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**THE EFFECT OF USING NEUTRAL VISUAL AIDS IN INTERVIEWING CHILD
EYEWITNESSES – IMPROVING OR HINDERING THEIR RECALL?**

Master's thesis

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ABSTRACT

To improve the accuracy of the information gathered from child witnesses in the form of descriptions of people and events, several methods and props have been used during investigative interviews – model standards, anatomical dolls and body maps. There are still many discrepancies regarding the suggestiveness and effectiveness of these methods compared to verbal interviews. An experiment was conducted to examine whether the provision of neutral aids (colour palette, pictures of daily activities and seasons) during interviewing would improve pre-schoolers' accuracy of memory for colour and time; and whether it leads children to change their initial answers. The study involved 169 six- to seven-year-old children who took part in a scripted event that involved seeing and briefly interacting with a stranger during his visit to the kindergarten. One week later half-structured interviews with children were conducted. The experiment showed that neutral visual aids had an effect on the volume of total and false information, but not on true information or accuracy. Using neutral aids during interviews increased the amount of information children were able to provide about time and colour, however also increasing the amount of false information. Furthermore, when questions were repeated using neutral visual aids, children reported additional information in total, as well as additional false information. The results indicate that even neutral aids may lead children to provide more details as well as change their answers, which in turn hinders their recall. Therefore, using visual aids should be treated with care when used in practice.

Keywords: child witnesses; person descriptions; neutral aids; visual aids; eyewitness memory

**Neutraalsete visuaalsete abivahendite kasutamise mõju lapstunnistajate
meenutustele**

LÜHIKOKKUVÕTE

Lapstunnistajate meenutuste ja isikukirjelduste parandamiseks on küsitlemise juurde kasutusele võetud erinevaid meetodeid ja abivahendeid – võrdlusstandardid, anatoomilised nukud ja kehakaardid. Abivahendite kasutamise efektiivsus võrreldes verbaalsete intervjuudega on aga vastuoluline teema. Abivahendite tulemuslikkuse uurimiseks koostati eksperiment, mille eesmärgiks oli välja selgitada, kas ja kuidas mõjutab neutraalsete abivahendite (värvide ring, aastaegade pildid, päevategevuste pildid) kasutamine intervjuudes eelkooliealiste laste mälu värvi ja aja täpsusele. Samuti uuriti seda, kas ja kuidas muudavad abivahendid laste esialgseid ütlusi. Uuringus osalenud 169 kuue kuni seitsme aastast last suhtlesid põgusalt võõra isikuga, kes lavastatud sündmuse raames nende lasteaeda külastas. Nädal hiljem viidi kõikide lastega läbi poolstruktureeritud intervjuud. Uuringu tulemustest selgus, et abivahenditel on mõju kogu- ja valeinformatsiooni hulgale, kuid mitte tõesele informatsioonile ega ütluste täpsusele. Abivahendeid kasutades suurenes infohulk laste tunnistustes koos valeinfo hulgaga nii värvide kui ka aja kohta. Lisaks sellele suurenes koguinfo ja valeinfo hulk ka siis, kui küsimusi korrati koos abivahenditega. Tulemused viitavad sellele, et isegi neutraalsete abivahendite kasutamine intervjuudes võib lapsi suunata rohkemate detailide väljendamisele ning oma vastuste muutmisele, mis omakorda vähendab nende tunnistuste väärtust. Seega tuleks igasuguste abivahendite kasutamisel praktikas olla ettevaatlik.

Märksõnad: lapstunnistajad, isikukirjeldused, neutraalsed abivahendid, visuaalsed abivahendid

INTRODUCTION

In cases where other evidence (such as physical and medical evidence / statements from additional observers / a confession) is lacking, eyewitness testimony and the information acquired often determines the outcome of criminal investigations (Bull, 2013; Herman, 2005). Young children can also be required to testify, which makes obtaining a comprehensive statement even more complicated. Even though very young children as young as four years of age are capable of providing substantial amounts of the information needed (Lamb et al., 2003), they provide little information compared to adults (Pozzulo, Dempsey, Crescini, & Lemieux, 2009). This has led researchers to explore several ways of enhancing children's ability to accurately recall events and people and improving the quality of information without distorting it.

The aim of this thesis is to examine how using neutral visual aids during interviewing affects children's ability to recall the looks of a once-seen person, the event itself and the time of that event. Neutral aids should be applicable to all situations and not connected to one specific event. The aim is to examine whether using the aids while interviewing improves the accuracy of children's memory reports and the amount of information provided. More specifically, the ability to recall colour and time are explored.

Children as witnesses

During interviews younger children typically offer less information than adolescents and adults or are even unable to offer a description of a person despite remembering seeing the target (Karageorge & Zajac, 2011). Young children are encoding a lot of information about events but retrieving that information appears to be challenging for them (Fivush, 1993). The younger the person the less information they provide (Goodman & Reed, 1986; Hutcheson, Baxter, Telfer, & Warden, 1995); children aged five to eleven years mention one to two descriptors each on average and children of younger age offering even fewer descriptors (Davies, Tarrant, & Flin, 1989; Karageorge & Zajac, 2011; Kask, Bull, Heinla, & Davies, 2007). Even though children offer quantitatively less information than adults during free recall and while answering questions (Pozzulo & Warren, 2003), the accuracy of details when describing events or people does not differ with age (Dekle, Beal, Elliott, & Huneycutt, 1996; Jack, Leov, & Zajac, 2014; Pozzulo, Dempsey, & Crescini, 2009).

Children's descriptions mostly consist of the exterior facial descriptors (e.g. hair, face shape) and clothing of the target (Davies et al., 1989; Karageorge & Zajac, 2011; Pozzulo & Warren, 2003). However, facts about these features are generally considered as information

that is of the least use in apprehending a person because these features are the easiest to change (Karageorge & Zajac, 2011). Reporting more permanent features such as height, weight and interior facial features are more problematic for young children and adolescents (Pozzulo & Warren, 2003). In addition to describing people, children are also capable of giving relevant information about the time of the event to some extent. Children can provide specifications about the event by time of the day at age four and pre-schoolers at the age of six already have limited knowledge of seasons, days and months (Friedman, 2005). Therefore, the ability to reconstruct the time of an event emerges around the age of six (Friedman & Lyon, 2005).

Research findings suggest that a range of factors influence the quality of children's testimonies. In addition to factors associated with the interview procedure (e.g. question types) (Melinder et al., 2010), developmental factors also have a significant impact on the information acquired from children. According to Lamb and Sim (2013), developmental factors can be divided into four main categories: memory, communicative skills, social orientation and suggestibility. First, young children do not have the full ability to use memory strategies effectively (Bauer, 2007) and they are more likely to confuse memories from different sources (Cycowicz, Friedman, & Duff, 2003). Second, the verbalisation of facial features and novel events requires the use of complicated language that children younger than adolescents do not yet possess (Karageorge & Zajac, 2011; Nippold, 2000), which can also interfere with understanding the questions they are asked (Saywitz, Nathanson, & Snyder, 1993). In consequence, children with lower vocabulary skills cannot communicate as complete and accurate memories as children with higher vocabulary skills (Chae, Kulkofsky, Debaran, Wang, & Hart, 2014). Children also have less knowledge base than adults by which to interpret events (Goodman & Melinder, 2007). Third, as Lamb & Sim (2013) put it, children are not familiar with situations like forensic interviews where they have to answer questions and be the more knowledgeable side instead of adults who take that role in everyday interaction.

Moreover, as fourth, it has been shown that children tend to be more prone to suggestions (Batterman-Faunce & Goodman, 1993; Goodman & Reed, 1986). When misleading questions are presented, children, particularly five- and six-year-olds and younger, are more likely than older children and adults to agree to the suggestion and provide inaccurate information (Bjorklund, Bjorklund, Brown, & Cassel, 1998; Warren, Hulse-Trotter, & Tubbs, 1991). This could be caused by children's eagerness to gain the approval of

the adult interviewers in the interview situations (Ceci et al., 1987 as in Bjorklund et al., 1998 and in Lamb & Sim, 2013).

Children's suggestiveness can be illustrated by their tendency to change the answers to repeated questions within the interview as well as in repeated interviews (Bjorklund et al., 1998). Repetitive questioning within interviews may lead children to change their answers because they perceive that a different response is expected. The children assume that the reason for repeating the question is that their initial answer must have been incorrect (Rose & Blank, 1974; Warren et al., 1991; White & Quinn, 1988) or the interviewer is unhappy with the answer (Fivush, Peterson, & Schwarzmueeller, 2002). As a result of the social demands of the situation, they change their previous response. The younger the children are, the more likely they are to change their response, with children aged six and younger changing their answers the most (Fivush et al., 2002).

The reasons mentioned above and the growing number of children engaging in legal procedures (U.S. Department of Health & Human Services, 2016) has created a need to explore ways to assist children in recalling accurate and detailed information. Since it is impossible to modify the encoding of the event, several retrieval cues used during the interviews about past events are of particular interest (Pipe, Gee, & Wilson, 1993). To recall events accurately, pre-school children need a great deal of support from adults (Fivush, 1993). Proper help and appropriate interviewing techniques enable even young children to give a worthwhile testimony (Bull, 2010). Traditionally, ways of increasing the amount of information children report have focused on improving interviewing techniques and interview procedure. The effects of different questioning methods (see Kask & Bull, 2009 for review), structured interviewing methods (e.g. Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007) and techniques that can be used during interviewing (see Pipe, Lamb, Orbach, & Esplin, 2004) such as context reinstatement (e.g. Hershkowitz, Orbach, Lamb, Sternberg, & Horowitz, 2002), eye closure (e.g. Mastroberardino, Natali, & Candel, 2012) and comfort drawing (e.g. Poole & Dickinson, 2014; Salmon, Pipe, Malloy, & Mackay, 2012) have been explored. Alongside these, research about the effectiveness of other methods, such as using visual aids has also been conducted.

