

Crayons in the Courtroom: Jurors' Beliefs about Children's Drawings and their Impact on Child
Witness Credibility

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Abstract

In cases of child maltreatment, the child is often the sole eyewitness to the event. This means it is important that a child's testimony of the event is detailed, specific, and accurate (Salmon et al., 2012). To help elicit these testimonies, interviewers may ask children to "draw what happened to them". These drawings then become an evidential exhibit presented to jury members in court (Cohen-Liebman, 2013). The presentation of drawings alongside a child's testimony may impact how competent and trustworthy a child witness is perceived to be (Danby et al., 2021). Across two studies, the current research explored the beliefs that jury members hold about children's drawings and the impact that these beliefs may have on the evaluation of a child's testimony. Within the first study, potential jurors ($N=503$) completed an online survey exploring their beliefs about the use of drawings within forensic settings. Drawings were generally thought to be highly beneficial and allow access into a child's cognitive world; however, participants also identified some risks associated with having children draw. The second study investigated whether the presence of a child's drawing alongside their testimony influenced how the child witness was perceived. Within this study, potential jurors ($N=502$) read a simulated transcript of a child reporting a traffic incident and rated the child witness' credibility. Within each transcript, the child's age (6 or 10-years-old) and the drawing they presented (no drawing, low-quality drawing, or high-quality drawing) were manipulated. All findings indicated that the child's age and the presence of a drawing had no significant influence on child credibility ratings. Collectively, these studies suggest that although jurors hold strong beliefs about the meaning within children's drawings, these beliefs may not always influence jurors' evaluation of a child witness. However, further research is required to comprehensively understand the conditions in which drawings may be a highly compelling and influential form of evidence.

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Ehara taku toa i te toa takitahi, engari he toa takitini kē

Mine is not the strength of one, but the strength of many

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Study One: Exploring Jurors' Beliefs about Children's Drawings

Introduction

Imagine walking into a courtroom and taking a seat as a jury member for a child maltreatment case. When the trial begins, you are told that a young child has reported an incident of sexual assault. Unfortunately, the alleged abuse occurred around a year ago, which means there is no longer any physical evidence that can be used within the case. The only form of evidence supporting the child's claims is a video of the child's initial testimony. Within this video, an interviewer asked the child questions about what happened, and the child did their best to report details about the abuse. However, the child struggled to explain the event in a lot of detail, resulting in the interviewer asking the child to "draw what happened to them". The child drew their room and the events that occurred and explained what they had drawn to the interviewer. As a jury member, this drawing is presented to you alongside the video of the child's testimony. It is now your task to evaluate the evidence in the case and ultimately decide whether you believe the defendant is guilty of the charges.

You might ask yourself: do I think the child's description of the event is accurate? Is there anything that indicates that the child may have made a mistake? Has the drawing helped the child tell their experiences? And does the drawing provide any information that might help me decide whether their story is accurate? These exemplify some of the important questions jurors might reflect upon when presented with evidence. Unfortunately, we know surprisingly little about how jury members would answer these questions – especially those relating to children's drawings.

The answers to these questions will be driven by jury members' *beliefs* and *expectancies* around what constitutes an accurate testimony, what function drawing serves within an interview, and what makes a convincing drawing (McAuliff & Bornstein, 2012). *Beliefs* can be defined as knowledge or information accepted by an individual as true (Fishbein & Ajzen, 1975). For example, a belief may be "I believe that children's drawings hold meaning about what a child is feeling". Beliefs are developed over one's lifespan through personal experiences, education, and

culture (McAuliff & Bornstein, 2012). *Expectancies* are developed from beliefs and relate to how likely an individual believes an outcome is (i.e., “my belief about X leads me to expect Y”) (Olson et al., 1996). Both beliefs and expectancies guide how individuals perceive the world, as they prioritise what is attended to and remembered from external environments (Roese & Sherman, 2007). Importantly, humans are known to actively seek out information that aligns with their beliefs and expectations – a phenomenon termed confirmation bias (Lord et al., 1979). We also tend to avoid or disregard information that disconfirms our beliefs, as these opposing beliefs can often create psychological discomfort. Therefore, it is crucial to understand the beliefs and expectancies held by jury members, as they can influence how jurors respond to information presented by counsel. According to confirmation bias, arguments which align with jurors' beliefs will likely be highly compelling (Lord et al., 1979). Alternatively, arguments that are contrary to their beliefs may be met with greater resistance and scepticism. As a result, if jurors' beliefs are inaccurate, it will increase the likelihood of child witnesses being believed or discredited and defendants being tried or committed in a biased fashion (McAuliff & Bornstein, 2012).

Despite the importance of juror's beliefs on legal outcomes, no research has yet explored jurors' beliefs relating to children's drawings. To account for this gap within the literature, the current research explored jurors' beliefs around the benefits and pitfalls of using children's drawings in forensic settings and the meaning held within children's drawings.

The Use of Drawings within Interviews

As cases of child abuse often contain limited corroborating evidence, it is of utmost importance that when reported, children's statements of the event(s) are detailed, specific, and accurate (Brown & Lamb, 2015; Salmon et al., 2012). Unfortunately, it is often difficult for interviewers to elicit sufficient forensically relevant information from children. Children's communicative and cognitive limitations, their fear or embarrassment about the sensitive topics being discussed, and the intimidation associated with forensic interviewing contexts may limit

children's contributions (Brown, 2011; Hill, 2017; Poole & Dickinson, 2014). Drawings can be introduced within interviews to combat these limitations and support children in providing both detailed and accurate information about forensically relevant events. In fact, in New Zealand, drawings are one of the most commonly used interview aids, especially with younger children (Hill, 2017).

Having children draw their experiences has high face validity and is assumed by interviewers to be of benefit for several reasons. Firstly, drawing is thought to be a memory prompt for children through its ability to create retrieval cues that allow children to better remember an event (Butler et al., 1995; Katz & Hershkowitz, 2010). Secondly, drawings are proposed to assist in creating a more supportive interview context and aid an interviewer in building rapport with the child (Bourg et al., 1999; Davies et al., 1996). Furthermore, given that drawing is generally a familiar and enjoyable activity for children, it is thought to increase the child's comfort in an otherwise intimidating and unfamiliar environment (Brown, 2011). Other mechanisms include drawing's ability to: provide a non-verbal means for children to communicate, increase the length of the interview, increase a child's engagement, and increase the interviewer's responsivity to the child (Katz & Hershkowitz, 2010; Wesson & Salmon, 2001).

Research paradigms were developed to explore whether the assumed benefits of drawing transferred into practice (Butler et al., 1995; Gross & Hayne, 1998; Katz & Hershkowitz, 2010). However, this research reveals that the influence of drawing on a child's testimony may be more complex than was expected. Within these research paradigms, children participate in a unique event (i.e., going for a trip to the fire station) where several staged events occur (i.e., putting on a fireman's uniform and sitting in the fire truck). Following the event, children are interviewed about what happened, either with or without being asked to draw. The amount of information they report and the number of errors they make are recorded (e.g., Butler et al., 1995). An alternative method chosen by some researchers is to ask children to either "draw about" or just "talk about" a time that they were happy, sad, or scared, and the number of details children report is calculated

(e.g., Gross & Hayne, 1998). Most early studies found that allowing children to draw within an interview increased the amount of information that both younger (i.e., under 6-years-old) and older (i.e., over 6-years-old) children reported, without decreasing the accuracy of this information (Butler et al., 1995; Driessnack, 2005; Gross & Hayne, 1999a; Gross & Hayne, 1998; Katz & Hershkowitz, 2010; Patterson & Hayne, 2011; Wesson & Salmon, 2001). Thereby, there was large support for the use of drawings within forensic settings. However, more recent research has indicated that these benefits of drawing are not universally observed. For example, Salmon and colleagues (2012) found that when drawings were presented within an interview alongside 'best-practice' interviewing techniques, they had no additional benefit. Of greater concern, some research found that under certain interview conditions (i.e., suggestive interviewing), drawing increases the likelihood of inaccuracies in children's reports (Macleod et al., 2016) or the development of false memories (Bruck et al., 2000b; Gross et al., 2006).

Based on this past research, it is possible that drawing only assists children and interviewers under certain questioning conditions. The studies that found drawings to be of benefit within interviews used a more constrained and structured interview protocol (i.e., Butler et al., 1995; Gross & Hayne, 1999a). Within these interviews, children were first asked to openly recall an experience (i.e., draw (or tell) me everything you remember). Children were then asked more directive questions (i.e., draw (or tell) me where you went). Lastly, children were given a chance to respond to forced-choice or recognition questions (i.e., did you put on a fireman's uniform?) (Butler et al., 1995). Within these highly structured interviews, drawings are seen to be of benefit. In reality, 'best practice' forensic interviews allow multiple opportunities and prompts for children to freely recall their experiences and elaborate upon these, before any clarification questions are asked. When Salmon and colleagues (2012) used an approach closer to this interviewing strategy, the beneficial effects of drawing were not observed. These different interviewing methods perhaps explain why drawing is not always beneficial. When children have received minimal prompting or have restricted opportunities to verbally elaborate on their initial accounts, allowing the child to

draw may assist in filling the gaps. Alternatively, drawings may not be required when children receive 'best practice' interviewing techniques, as children are given the opportunity to fully recall their experiences with the greatest accuracy and detail (Salmon et al., 2012). These different outcomes indicate that the benefit or harm caused by drawing may depend on the context in which drawings are introduced.

Despite these conflicting findings, New Zealand has provisions that allow specialist child interviewers to use drawings within child witness interviews (New Zealand [NZ] Police & Child Youth and Family [CYF], 2017). These provisions are guided by the Specialist Child Witness Interview (SCWI) model (NZ Police & CYF, 2017). This model suggests that when deemed necessary, drawings should be used alongside open-ended questions, introduced as late into the interview as possible, and only be related to information that the child has already disclosed within their free narrative. These conditions are consistent with 'best practice' interviewing demonstrated within previous research (Salmon et al., 2012). Furthermore, when using drawings, the SCWI model suggests the 'draw and talk' method in which children are given the opportunity to draw while they verbally recall an experience (NZ Police & CYF, 2017). Importantly, once a child produces a drawing within an interview, it becomes part of the evidential exhibits within the case, meaning it will be presented as part of the child's evidence in court (Cohen-Liebman, 2013). It is, therefore, of utmost importance to understand the beliefs jury members hold around this topic and how jury members are likely to respond to the presentation of children's drawings in court.

Jury Members and the 'Common Sense' Belief System

Previous research has indicated that jurors often hold limited and inaccurate beliefs about the various factors influencing eyewitness memory (Neal et al., 2012). For example, there is a general lack of understanding and appreciation for how factors such as the presence of a weapon, lineup instructions, or misinformation can influence the accuracy of an eyewitness's memory (Helm, 2021). Jurors are instead found to hold a 'common sense' belief system, in which memory is

thought to function as a video camera and accuracy can be determined by the amount of detail that is recalled about an event – beliefs that are highly contested by memory experts (Akhtar et al., 2018). Furthermore, professionals within the justice system are not exempt from these problematic beliefs, as police officers, judges, and lawyers are also prone to holding inaccurate beliefs about memory (Akhtar et al., 2018; Knutsson & Allwood, 2015). Consequentially, highly important legal decisions, may be informed by beliefs and assumptions that are largely incorrect (Read & Desmarais, 2009). If jurors' inaccurate beliefs are not recognised and recalibrated before being exposed to witness testimony, their evaluation of case evidence may be flawed, resulting in incorrect verdicts (Benton et al., 2006).

Given the incongruencies between juror's beliefs and ideas accepted within cognitive science, it is important to understand where further inconsistencies in juror knowledge may exist. In a single study, Leander et al. (2007) investigated the factors that legal professionals (i.e., judges, lay judges, and police officers) thought would facilitate or complicate children's reporting of sexual abuse. Interestingly, the use of drawings within interviews was deemed by all groups to be one of the greatest facilitating factors (Leander et al., 2007). However, as noted earlier, drawings are not universally beneficial, indicating that even legal professionals may have misconceptions about the helpfulness of drawing. Considering these views held by legal professionals and the common inaccurate beliefs identified within other juror research, laypeople may overestimate the benefit of using drawings within forensic interviews and lack an understanding of how they may be problematic.

The Circulating Assumptions about Children's Drawings

Children's ability to draw

It is commonly assumed by laypeople and researchers alike that as children age their drawing ability typically improves (Adi-Japha et al., 1998). Representational drawing refers to drawings that depict life-like objects that are easily distinguished and understood by another

observer (Iordanou et al., 2021). A child's ability to produce representational drawings is found to follow a developmental sequence. In their preschool years, children's drawings typically consist of scribbling and abstract shapes (Golomb, 1992; Freeman, 1993; Krampen, 1991). During early school years, children progress to drawing basic forms and shapes that begin to resemble real-life objects (Adi-Japha et al., 1998). Children can create increasingly representative drawings as their abilities develop, incorporating spatial features (i.e., proportion and depth) and different perspectives into their illustrations (Golomb, 2004; Jolley, 2010). Thereby, one could assume that their ability to produce forensically relevant drawings (i.e., drawings that depict a crime) will increase as children get older. Indeed, some studies have investigated the representational quality of drawings that children produce within forensic interviews (Barlow et al., 2011; Butler et al., 1995; Gross & Hayne, 1998). In these studies, naïve adults typically rate children's drawings as having "good" representative quality. Furthermore, Iordanou and colleagues (2021) found that children's drawings of a forensically relevant event often contain information pertinent to the event in question (i.e., the victim and the perpetrator). Thereby, while children's progression through drawing stages will be highly individualistic, research seems positive about children's ability to create drawings relevant to a forensic event.

However, it is important to understand the emergence of drawing within a child's social context. From an early age, drawing is associated with creativity, imagination, and entertainment (Macleod et al., 2016). Although children may draw on past experiences and knowledge to create their drawings, they are not typically taught or expected to convey their past experiences in these drawings accurately. Contrastingly, drawings are presented to jurors as a form of evidence (Cohen-Liebman, 2013). Thereby, jurors may evaluate the child's drawing for its ability to provide additional information about a crime, give details on the observers and victims within a crime, and corroborate or clarify verbal information that has been presented. As children have never been taught to create drawings in this manner, there may be a discordance between how the child approaches the drawing task and what jury members expect a child to produce.

The meaning behind a child's drawings

There is a common assumption by some researchers and laypeople that children's drawings can provide a window into the inner workings of a child's mind (Cohen-Liebman, 2003). Through the correct interpretation, drawings are often proposed to provide insight into a child's personality, emotions, or experiences. Many of these ideas circulate within online articles, websites, and blog posts, introducing parents and laypeople to copious messages about the significance of children's drawings (i.e., Fattal, 2017; Huntsberry, 2014; Ling, n.d.; Mandrapa, 2015). This includes claims that small details such as the size of the paper, the placement of the image, and the choice of pen provide information about a child's personality and wellbeing (Farokhi & Hashemi, 2011). Importantly, these blog posts and websites are highly accessible to the public, and commonly contain no scientific references, making it difficult for individuals to analyse the reported information critically.

Psychological practice has also assisted in the emergence of theories around interpreting children's drawings. Indeed, psychotherapeutic tools have been developed specifically to decipher meaning from these drawings (Allan & Tussey, 2012). The most commonly utilised method is termed projective drawing – also known as human figure drawings or kinetic drawings. Within these tasks, children are asked to draw a person (i.e., Draw-A-Person technique; Koppitz, 1968) or draw their family engaged in an activity (i.e., Kinetic Family Drawing Technique; Burns & Kaufman, 1970). These drawings are then analysed for features that provide information about the child's wellbeing, the health of their relationships, or the state of their family systems (Cohen-Liebman, 2003). However, while drawings may sometimes provide insight into what a child is experiencing, there is limited research outlining the reliability of utilising drawings in this manner (Allan & Tussey, 2012; Gross & Hayne, 1999b). Considering the lack of consistent and specific evidence in this regard, it is difficult to confidently make claims about what the information within

a child's drawing could tell us. As a result, it may be problematic if such ideas are introduced within the courtroom, where certainty and objectivity are sought after (Holcomb & Jacquin, 2007).

Another concern to the legal system is the prevailing assumption by some researchers and psychologists that drawings can be diagnostic of physical and sexual abuse (Allan & Tussey, 2012). Due to children's struggles in disclosing abuse, the features within a child's drawing have been proposed as an indirect means of detecting when a child has experienced abuse (Allen & Tussey, 2012, Conte et al., 1991; Oberlander, 1995). For example, in a child's human figure drawings, the presence of genitalia, the inclusion of sexually related features, and obscure bodily organisation have all been proposed to be indicative of sexual abuse experiences (Lev-Wiesel, 1999). Initial research and case studies advocated for using drawings for this purpose and concluded that these features are a possible sign of sexual or physical abuse (Hibbard et al., 1987; Howe et al., 1987). However, these studies often lacked sufficient control, could not be replicated, or made conclusions that were not reflective of their findings, creating doubt as to whether drawings can assist in differentiating between abused and non-abused children (Allan & Tussey, 2012). Furthermore, Allen and Tussey (2012) argue that despite the small amount of research that reports significant findings, the risk of incorrectly identifying a child as being abused or dismissing a child that has been abused based on their drawings is too large to justify their use.

Despite the inconsistency and scepticism drawn by previous research, some literature continues to advocate for and investigate the use of children's drawing in detecting physical and sexual abuse (Kissos et al., 2019). Research released in the last two years has extended to investigate how well e-learning and artificial intelligence programmes can identify children who have and haven't been abused from their human figure drawings (Kissos et al., 2019; Kissos et al., 2020). Unfortunately, the programs use the same drawing features from earlier studies to detect (i.e., Lev-Wiesel, 1999). This includes how the face (e.g., an emphasised or shadowed chin), eyes (e.g., hollowed or omitted eyes), hands (e.g., if they are clinging or omitted), and genitals (e.g., a disconnected or omitted lower body) are drawn. Importantly, results show that humans do not do

well at identifying children who have been abused from these features, and artificial intelligence programmes do even worse (Kissos et al., 2020).

The sheer amount of scientific research investigating this topic creates a sense of legitimacy for analysing children's drawings and provides confirmatory evidence for those who believe that drawings are a window to a child's mind. Such beliefs are concerning considering the frequent inconsistencies and poor replicability demonstrated in some of this research (Allan & Tussey, 2012). Furthermore, the presence of these theories within scientific literature has likely assisted in these techniques making their way into psychological practice. These practitioners may then testify as expert witnesses in courts, further bringing ideas, beliefs, and assumptions about the meaning behind children's drawings into the courtroom (Cohen-Liebman, 2013). Lastly, the abundance of online articles discussing projective drawing within the mainstream media indicates that even the general population is fascinated with this topic. Overall, this creates fertile ground for jury members to draw upon preexisting beliefs, popular psychology, and perhaps a sense of scientific legitimacy about the meaning behind children's drawings when evaluating them as evidential exhibits. However, given the lack of empirical evidence supporting the use of drawings for this purpose, such beliefs may pose significant risks to legal decision making. Thereby, jurors' beliefs and knowledge around children's drawing must be investigated to better support legal processes and reduce the likelihood of a miscarriage of justice.

Research Aims.

Given the lack of research within the field, this first study aimed to understand jurors' beliefs about using drawings within forensic settings. A diverse group of people were recruited to complete an online survey. Within this survey, respondents were asked a range of both open and focused questions about their beliefs relating to children's drawings and the functions they serve within forensic interviews. The study was a mixed-methods design consisting of both qualitative and quantitative methods. The survey was designed to answer the following four research

questions: What do potential jury members believe are the benefits of having children draw in investigative interviews? What do potential jury members believe are the problems with having children draw in investigative interviews? What do potential jury members believe children's drawings can tell us? And what features in a child's drawing do potential jury members believe will indicate how well a child remembers an event?

Hypotheses

Given the high face validity of using drawings within interviews, we hypothesised that jurors would believe that drawings could be a highly beneficial aid within an interview. We further hypothesised that jurors would underestimate the issues that may follow the use of drawings. Furthermore, due to the 'popular psychology' ideas circulating within mainstream media, we predicted that jury members would believe information is 'hidden' within children's drawings that could provide information about their experiences, emotions, and personality. Lastly, we hypothesised that jurors would believe that children who presented highly detailed, consistent, and coherent drawings had a stronger memory than children who presented drawings that are low in detail, consistency, or coherency.

Method

This study was granted ethical approval by the School of Psychology Human Ethics Committee, under delegated approval from the Victoria University of Wellington Human Ethics Committee application 0000028564.

Design

Qualitative and quantitative approaches were used to investigate the underlying beliefs and assumptions that jury-eligible members of the population hold about the use of children's drawings in legal settings. The study was conducted using a within-subjects design. Qualitative analysis was performed on participants' responses to open response questions, and quantitative analysis was performed on participants' responses to focused questions. The qualitative aspect of the study employed a latent inductive content analysis. Qualitative analysis was chosen to capture participants' spontaneous beliefs, reducing any constraints or influence placed on participants by predetermined questions (Braun & Clarke, 2013). Furthermore, it allows for a richer and deeper understanding of their beliefs, expectations, and experiences – a particularly important factor considering the lack of research within the area. This qualitative analysis was further supported by a quantitative analysis. These focused questions were included as they allow a more specific and guided examination of participants' beliefs (Brosius et al., 2021).

Participants

Participants were recruited through Prolific Academic's online crowdsourcing platform (www.prolific.co). A crowdsourcing platform was chosen as they produce more representative samples than university samples, while still maintaining data reliability (Buhrmester et al., 2011; Goodman & Paolacci, 2017). Prolific Academic, in particular, has been shown to have more naïve, less dishonest, and more diverse participants, and produces higher quality data when compared to other recruitment sites (i.e., Amazon Mechanical Turk and CrowdFlower) (Peer et al., 2017).

Eligibility. The study was made available to adults registered with the Prolific Academic website. There were two conditions for people to access and complete the survey: fluency in English and being over 18 years of age. When released, 503 participants self-selected into the survey and fully completed the questionnaire. A large sample size was chosen as it reflects similar sample sizes within previous juror belief research (e.g., Akhtar et al., 2018; Cossins et al., 2009; Goodman-Delahunty et al., 2017). These large samples are often selected to gain a representative sample of the population and understand the wide range of beliefs that can be held within such a diverse group.

Of this final sample, 281 participants identified as male (55.9%), 212 identified as female (42.1%), 8 participants identified as other (1.6%), and 2 participants stated that they would 'prefer not to say' (0.4%). The participants ranged from 18 to 74 years of age ($M = 31.98$ years, $SD = 10.35$). The majority of participants had attended university (20.9%), received a bachelor's degree (33.2%), or had a master's degree (21.3%). In addition, most participants identified as White/Caucasian (64.2%), Black/African American (11.9%), or of East Asian origins (10.9%). A summary of the sample demographics can be found in Table 1.

Table 1.*Study One Sample Demographics (N = 503)*

Demographic Characteristic	Frequency (n)	% of sample
M age (SD)	31.98 (10.35)	
Gender		
Male	281	55.9
Female	212	42.1
Other	8	1.6
Prefer not to say	2	0.4
Ethnicity		
White/Caucasian	323	64.2
Black/African American	60	11.9
East Asian	55	10.9
Hispanic/Latino/Spanish	39	7.8
Eastern European	27	5.4
South Asian	20	4.0
American Indian/Alaska Native	7	1.4
Middle Eastern/North African	7	1.4
NZ Pākehā	1	0.2
Pacific Peoples	1	0.2
Maori	1	0.2
Aboriginal Peoples	1	0.2
Other	12	2.4
Prefer not to say	1	0.2
English as their first language		
Yes	404	80.3
No	99	19.7
Have own children		
Yes	207	41.2
No	296	58.8
Education level		

Bachelor's degree	167	33.2
Master's degree	107	21.3
Attended university	105	20.9
High school qualification	59	11.7
Associate degree	34	6.8
Doctoral degree	16	3.2
Professional degree	10	2.0
No high school degree or qualification	5	1.0

Careless responding is an issue that can sometimes be present when online surveys are distributed. Careless responding is when participants are unmotivated to pay attention and respond meaningfully to survey instructions and questions (Goldammer et al., 2020). An attention check – in the form of a directed question (i.e., Please click “disagree”) - was included within the middle of our survey to detect careless responses. Research has shown that the addition of these questions is well suited at identifying careless respondents, exerting a motivational effect on participant responding, and improving data quality (Kung et al., 2018; Shamon & Berning, 2020). It was recommended that only one attention check be used due to the short nature of the survey and the inclusion of open-ended questions (Yarrish et al., 2019). No participants failed the attention check within the survey.

Participants' response time (i.e., the time it takes them to complete the survey) can also be used to identify careless responding (Desimone et al., 2015). Huang and colleagues (2012) outlined that it is unlikely that participants would be able to respond to a question in under 2 seconds meaningfully. Based on the number of questions delivered to participants, the minimum response time in which participants would be expected to give meaningful answers is 2.93mins. Participants in the current sample had a mean response time of 23.95 minutes ($Min_{time} = 6.30mins$; $Max_{time} = 282.57mins$). Therefore, no participants responded faster than the minimum response,

and no participants' responses were outliers. Resultantly, no responses were excluded based on careless responding.

Procedure

This research was presented on Prolific through an advert to participants. The advert informed participants that the research would explore their beliefs about the use of drawings within interviews with children. Once participants were self-selected into the study, they were redirected to the Qualtrics research platform used to administer the survey.

Participants who accessed the study through Prolific Academic were first presented with an information sheet outlining the study and how the data would be used. Participants were required to provide consent before progressing to the survey questions. The survey firstly consisted of a series of demographic questions. The demographic information collected included age, ethnicity, gender, education level, and participation in the legal justice system. Once participants had completed the survey, they were presented with a debrief message and were compensated with £2.56 for their time. This payment was processed through Prolific and is consistent with a good payment rate relative to the average duration of the survey (www.prolific.co).

Survey Layout

Open response questions.

Following the demographic questions, each participant was asked to answer five open-ended questions in as much detail as possible. Table 2 outlines the specific questions delivered to participants. These questions were formulated specifically for the current research and were presented first to capture participants' spontaneous beliefs before being primed by any other questions within the survey.

Table 2.*Open Response Questions from Survey*

Q#	Question delivered to participants
Q1	Please describe in detail what benefits you think there might be when asking children to draw during investigative interviews.
Q2	Please describe in detail what problems you think there might be when asking children to draw during investigative interviews.
Q3	Please describe in detail what you believe the content of children's drawings can tell us about their experiences
Q4	Please describe the features in a child's drawing that would cause you to believe that their memory for an event was accurate
Q5	Please describe the features in a child's drawing that would cause you to doubt their memory for an event

Focused questions

The use of drawings within interviews. Following the open response questions, participants were asked to rate their agreement with statements regarding the use of drawings within child witness interviews. The following two dimensions were explored: children's ability to use drawings and the influence of drawings on the information children report. Participants indicated their agreement with each statement on a scale of one to seven, with eight being an "I don't know" option (1 = strongly agree, 7 = strongly disagree, and 8 = I don't know). For each statement, participants were asked to rate their agreement for two age groups: early-childhood children (< 7 years) and middle-childhood children (8-11 years). They were then asked to rate their confidence in their responses for each age group (0% = Not at all Confident, 100% = Extremely Confident). We included both a neutral option (i.e., neither agree nor disagree) and the "I don't know" option. This allowed an understanding of whether participants lacked the knowledge of how to respond to a question (i.e., 'I don't know) or whether they held neutral opinions concerning the statement (i.e., "neither agree nor disagree). Figure 1 displays an example of the question layout. The full list

of statements delivered to participants can be found within Appendix A. The randomising function on Qualtrics was used to randomise the order in which these eight questions were presented. Randomising ensured that the question order did not influence participants' responses.

