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Establishing the Most Effective Way to Deliver the Sketch Procedure to Enhance Interviewee

Free Recall

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Abstract

The relative effectiveness of three sketching procedures for enhancing the recall of a witnessed event was assessed. Participants ($N = 123$) viewed a mock crime video and were asked to recall its contents using one of three sketching procedures (i.e., Sketch *and* Free Recall; Sketch *then* Free Recall; Sketch *and* Explain *then* Free Recall) or two comparison procedures (i.e., Mental Reinstatement of Context; Control). Participants who were administered the Sketch *and* Explain *then* Free Recall procedure recalled more correct details than those who were administered the other four procedures (all $d_s > 0.70$); the greater number of correct details was observed primarily for object and action details. There was minimal difference in incorrect details recalled or accuracy rate between all five procedures. The implications of using different sketching procedures for enhancing recall at the onset of investigative interviews are discussed.

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The Cognitive Interview (CI) is a comprehensive interviewing protocol containing several evidence-based techniques that help interviewees recall information (Fisher & Geiselman, 1992). Much research has been dedicated to testing techniques that comprise the CI (see Memom, Meissner, & Fraser, 2010). One promising, yet relatively under-researched CI technique is sketching. Sketching involves an interviewee drawing details of a witnessed event (e.g., locations, movements, people), and then using their sketch as a reference when providing a verbal account of what they witnessed (Dando, Wilcock, Behnkle, & Milne, 2011). Sketching is grounded in encoding specificity theory (Tulving & Thomson, 1973), whereby the sketch is believed to help an interviewee recreate the cues present during encoding of the event that facilitate recall. Sketching may also reduce cognitive load through external storage (i.e., committing cues to paper to avoid taxing working memory; Bromage & Mayer, 1986; Di Vesta & Gray, 1972; Middendorf & Macan, 2002; Rickards & Friedman, 1978). Several studies have shown that sketching increases the amount of detailed and accurate information obtained from both child and adult interviewees (e.g., Eastwood, Snook, & Luther, 2018; Dando, Wilcock, & Milne, 2009a; Mattison, Dando, & Ormerod, 2015; Mattison, Dando, & Ormerod, 2018).¹ One important issue that has yet to be addressed empirically – the goal of this study – concerns the most effective way to administer the sketch procedure to maximize adult interviewee recall.

In an initial study measuring the effectiveness of the sketch procedure with adult witnesses, Dando and colleagues (2009a) compared the sketch procedure against a Control interview (i.e., an open-ended prompt asking interviewees to report what they remembered) and a Mental Reinstatement of Context (MRC) procedure. Their Sketch procedure consisted of

asking the interviewee to draw a detailed sketch of the target event on a piece of paper while describing each item as they were drawing it. Once the sketch was completed, the interviewee was prompted to provide a verbal free recall of the target event while using the sketch to further explain the details that they recalled (the same procedure was used by all subsequent sketching studies discussed below). Sixty participants were shown a video (1 minute and 20 seconds) of a mock theft and were interviewed 48 hours later about what they witnessed. Their results showed that both the Sketch and MRC procedures elicited more correct details from witnesses than a Control procedure ($d = 0.93$ and $d = 1.85$, respectively); similar levels of incorrect details were recalled for each procedure. Fewer confabulations (i.e., details or events that were not present in the video) occurred when the Sketch procedure was used than when the MRC or Control procedures were used ($d = 1.18$ and $d = 1.36$, respectively). The length of interviews using the MRC procedure were, on average, longer than those using the Sketch or Control procedures ($d = 1.17$ and $d = 2.65$, respectively). Two subsequent studies by Dando and colleagues using similar procedures found comparable results (Dando et al., 2011; Dando, Wilcock, Milne, & Henry, 2009b).