Using visual aids: children's ability to recall

Speech and language are the main means through which children can communicate their thoughts in an understandable way. But due to their language abilities young children are not able to express themselves verbally at the same level as adults (Klemfuss, 2015). In

addition to several questioning methods and techniques, which still require a wide vocabulary from children, developing non-verbal visual aids has also been pursued (Bull, 2010). Visual aids may accommodate vocabulary deficits by reducing the verbal skills required to convey information (Gee & Pipe, 1995) as well as simplify forwarding some information clearly and unambiguously by allowing children to point at the aids (Priestley & Pipe, 1997).

In addition to facilitating the process of reporting what happened, the purpose of visual aids is to provide effective cues for the retrieval of information from memory as well (Priestley & Pipe, 1997). Physical cues can decrease the cognitive demands of the memory task by remaining present during the task (Salmon, 2001) and provide concrete external retrieval cues which are easier for young children to use than searching their internal world for cues (Pipe et al., 1993).

Children are capable of making that connection between props and their referents even at a very young age (Troseth, Pickard, & DeLoache, 2007). They are also able to use that relationship when talking about past events (Priestley & Pipe, 1997). It is possible, that visual aids can provide more stimulus support than verbal interviews alone (Melinder et al., 2010) and combining them with best-practice interviewing can enable children to give their best evidence. Thus, visual aids may be advantageous.

The aids for reporting touch

The most prevalent props both researched and used in practice are visual aids for helping children to report touch and the location of it in sexual abuse cases (Goodman & Melinder, 2007). The experiments where children are touched during an event or where health assessments are either mimicked or performed have been conducted with anatomical dolls (e.g. Gordon et al., 1993; Thierry, Lamb, Orbach, & Pipe, 2005), human figure drawings (e.g. Brown, Pipe, Lewis, Lamb, & Orbach, 2007) and body maps (e.g. Morgan, Dorgan, & Hayne, 2013; Willcock, Morgan, & Hayne, 2006) as symbols to map body touches. The presence of dolls, human figure drawings and body diagrams as visual cues tends to increase the amount of information in three- to nine-year-olds' reports (Pipe et al., 1993; Poole & Dickinson, 2011; Salmon, Bidrose, & Pipe, 1995; Salmon & Pipe, 2000). Findings about the effectiveness of these aids, however, remain controversial and ambivalent. Different studies have associated found enhanced reports with an increase in inaccurate information (Brown, Pipe, Lewis, Lamb, & Orbach, 2007; Poole & Dickinson, 2011; Salmon, Bidrose, & Pipe, 1995), increase in accurate information (Salmon & Pipe, 2000) and with no effects on accuracy (Goodman & Aman, 1990; Lytle, London, & Bruck, 2015). Although in some cases

these props have been shown to serve their purpose, they can also be ineffective and neither facilitate nor compromise the amount of information and the accuracy (Morgan et al., 2013) of five- to six-year-old pre-schoolers' reports when compared to verbal techniques (Salmon et al., 2012).

Items from the to-be-remembered event as aids

To aid retrieval and reporting information about an event and a setting after short and long delays, using real items or replicas of these items from a to-be-remembered event as visual cues have been found effective in laboratory experiments (Salmon, 2001). These retrieval cues should replicate the encoding context and maximise the overlap between these cues and the features encoded (Pipe et al., 1993). In addition to eliciting more information during free recall (O'Callaghan & D'Arcy, 1989), they have been shown to enhance the accuracy of responses to questions as well in four-year-olds and older children (Gee & Pipe, 1995; Macklin, 1994). As with anatomical dolls and body diagrams, real objects can also lead pre-schoolers into making more errors, particularly in recalling action (O'Callaghan & D'Arcy, 1989) and after long delays (Gee & Pipe, 1995). However effective or ineffective real items are, using them during real-life forensic interviews can be problematic. First, the existence of such items may not be known to the interviewer. Even if the connection between such items and the to-be-remembered event has been established, the interviewers still seldom know which of these are relevant (Pipe et al., 2004). Also, these items may not be even available to the interviewers (Nigro & Wolpow, 2004). Furthermore, presenting items from the event the child is describing would be highly suggestive (Pipe et al., 2004).

Standard model

As noted earlier, children's descriptions of people appear to be more limited and less accurate than their recollections of what occurred during an event (Davies et al., 1989). Therefore, assisting their ability to recall people is necessary. Kask et al. (2007) investigated whether using a standard model would improve the ability of children at ages six to eight to report details about a once-seen person. Children observed a male stranger visiting their kindergarten, about which they were later interviewed. During the questioning phase of the interview, children were able to use the interviewer as a comparison or a standard when describing the male stranger. However, it was found that the standard does not improve the recollection outcome, instead it might have been more confusing than helpful to the children.

Neutral visual aids

Although facilitating communication and memory retrieval, the central issue that arises in regards to using visual props mentioned above is their suggestibility. Providing children with these props during interviews might imply the need to use them while answering. Moreover, if props are presented after an earlier questioning phase children can assume their initial response was incorrect and alter their response using the props (Siegal, 1991). This is especially problematic as most of the props are somewhat situation-specific, meaning that they are closely related to the event the interviewer asks the child to recall. For example, real props derive from the original event and the use of anatomical dolls imply the happening of touch or abuse to children. Furthermore, some of the props such as anatomical dolls can also be viewed as objects of play (Ornstein, 1996) that encourage children to use them and point to different body parts thoughtlessly (Lytle et al., 2015). This is of concern, as shown by Thierry et al. (2005), because props led three- to six-year-old children to provide more fantastic details and contradict the information they presented first without the props. Therefore, with the increase in information communicated, the likelihood of exaggeration and false information can increase as well.

Because of their potential negative effects on the accuracy of children's accounts and as detailed knowledge about happened events is not available in most cases, the risk of recommending the use of props in real forensic context is concluded to be too high (Goodman & Melinder, 2007; Poole, Bruck, & Pipe, 2011). Nevertheless, the necessity of assisting children with their ability to recall remains. For that reason, it is crucial to study whether visual aids that would not have these deficiencies could be effective. Thus, they should be neutral and applicable in all the interviews but still enhance children's ability to recall and communicate without the risk of additional errors.

Topics covered in all investigative interviews

A neutral visual aid implies the possibility of its use in all cases. However, there are not many topics that are common to all possible events. One of the common aspects is colour. For instance, an investigative interviewer might need information about the colour of a person's clothes, hair, car or a house that a child might have seen. Previous research has pointed out that children's ability to recall colour is high already at the age of four (Ling & Blades, 1996) for objects and items seen as central to the event but not for details peripheral (meaning the attention of children is turned to something else) to the event (Ling & Blades, 2002; Patel, Blades, & Andrade, 2001). Children, even at the age of seven, find it easier to recall the colours of random items and objects than colours of clothing seen within a category

set. The recall of colours of clothing worn by a person is even less accurate (Patel et al., 2001).

It has been suggested by Sporer (1996 as in Meissner, Sporer, & Schooler, 2007) that supplying children with a colour plate may lead to better results for some aspects of describing a person. The effect of colour charts has been tested in laboratory experiments with objects. Indeed, provision of colour charts has been found to improve children's ability to recall colour correctly without a decrease in accuracy (Ling & Blades, 2000) and without a difference in pre-schoolers and older children (Ling & Blades, 2002). Hence, even very young children (four years old) can employ aids that are not exact copies of previously seen objects to their advantage (Ling & Blades, 2000). Since colour memory is less accurate as the time delay increases (Patel et al., 2001) and colour charts increase the recall for colours of objects, as noted earlier, it can be assumed that a colour chart could be effective in enhancing children's ability to recall colours of objects and of features of people seen during an event as well.

Another common topic reported in forensic interviews is time. Friedman (2005) has done extensive studies on children's knowledge of and ability to report time. Children are capable of constructing times of events by the age of six (Friedman & Lyon, 2005), nevertheless, they are still less accurate than adults in most time scales (Jack, Friedman, Reese, & Zajac, 2016). Six-year-olds are relatively familiar with days of week, months and seasons (Friedman, 1991), although they have been found to struggle with reporting all of them (Jack et al., 2016). Younger children, aged four to five, exhibit accuracy judging the part of the day during which a certain event took place (Friedman, 1991) by using their knowledge of their daily routine to link it to the time of that event (Friedman, 1990; Friedman & Lyon, 2005).

As remembered events can be linked to personal and natural time patterns (Friedman & Lyon, 2005; Jack et al., 2016), using scales representing time could aid children's memory. In their experiments, Friedman (1991) and Friedman & Lyon (2005) have showed image representations of daily activities and seasons, as well as verbal lists of days of weeks and months to children in different age groups in order to measure their ability to tell time. Even though they did not measure how the aids benefited children, they found that four-year-olds are capable of using image representations of daily activities (such as waking up, meal times and going to bed) to report time. By six years of age, children provided relevant information using the time-of-year scale. Children also begin to use logical constraints to infer the season

and day of the week at this age. Accurate reporting for days of week and months using verbal-list scales comes later, at seven years and at 11 years, respectively.