Figure 1.

Format of Likert-Scale Questions about the Use of Drawings within Interviews

Please rate your agreement to the following statement for each child age group

Children are able to use drawings to demonstrate their own experiences.

	Strongly Agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree	I don't know
Early childhood children (under 7 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Middle childhood children (8-11 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How confident are you with your answers to the above statement (for each child age group)?

Not at all confident											Extremely confident
0	10	20	30	40	50	60	70	80	90	100	
Early childhood (under 7 years)											
Middle childhood (8-11 years)											

The helpfulness or harmfulness of drawings. Participants were then provided with ten statements about the helpfulness (i.e., drawing will help if the child is shy) or harmfulness (i.e., drawings will be distracting for children) of using drawings within forensic interviews. They were asked to select the statements they agreed with (i.e., select all that apply). This process was completed twice: once for early childhood children (<7 years) and once for middle childhood children (8-11 years). The format and content of these questions can be observed in Figure 2.

Figure 2.*Format of 'Select all that apply' Questions on the Helpfulness or Harmfulness of Drawings*

Which of the following things apply to the use of children's drawings in interviews with **early childhood children (under 7 years)**? Please select all that apply.

- ☐ Drawing during an interview will help memory recall for children (under 7 years)
- ☐ Children (under 7 years) do not mean for their drawings to be exact representations of their experiences
- ☐ Drawing will help if the child (under 7 years) is shy
- ☐ Drawing is a difficult activity for children (under 7 years)
- ☐ Drawings help children (under 7 years) talk about events that are embarrassing or shameful
- ☐ Drawings will be distracting for children (under 7 years)
- ☐ Drawings help because children (under 7 years) do not know the right words to describe some events
- ☐ A child's (under 7 years) drawing can be used to understand what emotions they are experiencing
- ☐ Drawings are useful if the child (under 7 years) is untalkative
- ☐ Drawings are not helpful as children (under 7 years) will use their imagination to make them
- ☐ A child's (under 7 years) drawings are helpful as they tell us what the child has experienced
- ☐ Drawing during an interview will make children (under 7 years) feel more comfortable and relaxed

Relationship between drawing quality and child's memory. The survey then explored whether participants believe that the features within a child's drawing of an event related to how well the child remembers that event. Participants were asked to rate how six different drawing features related to how well the child remembered the event. These features consisted of high detail, low detail, high consistency, low consistency, high coherence, and low coherence. The participants rated the child's memory on a scale from one to seven (1 = very well, and 7 = very poorly), with eight being an "I don't know" option. Again, participants responded for two groups of children: early childhood children (<7 years) and middle childhood children (8-11 years). They were also asked to rate their confidence in their responses for each age group (0% = Not at all Confident, 100% = Extremely Confident). Figure 3 displays an example of the question layout.

The full list of statements delivered to participants can be found within Appendix A. The randomising function on Qualtrics was used with these six questions to randomise the order in which they were presented.

Figure 3.

Format of Likert-Scale Questions about the Relationship between Drawing Quality and a Child's Memory

If a child's drawing of an event is **very detailed**, it means the child remembers the event...

	Very well	Well	Somewhat well	Neither poorly nor well	Somewhat poorly	Poorly	Very poorly	I don't know
Early childhood children (under 7 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Middle childhood children (8-11 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How confident are you with your answers to the above statement (for each child age group)?

Not at all confident											Extremely confident
0	10	20	30	40	50	60	70	80	90	100	
Early childhood (under 7 years)											
Middle childhood (8-11 years)											

Qualitative Analysis

The open-ended questions within the survey were analysed using latent inductive content analysis. Content analysis is a methodology that condenses textual data into meaningful categories (Stemler, 2000). Latent analysis refers to textual analysis, which goes beyond the participant's exact words to interpret the underlying meaning of their response (Downe-Wamboldt, 2009). Manifest analysis, in comparison, is when researchers stick closely to the text and report exactly what participants say. Latent analysis was selected to allow for a deeper understanding of

participants' responses and an analysis of overarching themes (Elo & Kyngäs, 2007). Inductive analysis refers to a data-driven approach, where the categories are derived from participants' responses (Stemler, 2001). This is distinct from deductive analysis, in which analysis is driven by pre-existing theories, and responses are placed into pre-developed categories to test theoretical models. An inductive approach was chosen as it allows a wider and more representative understanding of participants' beliefs in an area that lacks previous research (Elo & Kyngäs, 2007).

All 503 participants' responses were initially included in the content analysis. However, across the sample, eight participants' transcripts were removed from the analysis due to being incomprehensible. Additionally, one participants' transcript was removed due to being written in a language other than English. Therefore, content analysis was carried out on the remaining 494 participants' responses. As these participants' responses to the focused questions appeared valid, their data remained within the quantitative analysis.

Content analysis does not contain a distinct set of processes, rules, or guidelines for its use (Bengtsson, 2016). However, across a wide range of research, content analysis generally utilises four broad processes (see Bengtsson, 2016). These were employed in the current study and consist of: (1) immersion, (2) open-coding, (3) categorisation, and (4) compilation.

Phase 1: Immersion

Immersion consists of the researcher familiarising themselves with the data as a whole before breaking it down into meaningful units (Bengtsson, 2016). Once the data was collected in its entirety, participants' responses to the five open questions were collated into a 'transcript'. Maintaining the responses in their entirety ensured that participants' responses to the questions remained cohesive and were analysed as a whole, rather than being separated by question type (Braun & Clarke, 2019). Immersion then consisted of the primary researcher reading through each participant's open response in its entirety. Within this phase, no coding was undertaken to gain a

general sense of the beliefs held across the sample. Instead, the researcher made notes about general thoughts, impressions, and interesting points within the transcripts.

Phase 2: Open-coding

The second phase consisted of open coding. The analysis was completed separately for each of the four research questions being explored, as they captured distinct conceptual information. For each research question, the open-coding process began with the first 250 participants' responses being broken down into meaning units – the smallest amount of detail relevant to the research question from which meaning can be drawn. Next, these meaning units were given initial code names, which consisted of short descriptive labels that captured the core content of the meaning unit. Following this, the first 250 responses were re-read to ensure that all aspects of the content were captured.

Phase 3: Categorisation

The third phase consisted of condensing and organising the initial codes into broader categories. This process allowed the data to be more easily understood without losing the content and meaning of each participant's response (Graneheim & Lundman, 2004). Again, this process was carried out separately for each research question. Through latent analysis, initial codes which had the same meaning were combined, and where possible, the names of codes were shortened and simplified. Following this, related codes which held similar underlying meanings were grouped into broader meaningful categories. Around ten to fifteen categories were developed in relation to each research question. Once these categories were identified, detailed definitions were developed to capture all responses within the category. These formed the initial coding schemes. Finally, the primary researcher and the researcher's supervisor collaboratively reviewed the coding schemes to determine whether the categories and their corresponding definitions were relevant, exhaustive, and mutually exclusive (Stemler, 2000).

The following example exemplifies the categorisation process. In response to question 1: *Please describe in detail what benefits you think there might be when asking children to draw during investigative interviews;* some participants responded that drawing “makes children more relaxed”, “reduces anxiety”, “reduces stress”, and “reduces embarrassment”. These initial codes allude to the idea that allowing children to draw within interviews increases their comfort and enables them to have a more positive emotional experience within the interview context. Thereby, the category ‘*Drawing increases a child’s comfort*’ was developed. Upon further reading of the data, the extra code that drawing “puts children at ease” was also added within the ‘*Drawing increases a child’s comfort*’ category because it held the same underlying meaning. As a result, the final category definition was formed (See Table 3 for the full definition and example responses).

Phase 4: Compilation

In the final process of compilation, the initial coding schemes were reviewed and fully developed. Firstly, a further 50 participants’ (#251-300) responses were read and applied to the initial coding scheme. If any meaningful information did not fit into the pre-developed categories, new categories were made, or original categories were expanded. This process was repeated for the next 50 participants (#301-350), resulting in the development of the final four coding schemes. See Table 3 to 7 for the categories, definitions, and response examples.

Interrater Reliability

The finalised four coding schemes were assessed for inter-rater reliability to determine the comprehensiveness and reproducibility of the coding framework and protocols (Viera & Garrett, 2005). Interrater reliability was conducted between the primary researcher and a secondary coder. The secondary coder had limited knowledge about the research project and minimal prior contact with the primary researcher. These precautions were in place to reduce the likelihood of inflated reliability agreements (Krippendorff, 1980; Stemler, 2001).

The primary researcher trained the secondary coder to comprehend and utilise the coding schemes. The primary researcher explained the coding frameworks within this training, and 5 participants' responses were collaboratively coded. Following this, the primary and secondary coder independently coded transcripts and collaboratively discussed the codes once completed. Transcripts were independently coded until the primary and secondary coder reached 80% agreement (i.e., the primary and secondary coder were independently assigning the same code 80% of the time). This 80% agreement was reached after the primary and secondary coder independently coded ten transcripts. The coding scheme was consistently altered during training to increase clarity when any confusion arose. After completing this training, to establish reliability, the primary and secondary coder independently coded 25% of the data from the sample (125 transcripts). The 125 transcripts were selected randomly.

Cohen's Kappa (κ) was calculated to determine if there was agreement between the primary and secondary coder on the meaning behind participants' responses. Cohen's Kappa is a robust statistic when determining interrater reliability, considering the expected amount of agreement from random chance (Viera & Garrett, 2005). The coders agreed on 86.6% of the codes assigned to participants' responses. Cohen's Kappa reached a 'substantial agreement' between the two coders across all codes, $\kappa = .792, p < .001$, (Viera & Garrett, 2005).

Intrarater Reliability

The coding schemes were also examined for intrarater reliability. Following the full coding of all 494 transcripts, the primary researcher re-coded the first 50 transcripts. This process was undertaken to determine consistency across the coding process. Cohen's Kappa (κ) was calculated to determine if there was agreement between the primary researcher's coding at the beginning and end of the coding process. The primary researcher showed 89.3% agreement across these two times. Cohen's Kappa reached an 'almost perfect' agreement across these times, $\kappa = .856, p < .001$, (Viera & Garrett, 2005).

Results

Qualitative Results

Through our content analysis, participant's responses to the open questions were categorised across four distinct research questions. The definition of each category will be provided, as well as supporting participant quotes. These quotes have been taken directly from participants' responses. In some cases, quotes may have had minor alterations to increase clarity. Words within square brackets before a quote provide context to the participant's response and are associated with the question the participant was asked. Words in square brackets within a quote indicate adjustments to the participant's response to improve clarity.

Beliefs on the Benefits of Having Children Draw within Forensic Interviews

Nine categories were developed based on participants' responses that relate to the benefits of having children draw within forensic interviews. Table 3 displays these categories and the number of participants stating a belief within each category. Most participants ($n = 351$, 71.2%) indicated that drawing would positively affect the quantity, quality, or accuracy of information children report. Participants also commonly reported that drawing positively impacted an interview through its ability to increase a child's comfort ($n = 163$, 33.0%) or through aiding a child's recall or understanding of the event ($n = 80$, 16.2%). Additionally, 35 participants (7.1%) partial or full responses were classed as '*Other*'. This category was developed for responses that meaningfully answered the question but did not fit within their own category (i.e., it was the only response of its kind).

Table 3.

Categories, Example Responses, and the Number of Participants who reported Beliefs about the Benefits of Asking Children to Draw within Forensic Interviews (N = 494).

Category	Definition	Example(s)	<i>n</i>	%
Drawing increases the quantity, quality, or accuracy of the information that children report	The belief that drawing positively impacts the quantity (i.e., amount), quality (i.e., clarity) or accuracy (i.e., reliability) of the information that children reported about an event.	<i>[Drawings] “help [children] to provide reliable honest information in cases where it is hard to get evidence the normal way through interrogation.”</i> <i>“Children may not have the vocabulary to describe what happened, so a drawing may help them communicate more effectively.”</i>	351	71.2%
Drawing increases a child's comfort	The belief that drawing within forensic interviews will make a child feel more relaxed, safe, confident, and comfortable within an interview context.	<i>“Children find drawing to be a normal activity, so it could help them feel more comfortable or relaxed in the interview.”</i>	163	33.0%
Drawing aids a child's recall or understanding of an event	The belief that drawing acts as a memory prompt or tool to assist a child in recalling, remembering, or understanding an event.	<i>[Drawing] “Might help [children] recall the memory better.”</i>	80	16.2%

		<i>[Drawing] "May help [children] to better understand what they have experienced or witnessed."</i>		
Drawing is a therapeutic activity for children	The belief that drawings can benefit the child as a therapeutic or healing activity, allowing them to process or cope with traumatic experiences.	<i>"It may also be beneficial to the child for letting the things out like a therapeutic experience as well as having a sense of control."</i>	12	2.4%
		<i>[Drawing] "May be therapeutic, a way to vent it out, beneficial to an ongoing investigation."</i>		
Drawing increases engagement	The belief that drawing increases the child's responsiveness, attentiveness, or engagement within an interview context.	<i>"It helps engage [children's] brains. Pictures help keep their attention and are a great way to interact."</i>	11	2.2%
Drawing reduces a child's suggestibility	The belief that drawing as an interviewing technique reduces the child's likelihood of being led or pushed into providing a certain answer.	<i>[Drawing may] "Potentially limit or reduce the witness from saying something which may not be true to 'please' the adult."</i>	5	1.0%
Drawings can be interpreted	The belief that drawings are beneficial as they can be interpreted	<i>[Children] "Can draw situations or have them analysed by psychs."</i>	5	1.0%

	by a third party or meaning can be drawn from them.			
Drawings can be used as evidence within court	The belief that drawings can be of benefit as they can be used as an evidential exhibit within court.	<i>“Drawing therefore allows the investigators more details of what actually happened, and the drawing can be used as evidence in court.”</i> <i>[Drawings] “can explain things that they may not have the vocabulary to describe as an important witness, and this may be emotionally compelling to a jury.”</i>	3	0.6%

Note: Percentages add up to more than 100% as participants were able to report multiple benefits

Beliefs on the Problems with Having Children Draw within Forensic Interviews

Nine categories were developed from participants' responses about the potential problems with having children draw within forensic interviews. Table 4 displays these categories and the number of participants' stating a belief within each category. The majority of participants ($n = 303$, 61.3%) indicated that they believed drawing could harm the quantity, quality, or accuracy of the information that children report. A substantial number of participants also commented that drawing might be problematic as it can increase a child's distress ($n = 98$, 19.8%) or because children may lack the ability to draw their experiences ($n = 92$, 18.6%). Eight participants (1.6%) stated that they believed there were no problems with having children draw in investigative interviews. Lastly, 33 participants (6.7%) partial or full responses were coded as 'Other'.

Table 4.

Categories, Example Responses, and the Number of Participants who reported Beliefs about the Problems with Asking Children to Draw within Forensic Interviews (N = 494).

Category	Definition	Example(s)	<i>n</i>	%
Drawing harms the quantity, quality, or accuracy of the information that children report	The belief that drawing harms the quantity (i.e., amount), quality (i.e., clarity), or accuracy (i.e., reliability) of information that children report within forensic interviews.	<i>“Children have wild imagination and drawing may not be accurate.”</i> <i>[Children] “May add things that were not involved in what actually happened, only to please their imaginative skills.”</i>	303	61.3%
Drawing increases a child’s distress	The belief that drawing is problematic as it will be a stressful, upsetting, traumatic, or generally uncomfortable emotional experience for a child.	<i>“I think the only major problem that may arise is PTSD (post-traumatic stress disorder) this is caused from a horrible memory that can not be let go of and drawing these memories out may help or may lead to the issue never going away which is harmful to the child and his/her mental health.”</i>	98	19.8%
Children lack the ability to draw	The belief that drawing is an inappropriate activity for children as they lack the physical and cognitive abilities to express their experiences through drawing accurately.	<i>“I believe motor-skill issues would be the source of greatest problems - namely, inability to draw with sufficient clarity or detail would leave investigators unable to comprehend what is being drawn.”</i>	92	18.6%

A child's drawing can be misinterpreted	The belief that having children draw will be problematic as the interpretation of children's drawings is difficult, complex, unreliable, and inaccurate within the legal system.	<i>"The only problems I can see would be that the child's drawing might get misinterpreted."</i>	75	15.2%
Drawing reduces a child's engagement within an interview	The belief that drawing is problematic within interview contexts as it negatively impacts the child's attentiveness, engagement, and willingness to participate within the interview context.	<i>[Drawing] "May lead to the child becoming overly distracted."</i>	45	9.1%
Drawing increases a child's suggestibility	The belief that drawing is problematic as it increases a child's likelihood of being lead or pushed into providing a certain answer	<i>[Asking a child to draw] "Might make it easier for the investigator to accidentally ask leading questions."</i>	37	7.5%
Drawings are harmful to how the child witness is perceived	The belief that the use of children's drawings could be detrimental as it will negatively impact how the child witness is perceived.	<i>"Children are very imaginative and might embellish some details in their drawings. For example, a child who draws a picture of their abuser might depict them as a monster/imaginary creature instead of a person. This could make it hard for some people to believe their testimony."</i>	5	1.0%

Note: Percentages add up to more than 100% as participants were able to report multiple problems

Beliefs on the Meaning Behind Children's Drawings

Eight categories were developed from participants' responses about what children's drawings could tell us. Table 5 displays these categories and the number of participants reporting a belief within each category. The first five categories pertain specifically to the information that can be obtained from a child's drawing. Many participants indicated that children's drawings could tell us about what happened in a criminal event ($n = 220$, 44.5%) and information about a child's cognitive state ($n = 211$, 42.7%). The last four categories are related specifically to how we can draw meaning from these drawings. Participants often indicated that we could decipher what happened or how the child felt, primarily through the child's use of symbolic features and colours within their drawing ($n = 67$, 13.6%). In addition, 6 participants (1.2%) stated that they didn't have enough knowledge to provide a response and 32 participants (6.5%) partial or full responses were coded as '*Other*'.

Table 5.

Categories, Example Responses, and the Number of Participants who reported Beliefs about What Children's Drawings Can Tell Us (N = 494).

Category	Belief Definition	Example(s)	n	%
Information about the offence	The belief that children's drawings can tell us information about what happened during a criminal event, such as the sequence of events, the people involved, the location of the crime, or the suspect.	<i>[Drawings can show us] "The person involved, how they looked, what happened"</i>	220	44.5%
Information about a child's cognitive experiences	The belief that children's drawings can tell us about a child's cognition, perceptions, emotions, or psychological wellbeing.	<i>"Drawings can show us what the inside of a child's mind is all about. Their hopes, dreams, friends, and thoughts are shown in their drawings, and they like expressing themselves through activities like art and the like."</i>	211	42.7%
Information about the child's life experiences.	The belief that children's drawings can give us information about a child's everyday life experiences.	<i>"The child's drawings show its experiences, mainly with family (the younger it is), school and the events in its life that had the greatest impression on it, regardless if the events were pleasant or not, or even traumatising."</i>	66	13.4%

Information about a child's experiences of abuse	The belief that children's drawings can tell us if a child has experienced physical, emotional, or sexual abuse or inappropriate touching.	<i>[Drawing can show us a child's experiences of] "Physical and emotional abuse or a situation a child may not want to talk about."</i>	15	3.0%
Everything about a child	The belief that drawings can tell us everything about a child.	<i>"The contents of a child drawing tells everything the child knows or has seen."</i>	5	1.0%
Interpreting the child's use of symbolic features or colours	The belief that we can draw meaning from the child's addition of metaphorical images or colours.	<i>[In a child's drawing] "Darker colors or lots of red and black can reflect anger or sadness whereas lighter and more colorful shades can indicate optimism"</i> <i>"I think the use of color, boldness, drawing-pressure of lines, relative sizes of human figures in the drawings, and subjective visual qualities of the people represented can tell us how they felt as a witness or victim to a traumatic incident".</i>	67	13.6
Interpreting the style of the child's drawing	The belief that the child's stylistic choices within the drawing could tell us things about the child or their experiences.	<i>"Artstyle can indicate things such as [children's] mood/mental state."</i>	12	2.4%

Interpreting the child's use of exaggerated or repeated content	The belief that the exaggeration or repetition of features can be used to tell us things about a child's experiences or things that are important to them.	<i>"The content of the drawings will often be exaggerated but can pinpoint the part of the experience that was most traumatic as that will be the focal point of the drawing."</i>	4	0.8%
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Note: Percentages add up to more than 100% as participants were able to report multiple features

Beliefs on the Drawing Features which Signal How Well a Child Remembers and Event

Twelve categories were developed based on participants' responses relating to the features within a child's drawing that would indicate the child remembers the event accurately. Table 6 displays these categories and the number of participants reporting a belief within each category. Many participants suggested that the presence of details about the offence ($n = 189$, 38.3%) or the consistency of details with the real world or known details about the case ($n = 183$, 37.0%) would indicate that a child remembered an event well. Additionally, 12 participants (2.4%) stated that they were unsure, and 49 participants (9.9%) partial or full responses were coded as '*Other*'.

Lastly, twelve categories were developed based on participants' responses about the features within a child's drawing that would cause them to doubt that a child remembers an event accurately. Table 7 displays these categories and the number of participants reporting a belief within each category. The majority of participants ($n = 316$, 64.6%) indicated that the presentation of details inconsistent with reality or inconsistency with details about the case would cause them to doubt the child's memory. Furthermore, 10 participants (2.0%) stated that they were unsure, and 49 participants (9.9%) participants' partial or full responses were coded as '*Other*'.

Table 6.

Categories, Example Responses, and the Number of Participants who reported Beliefs about Drawing Features that Indicate a Child Remembers an Event Accurately (N = 494).

Category	Belief Definition	Example(s)	<i>n</i>	%
Content within the drawing	The addition of specific details or details about the offence would indicate that the child's memory for the event was accurate	<i>[I would believe a child's memory is accurate if their drawing includes] "Who was there, where they were, if there are specific details."</i>	189	38.3%
Quantity of detail within the drawing	The production of a highly detailed drawing would indicate that the child's memory for the event was accurate	<i>"I would think that the more detail would indicate accuracy."</i>	45	9.1%
Consistency of the drawing with the world or details about the case	The presentation of details that are consistent with what is known about the world (i.e., plausible details) or what is known about the case (i.e., corroborated information) would indicate that the child's memory for the event was accurate	<i>[I would believe a child's memory is accurate] "If the drawing of an event seemed plausible and if the drawing has no inconsistencies and matched up with other evidence."</i> <i>[I would believe a child's memory is accurate if their drawing includes] "Things that could be corroborated for example if they draw a picture of a room it would be possible to check if the shape</i>	183	37.0%

		<i>was broadly correct, the colour of walls broadly correct etc. etc."</i>		
Consistency of the drawing with the child's verbal information	The inclusion of details within the drawing that are consistent with the child's verbal report would indicate that the child's memory for the event was accurate	<i>"The ability to understand it in connection with what the child was saying."</i>	38	7.7%
Presentation of features consistent with the child's developmental level	The inclusion of details unexpected based on the child's age or developmental level would indicate that the child's memory for the event was accurate.	<i>[I would believe a child's memory is accurate if their drawing is] "Beyond my expectations of what a child would know about the subject. Say, if they were victims of a sexual crime and drew genitals to a detail I wouldn't expect a child to know."</i>	24	4.8%
Coherence of the drawing	A coherent and clear drawing would indicate that the child's memory of the event was accurate.	<i>"If the drawing is coherent, then definitely the child's memory of the event is accurate."</i>	17	3.4%
Presence of colour within the drawing	The presence of colour or a high amount of colour in a child's drawing would indicate that the child's memory for the event was accurate.	<i>"A colorful, clear drawing meaning that the child really remembers exactly what happened."</i>	39	7.9%

Presence of emotional content in the drawing	The depiction of emotions or an overall emotional drawing would indicate that the child's memory for the event was accurate.	<i>[I would believe a child's memory is accurate if their drawing includes] "lots of details like happy or sad faces and tools or weapons that were there"</i>	29	5.9%
Child's behaviour when making the drawing	Features of the child's behaviour or demeanour while drawing (i.e., attentiveness and confidence) would indicate that the child's memory for the event was accurate.	<i>[I would believe a child's memory is accurate] "If a child seemed focused during the drawing and also did not need to keep being prompted to add more to the drawing."</i>	26	5.3%
Presence of repetition within the drawing	The repetition of details within a child's drawing would indicate that the child's memory for the event was accurate	<i>[I would believe child's memory is accurate if their drawing includes] "Repeated patterns or vivid unique elements."</i>	17	3.4%
Spatial features within the drawing	The correct depiction of spatial features or the correct use of perspectives would indicate that the child's memory for the event was accurate.	<i>"I think some of the features in child's drawing that would indicate accuracy would be directions of things and arrows pointing to different places because kids don't often think spatially unless it is something they've experienced personally."</i>	12	2.4%
Interviewers' behaviour when making the drawing	The interviewer's behaviour within the interview would indicate whether the child accurately recalled the event.	<i>[I would believe a child's memory is accurate] "If nobody influences what the child is drawing; his memory is also very accurate."</i>	1	0.02%

Children are always truthful	The belief that children always tell the truth and their reports should always be trusted.	<i>"Children typically do not hide the truth. They are brutally honest but sometimes they might not communicate the best."</i>	46	9.3%
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Note: Percentages add up to more than 100% as participants were able to report multiple features

Table 7.

Categories, Example Responses, and the Number of Participants who reported Beliefs about Drawing Features that would cause them to Doubt a Child Remembers an Event Accurately (N = 494).

Category	Belief Definition	Example(s)	<i>n</i>	%
Content within the drawing	A lack of specific details about an offence would cause them to doubt the child's memory of the event.	<i>[I would doubt a child's memory if their drawing included] "Vagueness [in] places, no specific details."</i>	18	3.6%
Quantity of detail within the drawing	The production of a drawing that lacked detail or was simplistic would cause them to doubt the child's memory of the event.	<i>[I would doubt a child's memory if their drawing] "Lacked enough detail or the child not able to express himself well."</i>	52	10.5%

Consistency of the drawing with the world or details about the case	The presentation of details within the drawing which are implausible or inconsistent with details known about the case, would cause them to doubt the child's memory for the event.	<i>[The inclusion of] "Abstract colors and features not seen in the real world would cause me to have doubt in the factuality of a child's drawing."</i> <i>[I would doubt a child's memory if their drawing]</i> <i>"Cannot be corroborated in any way."</i>	316	64.6%
Consistency of the drawing with the child's verbal information	The inclusion of details within a drawing that are inconsistent with the child's verbal report, or if the child is unable to explain what they have drawn, would cause them to doubt the child's memory for the event.	<i>[I would doubt a child's memory if their drawing included] "Something that doesn't make sense with what the child is saying."</i>	17	3.4%
Presentation of features consistent with the child's developmental level	The inclusion of details that are expected for the child's age or development level would cause them to doubt the child's memory for the event.	<i>[I would doubt a child's memory] "If the drawing seemed like something any kid would draw."</i>	4	0.8%
Coherence of the drawing	An incoherent drawing or a drawing that didn't make sense would cause them to doubt the child's memory of the event.	<i>[I would doubt a child's memory if they drew] "Hazy drawings, incoherent drawings. Random squiggly lines."</i>	43	8.7%

Presence of colour within the drawing	A lack or absence of colour in a child's drawing would cause them to doubt the child's memory for the event.	<i>[I would doubt a child's memory if their drawing included] "Simple shades and not colorful detail also may show uncertainty."</i>	14	2.8%
Presence of emotional content in the drawing	The absence of emotions or the presence of happy emotions within a child's drawing about a criminal event would cause them to doubt the child's memory for the event.	<i>[I would doubt a child's memory if their drawing] "Is not full of emotions when it is a bad incident." "If the child adds extra things like a sun with a smile or happy flowers, I would doubt what they are drawing and just think that they are happy to be drawing at that moment."</i>	7	1.4%
Presence of repetition within the drawing	The repetition of details within or across a child's drawings would cause them to doubt the child's memory for the event.	<i>[I would doubt a child's memory] "If their drawing is similar to other drawings they have done in the past."</i>	3	0.6%
Spatial features within the drawing	The inability of a child to depict spatial features would cause them to doubt the child's memory for the event.	<i>[I would doubt a child's memory if their drawing included] "Disconnected field of view"</i>	2	0.4%

Child's behaviour when making the drawing	The child's behaviour (i.e., a lack of confidence or displays of uncertainty) would cause them to doubt the child's memory for an event.	<i>[I would doubt a child's memory] "If they hesitate to fill the page or details don't come to mind quickly to make a full picture."</i>	33	6.7%
Interviewers' behaviour when making the drawing	The interviewer's behaviour (i.e., asking leading or suggestive questions) would cause them to doubt the child's memory for the event.	<i>"If the investigator hasn't taken sufficient care in framing their questions, the child may end up drawing actions, locations or physical descriptions of an alleged offender, that didn't actually happen. Careless wording in follow-up questions can then lead to the development of false memories, leading to incorrect identifications or testimonies."</i>	4	0.8%
Children don't tell the truth and can never be trusted	The belief that children cannot be trusted to tell the truth or are easily manipulated into lying.	<i>"Naïve the dilemma [what would cause me to doubt a child], because I could never trust a child's memory is accurate within given hard evidence, naïve Think it's naïve and false to trust a child's mind in a serious manner such as court."</i>	4	0.8%

Note: Percentages add up to more than 100% as participants were able to report multiple features

Quantitative Results

The Use of Drawings within Interviews

Data analysis strategy. This section explains the analysis approach for the Likert-style questions assessing participants' beliefs on children's ability to use drawings and the influence of drawings on the information children report. Participants rated their agreement to eight statements for early-childhood children and middle-childhood children. Within each question, the number of participants who selected 'I don't know' ranged between 2 and 17 - see Table 8 for the specific number of 'I don't know' responses. As these individuals could not provide an affirmative response for the item, their responses were excluded from the analysis of that item.

