revealed more critical details implicitly than long-encoding or control participants. Further, the number and percentage of accurate details recalled explicitly were higher for long-encoding than for brief-encoding participants. Implicit testing prior to explicit recall—as compared to completing a filler task—was detrimental to free recall performance. Interestingly, brief-encoding participants were significantly more likely to remember critical details implicitly but *not* explicitly than long-encoding participants. This is the first study to investigate implicit eyewitness memory for a multimodal mock crime. Findings are theoretically consistent with prior research on cognition while expanding upon the extant eyewitness memory and investigative interviewing literature.

1. The effect of encoding duration on implicit and explicit eyewitness memory

After a crime has occurred, a primary objective for investigators is to interview any eyewitness who can provide information about the particular crime. If, during an investigative interviewing, an eyewitness claims to be unable to remember a particular detail, is it fair to assume memory of this detail is lost for good? Memory researchers have reason to argue that, in fact, this is an invalid assumption. Based on an extensive body of research (for a review see Schacter, Chiu, & Ochsner, 1993), two fundamental distinctions in the literature lend support to this contention: (1) the distinction between availability and accessibility and (2) the distinction between explicit and implicit memory. Tulving and Pearlstone (1966) distinguished memory availability (i.e., the *presence* of a memory trace in storage) from accessibility (i.e., a memory trace *retrieved* from storage). Further, they demonstrated that unrecalled memories were not erased from storage but needed to be accessed via effective cues. Kihlstrom (2004) suggests that while memory availability is a byproduct of encoding processes, the accessibility of memory is a byproduct of retrieval processes. Drawing a parallel to eyewitness scenarios, it is important to distinguish between which crime-relevant details are *available* in memory and which details are actually *accessible*.

Regarding the second fundamental distinction, Schacter (1987) highlights the dissociation between explicit (i.e., conscious) and implicit memory (i.e., prior experience(s) facilitating performance *without* awareness). While explicit memory is elicited by asking witnesses to recall or recognize directly, implicit memory is inferred from how witnesses perform on a given indirect memory task. Consequently, as investigative interviews consist purely of explicit probes, eyewitness implicit memory remains entirely untapped.

* Corresponding author.

E-mail addresses: rcarol@aum.edu (R.N. Carol), schreibe@fiu.edu (N. Schreiber Compo).

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Taken together, if one assumes that (a) eyewitness memory availability exceeds eyewitness memory accessibility and (b) only explicit memory of the crime has been probed, then an eyewitness may still possess available memories accessible through implicit measures. The present research, therefore, explored this theoretically-predicted dissociation between implicit and explicit memory for a mock eyewitness scenario. More specifically, our goals were to: (1) demonstrate that eyewitnesses can reveal memory implicitly for a multi-modal event, and (2) identify conditions under which eyewitnesses can reveal implicit memory for details not recognized explicitly.

1.1. Explicit and implicit memory

A plethora of research supports two distinct ways in which memories can be accessed: explicitly and implicitly (Craig, Rose, & Gopie, 2015; Schacter, 1987). While explicit memory is intentional, conscious recollection, implicit memory is unconscious or unintentional recollection (Schacter, Bowers, & Booker, 1989). In a typical implicit memory task, participants first encode stimuli and are then asked to complete a task (ostensibly) unrelated to the previously-encoded stimuli. A change in task performance (e.g., preferring previously-seen items over unseen items) without awareness or intent reveals implicit memory for those stimuli.

1.1.1. Experimental dissociations

Implicit and explicit memory can be dissociated, that is, they can be manipulated and assessed independently such that one does not affect the other. Implicit-explicit dissociations have been demonstrated across various memory tasks. Craig et al. (2015), for instance, found participants could identify previously-seen visual patterns correctly, even though participants claimed to have been guessing. Dissociations between implicit and explicit memory have also resulted from working memory load during encoding (Baques, Saiz, & Bowers, 2004).