Dando (2013) also compared the Sketch procedure against an MRC procedure and a Control procedure using a sample of 51 older adults (i.e., > 67 years old). Potential participants attended a public presentation about psychology and were not aware they would later be asked to participate in a study on eyewitness memory regarding an interaction (approximately one minute in length) they witnessed during the presentation. When interviewed 48 hours later, Dando found that participants interviewed with the Sketch procedure recalled substantially more correct details than participants interviewed with either an MRC or Control procedure ($d = 1.86$ and $d = 2.62$, respectively). Those interviewed with the Sketch procedure also recalled substantially

fewer incorrect details than those interviewed with an MRC or Control procedure ($d = 1.66$ and $d = 1.29$, respectively). There were minor differences between conditions with regards to the number of confabulations ($ds < 0.16$). In terms of the type of details recalled, participants interviewed with the Sketch procedure recalled substantially more correct person details than those interviewed with either the MRC or Control procedures ($d = 1.43$ and $d = 1.56$, respectively), and more correct object details compared to the MRC and Control procedures ($d = 1.36$ and $d = 1.35$, respectively). No other meaningful differences were found between interview procedures in terms of the type of details recalled.

Most recently, Eastwood et al. (2018) assessed the efficacy of the Sketch procedure using a live target event. Specifically, 88 participants engaged in a scripted interaction with a confederate, which participants did not know they would be asked to recall later. Following a short delay, participants were questioned about the interaction using either a Control, Sketch, or MRC procedure. Eastwood et al. (2018) found that the participants who were administered the Sketch procedure recalled more correct details than participants administered either the MRC or Control procedures ($d = 0.55$ and $d = 1.31$, respectively), with no differences between conditions for number of incorrect details recalled. In terms of the type of details recalled, participants who were administered the Sketch procedure recalled more correct action details than participants administered the MRC or Control procedures ($d = 0.78$ and $d = 1.19$, respectively). Participants interviewed with the Sketch procedure also recalled more correct object details correctly than participants interviewed with either the MRC or Control procedures ($d = 0.57$ and $d = 1.51$, respectively). Interviews that contained the Sketch procedure were, on average, longer than interviews that contained the MRC procedure ($d = 0.51$), and they were also slightly more efficient because they recalled nearly one additional correct detail per minute (7.42 vs. 6.53).

Overall, the aforementioned experimental research showed that interviews using the Sketch procedure resulted in more correct details being recalled compared to a Control procedure (average $d = 1.71$), while matching – and in some cases exceeding – the performance of the MRC procedure (average $d = 0.53$).² In addition, the Sketch procedure produced more accurate details without a concomitant increase in incorrect details (average $ds = -0.28$ and -0.49 compared to the Control and MRC procedures, respectively). One important issue that has yet to be addressed empirically, however, concerns the most effective way to administer the Sketch procedure.

The Sketch procedure used in all the aforementioned studies involved the interviewee first drawing components of the witnessed event while explaining briefly those drawn components. Once the sketch was drawn, participants were asked to provide as much verbal details as they possibly could regarding the witnessed event (henceforth referred to as the Sketch *and Explain then* Free Recall procedure). The underlying assumption is that having interviewees provide basic details about what is being drawn while completing the sketch, followed by a full verbal recall of the event details, will maximize the number of correct details recalled. Although effective, there are at least two alternative Sketching procedures that warrant investigation.

The first alternative Sketch procedure involves interviewees providing a full verbal recall concurrent with the drawing of their Sketch (Sketch *and* Free Recall). This procedure differs from the original procedure in that the details of an event are provided verbally while the related components are being drawn (as opposed to only describing the basic details of the components they generate in their sketch). Given the limitations of human working memory (Baddley, 2012; Miller, 1956), this procedure may maximize recall by allowing interviewees to provide the

details triggered by the sketched components verbally as they emerge; details that may be forgotten in the delay between completing the sketch and subsequent verbal free recall.

The second alternative Sketch procedure encourages interviewees to first sketch all the components of the witnessed event silently, which is followed by interviewees then providing a verbal free recall (Sketch *then* Free Recall). This differs from the original procedure in that interviewees are asked to complete their entire sketch prior to providing any verbal details (as opposed to describing the basic details of the components in the sketch as they are generated). Having the opportunity to review cues may facilitate greater recall because this process allows for repeated exposure to the cues (Bromage & Mayer, 1986; Middendorf & Macan, 2002), and may mitigate memory deterioration.