For each statement, a two-tailed, paired-samples t-test ($\alpha = .05$) was conducted to determine whether participants' agreement to the statement significantly differed across early-childhood and middle-childhood children. The data was assessed for outliers by inspecting the relevant boxplots. The number of outliers ranged from 2 to 13. These outliers appeared to be valid responses, and the exclusion of the outliers within each test did not alter the analysis result. Thereby, the outliers were retained within each analysis. The relevant histograms within each question were investigated, with all data meeting the normality and normality of difference scores assumptions (Field, 2013).

Participants' agreement with each statement for each age group was then condensed into three groups. These groups consisted of: *Agree* (participants who selected strongly agree and agree), *Tentative* (participants who selected somewhat agree, neither agree nor disagree, and somewhat disagree), and *Disagree* (participants who selected strongly disagree and disagree). This categorisation allowed a simpler understanding of the number of participants who stated a clear agreement or disagreement with the statement. A crosstabs analysis was conducted to determine the number of participants within each agreement status and the number of participants that changed their agreement status based on the child's age (Field, 2013). A McNemar-Brooker test was then conducted to determine whether participants' tendency to change their agreement status based on the child's age was significant.

Lastly, participants rated their confidence in their above answers for early-childhood and middle-childhood children. Each set of confidence ratings was assessed for outliers by inspecting the relevant boxplots. The number of outliers ranged from 4 to 11. These outliers also remained in the analysis as they appeared to be valid responses, and their removal did not alter the outcome. A two-tailed, paired-samples t-test ($\alpha = .05$) was used to determine whether participants' confidence in their answers significantly differed based on the child's age. The relevant histograms within each question were investigated, with all data meeting the normality and normality of difference scores assumptions. A summary of these confidence ratings can be found in Table 8. Furthermore, the results of the above analyses will be detailed for each statement separately.

Table 8.

Summary of Agreement levels and Confidence ratings on Statements about The Use of Drawings within Interviews.

Belief statement	Child's age	Mean agreement score (1 = strongly agree, 7 = strongly disagree)	(SD)	Number of participants who showed agreement (i.e., agreed or strongly agreed)	Mean confidence rating (%)	(SD)	Number of 'I don't know' responses
Children are able to use drawings to demonstrate their own experiences	< 7 years	2.43*	(1.30)	305	75.00*	(19.58)	2
	8-11 years	1.98*	(.99)	397	79.99*	(17.67)	2
When children draw what happened to them, it is not clear what their drawings are meant to represent	< 7 years	3.61*	(1.50)	111	67.63*	(20.28)	2
	8-11 years	4.82*	(1.40)	31	71.02*	(20.22)	2
Asking children to draw during an interview increases the amount of spoken information that they provide	< 7 years	2.98	(1.42)	206	69.18	(19.97)	11
	8-11 years	2.91	(1.34)	216	69.87	(20.26)	9
Asking children to draw during an interview increases the amount of correct information children give about an event	< 7 years	2.98*	(1.19)	175	67.27*	(21.01)	13
	8-11 years	2.71*	(1.12)	225	70.47*	(20.76)	12
Asking children to draw during an interview reduces the amount of spoken information that they give	< 7 years	4.19*	(1.74)	107	68.51	(21.27)	17
	8-11 years	4.48*	(1.64)	73	69.42	(20.87)	17

Asking children to draw during an interview increases the amount of incorrect information children give about an event	< 7 years	4.56*	(1.49)	47	65.98*	(21.04)	12
	8-11 years	5.07*	(1.37)	21	68.61*	(21.15)	10
Asking children to draw during an interview leads to them giving unclear spoken information	< 7 years	4.25	(1.55)	64	66.81	(20.25)	15
	8-11 years	4.78	(1.54)	41	70.53	(20.67)	12
Asking children to draw during an interview increases the chance of them talking about things that never happened	< 7 years	3.82*	(1.61)	103	66.39*	(21.65)	9
	8-11 years	4.31*	(1.64)	76	69.00*	(21.15)	9

* $p < .001$; indicating significant difference observed in agreement or confidence ratings across early-childhood (<7 years) and middle-childhood (8-11 years) children. Note that all significant p -values were $p < .001$.

Statement 1: 'Children are able to use drawings to demonstrate their own experiences'.

The majority of participants stated agreement that early-childhood children ($n = 305$, 60.9%) and middle-childhood children ($n = 397$, 79.2%) could use drawings to demonstrate their experiences (see Table 9). A two-tailed paired t-test revealed that participants were significantly more likely to agree with the statement for middle-childhood children ($M = 1.98$ $SD = .99$) than early-childhood children ($M = 2.43$, $SD = 1.30$), $t(500) = 8.75$, $p < .001$, $d = .39$. Furthermore, a McNemar-Brooker test indicated that the observed tendency for participants to change between agreement, tentativeness, and disagreement based on the age of the child was statistically significant, $X^2(3) = 59.69$, $p < .001$. Participants also showed moderately strong levels of confidence in their answers, with confidence being significantly higher when answering for middle-childhood children ($M = 79.99\%$, $SD = 17.67$) than early-childhood children ($M = 75.00\%$, $SD = 19.58$), $t(500) = 8.63$, $p < .001$, $d = .27$.

Table 9.

Number of Participants in each Agreement Level for the Statement: 'Children are able to use drawings to demonstrate their experiences'.

		Age: 8-11 years			
		Agree	Tentative	Disagree	Total
Age: <7 years	Agree	278	27	0	305
	Tentative	110	64	4	178
	Disagree	9	6	3	18
	Total	397	97	7	501

Note. Two values were missing due to participants selecting 'I don't know'

Question 2: 'When children draw what happened to them, it is not clear what their

drawings are meant to represent'. Many participants were tentative that it would not be clear what children's drawings represent for both early-childhood ($n = 324$, 64.7%) and middle-childhood ($n = 296$, 59.1%) children (see Table 10). Participants showed significantly greater disagreement with

the statement for middle-childhood children ($M = 4.82$ $SD = 1.40$) than early-childhood children ($M = 3.61$, $SD = 1.50$), $t(500) = 18.91$, $p < .001$, $d = .84$. The tendency for individuals to change their opinion based on the child's age was also statistically significant, $X^2(3) = 61.46$, $p < .001$. Participants showed moderately strong levels of confidence in their answers, with confidence being higher when answering for middle-childhood children ($M = 71.02\%$, $SD = 20.22$) than early-childhood children ($M = 67.63\%$, $SD = 20.28$), $t(500) = 5.68$, $p < .001$, $d = .17$.

Table 10.

Number of Participants in each Agreement Level for the Statement: 'Children are able to use drawings to demonstrate their experiences'.

		Age: 8-11 years			
		Agree	Tentative	Disagree	Total
Age: <7 years	Agree	21	68	22	111
	Tentative	10	220	94	324
	Disagree	0	8	58	66
	Total	31	296	174	501

Note. Two values were missing due to participants selecting 'I don't know'

Question 3: 'Asking children to draw during an interview increases the amount of spoken information that they provide'. Participants on average 'agreed' or 'somewhat agreed' that asking children to draw increases the amount of information they provide for both young-childhood children ($M = 2.98$, $SD = 1.42$) and middle-childhood children ($M = 2.91$, $SD = 1.34$). Table 11 demonstrates that participants were split over either agreement or tentative responses for both ages. There was no significant difference in the strength of agreement across early-childhood and middle-childhood children, $t(491) = 1.08$, $p = .28$, $d = .04$. However, the tendency for individuals to change their agreement status based on the child's age was statistically significant, $X^2(3) = 61.46$, $p < .001$. Participants again showed moderate levels of confidence in their answers, with no

significant difference in confidence occurring across early-childhood ($M = 69.18\%$, $SD = 19.97$) and middle-childhood ($M = 69.87\%$, $SD = 20.26$) children, $t(484) = 1.60$, $p = .222$, $d = .02$.

Table 11.

Number of Participants in each Agreement Level for the Statement: 'Asking children to draw during an interview increases the amount of spoken information that they provide'

		Age: 8-11 years			
		Agree	Tentative	Disagree	Total
Age: <7 years	Agree	148	56	2	206
	Tentative	64	185	6	255
	Disagree	4	10	17	31
	Total	216	251	25	492

Note. 11 values were missing due to participants selecting 'I don't know'

Question 4: 'Asking children to draw during an interview increases the amount of correct information children give about an event'. Participants on average 'agreed' or 'somewhat agreed' that drawing increases the amount of correct information children report for both young-childhood ($M = 2.98$, $SD = 1.19$) and middle-childhood ($M = 2.71$, $SD = 1.12$) children. Table 12 demonstrates that participants were split over either agreement or tentative responses for both ages. However, a two-tailed paired samples t-test indicated that participants showed stronger agreement with the statement for middle-childhood children than early-childhood children, $t(489) = 5.43$, $p < .001$, $d = .24$. Additionally, the tendency for individuals to change their agreement status based on the child's age was statistically significant, $X^2(3) = 61.46$, $p < .001$. Furthermore, participants were more confident in their responses for middle-childhood children ($M = 70.47\%$, $SD = 21.01$) than young-childhood children ($M = 67.27\%$, $SD = 20.76$), $t(487) = 5.33$, $p < .001$, $d = .15$.

Table 12.

Number of Participants in each Agreement Level for the Statement: 'Asking children to draw during an interview increases the amount of correct information children give about an event'

		Age: 8-11 years			
		Agree	Tentative	Disagree	Total
Age: <7 years	Agree	137	38	0	175
	Tentative	82	209	5	297
	Disagree	5	6	5	16
Total		225	253	10	488

Note. 15 values were missing due to participants selecting 'I don't know'

Question 5: 'Asking children to draw during an interview reduces the amount of spoken information that they give'. Many participants were tentative that drawing reduces the amount of information reported for both early-childhood ($n = 236$, 48.7%) and middle-childhood ($n = 259$, 53.4%) children (see Table 13). However, participants showed greater disagreement with the statement for middle-childhood children ($M = 4.48$, $SD = 1.64$) than early-childhood children ($M = 4.19$, $SD = 1.74$), $t(484) = 4.75$, $p < .001$, $d = .17$. The tendency for individuals to change their agreement status based on the child's age was also statistically significant, $X^2(3) = 61.46$, $p < .001$. Participants were moderately confident in their responses for both early-childhood ($M = 68.51\%$, $SD = 21.27$) and middle-childhood ($M = 69.42\%$, $SD = 20.87$) children, with no significant difference in confidence found across age, $t(484) = 1.60$, $p = .110$, $d = .06$.

Table 13.

Number of Participants in each Agreement Level for the Statement: 'Asking children to draw during an interview reduces the amount of spoken information that they give'

		Age: 8-11 years			
		Agree	Tentative	Disagree	Total
Age: <7 years	Agree	60	42	5	107
	Tentative	11	184	41	236
	Disagree	2	33	107	142
	Total	73	259	153	485

Note. 18 values were missing due to participants selecting 'I don't know'

Question 6: 'Asking children to draw during an interview increases the amount of incorrect information children give about an event'. The majority of participants were tentative that drawing increases the amount of incorrect information children report for both early-childhood ($n = 288$, 58.7%) and middle-childhood ($n = 251$, 51.2%) children (see Table 14). Participants showed significantly greater disagreement with the statement for middle-childhood children ($M = 5.07$, $SD = 1.37$) than early-childhood children ($M = 4.56$, $SD = 1.49$), $t(489) = 8.68$, $p < .001$, $d = .36$. Furthermore, the tendency for individuals to change their agreement status based on the child's age was statistically significant, $X^2(3) = 61.46$, $p < .001$. Participants were again moderately confident in their responses and showed a greater level of confidence when responding about middle-childhood children ($M = 68.61\%$, $SD = 21.15$) than young-childhood children ($M = 65.98\%$, $SD = 21.04$), $t(490) = 4.43$, $p < .001$, $d = .12$.

Table 14.

Number of Participants in each Agreement Level for the Statement: 'Asking children to draw during an interview increases the amount of incorrect information children give about an event'

		Age: 8-11 years			
		Agree	Tentative	Disagree	Total
Age: <7 years	Agree	16	20	11	47
	Tentative	3	206	79	288
	Disagree	2	25	128	155
	Total	21	251	218	490

Note. 13 values were missing due to participants selecting 'I don't know'

Question 7: 'Asking children to draw during an interview leads to them giving unclear spoken information'. Most participants held tentative opinions about whether drawing leads to children giving unclear spoken information for both early-childhood children ($n = 301$, 61.7%) and middle-childhood children ($n = 254$, 52.0%) (see Table 15). However, participants showed a significantly higher level of disagreement with the statement for middle-childhood children ($M = 4.78$ $SD = 1.54$) than early-childhood children ($M = 4.25$, $SD = 1.55$), $t(487) = 8.93$, $p < .001$, $d = .34$. Furthermore, a McNemar-Brooker test indicated that participants tended to change their agreement status based on the child's age, $X^2(3) = 61.46$, $p < .001$. Participants again showed moderate levels of confidence in their responses, with confidence being significantly higher when answering for middle-childhood children ($M = 70.53\%$, $SD = 20.67$) than early-childhood children ($M = 66.81\%$, $SD = 20.25$), $t(487) = 6.78$, $p < .001$, $d = .84$.

Table 15.

Number of Participants in each Agreement Level for the Statement: 'Asking children to draw during an interview leads to them giving unclear spoken information'

		Age: 8-11 years			
		Agree	Tentative	Disagree	Total
Age: <7 years	Agree	28	30	6	64
	Tentative	11	214	76	301
	Disagree	2	10	111	123
	Total	41	254	193	488

Note. 15 values were missing due to participants selecting 'I don't know'

Question 8: 'Asking children to draw during an interview increases the chance of them talking about things that never happened'. Table 16 demonstrates that participants showed varied opinions on whether asking children to draw increases the chance of them talking about things that never happened. For early-childhood children, participants were split over agreement ($n = 103$, 20.9%), tentative opinions ($n = 296$, 60.0%), and disagreement ($n = 94$, 19.1%). However, for middle-childhood children, most participants either showed tentative opinions ($n = 277$, 56.2%) or disagreement ($n = 140$, 28.4%). A two-tailed paired samples t-test found that participants showed significantly higher disagreement with the statement for middle-childhood children ($M = 4.31$, $SD = 1.64$) than early-childhood children ($M = 3.82$, $SD = 1.61$), $t(492) = 8.39$, $p < .001$, $d = .30$. The tendency for individuals to change their opinion based on the child's age was also statistically significant, $X^2(3) = 61.46$, $p < .001$. Lastly, participants showed moderate levels of confidence in their answers, with confidence being significantly higher when answering for middle-childhood children ($M = 69.00\%$, $SD = 21.15$) than early-childhood children ($M = 66.39\%$, $SD = 21.65$), $t(492) = 4.27$, $p < .001$, $d = .12$.

Table 16.

Number of Participants in each Agreement Level for the Statement: 'Asking children to draw during an interview increases the chance of them talking about things that never happened'

		Age: 8-11 years			
		Agree	Neutral	Disagree	Total
Age: <7 years	Agree	58	38	7	103
	Neutral	16	221	59	296
	Disagree	2	18	74	94
	Total	76	277	140	493

Note. 10 values were missing due to participants selecting 'I don't know'

Relationship between agreement level and confidence. Participants' responses were further analysed to determine whether their strength of agreement (or disagreement) related to their confidence in their response. This analysis was conducted separately for each statement and age group. Agreement level (i.e., from strongly agree to strongly disagree) was treated as a categorical independent variable, and the participants' confidence rating formed the dependent variable. Visual inspection of the relevant histograms indicated that the data was not normally distributed when split based on agreement levels (Field, 2013). Thereby, a series of Kruskal-Wallis tests were run to determine whether participants' confidence was related to their strength of agreement or disagreement with the statement.

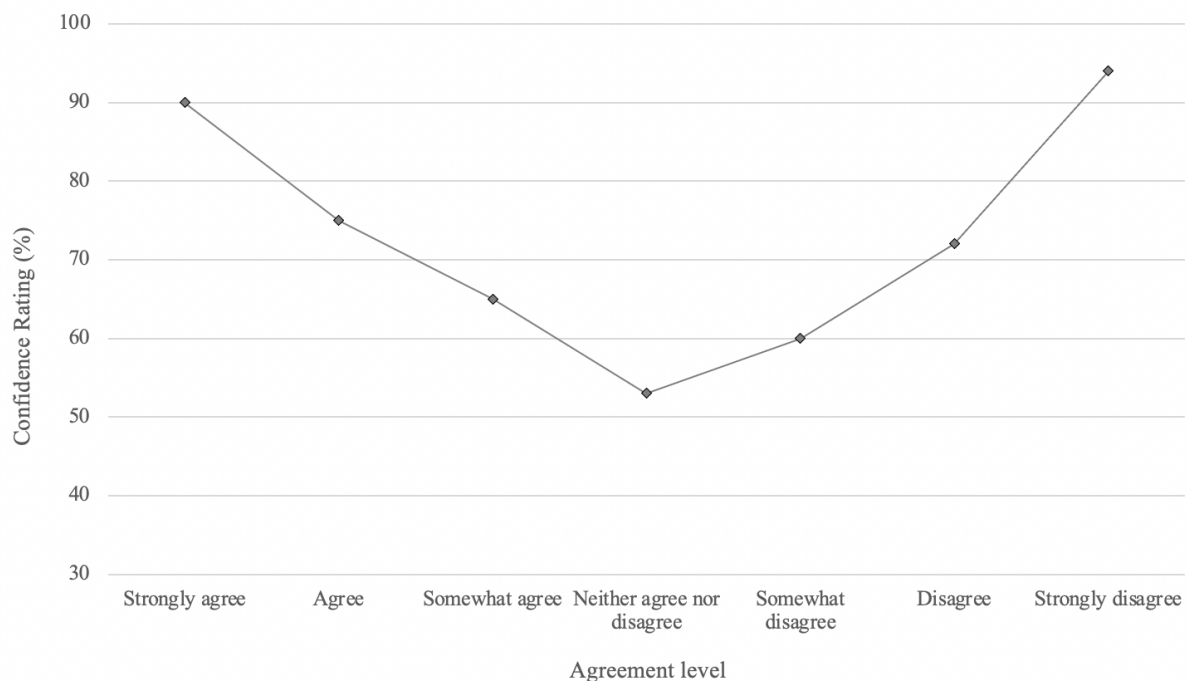
The following analysis details the relationship between agreement and confidence on Question 8 (i.e., Asking children (7+ years old) to draw during an interview increases the chance of them talking about things that never happened'). Only one analysis is detailed, as regardless of the statement and the child's age, the Kruskal-Wallis test was significant, and participants' responses all followed the same trend. All analyses can be found in Appendix B.

Agreement consisted of 7 levels: strongly agree, agree, somewhat agree, neither agree nor disagree, somewhat disagree, disagree, strongly disagree. Distributions of confidence ratings were

similar for all groups, as assessed by visual inspection of the relevant boxplots. Median confidence scores significantly differed across agreement levels $\chi^2(6) = 145.32, p < .001$. Following this significant result, pairwise comparisons were performed using Dunn's (1964) procedure with Bonferroni correction for multiple comparisons. This post-hoc analysis revealed that the relationship between agreement strength and confidence followed a U-shaped curve – detailed within Figure 4. Higher levels of agreement or disagreement were associated with higher confidence, and lower levels of agreement were associated with lower confidence. For example, pairwise comparisons showed that confidence level was significantly higher when “strongly agree” was selected compared to agree, somewhat agree, and neither agree nor disagree (all $p < .001$). Confidence was also higher when selecting agree than somewhat agree, and neither agree nor disagree (both $p < .001$). The full list of pairwise comparisons for this analysis is presented in Appendix C.

Figure 4.

Median Confidence Ratings (%) across each Agreement Level for Question 8.

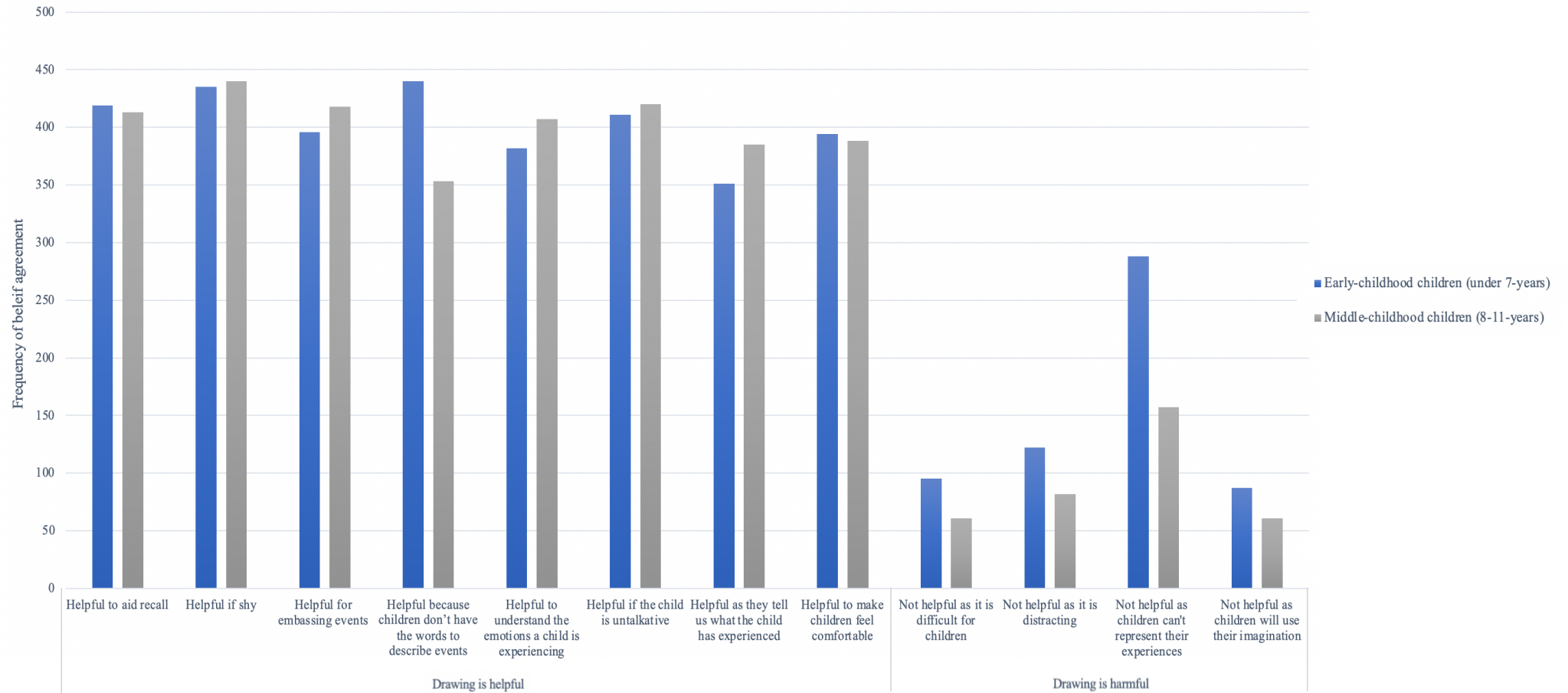


The Helpfulness and Harmfulness of Drawings

Participants were then asked to select which statements they agreed with on the helpfulness or harmfulness of using drawings within interviews. Figure 5 displays the number of participants who agreed with each of the statements for early and middle-childhood children. All participants agreed with at least one statement for early-childhood children. For middle-childhood children, a small number of participants ($n = 4$, .8%) did not agree with any of the statements presented. As can be observed, most participants agreed with statements about drawings being helpful for both early- and middle-childhood children. Fewer participants agreed with statements about how drawings could be problematic. The exception is that many participants agreed that drawings could be problematic as both early-childhood ($n = 288$) and middle-childhood ($n = 157$) children do not intend for their drawings to be accurate representations of their experiences

Figure 5.

Number of Participants Agreeing with Statements about the Helpfulness or Harmfulness of Drawings.



Relationship between Drawing Quality and Memory

Data Analysis strategy. Participants lastly rated how the presence and absence of specific features (e.g., high detail and low detail) within a child's drawing related to how well the child remembered the event (i.e., from very well to very poorly). Within each question, the number of participants who selected 'I don't know' ranged between 4 and 19 – see Table 17 for the specific number of 'I don't know' responses. As these individuals could not provide an affirmative response for the item, their responses were excluded from the analysis of that item.

A Wilcoxon signed-rank test was conducted for each item (e.g., high detail) to determine whether participants rated early- and middle-childhood children's memory strength differently when each drawing feature was present. This test was chosen as the data did not follow a normal distribution, even following transformation. Deviations from normality were particularly prominent within the 'high detail', 'high consistency' and 'high coherence' questions, in which the data was skewed towards the 'very well' end of the scale. The differences scores were approximately symmetrically distributed within each question, as assessed by a histogram with a superimposed normal curve (Field, 2013). The symmetry of these distributions allowed the comparison of group medians to determine group differences.

The data was then further examined to determine whether there were any significant differences in how participants rated children's memory abilities across the presence or absence of features (i.e., across high detail and low detail). As the data was not normally distributed, Friedman's test was run, and pairwise comparisons were performed with a Bonferroni correction for multiple comparisons (Field, 2013). Three Friedman's tests were conducted: high vs. low detail, high consistency vs. low consistency, and high coherence vs. low coherence. Four groups were created within these Friedman's tests to reflect the drawing feature (i.e., high or low detail) and the child's age (i.e., early-childhood or middle-childhood). The results of these tests are reported below.

