Drawings as Memory Aids: Optimising the Drawing Method to Facilitate Young Children's

Recall

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Abstract

There has been supportive evidence of drawing facilitating young children's event

recall. The present study investigated whether additional event details are recalled if the

interviewer uses interactive questions in response to information children have spontaneously

drawn or verbally reported.   Eighty 5- to 6-year-olds were shown a video clip of a novel

event and were interviewed the following day. The children were randomly allocated to one

of four recall conditions: tell-only, draw-and-tell, interactive draw-and-tell, and interactive

tell-only. The children's verbal reports were transcribed and scored on four different

categories of recall: items (objects and people), actions, colours and sayings. The interactive

draw-and-tell group recalled more correct information for items compared to the other three

recall groups, without any accompanying increase in errors. We propose that drawing

increases the opportunity for the interviewer to ask interactive questions, which in turn

facilitates children's accurate recall of item information.

Introduction

Being able to retrieve memories lays an important foundation upon which we can build a meaningful life, allowing us to make sense of our present circumstances and to plan ahead for the future. Childhood represents a developmental period that is fundamental to forming a proficient memory, where there is so much new information to learn and retain, particularly in educational settings. Furthermore, there are special cases which occur in some children's lives where it is paramount that their memories are recalled accurately, most notably in clinical referrals and in legal contexts. Nevertheless, children's memory of events is inferior to most adults, particularly so for young children. Even compared to an older child, a younger child's recall tends to be accurate but incomplete and vulnerable to increasing delay between event and recall (Baker-Ward, Gordon, Ornstein, Larus & Clubb, 1993; Peterson & Bell, 1996; Steward & Steward, 1996). Research has indicated that although deficiencies in encoding and storage partly account for young children's deficit in memory (see Howe & O'Sullivan, 1997), a significant contribution to their memory difficulties lies at the retrieval stage. As we have long since known that young children are poor at generating their own retrieval strategies compared to older children (Flavell, Beach & Chinsky, 1966), researchers and practioners have looked at ways they can help these children recall their memories. The focus of this paper is to examine how the interviewer may optimise the level of accurate reporting in young children, with a particular interest in drawing as a retrieval cue.

Direct questions and non-verbal props (such as in the provision of dolls and toys) have been found to increase the child's level of recall above that which is obtained from free recall only (e.g., see Poole & Lamb, 1998; Salmon, Bidrose & Pipe, 1995), but both methods are

also prone to eliciting more inaccurate information (Brady, Poole, Warren & Jones, 1999; Peterson & Bell, 1996; Salmon et al., 1995). An inherent problem with asking a child direct questions about an experienced event is that such questions may lead him or her to an inaccurate answer the child thinks the interviewer wants or expects. In a court of law this can lead the child to give false information (supportive or contestable) in relation to a defendant's case. With the provision of props as cues to recall, young children may treat them instead as toys within a play context that promotes verbal responses of fantasy. There is also a common problem associated with both direct questioning and the provision of props: the interviewer may hold insufficient knowledge of the event to be able to make appropriately informed choices of questions and props. Consequently the child would not receive useful retrieval cues.

In contrast, a child's drawing has the potential to act as the child's self-generated cue, releasing the interviewer from being required to provide the cues. Indeed, a number of researchers have suggested specific and non-specific recall benefits of asking children to draw the event in both experimental and applied settings (Burgess & Hartman, 1993; Butler, Gross & Hayne, 1995; Davison & Thomas, 2001; Edwards & Fornham, 1989; Gross & Hayne, 1998, 1999; Kahill, 1984; Pynoos & Eth, 1986; Thomas & Jolley, 1998; Salmon, 2001; Wesson & Salmon, 2001). As children's spontaneous and self-directed drawings typically portray subject matter and events that are of most interest to them, drawings are likely to stimulate the child to talk about the salient episodes associated with the topic of the drawing. More specifically, the items drawn act as representational retrieval cues. As the drawing unfolds, the child may spontaneously talk about the details of what they are producing (and hence the event), cue the child to think about related items or episodes in the event, or refer

back to features already drawn later in the drawing process. Furthermore, the child can be

unobtrusively questioned about the drawing by the interviewer (e.g., "tell me more about

this"). Indeed, even simple facilitative utterances provided by the interviewer (e.g., 'uh huh',

'really', repeating the child's own words) have been shown not only to be more frequent in a

drawing recall condition (Salmon, Roncolato & Gleitzman, 2003; Wesson & Salmon, 2001),

but also found to have a positive significant link with the amount children recall (Gross,

Hayne & Drury, 2009).   An example of a non-specific recall facilitator of the draw-and-tell

method is interview duration. Studies have shown consistently that this interview method

produces interviews of up to three times the length compared to interviews where drawings

are not requested, and that interview duration has a positive significant correlation with

amount recalled (Butler et al., 1995; Wesson & Salmon, 2001). Drawing event details keeps

the child's focus on the event for longer, and consequently provides more time for recall

(Butler et al., 1995; Wesson & Salmon, 2001). In addition, the aforementioned impact

drawing has on the interviewer's verbal behaviour is likely to increase the dialogue between

interviewer and interviewee, further increasing the duration of the interview.