The goal of the current study was to identify which of the three Sketch procedures is most effective in generating accurate recall of a target event. This was accomplished by administering the three aforementioned Sketch procedures – as well as a Control procedure and MRC procedure – and measuring the amount of correct and incorrect details generated from each procedure. It was hypothesized that all CI-based techniques (MRC and three Sketch procedures) would outperform the Control procedure in terms of correct details recalled, with no difference between the conditions in number of incorrect details recalled. Given that of the three Sketch procedures only the Sketch *and* Explain *then* Free Recall procedure has been tested empirically, no explicit hypotheses were made regarding the relative recall performance between the Sketch procedures. However, based on the reviewed research it was expected that the Sketch *and* Explain *then* Free Recall procedure (a) would lead to a greater number of correct details being recalled compared to the MRC condition and (b) that the greater number of correct details

recalled would primarily be for object details. No predictions were made regarding the effect of interview procedure on interview length as previous findings of this variable have been mixed.

Method

Design

A single-factor between participants design was employed. The independent variable was interview procedure with five levels: (1) Control, (2) Mental Reinstatement of Context (MRC), (3) Sketch *and* Free Recall, (4) Sketch *then* Free Recall, and (5) Sketch *and* Explain *then* Free Recall. The dependent variables were the number of details recalled correctly and the number of details recalled incorrectly by the interviewee during the course of the entire interview. We chose not to include a follow-up questioning phase after the free recall phase because of the lack of standardization with this process – asking a standard set of questions would violate the principle of witness-compatible questioning; conversely, following witness-compatible questioning would violate standardization. Recall accuracy was also computed (i.e., [total number of correct details recalled ÷ total number of correct and incorrect details recalled] x 100). Each type of detail recalled (i.e., person, object, action, verbal) was also recorded, along with the length of time taken to conduct the interview (as measured from the beginning of the interview script to the end of the participant's recall).

Participants

Participants ($N = 123$) were undergraduate students (54 men and 69 women) enrolled in an introductory psychology course at [redacted university].³ The mean age of the participants was 19.75 ($SD = 2.31$, $Range = 18 - 29$), and the mean year of study was 1.59 ($SD = 0.86$, $Range = 1 - 4$). There was no statistically significant difference in participants' age, gender, or year of study between the five conditions ($ps > .05$).

Materials

The materials for this study included a mock crime video, five interview scripts, and a demographic form.

Mock Crime Video. The mock crime video was one minute and fifty-nine seconds in length and portrayed a male suspect robbing a bowling alley. The video was recorded from a CCTV ceiling camera and captured two males entering a bowling alley, obtaining bowling shoes from the clerk, and proceeding to their lane. A short time later, another male entered, approached the cash register, and demanded money from the clerk. After the clerk opened the register, the male grabbed the cash from the till, and ran toward the exit. One of the male bystanders attempted to tackle the robber but was unsuccessful, and the suspect escaped.

Interview Scripts. All interviews began with the interviewer engaging the interviewee (e.g., shaking hands, establishing preferred name, outlining purpose of the interview) and explaining the interview process (e.g., purpose, ground rules). This was followed by the interviewer using one of the following scripts, based on the participant's randomly assigned condition, to obtain a free recall of the target event.

The script for the Control interview requested the participant to “*Please go ahead and tell me, in as much detail as possible, everything that you remember from the video that you watched*”. At the end of the free recall, the interviewer was required to pause for two seconds and then ask the participant “*What else do you remember about the video?*”.

The script for the MRC interview requested was as follows:

In a moment I am going to ask you to tell me what you remember about what happened in the video that you watched. Before you begin I am going to ask you to try something that can often help people to remember more about what

they have experienced. What I would like you to do is to close your eyes. Closing your eyes helps block out distractions in the room and helps you focus. Are you comfortable with that? [If not, I would like you to please pick particular point in the room and focus on that spot].