The current thesis

Concerns and controversies regarding the use of visual props have been exceedingly emphasised. However, it has not been studied whether visual aids which are considered neutral in their nature would be of help to children during investigative interviews. The central issue addressed in this thesis is the effect of neutral visual aids on children's recall of a previously experienced event, more specifically of colour and time.

Studying the effectiveness of neutral visual aids on the recall of colour and time is crucial as eyewitnesses are often asked to report details about both of these aspects. For the use of visual aids to be justified, the amount of information recalled should increase, but not at the expense of accuracy. Furthermore, visual aids should provide more effective retrieval cues during interviews than standard verbal prompts (Pipe et al., 1993).

To thoroughly examine the effect of neutral aids on the recall of children, the current thesis will first compare the average amount of information reported by children using the aids with the information reported without the aids. In addition, the thesis will also investigate how the information changes when neutral visual aids are introduced after the verbal interview. Repeated questioning within an interview can be problematic because slightly different information may be yielded in response to the same questions (Steward et al., 1996). For instance, Thierry et al. (2005) found that when a verbal interview was followed by a prop-assisted interview, three- to six-year-olds were more likely to provide information that contradicted the details provided without the props, whereas seven- to 12-year-olds stayed consistent in their responses. Contrary to that, repeating the questions using aids can also provide children an opportunity for a more complete report of an event (Steward et al., 1996). This is supported by the findings of Teoh, Yang, Lamb, & Larsson (2010) who showed that when visual aids were introduced to four- to 13-year-old children after the verbal interview, props helped the retrieval or reporting of additional information. The two designs combined will lead to a more thorough understanding of the impact of neutral aids on children's reports.

The current study attempts to create as ecologically valid procedure as possible in order to be able to apply the findings to practice. Therefore, instead of separate objects, a scripted event where children are simply bystanders is used as a stimulus for children to recall. Investigating event memory is more directly relevant to the use of cues in legal contexts than studying pictures or an object recall in terms of the complexity and the amount

of information to be recalled (Pipe et al., 1993). Although the event itself is not related to crime, there may be an occasional need for children to describe events that are not seemingly forensically important.

The time delay in this experiment between the event and the recall interview is one week. Usually, a large proportion of the studies use a time delay of only a few hours or one day (Hutcheson et al., 1995; Jack et al., 2014; Kask et al., 2007; Lytle et al., 2015; Morgan et al., 2013; Pozzulo & Warren, 2003). However, in real life cases, children can be asked to recall events that happened more than a day ago. As time delay affects the accuracy of information recalled (Ellis, Shepherd, & Davies, 1980), the question of whether visual aids are effective in facilitating recall over longer periods is particularly important (Pipe et al., 1993).

The study uses six-year-old children as participants. Children at the age of six have the ability to use scale models and understand the representation of models (DeLoache, 2000) even when the models are not highly similar to the original items in events that occurred several days earlier (Priestley & Pipe, 1997). Six-year-olds can also reconstruct events on longer time scales than just time-of-the-day (Friedman, 2005). Furthermore, the Estonian national curriculum for pre-school child care institutions defines that by the end of their enrolment in pre-school child care institution, children (at six to seven years of age) should be able to tell time, name the days of the week, months and seasons. They should also be able to name colours ('Koolieelse lasteasutuse riiklik õppekava – Riigi Teataja', 29.05.2008, no 87).

This thesis aims to investigate how the quality and quantity of children's recall of time and colours associated with a previously seen person and event are influenced by using neutral visual aids during interviews. Accordingly, three research questions posed are:

1. How does using neutral visual aids during interviews influence children's recall?
2. How do neutral visual aids affect children's recall when used during a repeated set of questions after an initial verbal interview?
3. What effect does using neutral visual aids have specifically on the recall of colour and time?

Based on the literature, it can be speculated that when children have the opportunity to use neutral visual aids while answering questions, their recall changes. In consequence, the following is hypothesized:

- H1 Using neutral visual aids while interviewing children will increase the amount of information recalled.

- H2 Using neutral visual aids during a repeated set of questions will increase the amount of information reported.
- H3 The opportunity to use neutral visual aids during interviews will have an impact on the accuracy of recall.
- H4 Using neutral visual aids in interviews will increase the recall of both colour and time.

METHOD

Participants

A total of 169 children with the mean age of 6.4 years ($SD = 0.42$, range from 5 to 7 years 5 months) participated in the study. The participants were recruited through the kindergartens they were enrolled in. An e-mail containing the description of the study was sent to all the regular kindergartens in Tartu ($N = 29$), to three kindergartens in Tartu county and to three kindergartens in Paide. The 12 kindergartens from Tartu and three from Paide that agreed to cooperate were involved in the experiment, except for one from Tartu with whom there was a scheduling conflict. All of the children spoke Estonian (147 as their primary language, four as their secondary language, five as one of their primary language) as the official study language in kindergartens was Estonian. Written consent was obtained from parents beforehand and all the children participated in the interview on a voluntary basis.

Materials

Three types of neutral aids were used during the interviews: a circle of colours, pictures of seasons and a picture of daily activities. All the materials were constructed specifically for this experiment and during the construction the principle of neutrality was followed (the aids should be generalizable to all events and not connected to this specific event).

The circle of colours (Figure 1) was a pie-graph ($r = 9.2$ cm) consisting of equal sectors of 11 different colours (black, white, grey, brown, yellow, orange, red, pink, purple, blue, green). The legend of the graph on the right side of the paper showed all the names of the colours. The circle was printed on an A4-sized paper. The purpose of the circle of colours was to aid children in evaluating the correct colour of person's clothes, hair, skin, eyes and accessories.

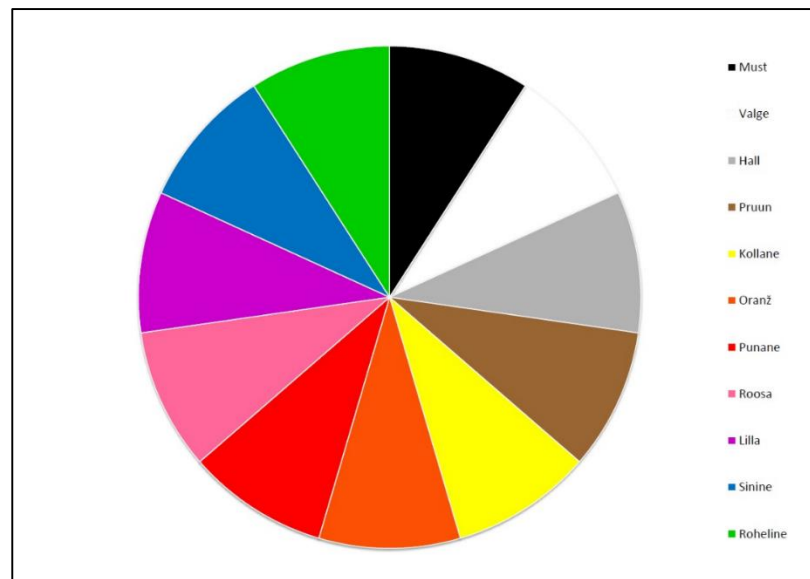


Figure 1. The circle of colours.

The pictures of seasons consisted of four different pictures printed separately as A4-sized pictures. Similarly to the stimulus cards used in a study by Friedman (1977), a figure picturing one season was comprised of a drawing of seasonal landscape and a drawing of several activities characteristic to that specific season. The drawings of seasons originated from the nature studies textbook for first-graders (Nilson, Karik, & Saar, 1997) that is used in Estonian schools. The neutral aid is displayed in Figure 2.



Figure 2. The pictures of seasons.

The picture of daily activities portrayed six different activities that children are familiar with and engaged in daily. As can be seen from Figure 3, the 2x3 picture consisted of drawings of the following activities: waking up, brushing teeth and washing one's face, study-activity behind a table, eating, playing and sleeping. The figure was printed on an A4-sized paper. The picture of a child doing study-activities behind a table was taken from a workbook that is meant as a preparatory material for pre-schoolers before going to school (Kula, 2011b). All the other pictures originated from a similar workbook (Kula, 2011a). All the activities were meant to represent different times during the day (as in Friedman, 1977) and chosen regards to their suitability to the daily plan of children in kindergartens.



Figure 3. The picture of daily activities.

Procedure

A pilot study was conducted with three children to test the comprehensibility of the interview procedure, especially the formulation of the questions. None of the three children took part in the main experiment. Observations from the pilot study were used to improve the interview procedure of the main experiment.

The experimental procedure consisted of the stimulus event followed by a recollection phase, which involved both free recall and questioning.

Stimulus event

The scripted event constructed for the experiment was same on each occasion. A male actor, aged 24, entered the room in the kindergarten while the participants were engaged in activities, which involved sitting calmly behind a table (e.g. learning activities, reading, drawing, crafts). The stranger briefly interacted with the teacher and exchanged some papers with the teacher, which was also the purpose of the visit. To get the attention of children, the actor asked the group some general questions about their current activity or about the kindergarten in general. He was introduced either as the classmate, friend or a former student of the teacher, depending on the age of the teacher. All the teachers were familiar with the script of the visit beforehand. All in all, the children observed the male actor for about three to five minutes.

The stranger's visits to the kindergartens followed the same script and as few details as possible were changed. In addition, the event was designed so that the correct answers using the props would be identical in all cases. Therefore, the activity of the children during the event was kept similar as well in order for the correct answer from the picture of daily activities to be the drawing of a child sitting behind a table. All the visits took place in the morning between 9AM to 12PM during the autumn months, in October or November. The male actor wore the same clothes (grey sweater, brown pants, blue trainers) and had the same folder (orange-red) and white papers with him in each kindergarten.