Research has presented four different types of information within varying experimental

approaches to test whether drawing can facilitate children's recall: recall of staged/naturally

occurring events, emotional memories, item recall tasks and video information.

Butler et al. (1995) used a staged event paradigm in which children were taken on a

school trip to a fire station in two separate studies. On the first occasion 5- and 6-year-old

children were tested for their recall one day after the trip. A different group of 5- to 6-year-

olds went on the second trip together with a younger group of 3- to 4-year-olds; these children

were tested for their recall one month after the trip. In both studies children were allocated to

either a 'tell' group in which they were interviewed about their recall of the trip, or a 'draw-and-tell' group who were asked to draw about the trip and verbally recall what they could remember. The recall for both groups was conducted in three phases: free recall, four direct (but general) questions (e.g., "draw [or tell] me where you went, how you got there, who went with you, what you saw there"), and a picture selection task. The main finding from both studies was that the 5- to 6-year-olds in the draw-and-tell group reported significantly more accurate information than those in the tell group for the direct questions, but obtained similar levels of recall during free and photograph phases of recall. Furthermore, the (commission) errors were minimal. Drawing did not, however, increase the amount of information recalled by the 3- to 4-year-olds.   The potential application of drawings to children's retrieval of memories in educational, clinical and legal settings depends upon, among other factors, whether drawing facilitates children's recall at time points representing long delays after the event. Reassuringly, Gross and Hayne (1999) found that drawing facilitated 5- to 6-year-old children's recall of a staged event (visit to a chocolate factory) up to a year afterwards compared to the tell-only group. Furthermore, drawing the event a year later benefited free recall as well as responses to the direct questions. As in their earlier study, the beneficial effects of drawing on children's accurate recall did not occur at the expense of any increase in inaccurate recall.

Some of the experiences children are asked to recall evoke emotions in the child, particularly so in events recalled in legal and clinical interviews. It is important for the interviewer to know, therefore, whether drawing facilitates emotional memories. A number of studies have confirmed the positive effects of drawing on recall for 3- to 8-year-olds' reporting of emotional events (either happy, sad, scared or angry) from their past, compared to

aged-control groups of children who are asked to recall without drawing (Gross & Hayne, 1998; Salmon et al., 2003; Wesson & Salmon, 2001).

However, not all research has reported positive effects of children drawing on recall. Drawing did not facilitate recall for a standard school health assessment (Salmon & Pipe, 2000) nor in item-recall studies (Davison & Thomas, 2001). Jolley (2010) notes that drawings tend to facilitate recall of events that are unique, interesting or emotional, but not for routine events or for isolated bits of information that are not part of a narrative (see also Salmon & Pipe, 2000). Consistent with this view, children who drew reported more accurate information of an educational and amusing video on gravity designed for young school children (Jolley, Apperley & Bokhari, 2002) and of a video of a simulated theft scene (Rowlands & Cox, 2002, 2003).

Although numerous studies have shown the effectiveness of drawing as a retrieval cue, Jolley (2010) notes that the optimum drawing conditions for recall have yet to be established. Children who are required to 'draw-and-tell' in the free recall phase of interviews are typically verbally supported by the interviewer only by the provision of general prompts to keep the conversation flowing (e.g., 'really?', 'can you tell me anything else about that?', etc.). Jolley notes that although such a restrained approach by the interviewer has allowed the 'pure' facilitatory effect of drawing to be established, it may underestimate the amount and type of information children could potential recall with more verbal support. In studies where the interviewer has asked direct questions, the questions posed are pre-determined and not reactive to either what the child has said or drawn. Hence, children are not encouraged to give more detailed and elaborative responses, despite this being an accepted interview technique with children in applied interview settings (see reviews of the National Institute of

Child Health and Development [NICHD] "Structured Interview Protocol", Lamb et al., 2009;

Larsson & Lamb, 2009). These reviews suggest that this interview protocol may elicit more

information than the current investigative interviewing techniques used by the police in the

UK when interviewing children (see 'Achieving Best Evidence in Criminal Proceedings',

Home Office, 2007).

Accordingly, in the present study we included (in addition to 'tell-only' and 'draw-and-

tell' recall groups) other children who were interviewed using an interactive interview

technique. These children were asked to elaborate on each piece of information they drew or

said by the interviewer calling upon a repertoire of five questions ("what is it?", "what

happened?", "what did it do?", "what colour was it?", "what was said?"), as deemed

appropriate according to what the child had drawn/said. Each question could be asked more

than once throughout the interview depending on its suitability to new details provided by the

child. Rather than a pre-determined set of direct questions used in previous research, this

'interactive' approach is reminiscent of the NICHD's Interview Protocol "focussed non-

suggestive questions" (see Lamb et al., 2009, p.454). Consistent with the focus of this paper

on drawing as a retrieval cue, half of these children were allocated to an 'interactive draw-

and-tell' group. The other half were presented with an 'interactive tell-only' interview in

which the same five questions were addressed to what the children spontaneously said

(children in this group did not draw). This group of children acted as an important control

group, allowing any significance facilitatory advantage of the interactive draw-and-tell group

to be directly attributed to the effects of the questions directed at the children's drawings.