Previous findings also suggest stimuli need not be encoded deeply for witnesses to yield implicit memory for those items (e.g., Keane, Cruz, & Verfaellie, 2015; Kunst-Wilson & Zajonc, 1980). In other words, when encoding conditions are poor, explicit memory may suffer while implicit memory remains unaffected. For instance, Jacoby and Dallas (1981) showed individuals who were presented with difficult-to-perceive stimuli still revealed implicit memory, even without having explicit recollections of said stimuli. These experimental manipulations of encoding duration have produced replicable dissociations across many studies. Seamon et al. (1995) showed participants could differentiate between stimuli using affective (implicit) judgments but not recognition (explicit) judgments after extremely brief encoding durations (e.g., 4 ms). However, as encoding duration increased, recognition performance increased while affective judgments remained unaffected. This finding, namely, that longer encoding opportunities benefit explicit memory independent of implicit memory is a reliable and generally accepted one (e.g., Jacoby & Dallas, 1981; Seamon, Marsh, & Brody, 1984). In fact, understanding that the longer an encoding opportunity, the better explicit memory will be is a common metacognitive “rule of thumb” for laypersons: simply *believing* that someone else encoded a stimulus for longer can lead witnesses to conform their recollections to those of that someone (Gabbert, Memon, & Wright, 2007). With this dissociation in mind, we aimed to replicate this differential effect of encoding duration on implicit and explicit memory while extending this phenomenon to *eyewitness* memory for a single, relatively longer exposure of a mock crime.

1.1.2. Dissociations across modalities

Implicit and explicit memory dissociations have also been demonstrated across various stimulus types. The mere exposure effect (Stafford & Grimes, 2012; Zajonc, 2001) is a phenomenon in which simply being exposed to a stimulus can alter (i.e., increase or decrease) one’s preference for that stimulus in comparison to stimuli not previously seen. In other words, familiarity with stimuli can affect future decisions made about said stimuli. The mere exposure effect functions independent of explicit recognition and for myriad modalities. Within this context, implicit memory of novel faces has been demonstrated: when asking participants to select faces they prefer quickly (e.g., Kunst-Wilson & Zajonc, 1980), they show a preference for previously-seen faces. Further, implicit memory has been demonstrated for familiar faces (e.g., Bruce & Valentine, 1985), novel shapes (e.g., Kruijne, Brascamp, Kristjánsson, & Meeter, 2015; Schacter & Cooper, 1993), and novel visual patterns (e.g., Musen & Treisman, 1990).

Implicit memory has also been demonstrated for briefly-seen written words (e.g., Feustel, Shiffrin, & Salasoo, 1983) and the completion of word fragments (e.g., Tulving, Schacter, & Stark, 1982), and for auditory stimuli, such as spoken words (e.g., Jackson & Morton, 1984; Kempley & Morton, 1982; Schacter & Church, 1992; Stuart & Jones, 1996) and environmental sounds (e.g., Chiu & Schacter, 1995). Implicit and explicit memory are also dissociable through modality changes from study to test phase (e.g., visual to auditory) in that implicit memory can be sensitive to modality shifts, whereas explicit memory remains rather stable across modality shifts. While some report decrements in implicit memory in response to modality shifts (e.g., Scarborough, Gerard, & Cortese, 1979; Roediger & Blaxton, 1987), others do not (e.g., Clarke & Morton, 1983).

Given the robustness of assessing implicit memory for various memory tasks and stimulus modalities, another goal of the present study was to extend these findings to an eyewitness context and assess implicit memory for multiple modalities encoded *simultaneously*. To our knowledge, this is the first study to attempt measuring implicit memory for a more externally valid stimulus, that is, a mock crime video comprised of multiple novel faces, verbal utterances, and written words interspersed throughout the event. Furthermore, only one other study has explored implicit memory in the context of investigative interviewing (Dawson, Hartwig, & Brimbal, 2015). However, while Dawson et al. primed participants with abstract concepts (e.g., openness) to manipulate their disclosure of information, the present study tested participants implicitly for crime-relevant details.

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