Now please concentrate on the instructions I am going to give you. I would like you to listen to my instructions. I will pause between each instruction to give you time to think about what I am saying. Please don't speak until I ask you to do so. While keeping your eyes closed [staring at that point], I would like you to think back when you first started watching the video...[5 second pause] ...think about the environment...[5 second pause] ...think about what you saw...[5 second pause] ...think about what you heard... [5 second pause] ...think about all of the actions... [5 second pause] ...think about all of the people...[5 second pause]

Now when you have a really clear picture in your mind, please go ahead and tell me, in as much detail as possible, everything that you remember from the video that you watched”.

[Wait to ensure sure they have finished recalling information and pause for two seconds] What else do you remember about the video?

The script for the Sketch *and* Free Recall interview requested that participants sketch out the details of the mock crime video and talking about what they witnessed at the same time.

Specifically, they were told:

In a moment I am going to ask you to tell me what you remember about what happened in the video that you watched. Before you begin I am going to ask

you to try something that can often help people to remember more about what they have experienced [give paper and pen]. I would like you to draw a detailed sketch of what happened in the video that you watched. I would like you to sketch as many details as you can about the event. Importantly, I would like you to sketch and talk at the same time. What I mean by that is I want you to talk me through your sketch, describing everything that you are drawing and everything that is happening in the sketch. Please keep in mind that your artistic abilities are not being judged at all, but this is simply a technique used to enhance memory.

Now, while sketching out what you saw, please go ahead and tell me, in as much detail as possible, everything that you remember from the video that you watched.

[Wait to ensure sure they have finished recalling information and pause for two seconds] What else do you remember about the video?

The script for the Sketch *then* Free Recall interview was as follows:

In a moment I am going to ask you to tell me what you remember about what happened in the video that you watched. Before you begin I am going to ask you to try something that can often help people to remember more about what they have experienced [give paper and pen]. What I would like you to do is to please draw a detailed sketch of what happened in the video that you watched. I would like you to sketch as many details as you can about the event. Importantly, I want you to just focus on drawing the sketch silently, and don't speak or try to describe what you are drawing at this point. I will ask you to tell me what happened in the video after you have finished sketching. Please keep in mind that

your artistic abilities are not being judged at all, but this is simply a technique used to enhance memory. When you are ready you can start your sketch. [pause]

What I would like to do now is go over what you saw. Please feel free to refer to your sketch when telling me what happened in the video. When you are ready, please go ahead and tell me, in as much detail as possible, everything that you remember from the video that you watched”.

[Wait to ensure sure they have finished recalling information and pause for two seconds]. What else do you remember about the video?

For the Sketch *and Explain then Free Recall* interview, the script was as follows:

In a moment I am going to ask you to tell me what you remember about what happened in the video that you watched. Before you begin I am going to ask you to try something that can often help people to remember more about what they have experienced [give paper and pen]. What I would like you to do is to please draw a detailed sketch of what happened in the video that you watched. I would like you to sketch as many details as you can about the event. Importantly, I would like you to describe to me each item/thing that you are drawing as you draw it. Please keep in mind that your artistic abilities are not being judged at all, but this is simply a technique used to enhance memory. When you are ready you can start [pause to allow participant to complete sketch].

What I would like to do now is go over what you saw. Please feel free to refer to your sketch when telling me what happened in the video. When you are ready, please go ahead and tell me, in as much detail as possible, everything that you remember from the video that you watched.

[Wait to ensure sure they have finished recalling information and pause for two seconds]. What else do you remember about the video?

Procedure

Participants were greeted at the entrance to the psychology research laboratory by a research assistant (RA). They were asked to sit at a desk containing a 21” computer monitor and headphones and read and sign an informed consent form. The RA then explained the details of the study. Participants viewed the mock crime video using the computer monitor and headphones. After viewing the video, participants filled out a demographics form and were asked to solve logic and word problems for 10 minutes (i.e., filler task). Participants were then assigned randomly to one of the five interview conditions and were brought to a private testing room where a second RA conducted the interview with the script assigned to that condition. Once the participant provided their free recall, they were debriefed and thanked for participating in the study. The same RA conducted all interviews to ensure consistency. All interviews were audio and video recorded.