Supplementary to this aim, we sought to discover whether there was a stronger relationship

between the number of interactive questions posed and children's correct recall in the

interactive draw-and-tell group compared to the interactive tell-only group. We also examined whether drawing ability was associated with greater recall in the interactive draw-and-tell group. The latter is based on the idea that drawings of higher representational quality act as more useful retrieval cues (Butler et al. 1995; Gross & Hayne, 1998, 1999; Salmon, 2001). Finally, as per our earlier discussion on interview duration, we investigated the relationship of correct recall and length of interview.

The sample tested in the present study consisted of 5- to 6-year-old children as previous research suggests that this age group in particular benefits most from the draw-and-tell method (e.g., Butler et al., 1995). The video presented by Jolley et al. (2002) was utilised as the memory stimulus.   It shows a series of comic episodes in which two adults and a toy cat attempt novel (and unsuccessful) ways to coax another toy cat down from a window ledge. It was chosen for the present study as it portrays a unique and engaging sequential series of event episodes that minimised the possibility of children's 'script' knowledge about general events falsely inflating their correct recall scores. More generally, the video method also offers control of the same information being presented to all children, while the scoring of the children's verbal responses can easily be checked against the video for accuracy. On the following day the children were individually interviewed about their recall of the video in one of the four recall groups described above. The children's verbal report, for both correct information and errors, was scored on four different categories of recall: items (objects and people), actions, colours and sayings. It is predicted that drawing in conjunction with the interactive questions will have a greater facilitatory effect on young children's recall in comparison to the other three recall groups.

Method

Participants

Eighty participants (40 boys and 40 girls) ranging from 5 years 1 month to 6 years 11 months were chosen from three local primary schools in an English city. There were 20 children in each of the four recall conditions: tell-only (10 boys and 10 girls, $M = 6;1$, $SD = 5$ months), draw-and-tell (11 boys and 9 girls, $M = 5;10$, $SD = 4$ months), interactive draw-and-tell (9 boys and 11 girls, $M = 5;10$, $SD = 6$ months) and interactive tell-only (10 boys and 10 girls, $M = 6;3$, $SD = 4$ months). Most of the children were Caucasian. Ethical approval for participation was obtained via informed parental consent and verbal consent from each child.

Materials

The drawing materials used were white blank A4 paper, a HB pencil and ten differently coloured pencils. The video material was an amusing 'child-friendly' 5 minute DVD on gravity entitled "Falling" (used in Jolley et al., 2002). This video had been chosen from a booklet of materials that publicised teaching aids for the National Curriculum for Primary Science in England.   None of the schools had previously shown this video to pupils in their school, and none of the participants reported that they had already seen the video. A dictaphone was used to record all the interviews.

Procedure

All children were seen on two separate occasions. In the first session the experimenter informed the children that they were going to be shown a short video and to watch it carefully because she would return the following day (the second session) to ask each child what he or she could remember about the video. Children watched the video in groups of five. In the second session, each child was given the opportunity not to be interviewed but no child refused to take part. Each child was randomly allocated to one of the four recall conditions.

All interviews were conducted individually with each child and audio recorded using a dictaphone.

Tell-Only. The child was asked to tell the experimenter "everything you can remember about the video I showed you yesterday". The experimenter used general prompts to encourage the conversational flow, such as "yes, really?", "that's nice, can you tell me more about that?".

Draw-and-Tell. Each child was provided with A4 paper in landscape orientation, a HB pencil and the ten coloured pencils, and was told "to help you remember the video I am going to ask you to draw a picture of the story. You can use all of the colours if you like. So now think about the video and start your picture". Whilst the child was drawing the interviewer encouraged the flow of conversation between child and interviewer by the same general prompts as used in the 'tell-only' group. The child was also given three additional prompts while drawing, "don't forget to tell me about your drawing", "your picture looks nice, tell me about it, tell me about your picture", and when the child appeared to have finished drawing and recalling the child was told "that's a lovely picture, tell me (again) about it".

Interactive Draw-and-Tell. The same procedure and instructions used in the 'draw-and-tell' group were given to the 'interactive draw-and-tell' group, except that in addition to the general conversational prompts and the three drawing prompts the child was asked to elaborate on any correct detail spontaneously verbally recalled or drawn by the child. This elaboration was requested by the interviewer asking any of the five interactive questions (i.e., "what is it?", "what happened?", "what did it do?", "what colour was it?", "what was said?"). For example, if the child recalled "a cat" the child might be asked "what did it do?", "what colour was it?", "what did it say?". Which questions were used depended on the nature of the

piece of information given by the child, and decided upon by the interviewer at the time. The actual number of interactive questions was therefore not pre-determined but was dependent on the amount of information the child recalled - the more information the child recalled the more questions were asked by the interviewer. Any detail not discussed during the drawing process was discussed after the child had finished drawing using the same interactive questions. In both drawing recall groups the child was allowed additional sheets of A4 paper if they appeared to run out of space when drawing or if the child requested more paper, but neither instance occurred for any of the children.