Recollection assessment procedure

A week later half-structured interviews with children were conducted. As the personal characteristics of an interviewer alter the interview style (Wachi, Watanabe, Yokota, Otsuka, & Lamb, 2016), which in turn can affect the information children disclose (e.g. Almerigogna, Ost, Akehurst, & Fluck, 2008; Sparling, Wilder, Kondash, Boyle, & Compton, 2011), I conducted all of the interviews myself. All the interviews were audiotaped and a record was kept for each interview. None of the interviews lasted more than 12 minutes. The process of interviewing followed the general guidelines for best interviewing (Bull, 2010).

The children were interviewed according to three recall conditions shown in Table 1. The participants were randomly assigned to one of these three conditions, with approximately equal numbers of males and females in each condition. The participants within Group 1 were interviewed first without the aids and then all the questions were repeated using the aids. The children in Group 2 were interviewed first without the aids as well, however later only those questions that were not answered due to not remembering or not knowing were asked again

while offering children the possibility to use neutral aids. The children within Group 3 were interviewed using the aids from the beginning.

Table 1.

Use of Neutral Aids During Interviews in Three Recall Conditions

	Group 1	Group 2	Group 3
1st set of questions	No aids	No aids	With aids
2nd set of questions	With aids	Partially with aids	

Before interviewing, the participants were taken individually to a separate room while the others were engaged in their usual activities. The on-going classroom activities prevented the children from communicating with each other about the conversation with the interviewer. In addition, the children were asked not to mention the details of the interview to the other kids while the interviews lasted.

All the interviews started with a rapport phase, during which I introduced myself to the child and asked if he/she was willing to answer some questions and talk to me. I asked the children some general questions (e.g. “What is your favourite game?”, “Do you have any pets?”) to establish contact and to make them more comfortable, preceded by a brief introduction of rules during which I reminded them to be honest. The participants were reminded that it was all right to say “I don’t know” or “I don’t remember” if they were unsure or did not remember what happened.

All of the children were then asked about a stranger who visited their kindergarten teacher (name used) at the kindergarten some time ago. If the child had trouble remembering the event, then the gender of the visitor was mentioned (in 55.6% of all the interviews). If the child still could not recall the event, then random questions (e.g. “What will you do later today?”, “What is your favourite thing about going to the kindergarten?”) were asked to not make them feel left out.

If the child could recall the teacher’s visitor, they first had to provide a free narrative of that event. Once the free narrative was completed, I continued with questions regarding the male actor’s characteristics, actions and time of the event.

During the interviews, the children were introduced to the aids one by one right before a question regarding the specific aid was coming up as it has been shown that prior experience with props decreases the accuracy of information reported (Nigro & Wolpaw, 2004). The children were explained that they have the opportunity to use the aids while answering and point to the correct part of the figures. The circle of colours was used along with questions

regarding the male actor's hair, eyes, skin, clothes, footwear and things he had with him during the visit (map and papers). The pictures of seasons were used when a question was asked about the season the visit took place and the picture of daily activities was used when the children were asked about their activity during the visit.

The closure phase of all the interviews consisted of thanking all the children for helping and going over to neutral topics to make sure that all the children leave the interview within a positive state of mind.

Ethical aspects

The main ethical concern with this study is the possible negative self-realization of children due to not being able to recall the asked event at all or as much as necessary. To minimise the potential harm, the children who were unable to remember were asked random questions about themselves. Furthermore, all the children were reminded from the beginning that the interviewer does not have any knowledge of the event.

All of the kindergartens and the teachers participating in the study were fully aware of its purpose and procedure. Written informed consent was obtained from the parents of all the children interviewed beforehand. At the beginning of the interview each child was asked whether he/she was willing to talk to the interviewer and answer some questions.

The confidentiality of the children was secured by giving each child a unique code. Instead of names, the code was used to identify interview protocols with audio recordings of the interviews. After transcribing the interviews, all the audio recordings were erased.

Coding

First, the interviews were transcribed by myself (1/3) and a student from Tallinn University (2/3). The interviews were coded using the transcriptions of the audiotapes and the interview protocols to cover both the verbal and non-verbal answers.

The content of participant answers to the questions was divided into a number of categories. The responses to the questions were scored on the basis of the number of semantic units (SUs) contained in each response, similarly to the method used by Poole & White (1991). One point was given for each semantic unit mentioned by the child. Correct and incorrect semantic units mentioned were coded separately. For example, if the visitor was said to have a blue folder with him, then one correct point was given for the folder and one incorrect point was given for the colour of the folder. The total semantic units recalled were true and false semantic units added together.

Subjects' responses were scored by three different people. I acted as the main coder as I coded all the interviews. The other two independent coders who were unaware of the study's exact purpose each coded half of the interviews to assess inter-coder reliability. Coders made judgements about the accuracy of the information on the basis of a written description of the event and a photograph of the male actor. Inter-coder agreement for all of the data was 91%, thus, the data coded by the main coder was used in data analyses.

Data analysis

The interviews included questions about several aspects of the male actor and his visit. However, in the current study, only the information about time and colours is observed.

Before applying a specific analysis, the data of the groups to be used was tested for the assumptions underlying that specific parametric analysis. The assumption of normality was explored using a histogram and a Shapiro-Wilk test and the homogeneity of variance was tested with Levene's test. Depending on whether the assumptions of the parametric tests were met or not, the relevant parametric (one-way ANOVA, independent t-test, paired samples t-test) or non-parametric test was used (Kruskal-Wallis H test, Wilcoxon signed-rank test, Wilcoxon rank sum test) to compare different conditions.

Data was coded to Microsoft Excel 2016 (Microsoft, 2016) and arranged using both Microsoft Excel and R. All data was analysed using R, version 3.2.3 (R Core Team, 2015).

RESULTS

Out of the 169 children who participated in the study, almost two-thirds of the children (62.7%, $N = 106$) provided a description of the event. Of those 106, in 42 interviews (39.6%) the suggestion of the gender of the visitor was used. The data of 63 children who did not recall the event was excluded from further analyses and the data of 106 children (68 girls, 38 boys, $M_{Age} = 6.44$, $SD = 0.35$) was used in subsequent analyses. Table 2 illustrates the allocation of children to the three groups.

Table 2.

Allocation of Children to the Three Recall Conditions (Groups).

	Boys	Girls	Total
Group 1	12	22	34
Group 2	15	24	39
Group 3	11	22	33
Total	38	68	106

The preliminary tests (ANOVAs and t-tests) revealed that neither the native language, gender nor the provision of a suggestion had a statistically significant impact on the amount of all information, true information and false information collected from the children (all had $p > .05$). No effect was detected on the accuracy of information either (all had $p > .05$).

Therefore, these variables were not included in further analyses.

The effect of neutral visual aids on the amount of information in total

The design of the experiment allows to compare the effect of neutral visual aids in three conditions: interviewing without visual aids, interviewing without visual aids followed by interviewing using visual aids partially and interviewing using visual aids (see Table 1 for clarification). A one-way analysis of variance (ANOVA) examining for the effect of visual aids did not reveal a statistically significant difference between the three conditions, $F(2, 103) = 2.86, p = .062, \omega = .18$. To see the effect of the neutral aids on the amount of information more clearly, only the conditions with and without the neutral aids were compared, thus leaving out the combined condition. Therefore, two separate analyses were conducted and a statistically significant effect was noted in both of them. Two independent-samples t-tests revealed a statistically significant difference between the “no visual aids” and “with visual aids” condition in the average semantic units provided, $t(56) = -2.24, p < .05, r = .29$ (Group 1 and Group 3), and $t(68) = -2.59, p < .05, r = .30$ (Group 2 and Group 3).

However, comparing the combined condition with the “no visual aids” condition (Group 2 together and Group 1) using an independent-samples t-test resulted in a statistically significant difference as well, $t(68) = -2.2, p < .05, r = .37$. No statistically significant difference was noted using the independent-samples t-test in the average semantic units between the combined condition and “with visual aids” condition (Group 2 together and Group 3), $t(68) = -.15, p = .88, r = .02$. As illustrated by Table 3, these results indicate that on average, children provide more information when visual aids are available to them at some point during the interviews than during verbal interviews only.

Table 3.