Data Coding and Reliability

The mock crime video was broken into its unique individual details ($N = 197$) to create a scoring template. Each detail was also designated as either a Person (e.g., suspect’s hair color, suspect’s clothing; $n = 68$), Object (e.g., table, cash register; $n = 61$), Action (e.g., sitting down, walking across room; $n = 56$), or Verbal (e.g., “size ten shoes”, “open the till”; $n = 12$) detail. Each participant interview was transcribed verbatim. Every individual detail mentioned by the participant was then coded by the first author as either correct or incorrect.

All participant responses were coded independently by a RA who was naïve to the details of the study. The RA was first provided with a detailed coding guide and a 30-minute training

session by the first author. The RA then coded five transcripts as a practice session, and any issues were clarified with the first author. The RA then coded the remaining 118 transcripts. The mean Kappa value was $\kappa = .84$ for correct details and $\kappa = .64$ for incorrect details, suggesting substantial agreement between the two coders (Landis & Koch, 1977).

Results

Recall performance. The mean recall performance (and associated 95% confidence intervals) as a function of interview procedure is shown in Table 1. An ANOVA showed that the effect of interview procedure for the number of correct details recalled was significant, $F(4,118) = 4.01, p = .004$. Participants administered the Sketch *and* Explain *then* Free Recall procedure recalled significantly more correct details than those administered the Control ($d = 1.06$), Sketch *then* Free Recall ($d = 0.87$), Sketch *and* Free Recall ($d = 0.73$), and MRC ($d = 0.71$) procedures. The remaining six pairwise comparisons between experimental conditions revealed small effects ($ds < 0.40$). No significant effect of interview procedure was found for the number of incorrect details recalled, $F(4,118) < 1$, or mean recall accuracy, $F(4,118) < 1$.

Type of correct details recalled. The mean recall performance for type of correct details recalled, as a function of interview procedure, is shown in Table 2. An ANOVA showed that the effect of interview procedure for recall of Object details was significant, $F(4,118) = 5.22, p = .001$. Participants who were administered the Sketch *and* Explain *then* Free Recall condition recalled more correct Object details than those administered the Control ($d = 1.14$), MRC ($d = 0.92$), Sketch *then* Free Recall ($d = 0.87$), and Sketch *and* Free Recall ($d = 0.65$) procedures. The size of the effect between the Sketch *and* Free Recall and the Control procedures was medium ($d = 0.49$). The remaining five pairwise comparisons revealed small effects ($ds < 0.35$).

The effect of interview procedure for recall of Action details was significant, $F(4,118) = 5.44, p < .001$. Participants who were administered the Sketch *and* Explain *then* Free Recall procedure recalled more correct Action details than those administered the Control ($d = 1.33$), Sketch *then* Free Recall ($d = 0.99$), Sketch *and* Free Recall ($d = 0.85$), and MRC ($d = 0.66$) procedures. The size of the difference between the MRC and Control condition was medium ($d = 0.58$). The remaining five pairwise comparisons revealed small effects ($ds < 0.45$).

The effect of interview procedure for Person details recalled was non-significant, $F(4,118) < 1$, as was the effect of interview procedure for Verbal details recalled, $F(4,118) = 1.25, p = .293$.

Interview length. The average length for the Control interviews was 119.96 seconds (95% CI = 105.43, 134.49), followed by 217.56 seconds (95% CI = 199.89, 235.23) for the MRC interviews, 218.40 seconds (95% CI = 184.78, 252.02) for the Sketch *and* Free Recall interviews, 316.00 seconds (95% CI = 273.22, 358.78) for the Sketch *and* Explain *then* Free Recall interviews, and 320.76 seconds (95% CI = 273.00, 368.52) for the Sketch *then* Free Recall interviews. An ANOVA revealed that the effect of interview procedures on interview length was significant, $F(4,118) = 25.15, p < .001$. The effect size for the comparison of the mean interview lengths between the Control procedure and all other procedure were large (all $ds > 0.80$). The effect sizes between the Sketch *and* Free Recall procedure and the Sketch *then* Free Recall and Sketch ($d = 1.02$) *and* Explain *then* Free Recall procedures ($d = 1.06$) were large, as were the effect sizes between the MRC procedure and the Sketch *then* Free Recall ($d = 1.18$) and Sketch *and* Explain *then* Free Recall ($d = 1.27$). All other effect sizes were small (all $ds < 0.30$).