Interactive Tell-Only. The same procedure and instructions used in the ' tell-only' group were given to the 'interactive tell-only' group, except that in addition to the general conversational prompts each child was asked to elaborate on any correct detail spontaneously verbally recalled by the child. The interviewer used the same repertoire of interactive questions as in the interactive draw-and-tell interviews, and according to the same principles of application (see above) notwithstanding that no drawings were present to address the questions to.

When each child in all interview groups appeared to have finished recalling (and drawing) he or she was finally asked whether there was anything else they could remember from the video. When the interview was concluded the child was thanked for taking part.

Scoring of Recall

All the children's interviews from the tape recordings were transcribed and scored for correct information and errors. One point was awarded for each correctly recalled detail of information using a list that had been generated from a frame-by-frame analysis of the DVD. If a child mentioned or drew an item which did not appear on this list then the DVD was

checked again in order to establish its presence. Each verbal statement made by the child was

scored for both correct information and errors on four different categories: items (objects and

people), actions, colours and sayings. For example, if a child stated the "the brown plant pot

fell on the man", the child would receive two item points (for *plant pot* and *man*), one action

point (for the action of *fell*) and one colour point (for the *brown* plant pot). If the child then

stated "and the man said ouch" they would receive a point for sayings (for the recall of *ouch*)

and a further item point for recalling correctly that it was the *man* who said this. Children

could therefore receive points for repeated items provided that they were related to a new

piece of information not previously described by the child. This scoring system represented a

partial departure to that commonly used in the literature. Although previous research has also

typically examined children's reporting of clauses of information (e.g., simple sentences), if

an item of information had already been mentioned in a previous clause (e.g., a character in

the event) then the child did not receive any further credit for mentioning that character in

further episodes (see Butler et al., 1995; Gross & Hayne, 1998, 1999; Salmon et al., 2003;

Wesson & Salmon, 2001). In clinical and judicial settings, however, interviewers are

interested in all the details relating to each mini-episode of the event, regardless of whether

certain components (such as a character or object) of the details had already been recalled in

an earlier part of the event. Indeed, it is often crucial to establish what each character did and

said; just because a character had already been recalled does not make further citations of that

character redundant, far from it. Our innovative scoring procedure, therefore, more closely

reflected the objectives and dynamics of interviews in applied settings. Nevertheless, points

were not awarded for straightforward repetition of information. In terms of errors, all

incorrect information was also scored within the four categories of recall. If the statement

was only partially incorrect then the child would still receive the credit for the correct

information. For example, if a participant stated "the plant pot fell on the lady" then the child

would receive one correct item point (for *plant pot*) and one correct action point (for *fell*) but

the child would receive an incorrect item point (for *lady*) as the plant pot fell on the man

rather than the lady.

Scoring of Representational Quality of Drawings

Ten adults (*M* = 33.61 years, *SD* = 19.82 years, five males and five females) ranked the

representational quality of each drawing produced by the 20 children in interactive draw-and-

tell group. The adults were given a description of the video content and ranked the drawings

with regards to how well the child had represented the video content using a ranking system

of 1 (lowest) to 20 (highest). From these ten individual rankings each drawing was assigned a

mean ranking. This scoring procedure is the same as reported in previous studies in this

literature (Butler et al., 1995; Gross & Hayne, 1998, 1999).

Results

The first and third author independently classified correct recall and errors in eight

interview transcripts, with discussions taking place initially on the first two and then on the

remaining six transcripts. These discussions clarified the scoring system and settled

disagreements. The third author then scored all the remaining transcripts from the whole

sample. An independent coder, unaware of the hypotheses of the study, scored 16 transcripts

(20% of the sample) and agreed the exact score per type of information (correct information

and errors) and interview in 95% of cases.

Figure 1 presents the mean correct recall scores in the four recall groups by category

information (items, colours, actions and sayings). A two-way (mixed) ANOVA examined the

effects of recall group and recall category on correct recall score. There was a significant main effect of recall condition, $F(3,76) = 3.87$, $MSE = 13.36$, $p = 0.01$, $\eta^2 = 0.13$. Post hoc Tukey tests revealed that the interactive draw-and-tell group reported more than each of the other three recall condition groups, with no other significant differences between the recall groups. There was also a significant main effect of recall category, $F(3,228) = 268.70$, $MSE = 11.84$, $p < 0.01$, $\eta^2 = 0.78$, with items recalled the most followed by actions, then colours, and finally sayings. There was also a significant interaction found, $F(9,228) = 3.12$, $MSE = 11.84$, $p = 0.02$, $\eta^2 = 0.11$.
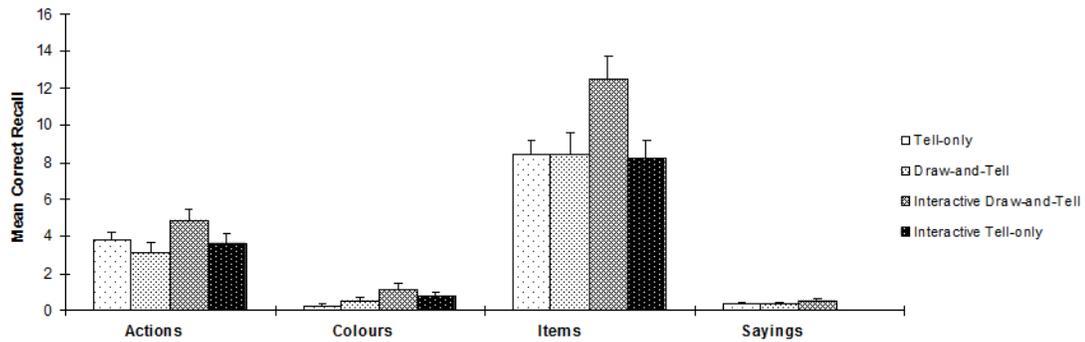

Figure 1. Mean correct recall scores and standard error bars in the four recall groups by category of information.