Average Semantic Units of Different Aspects and Accuracy in all the Experimental Conditions

Variable	Condition														
	No aids						With aids						Combined		
	Group 1 (set 1)			Group 2 (set 1)			Group 1 (set 2)			Group 3 (set 1)			Group 2 (set 1 + 2)		
	<i>M</i>	<i>SD</i>	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>Mdn</i>
All semantic units															
Total semantic units	7.12 ^{αδγ}	2.00	7.50	6.72 ^β	2.86	6.00	7.91 ^γ	1.83	8.00	8.48 ^{αβ}	2.91	8.00	8.38 ^δ	2.89	8.00
Correct semantic units	4.09	1.42	4.00	3.67	1.98	4.00	4.24	1.48	4.00	4.15	2.14	4.00	4.26	1.89	4.00
Incorrect semantic units	3.03 ^{αβ}	1.88	3.00	3.05 ^δ	2.21	3.00	3.68 ^β	1.87	4.00	4.33 ^{αδ}	2.45	4.00	4.13	2.46	4.00
Accuracy	.60	.20	.59	.56	.25	.60	.56	.20	.56	.51	.22	.50	.52	.21	.55
Semantic units about colour															
Total semantic units	5.21 ^γ	1.77	5.00	4.72 ^α	2.57	4.00	6.03 ^γ	1.88	6.00	6.24 ^α	2.76	6.00	5.97	2.56	6.00
Correct semantic units	2.29	1.22	2.00	2.08	1.35	2.00	2.59	1.23	2.50	2.36	1.69	2.00	2.38	1.46	2.00
Incorrect semantic units	2.91	1.82	3.00	2.64 ^α	2.15	2.00	3.44	1.73	3.50	3.88 ^α	2.29	4.00	3.59	2.05	3.00
Accuracy	.48	.26	.46	.47	.29	.50	.46	.22	.44	.39	.24	.33	.41	.21	.40
Semantic units about time															
Total semantic units	1.91 ^{αβδ}	.87	2.00	2.00	1.03	2.00	1.88	.41	2.00	2.24 ^{αβ}	.56	2.00	2.41 ^{αδ}	1.04	2.00
Correct semantic units	1.79	.88	2.00	1.59	.97	2.00	1.65	.65	2.00	1.79	.74	2.00	1.87	.86	2.00
Incorrect semantic units	.12 ^{αβγ}	.33	.00	.41	1.07	.00	.24	.50	.00	.45 ^{αγ}	.56	.00	.54 ^{αβ}	1.10	.00
Accuracy	.92 ^α	.22	1.00	.82	.36	1.00	.86	.31	1.00	.79 ^α	.29	1.00	.79	.33	1.00

Note. Means in the same row that share a superscript differ statistically significantly: α, β, δ at $p < .05$ and γ at $p < .01$.

The effect of neutral visual aids on the amount of true and false information

To further analyse the increased information and the statements of children, correct and incorrect semantic units were inspected separately. First, the information reported was compared between the three conditions (without aids, combined and with aids), but both of the Kruskal-Wallis H tests revealed that neutral visual aids do not have a statistically significant effect on the correct, $H(2) = 0.55, p = .758$, nor incorrect information, $H(2) = 5.7, p = .058$. Nevertheless, when separate analyses were conducted, the neutral visual aids proved to have a statistically significant effect on the amount of false information. An independent-samples t-test, $t(60) = -2.44, p < .05, r = .30$ (Group 1 and Group 3), and a Wilcoxon rank sum test, $W = 448, p < .05, r = .26$ (Group 2 and Group 3), showed that children provided more false information in their statements when visual aids were used during interviewing than when interviewed only verbally. However, there was no statistically significant difference in the false information provided between the combined condition and either the “with visual aids” condition, $W = 589, p = .53, r = .07$ (Group 2 together and Group 3), or the “no visual aids” condition, $W = 501, p = .07, r = .21$ (Group 2 together and Group 1), as shown by Wilcoxon rank sum tests. The findings with the average amount of semantic units provided by children are presented in Table 3.

Neutral aids did not have a statistically significant effect on the amount of correct information in any of the pairwise comparisons (all had $p > .05$).

The effect of neutral visual aids on the accuracy of information

As the false semantic units increased in children’s statements on average when visual aids were used during interviews, the aim was to see whether this reflects in the accuracy of statements as well. Accuracy (proportion of correct answers) was calculated as reported correct semantic units divided by total semantic units provided (correct semantic units + false semantic units). Despite the statistically significant increase in false information reported, the accuracy of children in different conditions did not change significantly (Table 3). A one-way ANOVA did not reveal a statistically significant difference between the three conditions (without aids, combined and with aids), $F(2, 103) = 1.99, p = .14, \omega = .14$, nor was there a statistically significant difference in any of the pairwise condition comparisons (all had $p > .05$).

The effect of neutral visual aids on the recalled information during a repeated set of questions

To analyse how the neutral aids affected children’s recall when a verbal interview had been given beforehand, the information provided within Group 1, in the “no aids” condition

and the “with aids” condition, was compared. As noted in Table 3, a Wilcoxon signed rank test revealed that after a verbal interview ($Mdn = 7.5$), children reported additional information with the use of visual aids ($Mdn = 8$), $T = 63$, $p < .01$, $r = .31$. Moreover, the neutral visual aids proved to have a statistically significant effect on the amount of false information, $t(33) = -2.21$, $p < .05$, $r = .36$, as shown by a paired t-test but not on the amount of correct information, $T = 103.5$, $p = .45$, $r = .09$, as shown by a Wilcoxon signed rank test, or accuracy, $t(33) = 1.5$, $p = .14$, $r = .25$, as shown by a paired t-test. When the effect of neutral aids on time and colour were inspected separately, a Wilcoxon signed rank test showed that using the aids led children to provide more information about colour ($Mdn = 6$) than in the verbal condition before ($Mdn = 5$), $T = 32.5$, $p < .01$, $r = .34$. However, the circle of colours did not have a statistically significant effect on the incorrect information, $t(33) = -1.93$, $p = .06$, $r = .32$ (paired t-test), correct information, $T = 44$, $p = .12$, $r = .19$ (Wilcoxon signed rank test), nor on accuracy, $t(33) = .53$, $p = .60$, $r = .003$ (paired t-test). Furthermore, no statistically significant effect was found in any of the comparisons about time (all had $p > .05$).

To further examine whether the neutral aids led children to alter their answers to the questions the second time, the change of answers was marked down during the interviews. Altogether, in more than one-third of the cases (37.2%) children decided to change their statements when using neutral visual aids, meaning that in 62.8% cases the answer stayed the same. When the change of answer took place, half of the time (52.69%) the initial answer was changed to an incorrect answer the second time. The initial answer was converted to a correct one in 34.4% of the cases and some kind of another change (e.g. no answer, “don’t know”) was generated in 13.17% cases.

The effect of neutral visual aids on information about colour

The impact of the circle of colours on information about colour was tested separately. Several analyses were performed to investigate that effect on the amount of total semantic units, correct semantic units and false semantic units provided by children as well as on the accuracy of their reports. According to Table 3, the circle of colours had a statistically significant effect on the total amount of semantic units about colour provided by children in only one of the comparisons. An independent-samples t-test revealed that using the aids led children to provide more information about colour than in the verbal condition, $t(66) = -2.4$, $p < .05$, $r = .28$ (without aids in Group 2 and with aids in Group 3). None of the other comparisons revealed a statistically significant difference (all had $p > .05$). Statistically

significant effect was also found on the amount of false information in only one of the pairwise comparisons (all others had $p > .05$). The results of the Wilcoxon rank sum test indicate a tendency for the average amount of false semantic units about colour to be higher when neutral aids were available to children, $W = 448, p < .05, r = .26$ (Group 2 and Group 3). Once again, there was no statistically significant effect on the amount of correct semantic units nor accuracy (all had $p > .05$).

The effect of neutral visual aids on information about time

The mean semantic units provided by children in different conditions and the results of statistical analyses about the effect of neutral aids (the pictures of seasons, the picture of daily activities) on information about time are presented in Table 3. Providing children with neutral aids was accompanied with growth in the total amount of information as well as in false information about time. This is indicated by the Kruskal-Wallis H test measuring the three conditions (without aids, combined, with aids), $H(2) = 6.77, p < .05$. As a post hoc analysis, all these conditions were tested pairwise. Wilcoxon rank sum tests revealed that the amount of information provided in the combined condition (Group 2 together) differs statistically significantly from the condition where aids were not used during interviewing (Group 1), $W = 480, p < .05, r = .27$, but not from the condition where visual aids were used (Group 3), $W = 666, p = .76, r = .04$. There was also a statistically significant difference as shown by the Wilcoxon rank sum test when comparing separate conditions of not using aids and using aids during interviews separately, $W = 417.5, p < .05, r = .25$ (no aids in Group 1 and with aids in Group 3). Other pairwise comparisons did not yield any statistically significant effects (all had $p > .05$). The average amount of semantic units was lowest when visual aids were not used and highest in the combined condition.

Similar patterns were also found when analysing the effect of aids on the amount of false information. The Kruskal-Wallis H test showed a statistically significant difference between the three conditions (interviewing without aids, combined, with aids), $H(2) = 8.02, p < .05$. Wilcoxon rank sum tests revealed that providing children with aids resulted in more false semantic units than not using neutral aids, $W = 387, p < .01, r = .35$ (no aids in Group 1 and with aids in Group 3), and that children provided false information about time the most in the combined condition, $W = 512, p < .05, r = .27$ (no aids in Group 1 and Group 2 together). The separate comparison of the combined condition (Group 2 together) and the “with aids” condition did not reveal a statistically significant difference, $W = 607, p = .63, r = .06$. A statistically significant difference was not noted on the false

information about time when comparing the “no aids” condition with the “with visual aids” condition either (without aids in Group 2 and with aids in Group 3), $W = 536$, $p = .14$, $r = .18$. This could be due to the fact that children in the “no aids” condition in Group 1 provided very few incorrect answers as opposed to children in other conditions.

In accordance with other results, using visual aids did not have a statistically significant effect on the amount of true semantic units children provided about time, all had $p > .05$. Be that as it may, the recall of time was revealed by a Wilcoxon rank sum test in one of the pairwise comparisons (without aids in Group 1 and with aids in Group 3; in all other tests $p > .05$) to be more accurate in verbal interviews than when visual aids were used while interviewing, $W = 710$, $p < .05$, $r = .29$. All the average semantic units about time can also be seen in Table 3.