Discussion

The goal of the current study was to compare the relative effectiveness of three different ways of administering the Sketch procedure on obtaining detailed and accurate information from witnesses. The first and second hypotheses were supported partially, as the Sketch *and* Explain *then* Free Recall procedure led to more correct details being recalled compared to participants administered either the MRC (moderate effect) or Control (large effect) procedures, with limited differences in the number of incorrect details recalled between all conditions. However, there was only a small effect – albeit in the predicted direction – for the number of correct details recalled between the remaining CI-based procedures and the Control procedure. The third hypothesis was supported partially, as the observed higher level of details recalled by those administered the Sketch *and* Explain *then* Free Recall procedure was due primarily to more correct Object and Action details being recalled. Taken together, the performance of the Sketch *and* Explain *then* Free Recall interview procedure in the current study matches what has been found in past research.

Of primary interest was the relative performance of the three Sketch procedures. The results showed clearly that the most effective way to administer a Sketch procedure – in line with what has been used in past research – is for interviewees to sketch and describe the event context, followed by using the sketch while providing a free recall of the target event (see Dando et al., 2011, Dando 2013). The effect sizes for number of correct details recalled between the Sketch *and* Explain *then* Free Recall procedure and the other two Sketch procedures were large, and both alternative Sketch procedures only produced slightly more correct details compared to the Control procedure. There are at least two potential explanations for the observed advantage Sketch *and* Explain *then* Free Recall procedure in comparison to the MRC and other Sketch

procedures. First, having the participants both sketch and explain what they are drawing may be more effective in reinstating the original context than mentally visualizing it (MRC condition) or silently sketching it (Sketch *then* Free Recall). That is, the procedure of verbalizing thought processes in real-time while drawing various aspects of the event settings may have allowed participants to better access their memory of the target event compared to the other approaches.

The second, and perhaps the most plausible, explanation for the observed advantage Sketch *and* Explain *then* Free Recall procedure is that this sketch procedure promotes two recalls of the event. That is, during the sketch phase interviewees were explicitly told to mention the items that they are drawing, and so crime-relevant details were being generated in both this phase and the subsequent free recall phase. In addition, despite being instructed to only describe the items that they were drawing during the initial *sketch and explain* phase, most participants also mentioned details about the event – in some cases verbalizing a complete account of the target event. Given that the initial sketching phase provides an additional opportunity to generate unique details and functioned as a *de facto* initial free recall phase for many participants, it is somewhat unsurprising that the participants who were administered the Sketch *and* Explain *then* Free Recall procedure recalled the greatest number of details (see Fisher & Geiselman, 1992).

The primary difference between the Sketch *and* Explain *then* Free Recall procedure and the remaining interview procedures regarding the type of details recalled correctly was for Action and Object details. The higher number of Object details recalled – relative to Control and MRC procedures – is in line with past research (Eastwood et al., 2018; Dando, 2013), and is likely due to the structure of the Sketch procedure. That is, participants are asked explicitly to sketch the elements of the target event while mentioning the items they are drawing, and then to recount the event using the sketch they had created. An increase for Action details was only

found in one of the previous sketching studies (i.e., Eastwood et al., 2018), and in both that study and the current one, a relatively action-filled target event was used (as opposed to a relatively stationary event in Dando, 2013). The higher number of Action details recalled when using the Sketch *and* Explain *then* Free Recall suggests that sketching may be useful for recounting events that include a variety of movements – likely because of ability of a sketch to represent spatial details (i.e., room layouts, movement within the rooms). In line with past research, Sketch *and* Explain *then* Free Recall procedure may be particularly beneficial for assisting interviewees in recalling object and actions details of a target event.

In terms of interview length, the interviews that contained the Sketch *then* Free Recall and Sketch *and* Explain *then* Free Recall procedures were longer than the other interviews. The longer interviews were due primarily to the instruction phase, as participants had to complete their sketch (either silently or describing the objects) prior to beginning the free recall phase. However, the Sketch *and* Explain *then* Free Recall procedure remained much more efficient than the Sketch *then* Free Recall procedure as it generated more than two additional correct details per minute (9.18 vs. 6.96).