Results. Across responses, participants indicated that the presentation of a drawing high in detail, consistency, or coherence meant that the child remembered the event 'well' to 'somewhat well' – see Table 17 for a more detailed breakdown of participants' responses. In addition, Wilcoxon-signed rank tests indicated that middle-childhood children received higher memory ratings than early-childhood children when they presented drawings high in detail, consistency, and coherence. The test statistics and significance levels for these analyses can be observed within Table 18.

Contrastingly, participants indicated that the presentation of a drawing low in detail, consistency, or coherence meant that the child remembered the event 'neither poorly nor well' or 'somewhat poorly' – see Table 17 for a more detailed breakdown of participants' responses. Wilcoxon-signed rank tests indicated that middle-childhood children were rated to have significantly poorer memory than early-childhood children when they presented a drawing low in detail, consistency, or coherence – the opposite relationship to what was observed in the case of drawings high in detail, consistency, or coherence. The test statistics and significance levels for these analyses can be observed within Table 18.

Lastly, it was investigated whether participants responded differently across the presence and absence of features. Across all drawing features, participants' ratings of a child's memory strength significantly differed depending on their age and level of detail, consistency, or coherence within the drawing – see Table 18 for the relevant test statistics and significance levels. Post hoc analysis revealed that participants were significantly more likely to rate children as having a strong memory when they presented a highly detailed, consistent, or coherent drawing of an event than when children presented a drawing low in detail, consistency, or coherence (all $p < .001$).

Table 17.*Memory Ratings depending on the Presence/Absence of Drawing Features and Child's Age.*

Drawing Feature	Statement delivered to participants	Child's age	Mean memory rating (1= very well, 4 = neither poorly nor well, 7 = very poorly)	(SD)	Median memory rating	Number of 'I don't know' responses
High detail	If a child's drawing of an event is very detailed , it means the child remembers the event...	<7 years	2.15*	1.16	2	8
		8-11 years	1.87*	1.90	2	6
Low detail	If a child's drawing of an event does not have much detail , it means the child remembers the event...	<7 years	4.48*	1.12	4	18
		8-11 years	4.67*	1.66	5	16
High consistency	If a child's drawing of an event and their spoken report of it are consistent , it means the child remembers the event...	<7 years	2.04*	1.01	2	5
		8-11 years	1.86*	.97	2	4
Low consistency	If there are inconsistencies between a child's drawing of an event and their spoken report of it, it means the child remembers the event...	<7 years	4.61*	1.22	5	16
		8-11 years	4.80*	1.28	5	15
High coherence	If a child's drawing of an event is easy to understand , it means the child remembers the event...	<7 years	2.65*	1.11	3	8
		8-11 years	2.44*	1.16	2	9
Low coherence	If a child's drawing of an event is hard to understand , it means the child remembers the event...	<7 years	4.20*	1.06	4	19
		8-11 years	4.41*	1.16	4	16

* $p < .001$; indicating a significant difference observed in memory ratings across early-childhood and middle-childhood children.

Table 18.*Comparisons of Memory Ratings across Child's Age and Drawing Features*

Drawing quality	Test Statistic ^a
High Detail	$z = 1911.50, p < .001$
Low Detail	$z = 10879.00, p < .001$
High consistency	$z = 1664.00, p < .001$
Low consistency	$z = 12635.00, p < .001$
High coherence	$z = 2415.00, p < .001$
Low coherence	$z = 10055.50, p < .001$
Drawing feature	Test Statistic ^b
Detail	$\chi^2(3) = 1053.43, p < .001$
Consistency	$\chi^2(3) = 1093.50, p < .001$
Coherence	$\chi^2(3) = 850.09, p < .001$

Note. ^a = output from Wilcoxon Signed rank test comparing memory ratings across age,

^b = output from Friedman's test comparing memory ratings across age and feature presence/absence

Discussion

This research represents the first direct exploration of jury members' beliefs and expectancies relating to the use of children's drawings within forensic settings. Four key research questions were explored: What do potential jury members believe are the benefits of having children draw in investigative interviews? What do potential jury members believe are the problems with having children draw in investigative interviews? What do potential jury members believe children's drawings can tell us? And what features in a child's drawing do potential jury members believe are indicative of how well a child remembers an event? These research questions were explored in two separate ways. Firstly, participants' answers to open-response questions allowed an understanding of the spontaneous and unprimed beliefs that jurors will bring with them into the courtroom. Secondly, participants' responses to focused questions provided an understanding of more specific beliefs that may be activated when information is presented, or arguments are posed within the courtroom. Participants' responses to these open and focused questions will be discussed in relation to the four research questions investigated.

The Benefits of Having Children Draw within Forensic Interviews

Participants' open responses detailed the wide range of ways in which they thought drawings could be of benefit when introduced within an interview. Participants believed that drawings could increase the amount of information children report, improve a child's comfort, assist a child in recalling an event, provide a non-verbal means for children to communicate, and increase a child's engagement within the interview. Interestingly, child witness interviewers and researchers within the field often assume drawings are beneficial for these same reasons (Hill, 2017; Wesson & Salmon, 2001). These findings support our first hypothesis as they indicate that jurors largely believe that the use of drawings within interviews can be beneficial for a myriad of reasons. While a range of beliefs about drawing were reported, two main beliefs frequently appeared within participants' responses. We will expand upon the legitimacy and implications of these beliefs.

The first belief was that *drawing increases the quantity, quality, or accuracy of information children report*. This belief was further reflected within the focused questions. Most participants agreed or tentatively agreed that drawing can increase the amount and accuracy of the information that both younger and older children report. However, given the inconsistency within previous research, the validity of these beliefs is difficult to determine. Depending on the circumstances in which drawings are introduced to an interview, they may increase (e.g., Butler et al., 1995; Driessnack, 2005; Katz & Hershkowitz, 2010), have no impact (e.g., Salmon et al., 2012), or even harm (e.g., Bruck et al., 2000b; Gross et al., 2006; Macleod et al., 2016) the information that children report. Thereby, further research is required to understand the specific conditions under which drawings might be expected to be more (or less) useful for supporting children's testimony (Brown & Lamb, 2019). However, given the range of outcomes and inconsistency observed within previous research, participants' largely favourable impressions of the usefulness of drawings may be misplaced.

Despite the large number of participants indicating that *drawing increases the quantity, quality, or accuracy of information children report*, some interesting inconsistencies did appear across the open and focused responses. Within participants' open responses, they often believed that drawings would benefit younger children as they provide a non-verbal means of expressing their experiences, thereby overcoming younger children's limited vocabulary. These beliefs are mirrored within the literature and practice. It is often assumed that due to their cognitive and communicative limitations, the introduction of drawings will greatly benefit younger children (Butler et al., 1995; Wesson & Salmon, 2001). However, within the focused questions, participants showed largely tentative opinions and lower confidence levels about whether drawings benefit the information that younger children report. Jurors seem to hold a level of uncertainty about how younger children will respond to the use of drawings. These findings are not surprising, as while jurors often see older children as having capabilities comparable to that of adults, the capabilities of younger children are often more foreign and unknown (Goodman et al., 1989). This uncertainty

poses interesting challenges when young children are witnesses within a case. It may mean that jurors are more reliant on external sources (i.e., judges, other jury members, and lawyers) to determine whether a child's testimony and behaviour are appropriate for their developmental level. As such, jurors may be more receptive to an expert's opinion and more susceptible to lawyer manipulation when the witness is a young child. Due to this, it may be important that jurors are appropriately informed of both younger and older children's capabilities, so they may have realistic expectations when presented with a child's evidence in court.

The second benefit that consistently arose within participants' open responses was that *drawing increases a child's comfort*. These beliefs were further reflected within the focused questions, as most participants agreed that drawings would be helpful in situations where both younger and older children are feeling shy, embarrassed, or uncomfortable. Again, the accuracy of these beliefs is difficult to determine. On the one hand, researchers and interviewers often similarly hypothesise that drawing has benefits through assisting rapport building and making a child feel more at ease. However, Poole and Dickinson (2014) found that comfort drawing did not influence the information that children reported, indicating that any positive effects of drawing may not be owing to drawing's ability to increase a child's comfort. While Poole and Dickinson (2014) did not observe significant findings, further research within the area is lacking, meaning the emotional benefits of drawing use are largely unknown. Thereby, greater knowledge is required to determine whether jurors' expectations about the facilitative effects of drawing on a child's comfort are justified.

The range of participants' responses about benefits drawings can serve within interviews, supports our hypothesis that jury members may tend to overestimate the facilitative effects of drawing. Furthermore, the limited and inconsistent foundational research restricts our ability to evaluate whether these beliefs are accurate or misinformed. However, suppose jurors do predominantly believe that drawings are of great help within interviews. In this case, they may find a child's testimony particularly convincing when the child has been asked to draw out their

experiences. As a result, the presence and presentation of drawings may sway juror decision making, especially if there is little acknowledgement for the risks that may come with asking children to draw their experiences.

The Problems with Having Children Draw within Forensic Settings

It was hypothesised that jurors would lack an understanding or appreciation for the problems associated with using drawings within forensic interviews. However, within their open responses, participants detailed many ways in which asking children to draw could be harmful within interview contexts. These mirrored some of the concerns raised within the literature (Brown, 2011; Bruck et al., 2000b; Gross et al., 2006). Participants believed that drawing might be a distracting task for children, may prompt children to use their imagination when recalling a story, or increase a child's suggestibility. However, within their focused questions, participants tended to disagree that drawing could be problematic to the information that children reported. Thereby, while participants' open responses tended to not support our hypothesis, participants' focused responses were in line with what was expected. These discrepancies will be discussed along with the dominant beliefs that participants reported.

The most frequently reported problem was that *drawing harms the quantity, quality, or accuracy of information children report*. These comments often reflected the belief that drawing prompts children to use their imagination, increasing the risk of inaccurate or fantastical information making its way into a child's drawing or verbal report. These echo concerns raised within previous research. Specifically, Macleod and colleagues (2016) found that children who participated in undirected drawing (i.e., were not asked to draw about the event in question) were more likely to include fantastical information within their verbal reports, than children who were specifically asked to draw the event. Thereby, it seems that when children are free to draw whatever they like, they can mistake the interview as a play activity and incorporate fantastical details within their reports. These findings demonstrate the problems with using drawings as an

interview aid, as they are so heavily associated with imagination and play in a child's everyday life (Macleod et al., 2016). Importantly, our participants may have held somewhat realistic expectations of children's capabilities and acknowledged that children might not be able to easily switch across the different demands of drawing within their everyday life and the demands of drawing within a forensic interview.

Interestingly, the belief that *drawing harms the quantity, quality, or accuracy of information children report* was not mirrored within participants' responses to the focused questions. Instead, participants typically disagreed or showed tentative opinions towards statements about the harm that drawing can cause to the information a child reports. It is not uncommon to observe such discrepancies within survey responses, especially considering the different task demands across open-response and closed questions (Brosius et al., 2021). Open questions tap into participants' spontaneous beliefs, meaning that open questions themselves do not prime specific beliefs. Furthermore, open questions do not have predetermined responses, restricting participants from being biased by the answer options. Resultantly, participants' responses to these questions are not often exhaustive, as they are limited to the information that is salient to the participant at the time. On the other hand, closed questions take little cognitive processing and present participants with a broader range of outcomes than they may have thought of without prompting (Brosius et al., 2021).

The different qualities of these questions may explain our contrasting results. Participants likely did their best to answer the open-response questions with the knowledge that they had about both drawings and interviewing processes. However, they may have slightly altered how they responded when presented with a broader range of options within the focused questions. Furthermore, within the focused (i.e., closed) questions, participants were given both positive and negative statements about drawings (i.e., drawing increases/reduces the amount of information children report). They may have felt compelled to provide more polarising views to these questions than their more considered responses within the open-response questions. These findings

allude to the importance of study design. Research exploring jurors' beliefs has typically been dominated by quantitative research (e.g., Akhtar et al., 2018; Buck et al., 2014; Cossins et al., 2009). While quantitative approaches are highly beneficial, the current research exemplifies how combining qualitative and quantitative methods can better understand the variability and exceptions within jurors' beliefs.

It is also interesting to note that participants stated many opposing opinions across the five open-response questions. For example, the belief that *drawing **increases** the quantity, quality, or accuracy of information children report* and the belief that *drawing **harms** the quantity, quality, or accuracy of information children report*, were both the most frequently reported benefit and problem with drawings. At face value, these beliefs seem contradictory. The simplest explanation is that it is different participants stating these opposing opinions. However, when breaking down the responses, 70% of participants said that drawings could benefit the information children report, and 60% stated that it could harm the information reported – indicating there must be at least some crossover. This crossover may have occurred as the code that *drawing **increases/harms** the quantity, quality, or accuracy of information children report*, includes multiple dimensions of a testimony. Participants may have placed different emphasis on these dimensions across questions. For example, participants may have indicated that having a child draw within an interview can increase the *quantity* of information the child reports. However, in doing so, the *accuracy* of the information may be reduced. Alternatively, these results may indicate that participants have an implicit understanding that the effectiveness of drawing depends on the context in which drawings are introduced. Potential jurors may understand that while drawings can be beneficial in some situations and with certain children, they may be potentially problematic when introduced in other conditions.

The Meaning Behind Children's Drawings

It was predicted that potential jurors would believe that children's drawings hold a wide range of meaning and allow insight into a child's cognitive world. Participants' responses within the open questions supported this hypothesis. They consistently mentioned that children's drawings could be used to determine a wide range of information about the child and the offence in question. They further indicated beliefs that drawing would allow insight into the child's life experiences, cognitive experiences and even experiences of abuse. These beliefs are not surprising as they are highly consistent with ideas circulating within psychological practice, popular media, and scientific literature (Allan & Tussey, 2012; Farokhi & Hashemi, 2011; Mandrapa, 2015). The legitimacy and implications of the most commonly reported beliefs will be discussed.

Firstly, many participants mentioned that drawings could tell us *information about the offence*. Participants believed that a child's drawing could provide additional information about a crime that wouldn't otherwise be present within their verbal report. Furthermore, for this reason, drawings were thought to be a tool that could assist legal professionals in determining details such as who was involved and where the crime happened. However, given that drawings do not typically serve as an investigatory tool in legal settings, little research has focused on understanding the relevance and reliability of the information that children include within forensic drawings (Butler et al., 1995). However, in the only study of its kind, Iordanou and colleagues (2021) interviewed children about a unique event using the 'draw and talk' method. Interestingly, the researchers examined the content within the child's drawing and verbal report and whether this content changed across a series of interviews. While the children's verbal descriptions contained a larger number of forensically relevant details, the content within a child's drawing was both relevant (i.e., included the victim, perpetrator, and objects involved in the event) and stayed consistent over time. These findings support participants' beliefs that a child's drawing may contain forensically relevant information. However, it appears that these drawings do not provide details above and beyond what is included within a child's verbal report (Iordanou et al., 2021).

Therefore, jurors may need to be cautioned against using drawings to determine what transpired during a criminal event and importance should instead be placed on the child's verbal testimony.

The second theme that commonly appeared within participants' open responses was that children's drawings could tell us *information about a child's cognitive experiences*. As was hypothesised, participants frequently indicated that drawing would allow a "window into the child's mind", giving insight into a child's emotions and thoughts. Furthermore, participants often elaborated on these beliefs indicating that this information could be obtained through interpreting features such as a child's use of colour or the symbolism within their drawing. Unfortunately, the legitimacy of these beliefs is difficult to determine. While children's drawings are an interesting form of expression for children, there is little empirical evidence demonstrating that drawings can reliably provide insight into what a child is experiencing within their cognitive world (Allen & Tussey, 2012). Furthermore, the interpretation of children's drawings lacks impartiality, as it is biased by adults' assumptions and preconceived ideas about a child's experiences. Instead, to reduce the likelihood of misinterpretation, experts within the field suggest that drawings should be understood through the child's explanation of the drawing rather than an adult's interpretation (Mortimore, 1996).

Participants' responses indicate that jurors may observe drawings not only as an interview aid but also a form of evidence providing information about a child's experiences and cognitions. The presence of these beliefs may firstly lead jurors to unfairly and inaccurately draw meaning from a child's drawing, to assist in determining a child's personality, competence, or trustworthiness. Importantly, if the presentation of a drawing alters how the child is perceived, case outcomes may also be largely influenced (Bottoms et al., 2007). Furthermore, if jurors believe that drawings can provide insight into a child's mind, they may be particularly swayed or influenced by arguments that critique and draw attention to features within a child's drawing. For this reason, jurors who hold these beliefs may be predisposed to being manipulated by defense and prosecution lawyers.

Drawing Features Which Indicate How Well a Child Remembers an Event

Within the open response questions, participants provided a large range of drawing features that they believed would convince them or cause them to doubt that a child recalled an event accurately. These features included the detail level, coherency, consistency, and use of colour within a child's drawing. These findings are highly reflective of wider juror research as jurors often assume that the embellishment, consistency, and fluency of an eyewitness' verbal report acts as a proxy for eyewitness accuracy (Akhtar et al., 1998; Denne et al., 2020; Newman et al., 2020). However, these assumptions are not often supported by the empirical literature. For example, a high level of detail within a testimony does not automatically indicate that the witness recalls the event accurately (Wells & Leippe, 1981). Indeed, even false memories can be highly specific and embellished (Arndt, 2012; Brainerd & Reyna, 2002). Given the existence of these beliefs within previous research, it is not surprising that our participants placed similar judgement on the detail, consistency, and coherency within a child's drawing. However, it raises concerns that jurors may put unwarranted pressure on children to produce high-quality drawings. This may be problematic considering the quality of a child's drawing may not necessarily reflect the strength of the child's memory, but instead be influenced by the child's drawing ability, the time pressure within the interview, and the child's comfort level (Brecht & Jolley, 2014).

Participants were also found to judge a child's drawing differently depending on the child's age producing the drawing. Specifically, jurors believed that the quality of the drawing was more important when assessing an older child's memory than a young child's memory. When older children presented a high-quality drawing (i.e., high in detail, consistency, or coherence), they were believed to have a stronger memory than younger children who created a high-quality drawing. However, when older children presented a low-quality drawing (i.e., low in detail, consistency, or coherence), they were believed to have a poorer memory than younger children who presented a low-quality drawing. Thereby, the quality of the drawing older children produced seemed to matter more than the quality of the drawing a younger child produced. Such findings

likely result from the expectancies placed on older children (Ruva & Bryant, 2004). Due to their greater developmental abilities, older children would be expected to present a more detailed, coherent, and consistent drawing than their younger counterparts. When these expectations are not met (i.e., when an older child presents a poorly drawn picture), jurors' expectations may be violated, resulting in the child being judged as less accurate or worthy of belief (Ruva & Bryant, 2004; Tabak & Klettke, 2014).

In summary, participants believed that a wide range of features within a child's drawing could assist them in determining whether a child accurately recalled an event. Furthermore, these judgements placed on children's drawings tended to differ based on the child's developmental level. The range of participants' responses may be both comforting and concerning when considering courtroom implications. Firstly, the sheer number of drawing features identified by participants – especially those that would be convincing - may indicate that participants had a relatively fluid and variable opinion of what makes an appropriate drawing. Furthermore, it may suggest that participants understood the variability in children's drawing ability and the type of drawing children might produce. On the contrary, the number of features identified by participants – especially those that would make them doubtful of a child's memory - may indicate the large criterion used to judge children's drawings. Jurors may be expecting an unrealistic level of detail, coherence, and consistency within a child's drawing, creating a standard that would be difficult for most children to meet. However, this research only explored the features that participants *thought* may be important when evaluating a child's credibility. Further research is required to determine whether these beliefs actually influence how a child's drawing is appraised when presented to jurors within a decision-making scenario.

The Suitability of Children as Witnesses

Interestingly, a small subset of participants demonstrated highly polarising views on whether children should generally be believed as witnesses. Specifically, almost 10% of participants ($n =$

46) stated the invariable belief that children should always be trusted as witnesses, as they lack the motivation or ability to lie. On the other hand, a small number ($n = 4$, 1%) of participants indicated an equally strong aversion to child witnesses, stating that it would be foolish or unwise to trust a child as a witness. This scepticism has been observed within previous research. Some potential jurors believe that children are too easily manipulated or that children's memories cannot be trusted (Kovera & Borgida, 1997; Quas et al., 2005). On both ends of the scale, these beliefs could be highly problematic if held by jurors on cases involving a child witness. Firstly, the belief that children should always be trusted fails to appreciate that, just like all witnesses, children are susceptible to suggestion, misinformation, and false memories (Ceci & Bruck, 1993; Sutherland & Hayne, 2001; Howe & Knott, 2015). Alternatively, the belief that children cannot be trusted is inconsistent with research finding that even young children have the competency and ability to recall events accurately when questioned under optimal interviewing protocols (Fivush et al., 1995; Rudy & Goodman, 1991). These strong views may lead to heavily biased decision making and a disregard for other evidence or arguments presented within the case.

Do People Think They Know?

It is not only important to understand the range of participants' beliefs but also the certainty they have in their knowledge. Jurors within legal settings must make dichotomous decisions on witness credibility and guilt. Thereby, it may seem counterintuitive that we provided individuals with an 'I don't know' and neutral option when responding. However, while verdicts are dichotomous, the jury comes to a decision collectively. Therefore, we chose to include these options to capture the diversity of the knowledge and certainty that jurors may bring into the deliberation room.

Across all statements delivered to participants, at least 96% of participants provided a response to the question, rather than choosing "I don't know". Thereby, most respondents believed that they had the knowledge to answer the question or were at least confident enough to state a

tentative opinion. When participants responded, they were also asked to rate their confidence in their answers. Across all questions, participants, on average, had moderate to high levels of confidence in their responses. Importantly, as the strength of agreement (or disagreement) increased, their confidence in their answers also increased. For example, those that selected 'neither agree nor disagree' generally showed the lowest confidence, whereas those that chose 'strongly agree' or 'strongly disagree' typically had the highest confidence. This relationship may have interesting implications within the courtroom, as jurors' belief certainty can influence whether they are easily persuaded by other individuals' opinions (Bassili, 1996; Krosnick & Abelson, 1992; Tormala & Petty, 2004). Jurors with tentative opinions and lower confidence may be more likely to adjust their beliefs when presented with information from lawyers or experts. Conversely, jurors with strong opinions – and thereby high confidence – may be highly receptive to arguments consistent with their beliefs and dismissive or resistant to those that counter their beliefs (Tormala & Petty, 2004). Despite the question asked within the current study, the range of participants' agreement and confidence levels spanned across the whole scale. Thereby, at any one time, a group of jurors may hold largely different beliefs and respond differently to the presentation of children's drawings and the arguments posed by counsel.

Limitations

The current research provides insight into some of the beliefs that jurors may bring into the courtroom about the use of children's drawings. It is, however, important to place these results within the context in which they were gathered. Firstly, participants were not provided with education or knowledge about the legal system and the function that drawings typically serve within forensic investigations. This method was chosen as it reduces the likelihood of priming or outside influence. However, within real juror situations, jury members will be presented with case summaries, the full child witness interview, the child's drawing, lawyers' arguments and counter-arguments, and other witness evidence (Tabak & Klettke, 2014). As such, jurors will better

understand the purpose that drawings serve within child witness interviews and within the case as a whole. Resultantly, some of the misconceptions or misunderstandings identified within participants' responses may be alleviated. For example, many participants believed that drawings could assist an investigation by providing additional details about what occurred during a criminal event. In reality, when presented with all the evidence in court, jurors may better understand that the content within a child's drawing is not actually used to obtain evidence. Instead, emphasis is placed on the information within a child's verbal testimony. Thereby, while the current study allowed us to assess participants' spontaneous beliefs about children's, there is a need for research to extend to determine whether these beliefs are still present when participants hold knowledge of the wider court process.

Implications

Education of the jury or judges. This research has demonstrated that while jurors hold some realistic beliefs about using children's drawings within forensic settings, some misconceptions are also present. Specifically, participants tended to overestimate the benefits of drawing and place a large amount of value on the symbolic meaning behind a child's drawing. Importantly, these misconceptions may be detrimental to the accuracy of court verdicts if they go on to influence how jurors evaluate evidence. A potential means of preventing this is by providing jury members with information and education around realistic expectations of child witnesses and their drawings (Cutler et al., 1989; Kovera et al., 1994). Although jurors were traditionally expected to make case judgements on their own, expert witnesses have become a popular means of providing jurors with education about the factors that can influence eyewitness memory (Helm, 2021).

However, it is important to understand the difficulties with juror education. Firstly, it is challenging for expert witnesses to be permitted access within the courtroom, as they must be deemed necessary by the judge on the case (R v Turner, 1975; Tenn. 2000, cited in Lindsay et al., 2007). This may pose problems in the case of drawings as judges may not yet have knowledge of

the many misconceptions that jurors hold around their use. Therefore, it may be beneficial to provide judges with resources or information on the topic, so they may make informed decisions as to when expert testimony may be important or necessary. Secondly, although expert testimony may be deemed necessary, it does not mean that these experts will effectively change jurors' beliefs and expectancies to be in line with empirical research. Despite concerns that expert witnesses may confuse jurors, research typically finds that expert testimony can increase jurors' sensitivity to problems with eyewitness memory without unduly increasing their scepticism about the information eyewitness' report (Buck et al., 2011; Cutler et al., 1989; McCloskey et al., 1986).

To increase the effectiveness of juror education, Helm (2021) proposed three criteria that should be met. Firstly, the directions or information provided to jurors must contain enough detail for jurors to grasp the trustworthiness and importance of the information and update their beliefs accordingly. Secondly, the information presented to jurors must be comprehensive enough that they understand the specific situations in which the information is relevant. Lastly, expert testimony or juror instructions should always be provided before evidence is presented (Helm, 2021). When the first piece of evidence is presented, or lawyers make their opening remarks, jurors are known to form a 'story' of what they believe happened during an event (Pennington & Hastie, 1981, 1986, 1988). Once this story or narrative is formed, jurors search for information that confirms their story or fills any gaps within their narrative. Expert evidence must be presented before this story is created; otherwise, it can be very difficult to alter jurors' beliefs, especially if the information is at odds with the story that the juror has constructed (Helm, 2021). Overall, this demonstrates that juror education may assist in correcting any problematic beliefs that are held about children's drawings. However, this education must be introduced in a thoughtful and theory driven way for jurors to adjust their beliefs accordingly.

Implications for legal processes. The current research has demonstrated that the use of drawings within forensic interviews could potentially bias decision making if presented to jurors

within legal settings. One means of combatting this problem could be to not physically show the child's drawing as an evidential exhibit within the courtroom. Within this situation, jurors would still see the child's drawing when the child produces it within the video testimony. Restricting access to the physical drawing may prevent jurors from being distracted by the drawing and instead emphasise the child's verbal testimony. Furthermore, it would reduce the likelihood of jurors being highly critical of the child's drawing or analytical about the meaning behind the features and colours within the child's drawing. However, if these restrictions are not possible, interviewers may need to carefully assess the circumstances in which they ask children to draw. Specifically, if children can proficiently recall the event verbally, drawings should not be introduced unnecessarily. Furthermore, if deemed necessary, interviewers may need to consider whether the child can produce a coherent and detailed drawing, to prevent jurors from placing unfair judgement on the quality of the child's drawing.

Implications for researchers. The current study consistently indicated the need for a greater evidence base within the area. While the current research demonstrated the wide range of beliefs that potential jurors hold about the use of drawings, the accuracy or validity of many of these beliefs is unknown. Further research would allow greater insight into whether the beliefs and expectations held by participants are both sensible and realistic. Additionally, it would be interesting for future research to investigate how factors such as juror gender, age, or exposure to children may alter their beliefs perceptions around children's drawings. Such research would provide a deeper understanding of how the specific characteristics of jury members may further influence how children's drawings are appraised.