DISCUSSION

The aim of this thesis was to examine how using neutral visual aids during interviews affects children’s ability to recall a previously experienced event. The impact of aids on the amount and accuracy of information about colour descriptions of a person and the time of the event were examined in particular. Furthermore, it was also studied whether the neutral aids tend to change the previously reported information. It was hypothesised that when visual aids are used, the information children provide in total increases, as well as the information about time and colours separately. It was also speculated that using neutral visual aids after an initial verbal interview leads children to provide additional information. Moreover, an assumption was made that using visual aids will have an impact on the accuracy of recall as well.

The results revealed a similar pattern throughout the results. Using neutral visual aids in interviews increased the amount of information in children’s answers as well as the amount of information about colour and time separately, as was speculated. Thus, the first and the fourth hypotheses are confirmed. While the amount of true information was unaffected by the use of visual aids, a growth in the amount of incorrect information in total, about colours and about time was noted in some of the comparisons. Namely, it can be said that the aids had an impact on the amount of false information. Moreover, when neutral visual aids were used, children provided additional false information to their verbal reports and reported more details about colour. Therefore, the second hypothesis can be affirmed. Even though the increase in the amount of false information was noted throughout the results, the aids did not have an

effect on the accuracy of children's recall, except for the recall of time in one of the comparisons. Hence, the third hypothesis is rejected.

The effect of neutral aids on children's recall

According to the results of this study, adding neutral visual aids to verbal interviews results in children providing more information about an event, more specifically about colours and time. This is highly consistent with the pool of prior research, where using various props and non-verbal aids has had a boosting effect on the volume of recall (Gee & Pipe, 1995; Goodman & Aman, 1990; Poole & Dickinson, 2011). This study adds to these results by proving that neutral aids do not differ from other props in that aspect. The information provided using neutral aids was larger in its quantity than information provided without using props. However, the reasons behind the increasing effect of visual aids still remain rather unknown.

The examined growth in the amount of total information can be explained by an increase in the amount of false information in total, but not in the amount of correct information. Non-verbal aids should provide children an additional opportunity to communicate forensically-relevant information (Salmon et al., 2012), however in the current study as in many studies before (Poole & Dickinson, 2011; Salmon, 2001; Salmon & Pipe, 2000), additional aids seemed to mislead children to report erroneous information.

There is a possibility that even neutral aids are suggestive, as implied by the increase in false information when children had the opportunity to use visual aids. Since young children are easy to influence and quite suggestible (Lamb et al., 2003; Salmon & Pipe, 2000), the presence of aids in this study could have been more confusing than helpful to them (Kask et al., 2007). Therefore, the memory and recall of children distort and they can make more errors in their reports (Pipe et al., 1993). Furthermore, props may also distract children and elicit fantasy play during interviews (Melinder et al., 2010). As children may view visual aids as objects of play, the aids encourage them to fantasise and respond thoughtlessly (Poole & Dickinson, 2011; Thierry et al., 2005).

Increase in false information can also be explained by the fact that having visitors in kindergartens can be very usual. The stimulus event used in this study involved a stranger and posed no personal significance for the children, which makes it harder for them to accurately date it (Jack et al., 2016). This makes the stimulus event an ordinary repeated event for children, in which case details from several visits and visitors could have migrated together into a script. Preschool children find it harder to differentiate a single occurrence from the

script (Powell, Thomson, & Ceci, 2003). Instead, they tend to give a general script report when asked about a single instance (Fivush, 1993) as they have increased recall for repeated details but confuse the timing of details that change across events (McNichol, Shute, & Tucker, 1999). Furthermore, providing props as used in this study is likely to access gist memory rather than specific information relating to a specific episode (Priestley & Pipe, 1997). Thus, children in this study could have also originated from a script in their recall or described an entirely different male visitor instead. There is no guarantee that children recalled the correct event.

However, despite the growth of false information, a change in the accuracy of recall was not observed. Although neutral aids may have facilitated fantasising and guessing, they did not enhance erroneous answers on the account of correct information. It can be speculated that children report the information they have a memory of correctly and add the extra information that has been generated using the neutral aids.

The change in statements with visual aids

Visual aids not only elicited more information from children, they also led children to change or add information to their initial responses – the details they provided during verbal recall only. The results indicate that during the second set of questions where aids were used, children recalled more information in total and about colours than before. Furthermore, an increase in false information was also noted. This can be explained by the fact that in almost one-third of the times the latter answer differentiated from the original one that was provided without using aids. Simply stated, these results imply that when children have the opportunity to clarify their responses using visual aids, they add extra information and false details to their initial statements or change their initial statements.

The reported results are supported by the research on repeated questioning, according to which children change their answers to repeated questions within a single interview (Krähenbühl, Blades, & Eiser, 2009). The change in answers and providing fantastic details has also been noted to happen when props are introduced with repeated questions (Thierry et al., 2005). However, there is also evidence in the previous research that question repetition (Rooy & Lamb, 2010) and providing props during the latter interview does not increase errors (Lyon, 2002). Instead, visual props have been shown to help the retrieval and reporting of information that were not mentioned without props (Teoh et al., 2010).

Repeated questions within an interview can signal children that their previous answers were incorrect, leading them to change their previous response (Willcock et al., 2006). In pre-

school children, being truthful rests on obedience to authority and children view adults as trustworthy authority figures. Children are accustomed that adults are generally more knowledgeable than themselves, which may orient them to change their statements based on their beliefs about what the interviewer wants to hear in order to please the adult (Bjorklund, Brown, & Bjorklund, 2002; Perry, 1995). This can explain why children provided additional information and the change in their responses when using the aids. Moreover, since aids were presented after an earlier questioning phase, children might have assumed that their previous response was incorrect and therefore altered their response (Salmon, 2001). However, during this experiment, children were warned in the beginning of the interviews that the questions will be asked twice from them. It has been proven that presenting a rationale for question repetition can reduce the tendency to shift responses in four to eight-year-old children (Howie, Sheehan, Mojarrad, & Wrzesinska, 2004). Despite of that, children still provided additional false details, although the warning might have minimised the compliance of children.

The effect of neutral aids on children's recall of colour and time

In accordance with the pattern observed about the effect of aids to all information, the results revealed tendencies for total amount of information and false information about colour and time to increase as well due to the use of the aids. The growth in false information indicates that the neutral visual aids failed to benefit children in recalling information about the event.

A possible reason for it could be that children are already fully capable of communicating information about those aspects. First, this is supported by findings in person description studies where children have a tendency to describe exterior features such as hair colour and clothing. Describing hair and clothing may be easier for children given their practice in doing that in their daily lives and the number of common terms available for that (Karageorge & Zajac, 2011; Pozzulo & Warren, 2003). Furthermore, previous works on the effect of aids on the recall of colours alone have not found an increase in false information but an increase in the amount of correct information and accuracy instead (Ling & Blades, 2000, 2002). At the age of four, children have the ability to name and recall colours accurately (Ling & Blades, 1996, 2000; Patel, Blades, & Andrade, 1999). Thus, children may not need aids to facilitate communication but to facilitate retrieval of information instead.

The focus in research using aids so far has mainly been on the recall of object colours, which might be easier for children to remember. Recalling information about the colours of

clothing is more difficult than just merely naming the colours of various objects. Furthermore, it has been proven by Patel et al. (2001) that seven- to ten-year-old children's reports on the colour of clothing worn by a real life person are even less accurate than reports on the colour of clothing seen within a category set. This was despite the fact that children were able to see the clothing worn by a person longer and more clearly. Seeing many items from the specific clothing category together and not individually can complicate encoding the colours of clothing worn by people, which in turn makes it more difficult for children to remember the colours of the clothing (Patel et al., 2001). Additionally, since the clothes and the colours of clothes that people wear tend to change frequently, clothing may not be very important when meeting and identifying people. Therefore, the clothing and their colours are not included in the mental representations of those people unless deliberate attention was paid to them (Patel et al., 2001).

Underestimating the skills of children at that age can also explain the lack of help from the aids about time as well. Children are capable of recalling events with respect to personal time intervals and knowledge about their personal time patterns (Friedman & Lyon, 2005). For instance, Jack et al. (2016) showed in their experiments that children report events related to school most often, which is understandable as these activities dominate their day-to-day activities. Children sometimes use that knowledge of their daily routine to infer when a particular event could have taken place (Friedman, 2005). Four-year-olds can already localise events and recall them by time of the day and six-year-olds are capable of doing that by seasons as well (Friedman, 1991; Friedman, 2005). Children's ability to recall information about time of the day and seasons is supported by the high mean accuracy in reporting time in this experiment as well. Regardless of that, the aids still influenced children to produce false information.

This study used neutral visual aids, but there is also some support that the similarity of aids to the event or items from the event would influence children's accounts positively (Priestley & Pipe, 1997). The neutral aids used, especially the pictures of seasons and the picture of daily activities, might not have portrayed the memory that children have of the event accurately. For example, the pictures of seasons consisted of seasonal landscape and outside activities, however, the event itself occurred indoors. Most of the children's attention was probably focused on the event and not on the weather outside. Regardless of that, the accuracy of reporting time was high, which supports the existence of general knowledge of seasons in children (Friedman & Lyon, 2005). On the other hand, false information provided increased, suggesting that the aids caused confusion and fantasising in children. Children

could have interpreted the content of these pictures differently and make opposite conclusions about what the pictures represent.

Analyses about recall of the time of the event revealed that using neutral aids during interviews increased the amount of total and false information elicited from children. The average amount of information about time alone provided in the combined condition was found to be the highest, indicating that the neutral aids influenced children to change their initial “don’t know” or “don’t remember” answer and provide some information about the asked aspect. Furthermore, in one of the comparisons, the accuracy of reporting information about time was shown to decrease while using aids. Both of these outcomes imply that the aids could have had a suggestive effect on children.