Simple effects (one-way between subjects ANOVAs) were conducted to investigate the effects of recall group on each recall category separately. Alpha was adjusted using a Bonferonni correction to 0.0125. For the recall of items there was an effect of recall group at the adjusted significance level, $F(3,76) = 3.86$, $MSE = 22.35$, $p = 0.01$, $\eta^2 = 0.14$. Post hoc Tukey tests revealed that the interactive draw-and-tell group reported more than the other three recall groups, with no other significant differences between the recall groups. There

were no significant effects between the recall groups for the other three recall categories (actions, colours and sayings).

Figure 2 presents the mean error scores in the four recall groups by category information. A two-way (mixed) ANOVA examined the effects of recall group and recall category on error score. There was a significant main effect of recall group, $F(3,76) = 6.57$, $MSE = 1.56$, $p < 0.01$, $\eta^2 = 0.21$. Post hoc Tukey tests revealed that that the interactive tell-only group recalled more errors than the tell-only and draw-and-tell groups, with no other significant differences between the recall groups. There was also a significant main effect of recall category, $F(3,228) = 12.21$, $MSE = 1.24$, $p < 0.01$, $\eta^2 = 0.14$, with incorrect item information recalled the most, followed by colours, then actions, and finally sayings. There was also a significant interaction found, $F(9,228) = 2.73$, $MSE = 1.24$, $p = 0.02$, $\eta^2 = 0.10$.

Figure 2. Mean error recall scores and standard error bars in the four recall groups by category of information
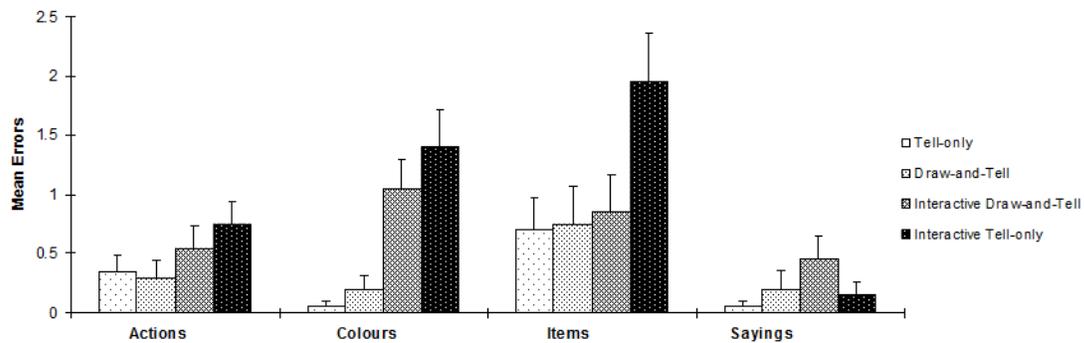
Simple effects (one-way between subjects ANOVAs) were conducted to investigate the effects of recall group on each recall category separately. Alpha was adjusted using a Bonferonni correction to 0.0125. Recall group was found to have a significant effect on the recall of incorrect colour information only, $F(3,76) = 9.57$, $MSE = 0.89$, $p < 0.01$, $\eta^2 = 0.27$.

Post hoc Tukey tests revealed that that both the interactive draw-and-tell group and interactive tell-only groups reported more incorrect colour information than the tell-only and draw-and-tell groups, but with no significance difference between the two interactive groups.

Effect of Number of Questions, Representational Drawing Quality and Interview Duration on Children's Correct Recall

More interactive questions were employed in the interactive draw-and-tell interviews ($M = 10.65$, $SD = 3.28$) than the interactive tell-only interviews ($M = 4.15$, $SD = 1.69$). Furthermore, Pearson product-moment correlations showed that whereas there was no association of the number of interactive questions and correct recall in the interactive tell-only group ($r = -0.07$, $p = 0.77$), there was a positive association in the interactive draw-and-tell group that only just fell outside significance ($r = 0.43$, $p = 0.058$). The effect size for the interactive draw-and-tell group was between medium and large according to Cohen (1988), and significance below the 0.05 level would have been achieved with the addition of only one more participant showing the same effect size. The contrasting correlations indicate that the interactive questions facilitate recall primarily in a context in which the child draws the event. We also examined whether the number of general prompts in the (non-interactive) tell-only and draw-and-tell groups was associated with higher recall scores. This was indeed the case for both groups (Tell-only: $r = 0.46$, $p = 0.04$; Draw-and-Tell: $r = 0.818$, $p < 0.001$).