Conclusion

Study One examined jurors' beliefs and expectancies around the use and creation of drawings within forensic settings. While it is important to understand what jurors *think* about child

witnesses and their drawings, it is equally important to determine how these beliefs influence juror *behaviour*. The next chapter describes an experiential study designed to test whether the expectations jurors hold about children's drawings influence how they perceive a child witness' testimony.

Study 2: The Influence of Drawing Presentation on Child Witness Credibility

Introduction

Let's go back to our imaginary courtroom. We now know that people bring a variety of beliefs about children's drawings into the courtroom with them. Some of these beliefs are about the benefits of drawing, some are about when drawing may be problematic, and others reflect beliefs about the information that can be pulled from a child's drawing. However, we do not yet know what happens when jury members are actually presented with a child's drawing. Will these beliefs be activated? Will these beliefs influence how credible the child is perceived to be? For example, if a child presents a highly detailed drawing that is consistent with their verbal report, would this convince jurors that a child is telling the truth? On the other hand, what if the child made a drawing that contains no relevant detail? Would this reduce the likelihood that jurors would trust the child? Unfortunately, research has not yet answered these questions, meaning there is a lack of understanding as to how the presence of children's drawings may influence how a child witness is perceived.

Jurors' perceptions regarding a child's credibility are essential to case outcomes (Bottoms et al., 2007; Voogt et al., 2017). The less credible a child witness appears, the less likely guilt will be attributed to the defendant (Goodman-Delahunty et al., 2010; Kaufmann et al., 2003). This is especially pertinent within cases of child maltreatment as the child is often the sole eyewitness to the crime (Bottoms et al., 2007). Credibility can be defined as how worthy of belief a witness is deemed to be (Nurcombe, 1986; Voogt et al., 2017) and is thought to consist of a range of different constructs. These constructs broadly include a witness' competence, trustworthiness, and suggestibility (Denne et al., 2020; McCauley & Parker, 2001; Rogers & Davies, 2007; Nikonova & Ogloff, 2005).

Given the importance of credibility in legal outcomes, our second study investigated whether the presentation of drawings alongside a child's testimony influences how a child witness is perceived. Within this experimental study, the type of drawing presented (i.e., no drawing, high-

quality drawing, or low-quality drawing) and the child's age (i.e., 6-years-old or 10-years-old) were manipulated to determine their impact on credibility judgements.

Factors influencing a child's credibility

Research on legal decision making has found that a wide range of factors can influence a child witness' credibility. Firstly, it can be affected by the child's characteristics, including their age, speaking style, or the emotions they express (Ruva & Bryant, 2004; Tabak & Klettke, 2014). Furthermore, credibility is impacted by factors external to the child, such as the style of questions asked within an interview, the aids introduced within an interview, and how information is presented within court (Danby et al., 2021; Bottoms et al., 2014). Understanding how these factors either explicitly or implicitly influence credibility may allow us to better predict how jurors will respond to the presentation of drawings. Firstly, we will review how the mere presence of a visual form of evidence could influence how a child is perceived. Additionally, we will outline how the features within the child's drawing and the child's age may further interact to alter a child's credibility (Ruva & Bryant, 2004).

The Presentation of Visual Evidence

Illustrations, in certain circumstances, can be extremely powerful resources. Research has found that when presented alongside a statement, images can alter the believability of that statement (Fenn et al., 2013; Newman et al., 2012; Newman et al., 2015). For example, students rate the scientific quality of a neuroscience article higher if it is accompanied by an image of the brain – despite the image providing no evidence supporting the claims within the report (McCabe & Castel, 2008). This phenomenon - termed the 'truthiness effect' - is thought to arise when the accuracy or truth value of a statement is unknown. In these situations, people turn to mental shortcuts to assist them in deciphering whether the information is true (Tversky & Kahneman, 1974). The specific mechanisms behind this truthiness effect are still unknown. Some hypothesise

that when a statement is presented alongside a related image, the image acts as 'confirmatory evidence', making the information seem more truthful (Newman et al., 2015). It is also proposed that the image increases the fluency in which the statement can be processed, thereby making the statement seem more truthful (Schwarz & Newman, 2017).

Interestingly, this truthiness effect has also been investigated within legal settings. Derksen et al. (2020) proposed that the presentation of non-probative images in court may cause a truthiness effect, especially when other evidence is lacking. Non-probative images refer to images presented in court that contain no evidential information but are still related to the crime in question. For example, non-probative images could include showing a picture of blood on a PowerPoint or a photo of the crime scene location to assist in constructing a narrative of the event. Within their study, Derksen et al. (2020) presented participants with a statement (i.e., "Mr Yves said the accused grabbed his phone out of his hands and threw it into the duck pond"), either on its own or alongside a related image (i.e., a photo of a duck pond). Participants then rated whether they believed the individual who was giving the statement. Derksen et al. (2020) found that participants rated an individual as more credible when the witness' statement was accompanied by a non-probative image, than when no image was presented. Most importantly, these photos contained no evidential information about the criminal event; therefore, logically, they should not affect the witness's believability.

Given that this truthiness effect occurs when images contextually related to a crime are presented, a similar phenomenon might operate when children's drawings are presented in court. Children's drawings in these circumstances are generally the child witness' illustration of the event in question, making the drawings often highly related to the alleged crime – a factor important within Derksen and colleagues' (2020) study. If the truthiness effect does indeed transfer to other visual mediums, a child's drawing of a crime may increase the credibility of a child witness' statement. More concerningly, research finds that a 'falsiness effect' can occur. Specifically, individuals are more likely to disagree with a statement when it is presented alongside an unrelated

image (Newman et al., 2015; Newman & Feigenson, 2013). Therefore, while a child's drawing, which bears a high resemblance to the crime, might increase a child's credibility, a drawing with little resemblance to the offence may have the opposite effect. Ultimately, the presence of a truthiness or falseness effect may bias credibility judgements and potentially alter case verdicts.

The Use of Visual Aids

It is also interesting to investigate how the use of a visual aid may alter how jurors perceive a child. While this has not been examined in terms of children's drawings, research has investigated how the use of anatomically detailed dolls can influence credibility. Anatomically detailed dolls are a form of visual aid where children use the dolls to show what happened to them (i.e., where they were touched) (Hill, 2017). Children are rated as more credible when interviewed with these dolls than when dolls are not used (Tessier & Krackow, 2013, as cited in DiSciullo, 2018). Additionally, Kovera et al. (1994) found that jurors were more likely to reach guilty verdicts when a child used an anatomically detailed doll within their testimony. This trend may occur for two reasons. Firstly, by interacting with dolls, children may report more details about the event (Bruck et al., 2000a; DeLoache & Marzolf, 1995). This extra level of detail can, in turn, make the child appear more credible (Akhtar et al., 2018). Alternatively, the child may simply seem more believable if they can demonstrate their experiences in both a verbal and non-verbal manner (Kovera et al., 1994). Thereby, credibility judgements may be largely inflated if a child has both the knowledge and the ability to present their experiences through a visual aid. Importantly, since jurors show this sensitivity when anatomically detailed dolls are used, similar increases in credibility may occur when drawings are introduced within interviews. Jurors may be more likely to trust a child witness when they can both verbally recall an experience and visually represent that experience within a drawing

Content within the Child's Drawing

It has been established that the mere presence of a drawing may influence how a child witness is perceived. However, it is also important to understand how the information within the drawing may be influential on juror perceptions. Drawings will be placed in front of jurors as an evidential exhibit (Cohen-Liebman, 2013). Therefore, it is likely that they will evaluate the drawings for information that might assist them in deciding the believability of the child's testimony. Study One indicated the vast features that jurors may look for when examining a child's drawing. The presence of some or all of these features may influence the child witness' credibility. For example, a drawing that contains a high level of detail, distinguishable information (i.e., a perpetrator and victim), and is consistent with a child's verbal report may be viewed as highly compelling evidence (Cohen-Liebman, 2013). On the contrary, a drawing containing undefined shapes and details that are difficult to interpret may make jurors more sceptical of the believability of the child's story.

Many drawing features could influence how a juror perceives a child witness. However, the current research focused on features commonly mentioned by participants within Study One and features that have received previous attention within the empirical literature (Akhtar et al., 2018; Hansen & Wanke, 2013). It should be noted that although most participants indicated that the presence of imaginary features would cause them to doubt a child's memory, this was not investigated within our second study. Unless interviewers allow children to free draw or ask children suggestive questions, children do not typically include imaginary or fantastical information within their drawings (Macleod et al., 2016; Ceci & Bruck, 1995). Thereby, altering the presence of imaginary features would lack relevance when discussing courtroom implications. Instead, we investigated elements that may realistically differ across children and their drawings within a forensic setting. Therefore, the current study manipulated the level of detail and coherence within the child's drawing.

Detail level. Previous juror research has found that jurors often place significance on the amount of detail within a witness' verbal testimony (Bell & Loftus, 1988; Brainerd & Renya, 2002). Therefore, witnesses are deemed more reliable and believable if they provide a testimony that is rich in both central and peripheral details about the event (Akhtar et al., 2018). Furthermore, when a witness provides these highly detailed testimonies, it increases the likelihood that the case will result in a guilty verdict (Bell & Loftus, 1988; Melinder & Magnussen, 2015). However, this relationship between detail and credibility is not supported by empirical research, as the amount of detail does not form a linear relationship with testimony accuracy (Arndt, 2015; Brainerd & Reyna, 2002). As we discussed, it has been demonstrated that even false memories can be highly embellished and contain many details, whereas genuine past experiences can often be recalled with a small amount of highly accurate information (Akhtar et al., 2018; Brainerd & Renya, 2002).

It is clear from this past research that jury members falsely place significance on the detail level within a child's testimony. Although drawings are a different form of expression, a similar phenomenon may occur regarding the detail in children's drawings. Our first study consistently demonstrated that potential jurors believe that the detail level within a child's drawing could give insight into the strength of the child's memory. However, in reality, children vary in their drawing abilities, representational skills, and creativity levels, which may largely influence the amount of detail contained within their drawing. As such, we chose to investigate whether the detail within a child's drawing had any tangible impact on the perceived credibility of the child witness.

Coherence. Another factor that is known to influence credibility judgements is the cognitive fluency of the information presented to jurors (Bacon, 1979; Newman et al., 2020; Schwarz & Newman, 2017). Cognitive fluency refers to the ease at which information is processed. Research has demonstrated that information presented in a way that is conceptually fluent, coherent, and provides easy access to meaning, is typically rated as more believable or truthful than information that is harder to process (Hansen & Wanke, 2013; Newman et al., 2020). These findings extend to

witness testimony, as the coherence of a witness' verbal testimony influences how accurate and honest the witness is perceived to be (Bennett & Feldman, 2014). If an event is recalled with high levels of semantic coherence, it is generally deemed more favourably than those that are less coherent (Newman et al., 2020; Reber & Schqarz, 1999).

These findings around cognitive fluency may be important in the case of children's drawings. The presentation of a coherent drawing that has distinguishable objects will likely be processed more effortlessly and fluently than a drawing that is difficult to understand. This ease of processing may lead to jurors evaluating the drawing or the child's memory as more trustworthy or believable. Indeed, participants within Study One commonly indicated that a drawing that was easily understandable, coherent, and logical would suggest that the child had a strong memory of the event. Given the importance placed on coherency, we also manipulated the coherency within a child's drawing to determine its influence on credibility.

Child's Age

Laypeople often view younger children as less capable of remembering and recounting their experiences than their older counterparts (Bottoms et al., 2007; Goodman et al., 1987; Leippe & Romanczyk, 1987). For these reasons, jurors generally rate younger children as less credible witnesses and are resultantly less likely to convict someone as guilty when a young child is an eyewitness (Danby et al., 2021). On the contrary, older children (aged 12 and above) are perceived to have memory capabilities similar to that of adults. Therefore, older children are judged as more reliable, accurate, and credible witnesses (Klettke & Simonis, 2011; Goodman et al., 1987).

Interestingly, these effects of age are dependent on the offence in question. Specifically, the relationship between witness age and witness credibility is altered in cases of child sexual assault (Tabak & Klettke, 2014). Within sexual assault cases, younger children are perceived as more credible and trustworthy than older children (Rogers & Davies, 2007; Tabak & Klettke, 2014). This is thought to occur for several possible reasons. Firstly, younger children are perceived to be

more sexually naive – meaning that they would not be able to explain or have knowledge of sexual behaviours unless they had been exposed to unsolicited sexual advances (Goodman et al., 1989). Secondly, young children are perceived to be less able to resist sexual advances and have less motivation to lie than older children, making them more trustworthy and credible witnesses (Castelli et al., 2005; Goodman et al., 1989). On the other hand, older children in sexual abuse cases are perceived as more responsible for sexual abuse, more able to resist sexual advances, and more capable of lying, resulting in them being perceived as less credible witnesses (Quas et al., 2005; Rogers & Davies, 2007; Waterman & Foss-Goodman, 1984). These findings allude to the complex reasoning that jurors can participate in when evaluating court evidence and how this may, in turn, influence a witness's credibility (Tabak & Klettke, 2014).

The importance of age was also demonstrated within Study One, as participants had different expectations of what constituted a 'developmentally appropriate' drawing across younger and older children. Essentially, older children were assumed to be more capable of producing high-quality drawings than younger children. These older children were then judged more harshly when they presented a lower-quality drawing. Expectancy theory states that if a witness performs below the norm of what is expected or appropriate, their credibility will decrease (Burgoon & Hale, 1988; Nigro et al., 1989; Ruva & Bryant, 2004). Alternatively, if a witness exceeds their expectations, their credibility subsequently increases (Ruva & Bryant, 2004). Ruva and Bryant (2004) demonstrated this phenomenon with a child witness' speaking style (i.e., powerful or powerless). When providing a testimony, younger children (i.e., 5–8-year-olds) were expected by jurors to speak in a powerless manner, resulting in their perceived credibility increasing when they spoke in a powerful manner (i.e., exceeding juror's expectations). Contrastingly, older children were expected to speak in a powerful manner, and their perceived credibility decreased when they spoke in a powerless manner (i.e., failed to meet juror's expectations). Similar effects may occur when drawings of different qualities are presented within the courtroom. Therefore, the current research

extended to examine whether a child's age and the quality of the drawing they produce, interact to affect the child's perceived credibility.

Research aims.

Given that drawings are a visual form of evidence generated by a child witness, there is the possibility that the presentation of a child's drawing could be highly compelling evidence and evoke intense responses from jury members (Cohen-Liebman, 2013). Furthermore, considering the importance of credibility on trial verdicts, it is concerning that children's drawings have received little attention in studies of legal decision making. This second study was thereby developed to better understand how potential jurors respond to the presentation of children's drawings and its impact on juror perceptions. A diverse group of participants were recruited to complete an online survey. Within the survey, participants were presented with a transcript from a child witness interview. This transcript was either presented on its own, alongside a low-quality (drawing of the event i.e., low detail and low coherence) or a high-quality drawing (i.e., high detail and high coherence). Furthermore, the child was described to either be within young childhood (i.e., 6-years-old) or older childhood (i.e., 10-years-old). Participants then rated the child on ten different constructs of credibility. We aimed to explore how the presence of a drawing, the quality of the drawing, and the child's age influenced jurors' ratings of the child's credibility.

Hypotheses

Given the truthiness effect observed within Derksen et al.'s (2020) study and the tendency for interview aids to increase a child's credibility, we hypothesised that children would be rated as more credible when they created a drawing than when a testimony is presented on its own. Secondly, as jurors are often swayed by the detail and coherence within a witness' verbal testimony, we hypothesised that children would be rated as more credible when they presented a high-quality drawing than a low-quality drawing (Akhtar et al., 2018; Newman et al., 2020).

Additionally, considering the findings from previous research, we hypothesised that younger children would be rated as less credible than older children (Goodman et al., 1987; Leippe & Romanczyk, 1987). Lastly, given what is typically observed with expectancy theory (i.e., Ruva and Bryant, 2004), we expected an interaction between the child's age and drawing quality. Namely, as adults have higher expectations of older children, we hypothesized that an older child's credibility would decrease to a greater extent when they produced a low-quality drawing than when a younger child produced a low-quality drawing.

Method

This study was granted ethical approval by the School of Psychology Human Ethics Committee under delegated approval from the Victoria University of Wellington Human Ethics Committee application 0000028564.

Design

The survey employed a 3 (drawing type: no drawing, low-quality drawing, or high-quality drawing) by 2 (child's age: 6-year-old or 10-year-old), between-subjects design.

Participants

Participants were again recruited through the online crowdsourcing platform Prolific (www.prolific.co).

Eligibility. Participants were required to have fluency in English and be over 18 years of age. Additionally, using Prolific's screening processes, any participant who had completed Study One was not provided with access to Study Two. This screening process was implemented to restrict priming effects, as participants who completed Study One would have had recent exposure to questions around the use of drawing within forensic interviews. Preventing participants from partaking in both studies allows the sample to be more representative of naïve jury members. A total of 502 adults self-selected into the survey and fully completed the questionnaire. Due to the limited research within the area, it was difficult to hypothesise whether the presentation of a drawing would increase, decrease, or have no impact on a child's credibility. Thereby, a larger sample size was chosen to increase the chances that we would detect modest differences between conditions.

Of this final sample, 104 participants identified as male (20.72%), 380 identified as female (75.70%), and 17 participants identified as non-binary (3.39%). The participants ranged from 18 to 74 years of age ($M = 26.71$ years, $SD = 9.93$). The majority of participants had attained a high-

school-level education (20.92%), attended university (24.10%), or received a bachelor's degree (31.47%). In addition, most participants identified as White/Caucasian (75.30%), Hispanic/Latino/Spanish origins (11.35%), or Black/African American (9.16%). A summary of these sample demographics can be found in Table 19.

Table 19.

Study Two Sample Demographics (N = 502)

Demographic Characteristic	Frequency	% of sample
M age (SD)	26.71 (9.93)	
Gender		
Male	104	20.72
Female	380	75.70
Non-binary	17	3.39
Prefer not to say	1	0.20
Other	0	0
Ethnicity		
White/Caucasian	378	75.30
Hispanic/Latino/Spanish	57	11.35
Black/African American	46	9.16
American Indian/Alaska Native	25	4.98
Eastern European	17	3.39
East Asian	13	2.59
South Asian	12	2.39
Middle Eastern/North African	8	1.59
NZ Pākehā	2	0.40
Pacific Peoples	2	0.40
Maori	1	0.20
Aboriginal Peoples	1	0.20
Other	8	1.59
Prefer not to say	2	0.40
English as their first language		
Yes	469	93.43

No	33	6.57
Have own children		
Yes	93	18.53
No	409	81.47
Education level		
Bachelor's degree	158	31.47
Attended university	121	24.10
High school qualification	105	20.92
Master's degree	62	12.35
Associate degree	40	7.97
Professional degree	7	1.39
Doctoral degree	6	1.20
No high school degree or qualification	3	.60

Note: The percentage of participants across ethnicities adds up to more than 100%, as participants were able to select more than one ethnic identity

As within Study One, participants' response time was used to identify careless responding (Desimone et al., 2015). Hill (1981) detailed that the most proficient readers are expected to read up to 600 words per minute. Furthermore, it is typically accepted that individuals cannot meaningfully answer a question in under 2 seconds (Huang et al., 2012). Based on the length of the transcripts delivered to participants and the number of questions within the survey, the minimum response time in which participants would be expected to give meaningful answers was between 2.28 minutes and 2.43 minutes. Participants in the current sample had a mean response time of 9.60 minutes ($\text{Min}_{\text{time}} = 3.13$ minutes; $\text{Max}_{\text{time}} = 62.28$ minutes). No participants responded faster than the minimum response, and no participants' responses were outliers. Furthermore, all responses appeared valid; thereby, no participant's responses were excluded.

Materials

Interview Transcript

Participants were presented with an interview transcript where a child reported a traffic incident. Within this transcript the child explained how they had been hit by a man on a motorbike while crossing the road, and they had broken their wrist. The event was a fictional plot selected due to its forensic relevance. However, as it was not a greatly traumatising incident, there was a reduced risk of participants finding the content distressing. These transcripts were created by examining interviews with children aged 5-12 within the research project GRACI (ethics #0000026259) (Brown et al., 2022b). Quotes were taken from these interviews and altered to create a realistic interview transcript outlining the traffic incident.

The transcripts began with a brief vignette, which outlined to participants that they would be required to read a portion of an interview transcript between a child and an investigator. Within this vignette, participants were made aware of the child's age (either 6-years-old or 10-years-old); however, no reference was made to the child's name or gender. All transcripts began with the interviewer asking the child to explain what happened to them. The transcripts did not include any introductions or conversational rules (i.e., ground rules) that generally occur at the beginning of child witness interviews (Brubacher et al., 2015). This portion of the interview was removed to reduce the reading requirements on participants. The interview followed the NICHD interview protocol, with the interviewer firstly asking the child a range of open-ended questions, followed by narrower cued-recall questions (Brown & Lamb, 2015).

Six interview transcripts were developed using the 3 (drawing presence: no drawing, low-quality drawing, or high-quality drawing) by 2 (age: 6-year-old or 10-year-old) design. Across all transcripts, the amount and content of forensically relevant details that the child reported were held constant (See Appendix D for the full transcripts). The following text explains how the transcripts differed based on the condition the participants were placed in.

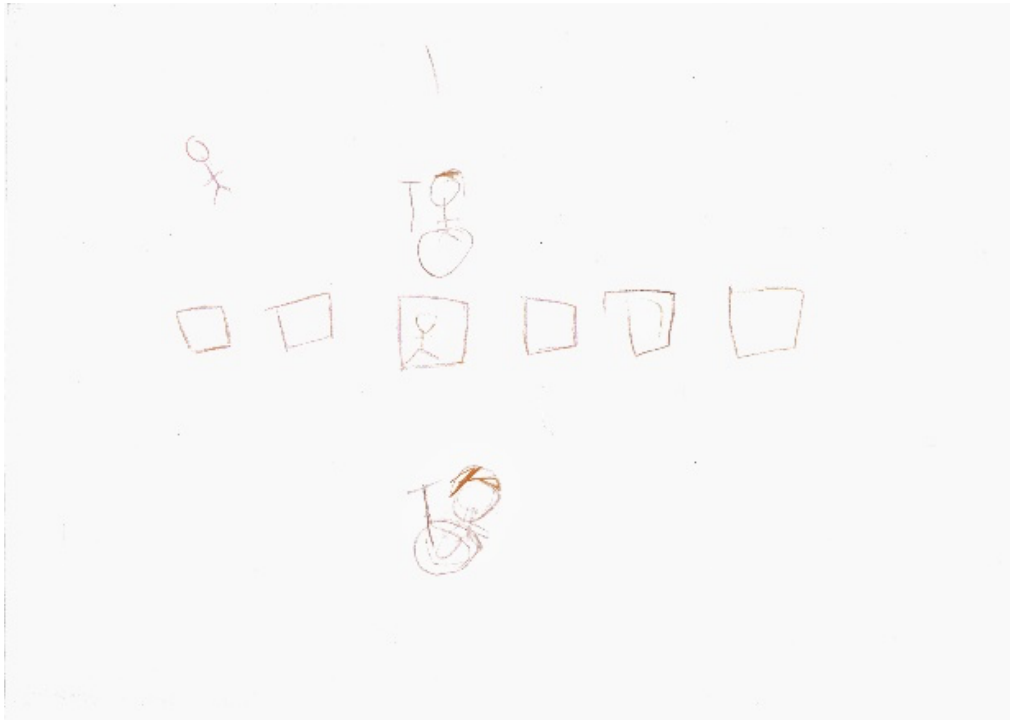
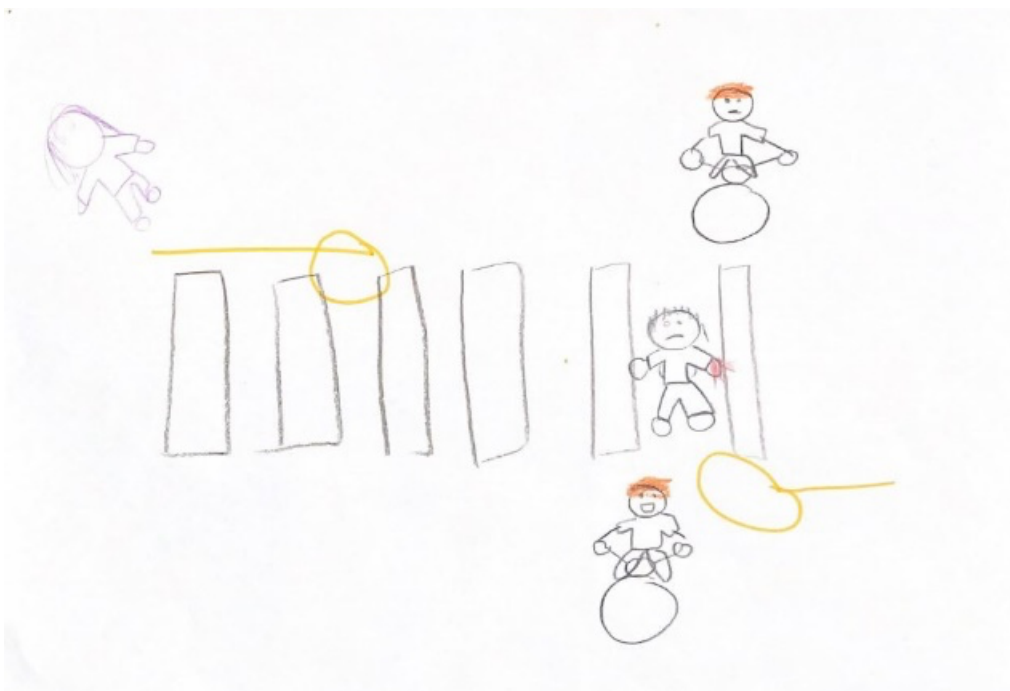
Drawing type. Participants were randomly assigned to one of three drawing conditions: no drawing (drawing-absent), low-quality drawing (drawing-present), or high-quality drawing (drawing-present). Following the cued-recall questions, the transcripts diverged depending on whether the participant was in a drawing-present or drawing-absent condition. Within the drawing-present conditions, once the child could no longer recall any further information, the interviewer asked the child to draw what happened and then explain their drawing. In the drawing-absent condition, once the child could no longer recall any further information, the interviewer said they would take a quick break where the child could think if there was anything else they could remember. The child was then asked more open-ended questions.

Age manipulation. As mentioned, the child within the transcript was described as either 6-years-old or 10-years-old. Furthermore, the child's speaking style was altered to emulate a younger or older child. This speech manipulation was included to increase the salience of the child's age within the transcript and to ensure that a child's credibility was not influenced by the appropriateness of their language (Ruva & Bryant, 2004). Examination of the transcripts within the GRACI project indicated that younger and older children differed in their use of filler phrases (i.e. um), correct grammar or tense, and the sophistication of their language. Thereby, within the transcripts, 6-year olds used more filler phrases, used less sophisticated language, made more grammatical errors, and gave shorter responses.

The final transcripts were firstly reviewed for authenticity by my supervisor, six undergraduate and postgraduate psychology students, and six members of the general public. All reviewers confirmed that the transcripts were believable and realistic. Furthermore, all reviewers verified that the transcripts were clearly from a younger (e.g. around 5-6-year-old) and older (e.g., around 10-12-year-old) child.

Child Witness' Drawing

Two drawings were developed that varied in detail and coherency to form the high-quality and low-quality drawings (see Figures 6 and 7). To produce these drawings, we asked five children aged 5-6-years and five children aged 9-12-years, to draw the motor vehicle accident outlined in the transcript. We combined elements from different children's drawings to make the final low- and high-quality drawings. Both drawings detailed an overhead view of the traffic incident. The features differentiating the high-quality drawing from the low-quality drawing included better use of colour, more detailed features, and greater coherence. Although the child's age was manipulated within the transcript, separate drawings were not made for different aged children. For example, those in the 6-year-old high-quality drawing condition received the same drawing as those in the 10-year-old high-quality drawing condition. We chose to keep these drawings consistent as there was little uniformity in children's drawing abilities, within the drawings we collected. For example, some 6-year-olds could draw better than the older children. On the other hand, some 12-year-olds drawings were incomprehensible. Due to these widely varying abilities, it was unnecessary to further complicate the study design by manipulating the drawing depending on the child's age.