Recall of central aspects of events is usually high and accurate (Fivush, 1993). However, as the event in this study was kept as normal as possible, there is no guarantee that children turned their attention on the male actor. Furthermore, it has been established that the aids make it easier for children to guess the answers and point to a random picture (Lytle et al., 2015). For this reason, the neutral aids might not have supported children in their recall and instead made it easier for them to compensate their lack of memory with random guessing.

Limitations and further research

Before drawing theoretical and practical conclusions from this study, it is necessary to contemplate on some of the limitations and how these could be avoided in future research.

First, the experimental design of the study required conducting several separate analyses to measure whether there was a significant difference in information between interviews where aids were used and the interviews with only verbal communication. It must be noted that this can influence the discovered results. When analysing the recall of time and colour, statistically significant differences were found only in some of the pairwise comparisons between the two conditions and not all of them, meaning the effects found could have been accidental. Therefore, retesting the use of neutral aids should be done with experimental groups that are more easily comparable.

Second, the current study investigated how the use of neutral aids influences the ability to recall only these aspects that the aids represented. However, it remains unknown whether using aids also has an impact on other details reported by children (e.g. person descriptors). Therefore, future studies should inspect how information unrelated to the aids is affected by them.

As mentioned before, the neutral aids used in this study might have not been appropriate for six-year-olds as their linguistic capabilities allow them to recall and express time and colour. Therefore, in the future these neutral aids might be helpful for children at a younger age who still struggle with naming and recalling colours. Furthermore, as young children report less information in free recall, using an aid during that part of interviewing could be beneficial as well (Ling & Blades, 1996; Meissner et al., 2007). These aids could be beneficial to other vulnerable witnesses as well (e.g. mentally impaired).

Moreover, the details of the event can be interpreted very differently. People have the ability to report details about what occurred and what they saw with close attention to details, but the participants of the same event may interpret the details of the event very differently (Canter & Youngs, 2009; Fivush, 1993). As an example, in this study, the actor's folder could have been reported as orange, as red or even as brown. Therefore, different answers could have been provided about the same memory picture. This could explain the noted increase in false information. As people can have a different understanding of colours, future research could use the circle of colours for clarification instead (Canter & Youngs, 2009). Namely, instead of facilitating memory retrieval, the aids could be used to clarify the memory picture.

As it was mentioned previously, no guarantee can be given that all the children took notice of the visitor. Although the male actor was introduced to the children and he conversed with the class, individual attention to him was not ensured. Even if the children paid attention to the visitor in the encoding phase, ensuring what children know and what they can and are willing to explain is difficult. Furthermore, as the time delay between the event and the recollection phase was one week, the post-event information children might have obtained from their peers or parents could have had an impact on their memory and answers (Candel, Memon, & Al-Harazi, 2007; Meissner et al., 2007). Although considered as limitations in an experimental study, these aspects can increase the ecological validity of the study. In real life, post-event information and guarantee about the child seeing and remembering the event cannot be controlled. However, to minimise these limitations and obtain more definite outcomes, future studies can pay more attention to the construction of the stimulus event and securing the discussion about the correct event in interviews.

There has been a heated debate over the generalisability of laboratory studies on eyewitness testimonies to forensic situations. However, no single study (neither field studies nor laboratory-based experimental studies) can cover and control all the relevant factors present in numerous forensic situations. Therefore, new knowledge from various studies

based on diverse methodological approaches should be integrated and compared in order to provide practical advice and recommendations for legal professionals (Chae, 2010).

Forensic implications

First of all, this thesis is a valuable contribution to the pool of research on using props and aids during interviews in order to help children recall more information more accurately. Although it does not solve the debate about whether props should be used, it adds its findings to existing knowledge that can guide legal practitioners in decisions about interviewing children.

Furthermore, this is the first study to test the effect of neutral aids on children's recall of an event. Previous studies have mostly used props and aids that cannot be considered neutral. There have been some experiments investigating the effect of neutral aids on the ability to recall separate objects but not events, for example the recall of objects' colour using colour charts (Ling & Blades, 2000). However, the novel aspect in this study is that the encoding phase consists of an event where the focus is not specifically on the features that children need to recall later. Therefore, it does not only investigate the recall of colour and time while using neutral aids, but uses an event as a stimulus as well. This is directly connected to the legal practice as in real-life cases children are usually asked to recall whole events or people and objects from those events.

The results of this study have a more practical merit as well. The results suggest that using neutral aids increases the total scope of information and false information about time and colours elicited from children. This implies that using other props (such as real items or dolls) could have an even bigger influence on the reports of children. In applied settings, making mistakes when using props can have serious consequences. For example, errors of omission may lead to wrongful acquittal (Nigro & Wolpow, 2004; Willcock et al., 2006). Therefore, practitioners should be careful with using any kinds of aids during interviews and focus more on the quality of the verbal interview. However, if props are used, it is necessary to take into account the type of prop and its suitability to the nature of the event (Priestley & Pipe, 1997).

CONCLUSIONS

The debate whether non-verbal props used during interviews are beneficial or detrimental to the statements of children has been ongoing for some time. In this thesis, I examined the effects of visual aids that are neutral on children's statements about colour and

time. Furthermore, to enhance the ecological validity, a live-event was staged. The results of the study suggest that when children have the opportunity to use the aids during recall, the volume of their statements increases. Along with that, children provide a larger amount of false information. Similar patterns were revealed when the effect of aids was observed on the recall of time and colour separately. Furthermore, when neutral visual aids were introduced after children had participated in a verbal interview, they tended to add more details altogether and also more false details to their previous statements. The increased amount of false details might be detrimental to the success of the investigation if aids are used in practice. Thus, even neutral visual aids that are not suggestive should be treated with care or not used at all. Witnesses should be interviewed in a manner that is likely to produce effective accounts. To conclude, this study affirms that verbal interviews with children are superior to interviews where aids are used.

REFERENCES

- Almerigogna, J., Ost, J., Akehurst, L., & Fluck, M. (2008). How interviewers' nonverbal behaviors can affect children's perceptions and suggestibility. *Journal of Experimental Child Psychology*, 100(1), 17–39.
- Batterman-Faunce, J. M., & Goodman, G. S. (1993). Effects of context on the accuracy and suggestibility of child witnesses. In G. S. Goodman & B. L. Bottoms (Eds.), *Child victims, child witnesses: Understanding and improving testimony* (pp. 301–331). New York, NY: Guilford Press.
- Bauer, P. J. (2007). Event memory. In D. Kuhn & R. Siegler (Eds.), *Handbook of child psychology* (6th ed., Vol. Cognition, Perception, and Language, pp. 373–425). Hoboken, NJ: John Wiley & Sons, Inc.
- Bjorklund, D. F., Bjorklund, B. R., Brown, R. D., & Cassel, W. S. (1998). Children's Susceptibility to Repeated Questions: How Misinformation Changes Children's Answers and Their Minds. *Applied Developmental Science*, 2(2), 99–111.
- Bjorklund, D. F., Brown, R. D., & Bjorklund, B. R. (2002). Children's eyewitness memory: Changing reports and changing representations. In P. Graf & N. Ohta (Eds.), *Lifespan memory development* (pp. 101–126). Cambridge, MA: MIT Press.
- Brown, D. A., Pipe, M.-E., Lewis, C., Lamb, M. E., & Orbach, Y. (2007). Supportive or suggestive: Do human figure drawings help 5- to 7-year-old children to report touch? *Journal of Consulting and Clinical Psychology*, 75(1), 33–42.
- Bull, R. (2010). The investigative interviewing of children and other vulnerable witnesses: Psychological research and working/professional practice. *Legal & Criminological Psychology*, 15(1), 5–23.
- Bull, R. (2013). Research on trying to improve the quality of information elicited from vulnerable witnesses. *International Journal of Disability, Development & Education*, 60(1), 53–57.
- Candel, I., Memon, A., & Al-Harazi, F. (2007). Peer discussion affects children's memory reports. *Applied Cognitive Psychology*, 21(9), 1191–1199.
- Canter, D., & Youngs, D. (2009). *Investigative psychology: Offender profiling and the analysis of criminal action*. Chichester: John Wiley & Sons.
- Chae, Y. (2010). Application of laboratory research on eyewitness testimony. *Journal of Forensic Psychology Practice*, 10(3), 252–261.
- Chae, Y., Kulkofsky, S., Debaran, F., Wang, Q., & Hart, S. L. (2014). Low-SES children's eyewitness memory: The effects of verbal labels and vocabulary skills. *Behavioral Sciences & the Law*, 32(6), 732–745.