Representational drawing quality of the drawings produced by the interactive draw-and-tell group was positively, but not significantly, correlated with recall scores ($r = .12$, $p = 0.62$). A one-way between subject ANOVA was conducted to investigate whether interview duration (measured in minutes) varied between the four recall groups. There was a significance difference, $F(3,76) = 34.33$, $MSE = 10.35$, $p < 0.01$, $\eta^2 = 0.58$. Post-hoc Tukey

tests revealed that the length of the interviews in the interactive draw-and-tell group ($M =$ 9.59, $SD = 4.15$) was significantly longer than the interactive tell-only ($M = 1.66$, $SD = 0.78$) and the tell-only ($M = 1.12$, $SD = 0.48$) interviews. The draw-and-tell ($M = 7.45$, $SD = 4.83$) interviews were significantly longer than the two tell-only interviews. Furthermore, interview duration was significantly correlated with children's recall scores ($r = 0.47$, $p < 0.01$).

Discussion

The purpose of this study was to investigate the optimum verbal support an interviewer can provide children to aid their retrieval of event memory details while they draw the event. Specifically, children in an interactive draw-and-tell group were asked if they could verbally expand upon information they had spontaneously spoken or drawn. Consistent with our prediction, the interactive draw-and-tell group recalled significantly more correct information compared to children interviewed in the other three recall groups (tell-only, draw-and-tell and interactive tell-only). Therefore, we can attribute the effect directly to the combination of the child drawing and interactive/elaborative questions from the interviewer, rather than merely the act of drawing the event (draw-and-tell group) or using interactive questions in an interview without drawing (interactive tell-only group). Furthermore, this facilitative effect was achieved without any accompanying overall increase in errors.

There is a consensus in the literature that asking children to draw an experienced event produces significant increases in their correct verbal recall of that event compared to recall conditions where drawings are not requested (e.g., Butler et al., 1995; Gross & Hayne, 1998, 1999; Jolley et al., 2002; Rowlands & Cox, 2002, 2003; Salmon et al., 2003; Wesson & Salmon, 2001). Our finding that there was no beneficial effect from the interviewer only making general conversational prompts and non-specific reminders for children to talk about

their drawing (i.e. the draw-and-tell group), supports the previous literature that drawing alone (with only conversational prompts) is not as strong or reliable a recall cue than when accompanied by direct questions from the interviewer (Butler et al., 1995; Gross & Hayne, 1999; Lambert, 2007). Although there are studies reporting significant recall increases from free recall alone (e.g., Gross & Hayne, 1998, 1999), children are likely to provide additional verbal information if they receive more specific prompts from the interviewer relating to the event details (see Jolley, 2010; Salmon, 2001).

The form of verbal guidance in our interactive draw-and-tell interviews was different in some important respects to the directed questions utilised in the previous research (see Butler et al., 1995; Gross & Hayne, 1999; Lambert, 2007). Our repertoire of interactive questions were utilised by the interviewer in response to the context of what the child had just said or drawn. In other words they were child cued. In contrast, the directive pre-determined questions used in the literature, whether general (e.g., 'tell me where you went', 'who was there?') or specific (giving details of a particular episode) in nature, typically follow the free recall phase in the interview, and are not responsive or tailored to the children's verbal reports or drawings. Furthermore, we noted an unexpected but welcome development of the interviewer's use of interactive questioning, particularly in the interactive draw-and-tell interviews. The interviews naturally presented the interviewer with further opportunities than the five set questions to ask additional interactive questions in response to what the child has said/drawn (e.g., 'where', 'who', 'how' and 'why' questions). The literature's use of directive pre-determined questions, in contrast, does not provide such flexibility.

The strong positive relationship between the number of interactive questions used in the interactive draw-and-tell interviews and children's correct recall scores, but with no such

relationship in the interactive tell-only interviews, supports our claim that combining drawing and interactive questions represents a particularly good retrieval cue for children. The child's developing drawing provides a publically shared resource that affords the interviewer useful opportunities to ask the child questions about the event. The child's verbal responses then give the interviewer further opportunity to ask the child to expand upon a point or give further details about what happened next, or even to draw further, setting up a circular memory cue of draw-talk-draw (and so on). Furthermore, because the drawing is a permanent and public record, unlike speech, the interviewer can refer the child's attention back to a previously drawn item that is presently available, thereby probing further the child's memory.

The increased opportunities that drawing offered for interviewer questioning no doubt led to more than twice as many interactive questions being asked in the draw-and-tell condition than the interactive tell-only condition.   We cannot rule out the possibility that the questions themselves provide the beneficial effect on recall (i.e., without the need for drawing) until further empirical testing standardises the number of interactive questions between draw-and-tell and tell-only recall conditions. Nevertheless, the lack of a relationship between number of interactive questions used by the interviewer in the interactive tell-only group and children's recall suggests that simply asking more questions in drawing-free interviews may not negate our reported effect. A further potential confounding variable was interview duration, as the length of interviews was markedly longer in the two interview groups in which children drew, and longest in the interactive draw-and-tell group. This is particularly relevant as we found that interview duration was positively correlated with correct recall, supporting prior research (Butler et al., 1995; Wesson & Salmon, 2001). As longer interviews provide children with more opporttnities to recall, the inclusion of a non-

drawing activity group that controls for interview duration would be a useful check as to whether interviews that incorporate drawing still facilitate children's recall. There are clearly a number of factors implicated in the interactive draw-and-tell approach (e.g., drawing, number and nature of interactive questions, natural conversational environment, task focus, representational retrieval cues, interview duration), some of which could be empirically isolated to assess their relative importance to recall benefits for children. Nevertheless, we believe that interactive questions promote improved recall in children in part because they encourage some of these other retrieval facilitators.