Figure 6.*Low-Quality Drawing***Figure 7.***High-Quality Drawing*

Credibility questionnaire

Questions about the child witnesses' credibility were adapted from Pierce (2020), Hartley (2021), and Brown and Lewis (2013) for this research. These witness credibility questions explored different credibility constructs, including the child's capability, accuracy, confidence, honesty, talkativeness, believability, suggestibility, informativeness, coherency, and reliability. The full questions delivered to participants can be observed in Table 20. These selected constructs of credibility are commonly referenced and demonstrated across a range of child witness research (McCauley & Parker, 2001; Rogers & Davies, 2007; Tabak & Klettke, 2014). Participants were asked to rate the child witness on the above ten credibility constructs on a percentage scale of 0-100. Within this scale, 0 was labelled 'Not at all' and 100 was labelled 'Extremely' (i.e., 0% = Not at all honest, 100% = Extremely honest). Participants were also asked to rate their confidence in each answer on a percentage scale of 0-100, with 0% being 'Not confident at all' and 100% being 'Extremely Confident'. See Figure 8 for an example of the question format. The order in which these questions were presented was randomised to reduce order bias.

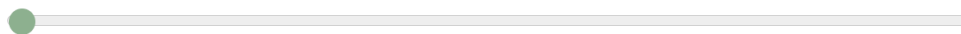
Table 20.*Credibility Questions from Survey*

Q#	Survey question
Q1	How capable was the child at describing the event that happened?
Q2	How accurate do you think the child's description of the event was?
Q3	How confident was the child when describing the event?
Q4	How honest was the description that the child provided?
Q5	How talkative was the child?
Q6	How believable was the child's description?
Q7	How swayed by interviewer suggestion do you think the child was?
Q8	How informative was the child's description of the event?
Q9	How coherent was the child's description?
Q10	How reliable do you think the information was that the child reported?

Figure 8.*Format of Credibility Questions***How capable was the child at describing the event that happened?**

Not at all capable Extremely capable

0 10 20 30 40 50 60 70 80 90 100



How confident are you with your above answer about the child's capability of describing the event?

Not at all confident Extremely Confident

0 10 20 30 40 50 60 70 80 90 100



Procedure

The research was presented on Prolific through an advert to participants. This advert informed participants that they would be expected to read a child witness' interview transcript and answer some questions. Once the participants were self-selected into the study, they were redirected to the Qualtrics research platform used to administer the Survey.

Survey layout. Participants were firstly presented with an information sheet about the research, after which they had to provide consent and confirm that they were over 18 years of age. Participants then completed a range of demographic questions asking their ethnicity, gender, and education level. The participants' exposure to children of different ages and their involvement with the criminal justice system was also examined. Next, utilising Qualtrics' randomisation tool, participants were randomly assigned to one of the six conditions within the 3 (drawing presence: no drawing, low-quality drawing, or high-quality drawing) by 2 (child's age: 6-year-old or 10-year-old) design. All conditions received the approximate same number of participants ($n = 82-85$ within each condition). Participants were then presented with the relevant vignette, transcript, and drawing (if allocated to a drawing present condition). After reading the transcript, participants responded to the ten credibility questions. Once the survey was completed, participants were presented with a debrief message and compensated £1.56 for their time. This payment was processed through Prolific and is consistent with a good payment rate relative to the average duration of the survey (www.prolific.co).

Results

Principal Component Analysis

A principal component analysis (PCA) was run on the 10-item credibility questionnaire, with oblique rotation (direct oblimin). This was conducted to determine what items loaded into components (Field, 2013). The suitability of PCA was assessed prior to analysis. Inspection of the correlation matrix showed that all but one of the variables had at least one correlation coefficient over .30. The suggestibility variable showed very low correlations with other variables (from .019 to .113), indicating that it is likely measuring something different to the other variables. Suggestibility was thereby excluded from the analysis. The model explained a larger amount of the variance when the suggestibility variable was excluded than when it was included. Following the exclusion of the suggestibility variable, the overall Kaiser-Meyer-Olkin (KMO) measure was 0.886 with individual KMO measures all greater than 0.8, classifications of 'meritorious' to 'marvellous' according to Kaiser and Rice (1974). Bartlett's test of sphericity was statistically significant, $\chi^2(36)$ 1888.09, $p < .001$, indicating that the data was likely factorisable.

PCA revealed two components with eigenvalues greater than one, which explained 50.1% and 12.4% of the total variance, respectively. Visual inspection of the scree plot showed inflexions that would justify retaining two components (Cattell, 1966). In addition, a two-component solution met the interpretability criterion. As such, two components were retained. The two-component solution explained 62.5% of the total variance. An oblique rotation was employed to aid the interpretability of the two components. Of the nine items within the PCA, five loaded strongly onto Component 1 (i.e., informativeness, capability, confidence, coherence, and talkativeness), and two loaded strongly onto Component 2 (i.e., believability and honesty). The reliability and accuracy variables correlated highly with both Component 1 and Component 2, although more strongly with Component 2. The constructs which cluster within each factor suggest that Component 1 represents the child's '*Competence*' and Component 2 represents the child's '*Trustworthiness*'. The clustering of these factors is consistent with previous research, which has

suggested that credibility consists of dimensions of competence – an individual's ability to recall and describe an event - and trustworthiness – the perception that an individual is telling the truth (McCauley & Parker, 2001; Rogers & Davies, 2007). Component loadings of the rotated solution are presented in Table 21. The scree plot can be found within Appendix E. As shown in Table 21, each component had high reliabilities: Competence $\alpha = .86$, and Trustworthiness $\alpha = .82$.

Components scores were generated from SPSS using the regression method. This process resulted in each participants' response being condensed to two component scores reflecting the child's competence and trustworthiness. See Table 22 for the means of these components. Higher component scores relate to higher ratings on each variable. For example, higher trustworthiness component scores relate to higher believability and accuracy ratings.

It should be noted that the means and standard deviations of these components were standardised through the regression method (Field, 2013). Thereby these means are not reflecting the same scale as the original data (i.e., from 0-100). Participants mean responses to the original credibility variables can be found within Appendix F. These means demonstrate that participants rated children to have moderate to high levels of each credibility variable.

Table 21.

Rotated Structure Matrix for PCA with Oblique Rotation of a Two Component Credibility Questionnaire (N = 502)

Credibility Item	Loadings	
	Component 1 ^a	Component 2 ^b
Informativeness	.81	.42
Capability	.79	.43
Confidence	.79	.40
Coherence	.74	.46
Talkativeness	.65	.19
Believability	.41	.86
Honesty	.31	.83
Accuracy	.65	.71
Reliability	.61	.72
α	.86	.82

Note. ^a = 'Competence'; ^b = 'Trustworthiness'. Major loadings for each item are bolded

The Impact of Drawing-Type and Child's Age on Credibility Ratings

Following the PCA, Two-Way ANOVAs were conducted on the component scores. These investigated whether participants' ratings of the child's competence and trustworthiness were influenced by the child's age (i.e., 6-years-old or 10-years-old) or the drawing type they presented (i.e., no drawing, low-quality drawing, or high-quality drawing). In addition, given that the suggestibility variable was excluded within the PCA analysis, a Two-way ANOVA was also run on participants' ratings of the child's suggestibility. This analysis determined whether suggestibility ratings were impacted by the child's age and the drawing type presented.

Competence Component

Residual analysis was performed to test for the assumptions of the Two-way ANOVA. For all analyses, outliers were assessed by inspection of a boxplot, normality was assessed using Shapiro-Wilk's normality test for each cell of the design, and Levene's test assessed homogeneity of variances. Within the analysis of competence scores, two outliers were detected; however, they remained in the analysis as their removal did not alter the outcome and appeared to be valid responses. The residuals were normally distributed (all $p > .05$), and there was homogeneity of variances (all $p = .466$).

The interaction effect between child's age and drawing type on child's competency was not statistically significant, $F(2, 496) = .096, p = .909$, partial $\eta^2 = .000$. Given these findings were not significant, an analysis of the main effect of both child's age and drawing type was performed. The main effect for child's age was not statistically significant, $F(1, 496) = .051, p = .821$, partial $\eta^2 = .000$. The main effect of drawing-type was also not statistically significant, $F(2, 496) = 2.660, p = .071$, partial $\eta^2 = .011$. Given these non-significant results, no further analysis was conducted. See Table 22 for the mean component scores.

Trustworthiness Component

Residual analysis was performed to test for the assumptions of the Two-Way ANOVA. Eighteen outliers were detected; however, they remained in the analysis as their removal did not alter the outcome and appeared to be valid responses. The residuals were not normally distributed as per the Shapiro-Wilk's normality test (all $p < .05$). However, we proceeded with the analysis given the large sample size, and visual inspection of the Q-Q plots indicated the data was sufficiently normally distributed. The assumption of homogeneity of variances was also met ($p = .474$).

The interaction effect between child's age and drawing-type on child's trustworthiness was not statistically significant, $F(2, 496) = 1.033, p = .357$, partial $\eta^2 = .004$. Given these findings

were not significant, an analysis of the main effect of both child's age and drawing-type on trustworthiness was performed. The main effect for child's age was not statistically significant, $F(1,496) = .415, p = .519$, partial $\eta^2 = .001$. The main effect of drawing type was also not statistically significant, $F(2,496) = 1.750, p = .174$, partial $\eta^2 = .007$. See Table 22 for the mean component scores.

Considering the assumption of normality was not met, we supplemented the above analysis with the non-parametric Kruskal-Wallis test. Median trustworthiness scores were not statistically significantly different between groups, $\chi^2(5) = 5.78, p = .350$. These findings confirmed the results of the Two-Way ANOVA.

Table 22.

Standardised Competence and Trustworthiness Component Scores across Child's Age and Drawing-Type.

Component	Child's age	Drawing-Type	<i>M</i>	<i>SD</i>
Competence	6-years	No drawing	-.02	1.0
		Low-quality drawing	-.11	.99
		High-quality drawing	.17	1.21
	10-years	No drawing	-.05	1.11
		Low-quality drawing	-.09	.93
		High-quality drawing	.17	.95
Trustworthiness	6-years	No drawing	-.11	.97
		Low-quality drawing	-.15	1.21
		High-quality drawing	.11	.94
	10-years	No drawing	.04	.96
		Low-quality drawing	-.01	.93
		High-quality drawing	.05	.99

Note: Higher scores indicate that the child was identified as being more competent or trustworthy

Suggestibility Rating

Residual analysis was performed to test for the assumptions of the two-way ANOVA. No outliers were detected; however, the residuals were not normally distributed per Shapiro-Wilk's normality test (all $p < .05$). Nevertheless, we proceeded with the analysis given the large sample size, and visual inspection of the Q-Q plots indicated the data was sufficiently normally distributed. The assumption of homogeneity of variances was also met ($p = .649$).

The interaction effect between child's age and drawing type on child's trustworthiness was not statistically significant, $F(2, 496) = .152, p = .859$ partial $\eta^2 = .001$. Given these findings were not significant, an analysis of the main effect of both child's age and drawing type was performed. The main effect for child's age was not statistically significant, $F(1, 496) = .216, p = .642, \eta^2 = .000$. The main effect of drawing type was also not statistically significant, $F(2, 496) = .865, p = .422, \eta^2 = .003$. See Table 23 for the mean suggestibility ratings across each condition.

Considering the assumption of normality was not met, we supplemented the above analysis with the non-parametric Kruskal-Wallis test. Median suggestibility ratings were not statistically significantly different between groups, $\chi^2(5) = 2.16, p = .826$. These findings confirmed the results of the Two-Way ANOVA.

Table 23.

Suggestibility Ratings across Child's Age and Drawing-Type (0% = Not at all suggestible, 100% = Extremely suggestible)

Credibility Item	Child's age	Drawing-type	<i>M</i>	<i>SD</i>
Suggestibility	6-years	No drawing	36.98	25.68
		Low-quality drawing	37.10	25.34
		High-quality drawing	32.79	23.46
	10-years	No drawing	35.31	23.88
		Low-quality drawing	35.10	22.39
		High-quality drawing	33.45	23.98

Note: Lower scores are related to higher credibility.

Discussion

This second study investigated whether the presence of a child's drawing alongside their testimony altered how jurors perceived a child witness. Our hypotheses consisted of: (1) children that created a drawing would be rated as more credible than those who were not asked to draw (2) children that presented a high-quality drawing would be rated as more credible than those that presented a low-quality drawing, (3) older children would be rated as more credible than younger children, and (4) age and drawing presence would interact; where an older children's credibility will decrease more when they produce a low-quality drawing than when a younger child creates a low-quality drawing.

Consistent with previous research, two constructs of credibility emerged from our factor analysis: competence and trustworthiness (McCauley & Parker, 2001; Rogers & Davies, 2007). We also considered suggestibility, given its relevance to a child's credibility (Denne et al., 2020). We found no significant differences in participants' ratings of a child's competence, trustworthiness, or suggestibility across our manipulated variables. Therefore, children were rated to be similarly credible regardless of their age, whether they had been asked to draw within the interview, or the quality of the drawing they produced. Therefore, although Study One showed potential jurors hold many beliefs about children's drawings and what they can tell us about their experiences, these beliefs did not appear to be activated or influence how jurors then evaluated the credibility of a child witness. Explanations for these findings will be discussed.

The Presence of Drawings

Surprisingly, the use of drawings within an interview and the presentation of these drawings did not affect how jurors perceived a child's credibility. These findings are somewhat inconsistent with previous research, which finds that the use of visual aids within interviews often positively influences a child's credibility (Kovera et al. 1994; Tessier & Krackow, 2013). These discrepancies may be explained by the context in which the interview aid was introduced. In real

forensic interviews, aids are typically introduced when a child struggles to verbally articulate what happened during an event (Brown & Lamb, 2015). If the aid has its intended effect, it will assist the child in reporting a greater amount of forensically relevant information – which can, in turn, boost the child's credibility (Akhtar et al., 2018; Bell & Loftus, 1988; Melinder & Magnussen, 2015). However, the child within our transcript verbally recalled many details about the traffic incident, with only a small amount of prompting from the interviewer. Thereby, as the child appeared to be giving an adequate verbal account on their own, drawings may not have been considered useful or adding anything of value.

Thus, when evaluating credibility, participants may have prioritised the verbal content within the child's testimony, potentially overshadowing any contribution of drawing presence or drawing quality. Similar ideas have been mirrored in previous research. Namely, when case evidence is strong, jurors are less likely to turn to ambiguous factors or witness characteristics to determine credibility and guilt (Leippe & Romanczyk, 1989; Moran et al., 1994). Thereby, drawings may only be influential when other components of the child's testimony are deficient. For example, when a child presents a strong verbal testimony elicited through open questioning, jurors may not need to look to the child's drawing to establish credibility (Danby et al., 2021; Ruva & Bryant, 2004). However, when a child provides minimal descriptions or has other challenges (e.g., motivation or language barriers), jurors may be left feeling uncertain. In these circumstances, jurors may be more likely to turn to ambiguous information – such as the quality of a child's drawing – to determine how credible they believe the child is.

Overall, within the current study, the strength of the child's verbal testimony may have protected the child from being criticized based on the drawing they presented. These findings allude to the importance of supporting children to provide detailed, relevant, and coherent verbal accounts, before any interview aids are introduced. To determine whether this is what occurred within the current research, further research should examine how credibility is impacted when both the strength of the child's verbal testimony and the presence of a drawing are manipulated.

An Alternative explanation

As we discussed, the lack of a drawing or expectancy effect may be because the child's strong verbal testimony reduced the pressure placed on the child's drawing. However, it may also indicate that participants evaluated the child's drawing through a relatively non-judgmental lens. For example, participants may have been aware that drawing is a highly variable and idiosyncratic trait rather than something reflecting a child's competence or trustworthiness (Adi-Japha et al., 1998). As such, jurors may not have been judgmental of the drawing quality or whether the drawing was developmentally appropriate for the child. Indeed, these themes were prevalent within Study One, as some participants showed an appreciation for the variability in drawing skills and the difficulty children might have in producing a highly detailed and coherent drawing during interviews. Classic attribution theory further aligns with this idea, stating that people often consider a wide range of causes for behaviour (Heider, 1958; Kelley, 1972; McAuliff & Kovera, 2012). Furthermore, when plausible explanations for someone's behaviour exist, people are less likely to judge someone's actions based on arbitrary factors (McAuliff & Kovera, 2012). Therefore, instead of assuming that the low-quality drawing reflected the child's poor memory, incompetence, or lack of trustworthiness, participants' may have attributed the low-quality drawing to a more plausible explanation, such as the child's poor drawing ability.

However, previous juror decision-making tasks have demonstrated that jurors do not often employ such a rational and logical approach when evaluating testimonies. Instead, credibility judgements are often guided by mental shortcuts and assumptions, which allow jurors to quickly – although often inaccurately – make judgements of guilt (McAuliff & Bornstein, 2012). To better understand jurors' credibility judgements, it would be interesting to investigate jurors' thought processes while evaluating a child's testimony and the related drawing. For example, participants could complete a mock juror task and be asked to self-reflect and provide reasoning for their evaluations of a child witness. This form of questioning would demonstrate the rationale behind jurors' decision making and assist in understanding how juror beliefs translate into behaviour.

The Truthiness Effect

It was unknown whether the truthiness effect caused by images would still occur when drawings were presented. While Derksen et al. (2020) found that images can increase a witness' credibility, the current research demonstrated that this effect might not transfer to other visual mediums such as drawings.

These contrasting findings could be due to the different characteristics across images and drawings. Firstly, as drawings are a child's hand-drawn depiction of an event, they lack the fluency and coherency found within images (Schwarz & Newman, 2017). This reduction in processing fluency may, in turn, reduce the likelihood that a drawing will automatically enhance a child's credibility (Hansen & Wanke, 2013; Newman et al., 2020). Additionally, unlike the images used within Derksen et al.'s (2020) study, children's drawings are not non-probative. Instead, drawings are a child's direct interpretation of the crime, presented as an evidential exhibit to jurors. Thereby, the credibility of the drawing itself must first be evaluated before it can boost the witness's credibility. Lastly, Derksen et al. (2020) presented the image alongside a singular statement from a witness. Therefore, the truthiness effect may only occur alongside these static forms of information rather than within more dynamic situations (i.e., a conversation between a child witness and interviewer).

Due to the different methods across the current study and previous truthiness research, it is difficult to determine whether a truthiness effect does not exist in the case of drawings, or whether the conditions within the present study restricted our ability to observe it. Nonetheless, if a truthiness effect does occur when drawings are presented, these findings indicate that the relationship may be more complex than those observed with images.

The Child's Age

Lastly, although children often receive different credibility ratings based on their developmental level, within the current study, the child's age had no significant influence on their

credibility (Klettke & Simonis, 2011). These results at first appear inconsistent with previous research, which often finds that older children are perceived to be more competent and trustworthy than younger children (Bottoms et al., 2007; Danby et al., 2021; Klettke & Simonis, 2011). However, some studies have found results consistent with the current results, indicating that the positive relationship between age and credibility may not be widely observed. Across a range of research, child witnesses' ranging from 6- to 13-years old have been rated to have similar levels of credibility, regardless of the crime in question (i.e., physical assault or robbery) (Nigro et al., 1989; Ross et al., 1987; McCauley & Parker, 2001). These findings indicate that the relationship between witness age and credibility may depend on factors such as the offence type and strength of evidence (Danby et al., 2020; McCauley & Parker, 2001; Leippe and Romanczyk, 1989). Further research would benefit from investigating when these age differences may be more likely to appear and thereby when a child's age may be more likely to influence case outcomes.

Alternatively, the lack of an age difference observed within the current study may be an issue of salience. Within the transcript presented to participants, they were made aware of the child's age. The transcripts were also manipulated to reflect a younger (i.e., 6-year-old) and older (i.e., 10-year-old) child's speaking style. However, participants may not have been sensitive to the manipulations used to create these differences. Furthermore, depending on their exposure to children of different ages, participants' may not even be familiar with the developmental level and capabilities of 6 or 10-year-old children. For these reasons, it may be beneficial for future research to present the child's testimony in video format. The current study chose to provide the testimony in a transcript form as it reduced the likelihood that other confounding variables (i.e., a child's mannerisms) influenced credibility judgments. However, presenting the testimony in video format would increase the salience of the child's age and allow participants to decide whether the child is capable for their age. Altering these methods would clarify whether an age difference or expectancy effect exists when drawings are presented.

Future Directions

Given the lack of research within this area, our study needed to exercise a high level of experimental control. Controlling a wide range of external variables allowed us to systematically manipulate the child's age and whether a drawing was presented, to determine how this impacted a child's credibility. However, in doing this, the ecological validity of the research was necessarily limited. While we aimed to create a realistic forensic event, our research paradigm and credibility rating scale was not highly consistent with a court-like environment. Firstly, the resources we delivered to participants are only part of the information that would be presented to jurors within the courtroom. This was chosen to reduce the impact of external factors on credibility ratings and lessen the demand to participants. However, this control restricts our understanding of jurors' decision making at a more holistic level. Namely, within the greater court environment, jurors would be exposed to the full witness interview, defendant's testimony, lawyers' arguments, expert testimony, and additional evidence - all of which can impact what jurors attend to and a child's credibility. Furthermore, verdicts are not individually determined. Instead, jury members deliberate and come to a decision collectively, adding yet another avenue of influence.

Therefore, while this study is an important first step in developing a greater empirical evidence base, caution must be utilised when making general conclusions from such a highly controlled lab-based study. Previous research has demonstrated that even highly robust findings within experimental paradigms may not transfer to more real-world scenarios (Brown et al., 2022a). Therefore, although the presence of a drawing was found to have no significant influence on credibility ratings in isolation, it does not mean that drawings will not have a compelling impact when introduced within the greater court environment (Cohen-Liebman, 2013). Thereby, before any conclusions can be made about the impact that drawing has within the courtroom, it is important to increase the complexities within the research paradigm, so they may better reflect real-world environments.

The first step may be altering the current study to determine whether drawings influence credibility judgements under certain conditions. For example, the testimony could be presented in video format, and the strength of the child's verbal testimony could be manipulated. Ideally, research would further extend to having participants partake in mock trials. In these studies, participants would be exposed to realistic court environments and all the information encapsulated within this process. Although large in scope, these studies would allow for a more realistic understanding of how the presentation of drawings may influence juror decision-making and case verdicts.

Conclusion

Overall, the findings across these two studies have provided important insight into the beliefs, perceptions, and misconceptions that jury members hold about the use of drawing within forensic settings. Potential jurors held largely positive opinions about the benefits that drawings can serve and consistently endorsed the use of drawings in interviews. Furthermore, many jurors had strong beliefs about the symbolic meaning contained within children's drawings and what this can tell us about a child's experiences and emotions. However, it was demonstrated within our second study that while jurors hold many beliefs surrounding children's drawings, these may not necessarily be activated or influence juror perceptions within child witness scenarios.

We have identified opportunities to improve and expand the evidence base to provide a more comprehensive understanding of whether or when drawings may influence juror perceptions. This involves research that builds on the current study, with increasing complexities to better mimic juror decision-making processes within court. Concurrently, education must be delivered to individuals within the legal system (i.e., police, prosecutors, judges, and jurors) to redirect the common misconceptions held about children's drawings. Furthermore, consideration should be placed into when and if drawings should be introduced within interviews and whether it is appropriate or necessary for these drawings to be presented as evidential exhibits within court. The beliefs and misconceptions identified within the current study indicate that presenting drawings within the courtroom has the potential to bias decision making; thereby, these precautions will ultimately ensure the safety of both victims and defendants.