There are at least two aspects of the current study which may limit the ability to generalize the findings. First, there was only a relatively short delay between the target event and the interview, and therefore different results may be found when there is an extended delay between viewing the target event and recalling the details from the event. Second, the target event was a mock crime video as opposed to a live event, and therefore it lacks realism (e.g., devoid of sensory cues) and participants were aware that they would be questioned about the details of the event.

This study builds upon previous research by demonstrating the efficacy of the Sketch procedure. Importantly, it also allows for the provisional conclusion that the most effective way to deliver the Sketch procedure is to request the interviewee draw and describe their sketch concurrently, and then provide a free recall of the entire event while referring to their sketch. We are encouraged by the progress that researchers have made in testing and validating tools within the CI toolkit and look forward to replication and expansion of research testing the bounds of sketching.

References

- Baddley, A. (2012). Working memory: Theories, models, and controversies. *Annual Review of Psychology, 63*, 1-29. doi: 10.1146/annurev-psych-120710-100422
- Bromage, B. K., & Mayer, R. E. (1986). Quantitative and qualitative effects of repetition on learning from technical text. *Journal of Educational Psychology, 78*, 271-278. doi:10.1037/0022-0663.78.4.271
- Dando, C. (2013). Drawing to remember: External support of older adults' eyewitness performance. *PloS One, 8*, e69937. doi:10.1371/journal.pone.0069937
- Dando, C., J., Wilcock, R., Behnke, C., & Milne, R. (2011). Modifying the cognitive interview: Countenancing forensic application by enhancing practicability. *Psychology, Crime & Law, 17*, 491-511. doi:10.1080/10683160903334212
- Dando, C., Wilcock, R., & Milne, R. (2009a). The cognitive interview: The efficacy of a modified mental reinstatement of context procedure for frontline police investigators. *Applied Cognitive Psychology, 23*, 138-147. doi:10.1002/acp.1451
- Dando, C., Wilcock, R., Milne, R., & Henry, L. (2009b). A modified cognitive interview procedure for frontline police investigators. *Applied Cognitive Psychology, 23*, 698-716. doi:10.1002/acp.1501
- Di Vesta, F. J., & Gray, G. S. (1972). Listening and note taking. *Journal of Educational Psychology, 63*, 8-14. doi: 101037/h0032243
- Eastwood, J., Snook, B., & **Luther, K.** (2018, online first). Measuring the effectiveness of the sketch procedure for recalling details of a live interactive event. *Applied Cognitive Psychology*.

- Fisher, R. P., & Geiselman, R. E. (1992). *Memory-enhancing techniques in investigative interviewing: The cognitive interview*. Springfield, IL: C.C. Thomas.
- Landis, J. B., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, *33*, 159–174. doi:10.2307/2529310
- Leins, D., Fisher, R. P., Vrij, A., Leal, S., & Mann, S. (2011). Using sketch drawing to induce inconsistency in liars. *Legal and Criminological Psychology*, *16*, 253-265. doi:10.1348/135532510X501775
- Mattison, M.L.A., Dando, C. J., & Ormerod, T. C. (2018). Drawing the answers: Sketching to support free and probed recall by child witnesses and victims with autism spectrum disorder. *Autism*, *22*, 181-194. doi:10.1177/1362361316669088
- Mattison, M.L.A., Dando, C. J., & Ormerod, T. C. (2015). Sketching to remember: Episodic free recall task support for child witnesses and victims with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *45*, 1751-1765. doi: 10.1007/s1080
- Memon, A., Meissner, C. A., & Fraser, J. (2010). The cognitive interview: A meta-analytic review and study space analysis of the past 25 years. *Psychology, Public Policy, & Law*, *16*, 340-372. doi:10.1037/a0020518
- Middendorf, C. H., & Macan, T. H. (2002). Note-taking in the employment interview: Effects on recall and judgments. *Journal of Applied Psychology*, *87*, 293-303. doi:10.1037/0021-9010.87.2.293
- Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*. *63*, 81–97. doi:10.1037/h0043158