The facilitative effect found in our interactive draw-and-tell group occured for item information only. There appears to be a consensus in the literature that drawing provides a useful cue for recalling items/objects, and their descriptions, but not for people, places, actions, and affective information (Gross & Hayne, 1998; Wesson & Salmon, 2001; see also Jolley, 2010).   A key explanation frequently given for the drawing-cued recall effect is that the representations act as visual memory cues, which in turn stimulates the recall of further event item information (Butler et al., 1995; Gross & Hayne, 1998, 1999, Salmon, 2001; Salmon & Pipe, 2000; Salmon et al., 2003; Wesson & Salmon, 2001). An extension of this explanation is that children producing higher levels of representational quality in their drawing also report higher levels of verbal recall, presumably because subject matter drawn more realistically act as better recall cues (Butler et al., 1995; Gross & Hayne, 1998, 1999; Salmon, 2001).   Although we also found a positive association between children's representational drawing quality and recall, it was neither strong nor significant. In this literature representational quality is always assessed by how it appears to a sample of adults. However, the subject matter drawn needs only to be of sufficient recognisable quality to the

child to act as a retrieval cue. Alternatively, the mere process of creating the representational details of the events may be an adequate retrieval cue, by keeping the child's thoughts focused on those aspects of the event.

Our findings are of particular interest to those who interview children in a number of applied settings. Studies on using drawing as a memory aid for children have sometimes been presented in a context of improving children's eye-witness testimony, although researchers have rarely discussed how their findings may apply in legal interviews with children. In England and Wales, guidelines on conducting interviews with children are outlined in the document, 'Achieving Best Evidence in Criminal Proceedings' (Home Office, 2007). The document stipulates that it is rarely possible to use only open-ended questions with children (e.g., 'tell me about what happened …'), and that specific questions ('who', 'what', 'where' 'when' and 'why') are often necessary to cue children children's memory further and to obtain sufficient evidence in charging. Furthermore, it states that, 'When posing questions, the interviewer should try to make use of information that the child has already provided …' (section 2.159). Our use of the 'Wh-' interactive questions in response to information the child had spontaneously given is therefore in accordance with these guidelines. However, our paper extends this practice to a child's drawings. The guidelines allow the provision of drawing materials in the interview room, stating that a child's recall could be assisted by drawing a 'sketch plan'(e.g., see section 2.106). But the document is mute on how the interviewer should incorporate the child's drawings in the interview, most notably in respect of the interviewer's questioning, no doubt because research has yet to address how this should be managed in legal interviews with children. The interactive draw-and-tell interview technique presented in this paper may represent therefore a useful initiative to deriving an

interview framework for how drawings and questions are combined to optimise children's verbal recall.

Our finding that interviews that combined drawing with interactive questions were the longest may reduce the need to conduct follow-up interviews in legal contexts. When interviewing children it is important to ensure that the child continues to feel comfortable in the situation. Drawing has long since been acknowledged as a non-threatening and enjoyable activity that most children engage in, and accordingly may facilitate children's recall by minimising the distress the child might experience in the interview (Butler et al., 1995; Jolley, 2010; Salmon, 2001). Furthermore, gentle questioning about the child's drawing may present questions to the child through the 'safe' activity of the drawing, allowing children more ease to respond compared to the potential anxiety they may experience being directly questioned by an adult (see also Jolley, 2010). Related to this point, drawing may enable the child to recreate an event from a position of power and control (a fundamental basis of art therapy), helping vulnerable children give evidence on issues they may not have felt comfortable doing in a conversation-only interview.

In conclusion, the present study's findings suggest that the interactive draw-and-tell interview technique is likely to be a particularly useful approach in helping young children retrieve event information. This is achieved through a series of questions that asks the child to verbally expand upon information he or she has spontaneously given.   In essence, the interactive draw-and-tell interview has all the recall benefits of the draw-and-tell method, but provides further verbal structure enabling the child to retrieve additional information.

References

Baker-Ward, L., Gordon, B. N., Ornstein, P. A., Larus, D. M., & Clubb, P. A. (1993). Young children's long-term retention of a paediatric examination. *Child Development, 64*, 1519-1533.

Brady, M. S., Poole, D. A., Warren, A. R., & Jones, H. R. (1999). Young children's responses to yes-no questions: patterns and problems. *Applied Developmental Science, 3,* 47-57.

Bruck, M., Melnyk, L., & Ceci, S.J. (2000). Draw it again Sam: the effect of drawing on children's suggestibility and source monitoring ability. *Journal Of Experimental Child Psychology, 77*, 169-196.