References

- Adi-Japha, E., Levin, I., & Sorin, S. (1998). Emergence of representation in drawing: The relation between kinematic and referential aspects. *Cognitive Development, 13*(1), 25-51.
[https://doi.org/10.1016/S0885-2014\(98\)90019-3](https://doi.org/10.1016/S0885-2014(98)90019-3)
- Akhtar, S., Justice, L. V., Knott, L., Kibowski, F., Conway, M. A., Imogen, J., & Coen, M. (2018). The 'common sense' memory belief system and its implications. *The International Journal of Evidence & Proof, 22*(3), 289-304. <https://doi.org/10.1177/1365712718784045>
- Allan, B., & Tussey, C. (2012). Can projective drawings detect if a child experiences sexual or physical abuse? A systematic review of the controlled research. *Trauma, Violence & Abuse, 13*(2), 97-111. <https://doi.org/10.1177/1524838012440339>
- Arndt, J. (2015). The influence of forward and backward associative strength on false memories for encoding context. *Memory, 23*(7), 1093-1111.
<https://doi.org/10.1080/09658211.2014.959527>
- Bacon, F. T. (1979). Credibility of repeated statements: memory for trivia. *Journal of Experimental Psychology, 5*(3), 241-152. <https://doi.org/10.1037/0278-7393.5.3.241>
- Barlow, C. M., Jolley, R. P., & Hallam, J. L. (2011). Drawings as memory aids: Optimising the drawing method to facilitate young children's recall. *Applied Cognitive Psychology, 25*(3), 480-487. <https://doi.org/10.1002/acp.1716>
- Bassili, J. N., (1996). Meta-judgmental versus operative indexes of psychological attributes: The case of measure of attitude strength. *Journal of Personality and Social Psychology, 71*(4), 637-653. <https://doi.org/10.1037/0022-3514>
- Bell, B. E., & Loftus, E. F. (1988). Degree of detail of eyewitness testimony and mock juror judgements. *Journal of Applied Social Psychology, 18*(14), 1171-1192.
- Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *Nursing Plus, 2*, 8-14. <https://doi.org/10.1016/j.npls.2016.01.001>

- Bennett, W. L., & Feldman, M. S. (2014). *Reconstructing Reality in the Courtroom: Justice and Judgement in American Culture*. Quid Pro Books.
- Benton, T. R., Ross, D. F., Bradshaw, E., Thomas, W. N., & Bradshaw, G. S. (2006). Eyewitness memory is still not common sense: Comparing jurors, judges, and law enforcement to eyewitness experts. *Applied Cognitive Psychology*, 20(1), 115-129.
<https://doi.org/10.1002/acp.1171>
- Bottoms, B. L., Golding, J. M., Stevenson, M. C., Wiley, T. R. A., & Yozwiak, J. A. (2007). A review of factors affecting jurors' decisions in child sexual abuse cases. In M. P. Toglia, J. D. Read, D. F. Ross, & R. C. L. Lindsay (Eds.), *The handbook of eyewitness psychology, Vol. 1. Memory for events* (pp. 509–543). Lawrence Erlbaum Associates Publishers
- Bottoms, B. L., Peter-Hagene, L.C., Stevenson, M. C., Wiley, T. R. A., Mitchell, T. S., & Goodman, G. S. (2014). Explaining gender differences in jurors' reactions to child sexual assault cases. *Behavioral Sciences and the Law*, 32(6), 789-812.
<https://doi.org/10.1002/bsl.2147>
- Bourg, W., Broderick, R., Flagor, R. Kelly, D. M., Ervin, D. L., & Butler, J. (1999). *A Child Interviewer's Guidebook*. Sage.
- Brainerd, C.J. and Reyna, V.F. (2002) Fuzzy trace theory and false memory. *Current Directions in Psychological Science* 11(5), 164–169. <https://doi.org/10.1111/1467-8721.00192>
- Braun, V., & Clarke, V. (2013). Ten fundamentals of qualitative research, In M. Carmichael (Ed.), *Successful Qualitative Research: A Practical Guide for Beginners* (pp. 19-43). SAGE Publications.
- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589-597.
<https://doi.org/10.1080/2159676X.2019.1628806>

- Brechet, C., & Jolley, R. P. (2014). The roles of emotional comprehension and representational drawing skill in children's expressive drawing. *Infant and Child Development*, 23(5), 457-470. <https://doi.org/10.1002/icd.1842>
- Brosius, A., Hameleers, M., & van der Meer, T. G. L. A. (2021). Can we trust measure of trust? A comparison of results from open and closed questions, 10, 1-18. <https://doi.org/10.1007/s11135-021-01250-3>
- Brown, D. A. (2011). The use of supplementary techniques in forensic interviews with children. In M. E. Lamb, D. La-Rooy, L. C. Malloy, & C. Katz (Eds.), *Children's Testimonies: A Handbook of Psychological Research and Forensic Practice* (pp. 217–250) (2nd ed.). Wiley.
- Brown, D. A., & Lamb, M. E. (2015). Can children be useful witnesses? It depends how they are questioned. *Child Development Perspectives*, 9(4), 250-255. <https://doi.org/10.1111/cdep.12142>
- Brown, D. A., & Lamb, M. E. (2019). Forks in the road, route chosen, and journeys that beckon: A selective review of scholarship on children's testimony. *Applied Cognitive Psychology*, 33(4), 480-488. <https://doi.org/10.1002/acp.3511>
- Brown, D. A., Lamb, M. E., Brainerd, C., & Pierce, H. (2022b). *A tale of two paradigms: Children's false memory development about a personally experienced event, and DRM word lists*. Manuscript in preparation.
- Brown, D. A., Lewis, C., Brubacher, S., & Lamb, M. E. (2022a). *Children's understanding and use of conversational ground rules*. Manuscript in preparation.
- Brown, D., & Lewis, C. (2013). Competence is in the eye of the beholder: Perceptions of intellectually disabled child witnesses. *International Journal of Disability, Development and Education*, 60(1), 3-17. <https://doi.org/10.1080/1034912X.2013.757132>
- Bruacjer, S. P., Poole, D. A., & Dickinson, J. J. (2015). The use of ground rules in investigative interviews with children: A synthesis and call for research. *Developmental Review*, 36, 15-33. <https://doi.org/10.1016/j.dr.2015.01.001>

- Bruck, M., Ceci, S. J., & Francoeur, E. (2000a). Children's use of anatomically detailed dolls to report genital touching in a medical examination: Developmental and gender comparisons. *Journal of Experimental Psychology: Applied*, 6(1), 74-83. <http://dx.doi.org/10.1037/1076-898X.6.1.74>
- Bruck, M., Melnyk, L., & Ceci, S. J. (2000b). Draw it again Sam: The effect of drawing on children's suggestibility and source monitoring ability. *Journal of Experimental Child Psychology*, 77(1), 115-129. <https://doi.org/10.1002/acp.1171>
- Buck, J. A., Warren, A. R., Bruck, M., & Kuehnle, K. (2014). How common is "common knowledge" about child witnesses among legal professionals? Comparing interviewers, public defenders, and forensic psychologists with laypeople. *Behavioural Sciences & the Law*, 32(6), 867-883. <https://doi.org/10.1002/bsl.2150>
- Buck, J., London, K., & Wright, D. (2011). Expert testimony regarding child witnesses: Does it sensitize jurors to forensic interview quality? *Law and Human Behavior*, 35(2), 152-164. <https://doi.org/10.1007/s10979-010-9228-2>
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality data? *Perspectives on Psychological Science*, 6(1), 3-5. <https://doi.org/10.1177/1745691610393980>
- Burgoon, J. K., & Hale, J. L. (1988). Nonverbal expectancy violations: Model elaboration and application to immediacy behaviors. *Communication Monographs*, 55(1), 58-79. <https://doi.org/10.1080/03637758809376158>
- Burns, R. C., & Kaufman, S. M. (1970). *Kinetic Family Drawing (K-F-D): An Introduction to Understanding Children through Kinetic Drawings*. Brunner/Mazel.
- Butler, S., Gross, J., & Hayne, H. (1995). The effect of drawing on memory performance in young children. *Developmental Psychology*, 31(4), 597-608. <https://doi.org/10.1037/0012-1649.31.4.597>

- Castelli, P., Goodman, G. S., & Ghetty, S. (2005). Effects of interview style and witness age on perceptions of children's credibility in sexual abuse cases. *Journal of Applied Social Psychology, 35*(2), 297-317. <https://doi.org/10.1111/j.1559-1816.2005.tb02122.x>
- Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research, 1*(2), 245-276. https://doi.org/10.1207/s15327906mbr0102_10
- Ceci, S. J., & Bruck, M. (1993). The suggestibility of the child witness: A historical review and synthesis. *Psychological Bulletin, 113*(3), 403-439. <https://doi.org/10.1037/0033-2909.113.3.403>
- Ceci, S. J., & Bruck, M. (1995). *Jeopardy in the courtroom: A Scientific Analysis of Children's Testimony*. American Psychological Association.
- Cohen-Liebman, M. S. (2003). Drawings in forensic investigations of child sexual abuse. In Malchiodi, C. A., *Handbook of Art Therapy* (pp. 167-180). The Guilford Press.
- Conte, J. R., Sorenson, E., Fogarty, L., & Rosa, J. D. (1991). Evaluating children's reports of sexual abuse: Results from a survey of professionals. *American Journal of Orthopsychiatry, 61*(3), 428-437. <https://doi.org/10.1037/h0079264>
- Cossins, A., Goodman-Delahunty, G., & O'Brien, K. (2009). Uncertainty and misconceptions about child sexual abuse: Implications for the criminal justice system. *Psychiatry, Psychology and Law, 16*(3), 435-452, <https://doi.org/10.1080/13218710902930234>
- Cutler, B. L. Penrod, S. D., & Dexter, H. R. (1989). The eyewitness, the expert psychologist, and the jury. *Law and Human Behaviour, 13*(3), 311-322.
- Danby, M. C., Sharman, S. J., & Klettke, B. (2021). Factors influencing the perceived credibility of children alleging physical abuse. *Psychiatry, Psychology and Law*. Volume ahead of print. <https://doi.org/10.1080/13218719.2021.1917012>
- Davies, D., Cole, J., Albertella, G., McCulloch, L., Allen, K., & Kekevan, H. (1996). A model for conducting forensic interviews with child victims of abuse. *Child Maltreatment, 1*(3), 189-199. <https://doi.org/10.1177/1077559596001003002>

- DeLoache, J. S., & Marzolf, D. P. (1995). The use of dolls to interview young children: Issues of symbolic representation. *Journal of Experimental Child Psychology*, 60(1), 155-173.
<https://doi.org/10.1006/jecp.1995.1036>
- Denne, E., Sullivan, C., Ernest, K., Stolzenberg, S. N. (2020). Assessing children's credibility in the courtroom investigations of alleged child sexual abuse: Suggestibility, plausibility, and consistency. *Child Maltreatment*, 25(2), 224-232.
<https://doi.org/10.1177/1077559519872825>
- Derksen, D. G., Giroux, M. E., Connolly, D. A., Newman, E. J., & Bernstein, D. M. (2020). Truthiness and law: Nonprobative photos bias perceived credibility in forensic contexts. *Applied Cognitive Psychology*, 34(6), 1335-1344. <https://doi.org/10.1002/acp.3709>
- Desimone, J. A., Harms, P. D., & Desimone, A. J. (2015). Best practise recommendations for data screening. *Journal of Organizational Behavior*, 36, 171-181.
<https://doi.org/10.1002/job.1962>
- DiSciullo, V. A. (2018). *Jurors' Perceptions of Child Witnesses with Autism Spectrum*. (Masters Thesis). Graduate Theses, Dissertations, and Problem Reports. West Virginia University, Morgantown, United States of America. <https://doi.org/10.33915/etd.5499>
- Downe-Wamboldt, B. (2009). Content analysis: Method, application and issues. *Health Care for Women International*, 13(3), 313-321. <https://doi.org/10.1080/07399339209516006>
- Driessnack, M. (2005). Children's drawings as facilitators of communication: A meta-analysis. *Journal of Paediatric Nursing*, 20(6), 415-423. <https://doi.org/10.1016/j.pedn.2005.03.011>
- Dunn, O. J. (1964). Multiple comparisons using rank sums. *Technometrics*, 6(3), 241-252.
<https://doi.org/10.1080/00401706.1964.10490181>
- Elo, S., & Kyngäs, H. (2007). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), 107-115. <https://doi.org/10.1111/j.1365-2648.2007.04569.x>

- Farokhi, M., & Hashemi, M. (2011). The analysis of children's drawings: Social, emotional, physical, and psychological aspects. *Procedia, Social and Behavioural Sciences*, 30, 2219-2224. <https://doi.org/10.1016/j.sbspro.2011.10.433>
- Fattal, I. (2017). The hidden meaning of kids' shapes and scribbles. *The Atlantic*.
<https://www.theatlantic.com/education/archive/2017/10/the-hidden-meaning-of-kids-shapes-and-scribbles/543873/>
- Fenn, E., Newman, E. J., Pezdek, K., & Garry, M. (2013). The effect of nonprobative photographs of truthiness persists over time. *Acta Psychologica*, 144(1), 207-211.
<https://doi.org/10.1016/j.actpsy.2013.06.004>
- Field, A. (2013). *Discovering Statistics using IBM SPSS Statistics*. SAGE Publications Ltd.
- Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Addison-Wesley
- Fivush, R., Haden, C., & Adam, S. (1995). Structure and coherence of preschoolers' personal narratives over time: Implications for childhood amnesia. *Journal of Experimental Child Psychology*, 60(1), 32-56. <https://doi.org/10.1006/jecp.1995.1030>
- Freeman, N.H. (1993). Drawing: Public instrument of representation. In C. Pratt & A.F. Garton (Eds.), *Systems of representation in children: Development and use* (pp. 113- 132). John Wiley.
- Goldammer, P., Annen, H., Stockli, P. L., & Jonas, K. (2020). Careless responding in questionnaire measures: Detection, impact, and remedies. *The Leadership Quarterly*, 31(4), 1-16. <https://doi.org/10.1016/j.leaqua.2020.101384>
- Golomb, C. (1992). *The Child's Creation of a Pictorial World*. University of California Press.
- Golomb, C. (2004). *The Child's Creation of a Pictorial World* (2nd edition). Lawrence Erlbaum Associates.

- Goodman-Delahunty, J., Cossins, A., & O'Brien, K. (2010). Enhancing the credibility of complainants in child sexual assault trials: The effect of expert evidence and judicial directions. *Behavioral Sciences & the Law*, 28(6), 769–783. <https://doi.org/10.1002/bsl.936>
- Goodman-Delahunty, J., Martschuk, N., & Cossins, A. (2017). Validation of the child sexual abuse knowledge questionnaire. *Psychology, Crime & Law*, 23(4), 391-412. <https://doi.org/10.1080/1068316X.2016.1258469>
- Goodman, G. S., Aman, C. J., & Hirschman, J. (1987). Child sexual and physical abuse: Children's testimony. In S.J. Ceci, M.P. Toglia, & D.F. Ross (Eds.), *Children's Eyewitness Memory* (pp. 1-23). Springer-Verlag.
- Goodman, G. S., Bottoms, B. L., Herscovici, B. B., & Shaver, P. (1989). Determinants of the child victim's perceived credibility. In S. J. Ceci, D. F. Ross, M. P. Toglia (Eds.) *Perspectives on Children's Testimony* (pp. 1-22). Springer.
- Goodman, J. K., & Paolacci, G. (2017). Crowdsourcing consumer research. *Journal of Consumer Research*, 44(1), 196-210. <https://doi.org/10.1093/jcr/ucx047>
- Graneheim, U. H., Lundman, B. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24(2), 105-112. <https://doi.org/10.1016/j.nedt.2003.10.001>
- Gross, J., & Hayne, H. (1998). Drawing facilitates children's verbal reports of emotionally laden events. *Journal of Experimental Psychology. Applied*, 4(2), 163–179. <https://doi.org/10.1037/1076-898X.4.2.163>
- Gross, J., & Hayne, H. (1999a). Drawing facilitates children's verbal reports after long delays. *Journal of Experimental Psychology. Applied*, 5(3), 265–283. <https://doi.org/10.1037/1076-898X.5.3.265>
- Gross, J., & Hayne, H. (1999b). Young children's recognition and description of their own and others' drawings. *Developmental Science*, 2(4), 476-489. <https://doi.org/10.1111/1467-7687.00091>

- Gross, J., Hayne, H., & Poole, A. (2006). The use of drawing in interviews with children: A potential pitfall. In J. R. Marroe (Ed.), *Focus on Child Psychology Research* (pp. 119-144). Nova Publishers.
- Hansen, J., & Wänke, M. (2013). Fluency in context: What makes processing experiences informative. In R. Greifeneder & C. Unkelbach (Eds.), *The Experience of Thinking: How the Fluency of Mental Processes Influences Cognition and Behavior* (pp. 70-84). Psychology Press
- Hartley, C. R. (2021). *I'll show you what I witnessed. Children's abilities to use non-anatomical dolls in forensic interviewing*. (Unpublished Master's Thesis). Victoria University of Wellington, Wellington, New Zealand.
- Heider, F. (1958). *The psychology of interpersonal relations*. Wiley. <https://doi.org/10.1037/10628-000>
- Helm, R. K. (2021). Evaluating witness testimony: Juror knowledge, false memory, and the utility of evidence-based directions. *The International Journal of Evidence & Proof*, 25(4), 264-285. <https://doi.org/10.1177/13657127211031018>
- Hibbard, R. A., Roghmann, K., Hoekelman, R. A. (1987). Genitalia in children's drawings: An association with sexual abuse. *Pediatrics*, 79(1), 129-137. <https://doi.org/10.1542/peds.79.1.129>
- Hill, A. (2017). *Dolls, diagrams and drawings: Interviewers' perspectives on visual aids in child witness interviews*. (Masters Thesis) Research Archive Victoria University of Wellington, Wellington, New Zealand. <http://researcharchive.vuw.ac.nz/handle/10063/6392>
- Hill, J.K. (1981). Effective reading in a foreign language. *English Language Teaching Journal*, 35(3), 270-281. <https://doi.org/10.1093/elt/XXXV.3.270>
- Holcomb, M. J., & Jacquin, K. M. (2007). Juror perceptions of child eyewitness testimony in a sexual abuse trial. *The Journal of Sexual Abuse*, 16(2), 79-95. https://doi.org/10.1300/J070v16n02_05

- Howe, J. W., Burgess, A. W., McCormack, A. (1987). Adolescent runaways and their drawings. *Arts in Psychotherapy, 14*(1), 35–40. [https://doi.org/10.1016/0197-4556\(87\)90033-5](https://doi.org/10.1016/0197-4556(87)90033-5)
- Howe, M. L., & Knott, L. M. (2015). The fallibility of memory in judicial processes: Lessons from the past and their modern consequences. *Memory, 23*(5), 633–656. <https://doi.org/10.1080/09658211.2015.101070>
- Huang, J. L., Curran, P. G., Keeney, J., Poposki, E. M., & DeShon, R. P. (2012). Detecting and deterring insufficient effort responding to surveys. *Journal of Business Psychology, 27*(1), 99–114. <https://doi.org/10.1007/s10869-011-9231-8>
- Huntsberry, W. (2014). Kids' drawings speak volumes about home. NPR. <https://www.npr.org/sections/ed/2014/12/08/368693069/kids-drawings-speak-volumes-about-home>
- Iordanou, C., Allen, M. L., & Warmelink, L. (2021). Drawing and memory: What is the content of children's drawings and how does it differ from their verbal reports? *Empirical Studies of the Arts, 1*-14. <https://doi.org/10.1177/0276237421104797>
- Jolley, R. P. (2010). Children & pictures: Drawing and understanding. Willey-Blackwell.
- Kaiser, H. F., & Rice, J. (1974). Little jiffy, mark IV. *Educational and psychological measurement, 34*(1), 111-117.
- Katz, C., & Hershkowitz, I. (2010). The effects of drawing on children's accounts of sexual abuse. *Child Maltreatment, 15*(2), 171-179. <https://doi.org/10.1177/1077559509351742>
- Kaufmann, G., Drevland, G. C., Wessel, E., Overskeid, G., & Magnussen, S. (2003). The importance of being earnest: Displayed emotions and witness credibility. *Applied Cognitive Psychology, 17*(1), 21–34. <https://doi.org/10.1002/acp.842>
- Kelley, H.H. (1972). Attribution in social interaction. In E.E. Jones, D.E. Kanouse, H.H. Kelley, R.E. Nisbett, S. Valins, & B. Weiner (Eds.), *Attribution: Perceiving the Causes of Behavior* (pp. 151-174). General Learning Press.

- Kissos, L., Goldner, L., Butman, M., Eliyaju, N., & Lev-Wiesel, R., (2020). Can artificial intelligence achieve human-level performance? A pilot study of childhood sexual abuse detection in self-figure drawings. *Child Abuse & Neglect*, 109, 1-10.
<https://doi.org/10.1016/j.chiabu.2020.104755>
- Kissos, L., Lev-Wiesel, R., Czamanski-Cohen, J. (2019). Sexual abuse detection through drawing workshop: E-learning contribution. *Journal of Loss and Trauma*, 24(5), 550-567.
<https://doi.org/10.1080/15325024.2018.154919>
- Klettke, B., & Simonis, S. (2011). Attitudes regarding the perceived culpability of adolescent and adult victims of sexual assault. *Aware*, 26, 7-12.
- Knutsson, J., & Allwood, C. M. (2015). Swedish legal professionals' opinions on child and adult witness memory-reporting capabilities: Using the method of indirect comparisons. *Applied Cognitive Psychology*, 29(3), 392-406. <https://doi.org/10.1002/acp.3117>.
- Koppitz, E.M. (1968). *Psychological Evaluation of Children's Human Figure Drawings*. Grure & Stratton.
- Kovera, M. G., Levy, R. J., Borgida, E., & Penrod, S. D. (1994). Expert testimony in child sexual abuse cases: Effects of expert evidence type and cross-examination. *Law and Human Behavior*, 18(6), 653-674. <https://doi.org/10.1007/BF01499330>
- Krampen, M. (1991). *Children's drawings: Iconic coding of the environment*. Plenum Press.
- Krippendorff, K. (1980). Validity in content analysis. In E. Mochmann (Ed.), *Computer Strategies for Content Analysis* (pp. 69-112). http://repository.upenn.edu/asc_papers/291
- Krosnick, J. A., & Abelson, R. P. (1992). The case for measuring attitude strength in surveys. In J.M. Tanur (Ed.) *Questions about Questions: Inquires into the Cognitive Bases of Surveys*. Russell Sage Foundation.
- Kung, F. Y. H., Kwok, N., & Brown, D. J., (2018). Are attention check questions a threat to scale validity? *Applied Psychology*, 67(2), 264-283. <https://doi.org/10.1111/apps.12108>

- Leander, L., Chrisrianson, S. A., Svedin, C. G., & Granhag, P. A. (2007). Judges', lay judges', and police officers' beliefs about factors affecting children's testimony about sexual abuse. *The Journal of Psychology*, 141(4), 341-358. <https://doi.org/10.3200/JRLP.141.4.341-358>
- Leippe, M. R., & Romanczyk, A. (1987). Children on the witness stand: A communication/persuasion analysis of jurors' reactions to child witnesses. In S.J. Ceci, M.P. Toglia, & D.F. Ross (eds.). *Children's Eyewitness Memory* (pp. 155-177). Springer-Verlag.
- Leippe, M. R., & Romanczyk, A. (1989). Reactions to child (versus adult) eyewitness: The influence of jurors' preconceptions and witness behaviour. *Law and Human Behavior*, 13(2), 103-132. <https://doi.org/10.1007/BF01055919>
- Lev-Wiesel, R. (1999). Use of the Manchover Draw-A-Person test in detecting survivors of sexual abuse: A pilot study. *American Journal of Art Therapy*, 37(4), 106-112.
- Lindsay, R.C.L., Ross, D.F., Read, J.D., and Toglia, M.P. (Eds.) (2007) *The Handbook of Eyewitness Psychology: Volume II: Memory for People*. Psychology Press.
- Ling, J. (n.d.). The hidden meanings in children's drawings you never knew about. *The Asian Parent*. <https://sg.theasianparent.com/meaning-of-kids-drawings>
- Lord, C. G., Ross, L., & Lepper, M. R. (1979). Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of Personality and Social Psychology*, 37(11), 2098-2109. <https://doi.org/10.1037/0022-3514.37.11.2098>
- Macleod, E., Gross, J., & Hayne, H. (2016). Drawing conclusions: The effect of instructions on children's confabulation and fantasy errors. *Memory*, 24(1), 21-31. <https://doi.org/10.1080/09658211.2014.982656>
- Magnussen, S., Melinder, A., Stridbeck, U., & Raja, A. Q. (2010). Beliefs about factors affecting the reliability of eyewitness testimony: A comparison of judges, jurors and the general public. *Applied Cognitive Psychology*, 24(1), 122-133. <https://doi.org/10.1002/acp.1550>
- Mandrapa, L. (2015). Learn to decode children's drawings. *Novak Djokovic Foundation*. <https://novakdjokovicfoundation.org/learn-to-decode-childrens-drawings/>

- McAuliff, B. D., & Bornstein, B. H. (2012) Beliefs and expectancies in legal decision making: An introduction to the Special Issue. *Psychology, Crime & Law*, 18(1), 1-10.
<https://doi.org/10.1080/1068316X.2011.641557>
- McAuliff, B. D., & Kovera, M. B. (2012).) Do jurors get what they expect? Traditional versus alternative forms of children's testimony. *Psychology, Crime & Law*, 18(1), 27-47.
<https://doi.org/10.1080/1068316X.2011.613391>
- McCabe, D. P., & Castel, A. D. (2008). Seeing is believing: The effect of brain images on judgments of scientific reasoning. *Cognition*, 107(1), 343–352.
<https://doi.org/10.1016/j.cognition.2007.07.017>
- McCauley, M. R., & Parker, J. F. (2001). When will a child be believed? The impact of the victim's age and juror's gender on children's credibility and verdict in a sexual-abuse case. *Child Abuse & Neglect*, 24(4), 523-539. [https://doi.org/10.1016/S0145-2134\(01\)00224-1](https://doi.org/10.1016/S0145-2134(01)00224-1)
- McCauley, M. R., & Parker, J. F. (2001). When will a child be believed? The impact of the victim's age and juror's gender on children's credibility and verdict in a sexual-abuse case. *Child Abuse & Neglect*, 25(4), 523-539. [https://doi.org/10.1016/S0145-2134\(01\)00224-1](https://doi.org/10.1016/S0145-2134(01)00224-1)
- McCloskey, M., Egeth, H., & McKenna, J. (1986). The experimental psychologist in court: The ethics of expert testimony. *Law and Human Behavior*, 10(1-2), 1-13.
<https://doi.org/10.1007/BF01044554>
- Melinder, A. & Magnussen, S. (2015) Psychologists and psychiatrists serving as expert witnesses in court: What do they know about eyewitness memory?. *Psychology, Crime & Law*, 21(1), 53-61. <https://doi.org/10.1080/1068316X.2014.915324>
- Moran, G., Cutler, B. L., & De Lisa, A. (1994). Attitudes toward tort reform, scientific jury selection, and juror bias: Verdict inclination in criminal and civil trials. *Law & Psychology Review*, 18, 309–328.

- Mortimore, H. (1996). Involving young children in their own statutory assessments. In S. Gibbs & R. Stoker (Eds.), *Perspectives of children and young people. Division of Educational and Child Psychology, 13*, 41–88.
- Neal, T. M. S., Christiansen, A., Bornstein, B. H., Robicheaux, T. R. (2012). The effects of mock jurors' beliefs about eyewitness performance on trial judgements. *Psychology, Crime & Law, 18*(1), 49-64. <https://doi.org/10.1080/1068316X.2011.587815>
- New Zealand Police and Child, Youth and Family. (2017). *Specialist Child Witness Interview Model*. (Interviewer guidelines). Wellington: Author
- Newman, E. J., & Feigenson, N. (2013). The truthiness of visual evidence. *Jury Expert, 25*(5), 9–14.
- Newman, E. J., Garry, M., Bernstein, D. M., Kantner, J., & Lindsay, D. S. (2012). Nonprobative photographs (or words) inflate truthiness. *Psychonomic Bulletin and Review, 19*(5), 969–974. <https://doi.org/10.3758/s13423-012-0292-0>
- Newman, E. J., Garry, M., Unkelbach, C., Bernstein, D. M., Lindsay, D. S., & Nash, R. A. (2015). Truthiness and falsiness of trivia claims depend on judgmental contexts. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 41*(5), 13–37. <https://doi.org/10.1037/xlm0000099>
- Newman, E., Jalbert, M., & Feigenson, N. (2020). Cognitive Fluency in the Courtroom. In R. B. Bull, & I. Blandon-Gitlin (Eds.), *The Routledge International Handbook of Legal and Investigative Psychology* (pp. 102-115). Routledge
- Nigro, G. N., Buckley, M. A., Hill, D. E. & Nelson, J. (1989). When juries “hear” children testify: The effects of eyewitness age and speech style on jurors' perceptions of testimony. In S. J. Ceci, D. F. Ross, M. P. Toglia (Eds.) *Perspectives on Children's Testimony* (pp. 57-70). Springer.
- Nikonova, O., & Ogloff, J. R. P. (2005). Mock jurors' perceptions of child witnesses: The impact of judicial warning. *Canadian Journal of Behavioural Science, 37*(1), 1-19.

- Nurcombe, B. (1986). The child as witness: Competency and credibility. *Journal of the American Academy of Child Psychiatry*, 25(4), 473–480. [https://doi.org/10.1016/S0002-7138\(10\)60004-0](https://doi.org/10.1016/S0002-7138(10)60004-0)
- Oberlander, L. B. (1995). Psycholegal issues in child sexual abuse evaluations: A survey of forensic mental health professionals. *Child Abuse & Neglect*, 19(4), 475–490. [https://doi.org/10.1016/0145-2134\(95\)00004-R](https://doi.org/10.1016/0145-2134(95)00004-R)
- Olson, J. M., Roese, N. J., & Zanna, M. P. (1996). Expectancies. In E.T. Higgins & A.W. Kruglanski (Eds.), *Social Psychology: Handbook of Basic Principles* (pp. 211-238). Guilford Press
- Patterson, T., & Hayne, H. (2011). Does drawing facilitate older children's reports of emotionally laden events? *Applied Cognitive Psychology*, 25(1), 119-126. <https://doi.org/10.1002/acp.1650>
- Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioural research. *Journal of Experimental Social Psychology*, 70, 153-163. <https://doi.org/10.1016/j.jesp.2017.01.006>
- Pennington, N., & Hastie, R. (1981). Juror decision making models: The generalization gap. *Psychological Bulletin*, 89(2), 246-287. <https://doi.org/10.1037/0033-2909.89.2.246>
- Pennington, N., & Hastie, R. (1986). Evidence evaluation in complex decision making. *Journal of Personality and Social Psychology*, 51(2), 242-258. <https://doi.org/10.1037/0022-3514.51.2.242>
- Pennington, N., & Hastie, R. (1988). Explanation-based decision making: Effects of memory structure on judgement. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14(3), 521-533. <https://doi.org/10.1037/0278-7393.14.3.521>
- Pierce, H. (2020). *Perception versus reality: Investigating the impact of talkativeness on children's credibility and reliability*. (Unpublished Master's Thesis). Victoria University of Wellington, Wellington, New Zealand.