Rickards, J. P., & Friedman, F. (1978). The encoding versus the external storage hypothesis in note taking. *Contemporary Educational Psychology*, 3, 136-143. doi:10.1016/0361-476X(78)90020-6

Tulving, E., & Thomson, D. M. (1973). Encoding specificity and retrieval processes in episodic memory. *Psychological Review*, 80, 352-373. doi:10.1037/h0020071

Uzer, T., & Brown, N. R. (2017). The effect of cue content on retrieval from autobiographical memory. *Acta Psychologica*, 172, 84-91. doi:10.1016/j.actpsy.2016.11.012

Vrij, A., Leal, S., Mann, S., Warmelink, L., Granhag, P. A., & Fisher, R. P. (2010). Drawings as an innovative and successful lie detection tool. *Applied Cognitive Psychology*, 24, 587-594. doi: 10.1002/acp.1627

Footnotes

¹ Although not the focus of the current research, several recent studies have also demonstrated that the sketch procedure can be effective in detecting deception in suspect interviews (e.g., Leins, Fisher, Vrij, Lela, & Mann, 2011; Vrij, et al., 2010).

² The average effect size values for the Sketch-Control group comparisons is based on the four relevant comparisons from Dando et al., (2009a), Dando et al. (2009b), Dando (2013), and Eastwood et al. (2018). The average effect size values for the sketch-CI comparisons is based on the four relevant comparisons from the same four studies as well as two comparisons from Dando et al. (2011), which did not contain a Control interview but instead comparisons between the sketch procedure and two CI procedures.

³ Two participants were removed due to recording errors during the interview. With the exception of gender, demographic information was unavailable for 13 participants. The descriptive statistics are based on a sample size of 110.

Table 1. *The Mean Recall Performance (and Associated 95% Confidence Intervals) as a Function of Interview Procedure.*

Recall Performance	Interview Procedure				
	Control (<i>n</i> = 24)	MRC (<i>n</i> = 25)	Sketch and Free Recall (<i>n</i> = 25)	Sketch then Free Recall (<i>n</i> = 25)	Sketch and Explain then Free Recall (<i>n</i> = 24)
Correct Details	33.42 (28.86, 37.97)	37.52 (33.08, 41.96)	36.36 (30.90, 41.82)	35.08 (30.12, 40.04)	45.88 (40.65, 51.10)
Incorrect Details	1.46 (0.73, 2.18)	1.32 (0.88, 1.76)	1.36 (0.86, 1.86)	1.12 (0.67, 1.57)	1.71 (1.35, 2.07)
Accuracy Rate	95.55 (93.59, 97.50)	96.44 (95.30, 97.59)	96.53 (95.46, 97.60)	96.65 (94.89, 98.42)	96.30 (95.58, 97.02)

Table 2. *The Mean Recall Performance (and Associated 95% Confidence Intervals) for Type of Correct Details Recalled as a Function of Interview Procedure.*

Recall Performance	Interview Procedure				
	Control (<i>n</i> = 24)	MRC (<i>n</i> = 25)	Sketch and Free Recall (<i>n</i> = 25)	Sketch then Free Recall (<i>n</i> = 25)	Sketch and Explain then Free Recall (<i>n</i> = 24)
Person Details	11.71 (7.86, 15.56)	11.40 (8.58, 14.22)	11.00 (8.40, 13.60)	10.68 (7.80, 13.56)	13.25 (10.24, 16.26)
Verbal Details	1.00 (0.65, 1.35)	1.52 (0.96, 2.08)	1.08 (0.59, 1.57)	1.48 (1.03, 1.93)	1.54 (1.01, 2.07)
Object Details	5.79 (4.78, 6.80)	6.52 (5.64, 7.40)	7.12 (5.89, 8.35)	6.40 (5.17, 7.63)	9.21 (7.74, 10.68)
Action Details	14.92 (12.86, 16.98)	18.08 (15.64, 20.52)	17.16 (14.85, 19.47)	16.52 (14.33, 18.71)	21.88 (19.52, 24.23)