Burgess, A. W., & Hartman, C. R. (1993). Children's drawings. *Child Abuse & Neglect*, *17*, 161−168.

Butler, S., Gross, J., & Hayne, H. (1995). The effect of drawing on memory performance in young children. *Developmental Psychology, 31,* 597-608.

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences* (2nd ed.). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Davison, L. E., & Thomas, G. V. (2001). Effects of drawing on children's item recall. *Journal of Experimental Child Psychology, 78,* 155-177.

Edwards, C. A., & Fornham, B. D. (1989). Effects of child interview method on accuracy and completeness of sexual abuse information recall. *Social Behavior and Personality, 17*, 237-247.

Flavell, J. H., Beach, D. R., & Chinsky, J. M. (1966). Spontaneous verbal rehearsal in a memory task as a function of age. *Child Development, 37*, 283-99.

Gross, J., & Hayne, H. (1998). Drawing facilitates children's verbal reports of emotionally

    laden events. *Journal of Experimental Psychology: Applied, 4*, 163-179.

Gross, J., & Hayne, H. (1999). Drawing facilitates children's verbal reports after long delays.

    Journal of Experimental Psychology: Applied, 5, 265-283.

Gross, J., Hayne, H. & Drury, T. (2009). Drawing facilitates children's reports of factual and

    narrative information: Implications for educational contexts. Applied *Cognitive*

    Psychology, 23, 953-971.

Home Office (2007). *Achieving best evidence in criminal proceedings: Guidance on*

    interviewing victims and witnesses, and using special measures. London: Home Office.

Howe, M. L., & O'Sullivan, J. T. (1997). What children's memories tell us about recalling

    our childhoods: A review of storage and retrieval processes in the development of long-

    term retention. *Developmental Review, 17*, 148-204.

Jolley, R.P. (2010). *Children and Pictures: Drawing and Understanding*. Oxford: Wiley-

    Blackwell.

Jolley, R. P., Apperley, A., & Bokhari, S. (2002, September). *Drawing improves young*

    children's recall of video information. Paper presented at the annual meeting of the

    British Psychological Society Developmental Section, Sussex, UK.

Kahill, S. (1984). Human figure drawing in adults: an update of the empirical evidence,

    1967-1982. *Canadian Psychology*, *25*, 269-292.

Lamb, M. E., Orbach, Y., Sternberg, K. J., Aldridge, J., Pearson, S., Stewart< H. L., Esplin, P.

    W. & Bowler, L. (2009). Use of a structured investigative protocol enhances the quality

    of investigative interviews with alleged victims of sexual abuse in Britain. *Applied*

    Cognitive Psychology, 23, 449-467.

Lambert, E. B. (2007). Diagrammatic representation and event memory in preschoolers.

   Early Years: An International Journal of Research and Development, *27*, 65-75.

Larsson, A. S. & Lamb, M. E. (2009). Making the most of information-gathering interviews

   with children. *Infant and Child Development, 18,* 1-16.

Peterson, C., & Bell, M. (1996). Children's memory for traumatic injury. *Child

   Development*, *67*, 3045-3070.

Poole, D. A., & Lamb, M. E. (1998). *Investigative interviews of children: A guide for helping

   professionals*. Washington, DC: American Psychological Association.

Pynoos, R. S., & Eth, S. (1986). Witness to violence: the child interview. *Journal of the

   American Academy of Child Psychiatry*, *25*, 306-319.

Rowlands, A. L., & Cox, M. V. (2002, September). *Children's drawings and facilitation

   of event memory: Implications for eye witness testimony*. Poster presented at the annual

   meeting of the British Psychological Society Cognitive Section, Kent, UK.

Rowlands, A. L., & Cox, M. V. (2003, September*). Does drawing facilitate young

   children's event memory recall? Implications for eyewitness testimony*. Paper presented

   at the annual meeting of the British Psychological Society Developmental Section,

   Coventry, UK.

Salmon, K. (2001). Remembering and reporting by children: the influence of cues and

   props. *Clinical Psychology Review, 21,* 267-300.

Salmon, K., Bidrose, S., & Pipe, M. E. (1995). Providing props to facilitate children's event

   reports: A comparison of toys and real items. *Journal of Experimental Child

   Psychology, 60,* 174-194.

Salmon, K., & Pipe, M. E. (2000). Recalling an event one year later: the impact of props,

drawing, and a prior interview. *Applied Cognitive Psychology, 14,* 99-120.

Salmon, K., Roncolato, W., & Gleitzman, M. (2003). Children's reports of emotionally laden

events: adapting the interview to the child. *Applied Cognitive Psychology, 17,* 65-79.

Steward, M.S., & Steward, D.S. (1996). Interviewing young children about body touch and

handling. *Monographs of the Society for Research in Child Development*, *61*(4, Serial

No, 248).

Thomas, G. V., & Jolley, R. P. (1998). Drawing conclusions: an examination of empirical and

conceptual bases for psychological evaluation of children from their drawings. *British

Journal of Clinical Psychology, 37*, 127-139.

Wesson, M., & Salmon, K. (2001). Drawing and showing: Helping children to report

emotionally laden events. *Applied Cognitive Psychology, 15,* 301-319.

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