- Poole, D. A., & Dickinson, J. J. (2014). Comfort drawing during investigative interviews: Evidence of the safety of a popular practise. *Child Abuse & Neglect*, 38(2), 192-201. <https://doi.org/10.1016/j.chiabu.2013.04.012>
- Quas, J. A., Goodman, G.S., Alexander, K. W., Edelstein, R., Redlich, A. D., Cordon, I. M., Jones, D. P. H., & Haugaard, J. J. (2005). Childhood sexual assault victims: Long-term outcomes after testifying in criminal court. *Monographs of the Society for Research in Child Development*, 70(2), 1-128.
- R v. Turner, (1975), Q.B. 834 (C.A.)
- Read, J. D., & Desmarais, S. L. (2009). Lay knowledge of eyewitness issues: A Canadian evaluation. *Applied Cognitive Psychology*, 23(3), 301–326. <https://doi.org/10.1002/acp.1459>
- Reber, R., & Schwarz, N. (1999). Effects of perceptual fluency on judgements of truth. *Consciousness and Cognition*, 8(3), 338-342. <https://doi.org/10.1006/ccog.1999.0386>
- Roese, N. J., & Sherman, J. W. (2007). Expectancy. In A.W. Kruglanski & E.T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 91-115). Guilford Press.
- Rogers, P., & Davies, M. (2007). Perceptions of victims and perpetrators in a depicted child sexual abuse case: Gender and age factors. *Journal of Interpersonal Violence*, 22(5), 566-584. <https://doi.org/10.1177/0886260506298827>
- Ross, D. F., Miller, B. S., & Moran, P. B. (1987). The child in the eyes of the jury: Assessing mock jurors' perceptions of child witnesses. In S.J. Ceci, M.P. Toglia, & D.F. Ross (Eds.). *Children's Eyewitness Memory* (pp. 142-154). Springer-Verlag.
- Rudy, L., & Goodman, G. S. (1991). Effects of participation on children's reports: Implications for children's testimony. *Developmental Psychology*, 27(4), 527-538.
- Ruva, C. L., & Bryant, J. B. (2004). The impact of age, speech style, and question form on perceptions of witness credibility and trial outcome. *Journal of Applied Social Psychology*, 34(9), 1919-1944. <https://doi.org/10.1111/j.1559-1816.2004.tb02593.x>

- Salmon, K., Pipe, M. E., Malloy, A., & Mackay, K. (2012). Do non-verbal aids increase the effectiveness of 'best practice' verbal interview techniques? An experimental study. *Applied Cognitive Psychology*, 26(3), 370-380. <https://doi.org/10.1002/acp.1835>
- Schwarz, N., & Newman, E. J. (2017). How does the gut know truth? The psychology of "truthiness." [APA Science Brief] *Psychological Science Agenda*. Retrieved from www.apa.org/science/about/psa/2017/08/gut-truth.asp
- Shamon, H., & Berning, C. (2020). Attention check items and instructions in online surveys: boon or bane for data quality? *Survey Research Methods*, 14(1), 55-77. <https://doi.org/10.1002/srm.2020.v14i1.7374>
- Stemler, A. (2000). An overview of content analysis. *Practical Assessment, Research, and Evaluation*, 7(17), 1-6. <https://doi.org/10.7275/z6fm-2e34>
- Stemler, S. (2001). An Overview of Content Analysis. *Practical Assessment, Research, and Evaluation*, 7. <http://pareonline.net/getvn.asp?v=7&n=17>
- Sutherland, R., & Hayne, H. (2001). Age-related changes in the misinformation effect. *Journal of Experimental Child Psychology*, 79(4), 388-404. <https://doi.org/10.1006/jecp.2000.2610>
- Tabak, S. J. & Klettke, B. (2014) Mock jury attitudes towards credibility, age, and guilt in a fictional child sexual assault scenario. *Australian Journal of Psychology*, 66(1), 47-55. <https://doi.org/10.1111/ajpy.12035>
- Tormala, Z. L. & Petty, R. E. (2004). Source credibility and attitude certainty: A metacognitive analysis of resistance to persuasion. *Journal of Consumer Psychology*, 14(4), 427-442. https://doi.org/10.1207/s15327663jcp1404_11
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124-1131. <https://doi.org/10.1126/science.185.4157.1124>
- Viera, A. J., & Garrett, J. M. (2005). Understanding interobserver agreement: The kappa statistic. *Family Medicine*, 37(5), 360-363.

- Voogt, A., Klettke, B., & Thomson, D. (2017). The development of a conceptual model of perceived victim credibility in child sexual assault cases. *Psychiatry, Psychology and Law*, 24(5), 760-769. <https://doi.org/10.1080/13218719.2017.1315764>
- Waterman, C. K., & Foss-Goodman, D. (1984). Child molesting: Variables relating to attribution of fault to victims, offenders, and nonparticipating parents. *The Journal of Sex Research*, 20(4), 329-349. <https://doi.org/10.1080/00224498409551231>
- Wells, G. L., & Leippe, M. R. (1981). How do triers of fact infer the accuracy of eyewitness identifications? Using memory for peripheral detail can be misleading. *Journal of Applied Psychology*, 66(6), 682-687.
- Wesson, M., & Salmon, K. (2001). Drawing and showing: Helping children to report emotionally laden events. *Applied Cognitive Psychology*, 15(3), 301-320.
<https://doi.org/10.1002/acp.706>
- Yarrish, C., Groshon, L., Mitchell, J. D., Appelbaum, A., Klock, S., Winternitz, T., & Friedman-Wheeler, D. G. (2019). Finding the signal in the noise: Minimizing responses from bots and inattentive humans in online research. *The Behaviour Therapist*, 42, 235-242.

Appendix A: Focused Questions from Survey One

The use of drawings within interviews

Please rate your agreement to the following statement for each age group:

- Children are able to use drawings to demonstrate their own experiences.
- When children draw what happened to them, it is not clear what their drawings are meant to represent
- Asking children to draw during an interview increases the amount of spoken information that they give
- Asking children to draw during an interview increases the amount of correct information children give about an event
- Asking children to draw during an interview reduces the amount of spoken information that they give
- Asking children to draw during an interview increases the amount of incorrect information children give about an event
- Asking children to draw during an interview leads to them giving unclear spoken information
- Asking children to draw during an interview increases the chance of them talking about things that never happened

Helpfulness or harmfulness of drawings

Which of the following things apply to the use of children's drawings in interviews with early childhood children (under 7 years) / middle childhood children (8-11 years)? Please select all that apply:

- Drawing during an interview will aid memory recall for children
- Children do not mean for their drawings to be exact representations of their experiences
- Drawing will help if the child is shy

- Drawing is a difficult activity for children
- Drawings help children talk about events that are embarrassing or shameful
- Drawings will be distracting for children
- Drawings will help because children do not know the right words to describe some events
- A child's drawing can be used to understand what emotions they are experiencing
- Drawings are useful if the child is untalkative
- Drawings are not helpful as children will use their imagination to make them
- A child's drawings are helpful as they tell us what the child has experienced
- Drawing during an interview will make children feel more comfortable and relaxed

Relationship between drawing quality and child's memory.

Please complete the following statement for each age group.

- *High detail:* If a child's drawing of an event is *very detailed*, it means the child remembers the event...
- *Low detail:* If a child's drawing of an event *does not have much detail*, it means the child remembers the event...
- *High consistency:* If a child's drawing of an event and their spoken report of it are *consistent*, it means the child remembers the event...
- *Low consistency:* If there are *inconsistencies* between a child's drawing of an event and their spoken report of it, it means the child remembers the event...
- *High coherence:* If a child's drawing of an event is *easy to understand*, it means the child remembers the event...
- *Low coherence:* If a child's drawing of an event is *hard to understand*, it means the child remembers the event...

Appendix B: Kruskal-Wallis Test Output**Table 24.***Median Confidence Ratings for each Agreement Level across all Statements*

Statement	Child's age	Agreement level	<i>n</i>	Median Confidence (%)
Children are able to use drawings to demonstrate their own experiences	<7 years	Strongly agree	121	95.00
		Agree	184	79.00
		Somewhat agree	126	69.50
		Neither agree nor disagree	27	52.00
		Somewhat disagree	25	68.00
		Disagree	11	56.00
		Strongly disagree	7	77.00
	8-11 years	Strongly agree	163	97
		Agree	234	80
		Somewhat agree	79	73
		Neither agree nor disagree	11	53
		Somewhat disagree	7	65
		Disagree	4	57
		Strongly disagree	3	95
When children draw what happened to them, it is not clear what their drawings are meant to represent	<7 years	Strongly agree	28	81.5
		Agree	83	73.00
		Somewhat agree	181	61.00
		Neither agree nor disagree	55	57.00
		Somewhat disagree	88	71.00
		Disagree	49	78.00
		Strongly disagree	17	100.00
	8-11 years	Strongly agree	7	83.00
		Agree	24	73.50
		Somewhat agree	70	63.00

		Neither agree nor disagree	70	59.00
		Somewhat disagree	156	71.00
		Disagree	127	80.00
		Strongly disagree	47	93.00
Asking children to draw during an interview increases the amount of spoken information that they provide	<7 years	Strongly agree	65	90.00
		Agree	141	75.00
		Somewhat agree	149	65.00
		Neither agree nor disagree	56	53.00
		Somewhat disagree	50	60.00
		Disagree	24	72.00
		Strongly disagree	7	94.00
	8-11 years	Strongly agree	69	92.00
		Agree	147	76.00
		Somewhat agree	141	65.00
		Neither agree nor disagree	62	55.00
		Somewhat disagree	49	59.00
		Disagree	19	68.00
		Strongly disagree	7	95.00
Asking children to draw during an interview increases the amount of correct information children give about an event	<7 years	Strongly agree	40	99.50
		Agree	136	76.00
		Somewhat agree	181	62.00
		Neither agree nor disagree	78	52.50
		Somewhat disagree	39	67.00
		Disagree	13	72.00
		Strongly disagree	3	99.00
	8-11 years	Strongly agree	59	95.00
		Agree	166	80.00
		Somewhat agree	163	65.00
		Neither agree nor disagree	70	52.00
		Somewhat disagree	21	60.00

		Disagree	9	74.00
		Strongly disagree	1	84.00
Asking children to draw during an interview reduces the amount of spoken information that they give	<7 years	Strongly agree	25	91.00
		Agree	82	75.00
		Somewhat agree	84	62.00
		Neither agree nor disagree	60	50.00
		Somewhat disagree	93	70.00
		Disagree	104	75.50
		Strongly disagree	38	91.00
	8-11 years	Strongly agree	20	95.00
		Agree	53	74.00
		Somewhat agree	73	64.00
		Neither agree nor disagree	63	53.00
		Somewhat disagree	123	68.00
		Disagree	112	77.50
		Strongly disagree	42	90.50
Asking children to draw during an interview increases the amount of incorrect information children give about an event	<7 years	Strongly agree	15	94.00
		Agree	32	73.50
		Somewhat agree	82	62.50
		Neither agree nor disagree	83	52.00
		Somewhat disagree	124	63.50
		Disagree	124	72.00
		Strongly disagree	31	92.00
	8-11 years	Strongly agree	9	93.00
		Agree	12	73.50
		Somewhat agree	53	64.00
		Neither agree nor disagree	65	52.00
		Somewhat disagree	134	63.50
		Disagree	161	76.00
		Strongly disagree	59	91.00

Asking children to draw during an interview leads to them giving unclear spoken information	<7 years	Strongly agree	23	94.00
		Agree	41	72.00
		Somewhat agree	109	60.00
		Neither agree nor disagree	78	53.00
		Somewhat disagree	114	64.50
		Disagree	99	80.00
		Strongly disagree	24	92.50
	8-11 years	Strongly agree	14	92.50
		Agree	27	75.00
		Somewhat agree	73	67.00
		Neither agree nor disagree	75	57.00
		Somewhat disagree	108	67.50
		Disagree	139	80.00
		Strongly disagree	55	90.00
Asking children to draw during an interview increases the chance of them talking about things that never happened	<7 years	Strongly agree	38	98.50
		Agree	65	73.00
		Somewhat agree	131	60.00
		Neither agree nor disagree	87	51.00
		Somewhat disagree	78	66.00
		Disagree	76	75.00
		Strongly disagree	19	88.00
	8-11 years	Strongly agree	33	98.00
		Agree	43	79.00
		Somewhat agree	83	60.00
		Neither agree nor disagree	87	58.00
		Somewhat disagree	107	65.00
		Disagree	111	78.00
		Strongly disagree	30	94.00

Table 25.*Output of Kruskal-Wallis Tests.*

Statement	Child's age	H-Statistic
Children are able to use drawings to demonstrate their own experiences	<7 years	$X^2(6) = 148.458, p < .001$
	8-11 years	$X^2(6) = 135.975, p < .001$
When children draw what happened to them, it is not clear what their drawings are meant to represent	<7 years	$X^2(6) = 72.455, p < .001$
	8-11 years	$X^2(6) = 97.344, p < .001$
Asking children to draw during an interview increases the amount of spoken information that they provide	<7 years	$X^2(6) = 110.327, p < .001$
	8-11 years	$X^2(6) = 147.148, p < .001$
Asking children to draw during an interview increases the amount of correct information children give about an event	<7 years	$X^2(6) = 116.144, p < .001$
	8-11 years	$X^2(6) = 152.884, p < .001$
Asking children to draw during an interview reduces the amount of spoken information that they give	<7 years	$X^2(6) = 102.459, p < .001$
	8-11 years	$X^2(6) = 103.251, p < .001$
Asking children to draw during an interview increases the amount of incorrect information children give about an event	<7 years	$X^2(6) = 88.114, p < .001$
	8-11 years	$X^2(6) = 98.472, p < .001$
Asking children to draw during an interview leads to them giving unclear spoken information	<7 years	$X^2(6) = 127.726, p < .001$
	8-11 years	$X^2(6) = 105.680, p < .001$
Asking children to draw during an interview increases the chance of them talking about things that never happened	<7 years	$X^2(6) = 112.636, p < .001$
	8-11 years	$X^2(6) = 145.321, p < .001$

Appendix C: Pairwise Comparisons from Kruskal-Wallis Test**Table 26.***Pairwise comparisons for Kruskal-Wallis Test*

Comparison	<i>Test statistic</i>	<i>Std. Error</i>	<i>Std. Test Statistic</i>	<i>Adj. Sig.</i>
Strongly agree – Agree	155.244	28.282	5.489	.001
Strongly agree – Somewhat agree	254.537	29.355	8.671	.000
Strongly agree – Neither agree nor disagree	245.505	29.163	8.418	.000
Strongly agree – somewhat disagree	225.848	28.403	7.951	.000
Strongly agree – Disagree	155.244	28.282	5.489	.000
Strongly agree – Strongly disagree	30.679	35.984	.853	1.000
Agree – Somewhat agree	121.907	26.802	4.548	.000
Agree – Neither agree nor disagree	112.874	26.591	4.245	.000
Agree – Somewhat disagree	93.217	25.756	3.619	.006
Agree - Disagree	22.613	25.622	.883	1.000
Agree – Strongly disagree	-101.952	33.933	-3.005	.056
Somewhat agree – Neither agree nor disagree	-9.032	21.887	-.413	1.000
Somewhat agree – Somewhat disagree	-28.690	20.864	-1.375	1.000
Somewhat agree – Disagree	-99.294	20.699	-4.797	.000
Somewhat agree – Strongly disagree	-223.859	30.387	-7.367	.000
Neither agree nor disagree – Somewhat disagree	-19.658	20.592	-.955	1.000

Neither agree nor disagree – Disagree	-90.262	20.425	-4.419	.000
Neither agree nor disagree – Strongly disagree	-214.826	30.201	-7.113	.000
Somewhat disagree – Disagree	-70.604	19.325	-3.653	.005
Somewhat disagree – Strongly disagree	-195.169	29.469	-6.623	.000
Disagree – Strongly disagree	-124.565	29.352	-4.244	.000

Note: significant relationships are bolded

Appendix D: Child Witness Interview Transcripts

Please note that at the end of each transcripts the script diverges depending on the condition the participant was in. This consisted of either a drawing absent (i.e., no drawing), or drawing present (i.e., high quality or low quality drawing) condition.

6-year-old transcript

I: So, please tell me everything you remember about why you're talking to me today

C: Umm I- I here because the man he hurts me here [holds up arm in cast] when he did that with his mot-bike.

I: Oh no, that's no good, tell me all about what happened from the beginning to the end...

C: Ahhh umm I- after school I was crossed the roads, then the road people said to cross then I did and then the man on the mot-bike came up quick and I thoughts he'd stop then he didn't do it ... um then he hits me and I feel it on here [points to wrist] and here [points to hip]

I: Oh no...

C: And and he said 'you okay?' then he just zoom away real real fast and I was hurts so I don't move.

I: Ahhh, tell me everything that happened next.

C: Ummm the mu- the lady runs over to me then checked then picked me up then umm brung me off the road.

I: Mmhmmm

C: Then then all the sirens came and the big ambulance was there then the police car with the loud sirens, then they all asking when- if I was okay. Then my mum came.

I: Your mum came... okay tell me anything else you can remember.

C: Ahhh ummmm, that's it

I: That's okay, you talked about the man, please tell me everything you remember about him

C: He went- he was coming closer and he didn't see me but I heard it go eeeerp cause he was tried not to crash, then he still came fast and his mot-bike pushed me over.

I: Oh no, and what did he look like?

C: ...

I: Tell me anything you remember about what the man looked like...

C: Ummm ahhh a big orange helmet and and he um just wears black I thinks

I: Mmhmmm, tell me anything else you can remember...

C: I don't remember, that's it

Drawing absent condition

I: That's alright, you're doing so well. Now, we're just going to have a little break and I'm going to go and grab us some water. While I do that just keep having a big think about what happened, and I'll ask you some more questions when we come back. Does that sound okay?

C: Mmhmmm...

[break]

I: Alrighty, thanks for waiting there. So while we were having a break you might have remembered some other things, so tell me any other things that you can remember about when the man came on his motorbike.

C: I went to the hospital and and got this [holds up cast] see it is blue, then everyone wried on it and be funny.

I: Oooh cool, what else can you remember from when you were crossing the road?

C: Ahh I told you all

I: Tell me anything else you can remember, even the little things...

C: That's all

Drawing present conditions

I: That's alright, you're doing so well. So, for you to give me an even better idea of what happened, I'd like for you to use these pencils and paper here and draw me everything you can remember about what happened when you were crossing the road.

C: Mmhmmm...

[child is drawing]

I: Tell me all about what you've drawn

C: Ahhh this road, then this is mot-bike there then there, and and here me and then the lady

I: Mhmmm thank you for drawing that, now tell me anything else that you can remember about when the man came on his motorbike

C: I went to the hospital and and got this [holds up cast] see it is blue, then everyone wrote on it and be funny.

I: Oooh cool, what else can you remember from when you were crossing the road?

C: Ahh I told you all

I: Tell me anything else you can remember, even the little things...

C: That's all

10-year-old transcript

I: So, please tell me everything you remember about why you're talking to me today

C: Umm I'm here because I got hurt by a man on a motorbike and um I ended up with the cast on my wrist cause it was really sore.

I: Oh no, that's no good, tell me all about what happened from the beginning to the end...

C: Ahhh umm I- after school I was crossing the road because the road people said that that it was time to cross. So yeah, um I crossed the road and the man on the motorbike was coming up really quickly and I don't know if he saw me because I thought, ahh I thought he'd stop, but he started to slow down but he didn't do it in time and his bike hit me and and I fell over. Cause I fell on my hand and my hip hurt too.

I: Oh no...

C: And and he said 'you okay?' um but then he just sped away super fast. But I couldn't move cause my wrist hurt too much.

I: Ahhh, tell me everything that happened next.

C: Ummm the um- one of the ladies ran over to me and checked if I was okay and helped me off the road to the side of the road.

I: Mmmhmm

C: But then um the ambulance and the police came with all of their sirens and they were all asking me if I was okay and to see what happened. Then my mum turned up too.

I: Your mum turned up... okay tell me anything else you can remember.

C: Ahhh ummmm, that's it

I: That's okay, you talked about the man on a motorbike, please tell me everything you remember about him?

C: He went- he was coming quite fast and he didn't see me at the start and then he did cause the motorbike went eeeeerp cause he was trying not to crash. But he he didn't stop in time and then um the motorbike pushed me over.

I: Oh no, and what did he look like?

C: ...

I: Tell me anything you remember about what the man looked like...

C: Ummm ahhh he had a big orange helmet and his motorbike uniform was just um black I think

I: Mmhmmm, tell me anything else you can remember...

C: I don't remember anything else, that's it

Drawing absent condition

I: That's alright, you're doing so well. Now, we're just going to have a little break and I'm going to go and grab us some water. While I do that just keep having a big think about what

happened, and I'll ask you some more questions when we come back. Does that sound okay?

C: Mmhmmm...

[break]

I: Alrighty, thanks for waiting there. So while we were having a break you might have remembered some other things, so tell me any other things that you can remember about when the man came on his motorbike.

C: They took me to the hospital afterwards and gave me this cast [holds up hand], see it's blue, and all of my friends have been writing funny things on it.

I: Oooh cool, what else can you remember from when you were crossing the road?

C: Ahh I've told you everything that I remember

I: Tell me anything else you can remember, even the little things...

C: Um that's all of it

Drawing present conditions

I: That's alright, you're doing so well. So, for you to give me an even better idea of what happened, I'd like for you to use these pencils and paper here and draw me everything you can remember about what happened when you were crossing the road.

C: Mmhmmm ...

[child is drawing]

I: Tell me all about what you've drawn

C: Ahhh this is the road, then this is the mans motorbike there then there, and and here is me and there's the lady

I: Mmhmmm thank you for drawing that, now tell me anything else that you can remember about when the man came on his motorbike

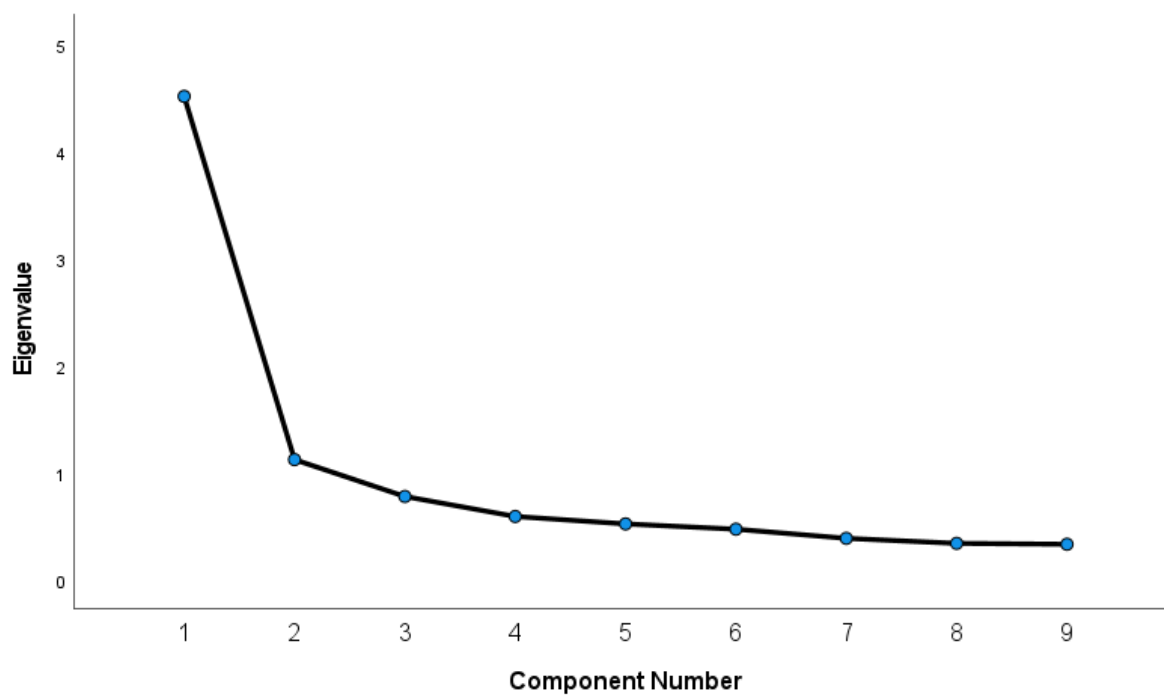
C: They took me to the hospital afterwards and gave me this cast [holds up hand], see it's blue, and all of my friends have been writing funny things on it.

I: Oooh cool, what else can you remember from when you were crossing the road?

C: Ahh I've told you everything that I remember

I: Tell me anything else you can remember, even the little things...

C: Um that's all of it

Appendix E: Scree Plot from Principal Component Analysis**Figure 9.***Scree Plot for PCA with Oblique Rotation*

Appendix F: Credibility Ratings prior to Principal Component Analysis**Table 27.***Mean Credibility Ratings (0% = Not at all capable, 100% = Extremely capable).*

Credibility Item	Child's age	Drawing-Type	<i>M</i>	<i>SD</i>
Capability	6-years	No drawing	61.66	20.36
		Low-quality drawing	60.04	21.68
		High-quality drawing	65.38	19.99
	10-years	No drawing	63.23	21.77
		Low-quality drawing	62.02	21.78
		High-quality drawing	67.50	19.66
Accuracy	6-years	No drawing	67.77	18.59
		Low-quality drawing	67.42	19.78
		High-quality drawing	70.29	19.58
	10-years	No drawing	69.64	18.87
		Low-quality drawing	70.80	16.82
		High-quality drawing	71.33	16.66
Confidence	6-years	No drawing	57.50	22.41
		Low-quality drawing	59.52	23.70
		High-quality drawing	59.96	21.81
	10-years	No drawing	54.34	23.62
		Low-quality drawing	55.42	22.42
		High-quality drawing	28.46	21.92
Honesty	6-years	No drawing	84.40	15.93
		Low-quality drawing	83.94	20.41
		High-quality drawing	88.86	13.75
	10-years	No drawing	85.56	16.10
		Low-quality drawing	84.31	15.09
		High-quality drawing	84.32	16.08
Talkative	6-years	No drawing	60.89	19.57

Believability	10-years	Low-quality drawing	55.67	18.23
		High-quality drawing	60.09	18.73
		No drawing	58.81	21.81
		Low-quality drawing	55.93	20.22
		High-quality drawing	58.77	18.02
		No drawing	79.52	16.88
	6-years	Low-quality drawing	78.13	20.76
		High-quality drawing	84.20	16.60
		No drawing	81.20	16.57
		Low-quality drawing	80.76	16.85
		High-quality drawing	82.31	16.98
		No drawing	36.98	25.68
Suggestibility	6-years	Low-quality drawing	37.10	25.33
		High-quality drawing	32.79	23.46
		No drawing	35.31	23.88
	10-years	Low-quality drawing	35.10	22.39
		High-quality drawing	33.45	23.98
		No drawing	57.05	20.73
Informativeness	6-years	Low-quality drawing	54.16	21.77
		High-quality drawing	60.48	21.14
		No drawing	55.58	21.37
	10-years	Low-quality drawing	54.15	20.85
		High-quality drawing	60.48	19.78
		No drawing	60.92	22.10
Coherency	6-years	Low-quality drawing	62.46	21.64
		High-quality drawing	64.92	19.97
		No drawing	62.76	23.43
	10-years	Low-quality drawing	65.27	18.49
		High-quality drawing	68.30	19.56
		No drawing	67.44	18.23
Reliability	6-years	No drawing	67.44	18.23

	Low-quality drawing	64.80	21.26
	High-quality drawing	69.89	19.15
10-years	No drawing	70.85	19.50
	Low-quality drawing	66.50	19.40
	High-quality drawing	71.00	18.97