- Cycowicz, Y. M., Friedman, D., & Duff, M. (2003). Pictures and their colors: What do children remember? *Journal of Cognitive Neuroscience*, 15(5), 759–768.
- Davies, G., Tarrant, A., & Flin, R. (1989). Close encounters of the witness kind: Children's memory for a simulated health inspection. *British Journal of Psychology*, 80(4), 415.
- Dekle, D. J., Beal, C. R., Elliott, R., & Huneycutt, D. (1996). Children as witnesses: A comparison of lineup versus showup identification methods. *Applied Cognitive Psychology*, 10(1), 1–12.
- DeLoache, J. S. (2000). Dual representation and young children's use of scale models. *Child Development*, 71(2), 329–338.
- Ellis, H. D., Shepherd, J. W., & Davies, G. M. (1980). The deterioration of verbal descriptions of faces over different delay intervals. *Journal of Police Science and Administration*, 8(1), 101–106.
- Fivush, R. (1993). Developmental perspectives on autobiographical recall. In G. S. Goodman & B. L. Bottoms (Eds.), *Child victims, child witnesses: Understanding and improving testimony*. (pp. 1–25). New York, NY: Guilford Press.
- Fivush, R., Peterson, C., & Schwarzmuller, A. (2002). Questions and answers: The credibility of child witnesses in the context of specific questioning techniques. In M. L. Eisen, J. A. Quas, & G. S. Goodman (Eds.), *Memory and suggestibility in the forensic interview* (pp. 331–354). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.
- Friedman, W. J. (1977). The development of children's understanding of cyclic aspects of time. *Child Development*, 48(4), 1593–1599.
- Friedman, W. J. (1990). Children's representations of the pattern of daily activities. *Child Development*, 61(5), 1399–1412.
- Friedman, W. J. (1991). The development of children's memory for the time of past events. *Child Development*, 62(1), 139–155.
- Friedman, W. j. (2005). Developmental and cognitive perspectives on humans' sense of the times of past and future events. *Learning and Motivation*, 36(2), 145–158.
- Friedman, W. J., & Lyon, T. D. (2005). Development of temporal-reconstructive abilities. *Child Development*, 76(6), 1202–1216.
- Gee, S., & Pipe, M.-E. (1995). Helping children to remember: The influence of object cues on children's accounts of a real event. *Developmental Psychology*, 31(5), 746–758.
- Goodman, G. S., & Aman, C. (1990). Children's use of anatomically detailed dolls to recount an event. *Child Development*, 61(6), 1859.

- . (2007). Child witness research and forensic interviews of young children: A review. *Legal & Criminological Psychology*, 12(1), 1–19.
- Goodman, G. S., & Reed, R. S. (1986). Age differences in eyewitness testimony. *Law and Human Behavior*, 10(4), 317–332.
- Gordon, B. N., Ornstein, P. A., Nida, R. E., Follmer, A., Crenshaw, M. C., & Albert, G. (1993). Does the use of dolls facilitate children's memory of visits to the doctor? *Applied Cognitive Psychology*, 7(6), 459–474.
- Herman, S. (2005). Improving decision making in forensic child sexual abuse evaluations. *Law & Human Behavior*, 29(1), 87–120.
- Hershkowitz, I., Orbach, Y., Lamb, M. E., Sternberg, K. J., & Horowitz, D. (2002). A comparison of mental and physical context reinstatement in forensic interviews with alleged victims of sexual abuse. *Applied Cognitive Psychology*, 16(4), 429–441.
- Howie, P., Sheehan, M., Mojarrad, T., & Wrzesinska, M. (2004). 'Undesirable' and 'desirable' shifts in children's responses to repeated questions: age differences in the effect of providing a rationale for repetition. *Applied Cognitive Psychology*, 18(9), 1161–1180.
- Hutcheson, G. D., Baxter, J. S., Telfer, K., & Warden, D. (1995). Child witness statement quality: Question type and errors of omission. *Law and Human Behavior*, 19(6), 631–648.
- Jack, F., Friedman, W., Reese, E., & Zajac, R. (2016). Age-related differences in memory for time, temporal reconstruction, and the availability and use of temporal landmarks. *Cognitive Development*, 37, 53–66.
- Jack, F., Leov, J., & Zajac, R. (2014). Age-related differences in the free-recall accounts of child, adolescent, and adult witnesses. *Applied Cognitive Psychology*, 28(1), 30–38.
- Karageorge, A., & Zajac, R. (2011). Exploring the effects of age and delay on children's person identifications: Verbal descriptions, lineup performance, and the influence of wildcards. *British Journal of Psychology*, 102(2), 161–183.
- Kask, K., & Bull, R. (2009). From person descriptions to interviewing methods: What can be done to improve child witnesses' testimonies? *TRAMES: A Journal of the Humanities & Social Sciences*, 13(2), 95–108.
- Kask, K., Bull, R., Heinla, I., & Davies, G. (2007). The effect of a standard to improve person descriptions by children. *Journal of Police and Criminal Psychology*, 22(2), 77–83.
- Klemfuss, J. Z. (2015). Differential Contributions of Language Skills to Children's Episodic Recall. *Journal of Cognition and Development*, 16(4), 608–620.
- Koolieelse lasteasutuse riiklik õppekava – Riigi Teataja. (n.d.). Retrieved 5 May 2016, from <https://www.riigiteataja.ee/akt/12970917>

- Krähenbühl, S., Blades, M., & Eiser, C. (2009). The effect of repeated questioning on children's accuracy and consistency in eyewitness testimony. *Legal and Criminological Psychology, 14*(2), 263–278.
- Kula, P. (2011a). *Terviseraamat*. Tallinn: Koolibri.
- Kula, P. (2011b). *Valmistume kooliks. Töövihik 2. osa*. Tallinn: Koolibri.
- Lamb, M. E., & Sim, M. P. (2013). Developmental factors affecting children in legal contexts. *Youth Justice, 13*(2), 131–144.
- Lamb, M. E., Sternberg, K. J., Orbach, Y., Esplin, P. W., Stewart, H., & Mitchell, S. (2003). Age differences in young children's responses to open-ended invitations in the course of forensic interviews. *Journal of Consulting and Clinical Psychology, 71*(5), 926–934.
- Lamb, M., Orbach, Y., Hershkowitz, I., Esplin, P. W., & Horowitz, D. (2007). A structured forensic interview protocol improves the quality and informativeness of investigative interviews with children: A review of research using the NICHD Investigative Interview Protocol. *Child Abuse & Neglect: The International Journal, 31*(11-12), 1201–1231.
- Ling, J., & Blades, M. (1996). Incidental recall of colour information by children and adults. *Applied Cognitive Psychology, 10*(2), 141–150.
- Ling, J., & Blades, M. (2000). The effect of a nonverbal aid on preschoolers' recall for color. *The Journal of Genetic Psychology, 161*(3), 314–324.
- Ling, J., & Blades, M. (2002). Further evidence for automatic encoding of colour by children and adults. *British Journal of Developmental Psychology, 20*(4), 537–544.
- Lyon, T. D. (2002). Applying Suggestibility Research to the Real World: The Case of Repeated Questions. *Law and Contemporary Problems, 65*(1), 97–126.
- Lytle, N., London, K., & Bruck, M. (2015). Young children's ability to use two-dimensional and three-dimensional symbols to show placements of body touches and hidden objects. *Journal of Experimental Child Psychology, 134*, 30–42.
- Macklin, M. C. (1994). The effects of an advertising retrieval cue on young children's memory and brand evaluations. *Psychology and Marketing, 11*(3), 291–311.
- Mastroberardino, S., Natali, V., & Candel, I. (2012). The effect of eye closure on children's eyewitness testimonies. *Psychology, Crime & Law, 18*(3), 245–257.
- McNichol, S., Shute, R., & Tucker, A. (1999). Children's eyewitness memory for a repeated event. *Child Abuse & Neglect, 23*(11), 1127–1139.
- Meissner, C. A., Sporer, S. L., & Schooler, J. W. (2007). Person descriptions as eyewitness evidence. In R. Lindsay, D. Ross, J. Read, & M. Toglia (Eds.), *Handbook of*

- eyewitness psychology: Memory for people* (pp. 3–34). Mahwah, NJ: Lawrence Erlbaum & Associates.
- Melinder, A., Alexander, K., Cho, Y. I., Goodman, G. S., Thoresen, C., Lonnum, K., & Magnussen, S. (2010). Children's eyewitness memory: A comparison of two interviewing strategies as realized by forensic professionals. *Journal of Experimental Child Psychology*, 105(3), 156–177.
- Morgan, K., Dorgan, K., & Hayne, H. (2013). Body maps do not facilitate older children's report of touch. *Scandinavian Journal of Psychology*, 54(1), 51–55.
<http://doi.org/10.1111/sjop.12000>
- Nigro, G. N., & Wolpow, S. I. (2004). Interviewing young children with props: prior experience matters. *Applied Cognitive Psychology*, 18(5), 549–565.
- Nilson, O., Karik, H., & Saar, A. (1997). *Loodusõpetus 1. klassile*. Tallinn: Koolibri.
- Nippold, M. A. (2000). Language development during the adolescent years: Aspects of pragmatics, syntax, and semantics. *Topics in Language Disorders*, 20(2), 15–28.
- O'Callaghan, G., & D'Arcy, H. (1989). Use of props in questioning preschool witnesses. *Australian Journal of Psychology*, 41(2), 187–195.
- Ornstein, P. A. (1996). To Interview a Child: Implications of Research on Children's Memory. *Monographs of the Society for Research in Child Development*, 61(4-5), 215–222.
- Patel, H., Blades, M., & Andrade, J. (1999). Children's incidental recall of colour information. *British Journal of Developmental Psychology*, 17(4), 537–549.
- Patel, H., Blades, M., & Andrade, J. (2001). Children's incidental learning of the colors of objects and clothing. *Cognitive Development*, 16(4), 965–985.
- Perry, N. W. (1995). Children's comprehension of truths, lies, and false beliefs. In T. Ney (Ed.), *Allegations in child sexual abuse cases: Assessment and management* (pp. 73–98). New York: Brunner/Mazel.
- Pipe, M.-E., Gee, S., & Wilson, C. (1993). Cues, props, and context: Do they facilitate children's event reports. In G. S. Goodman, B. L. Bottoms, G. S. (Ed) Goodman, & B. L. (Ed) Bottoms (Eds.), *Child victims, child witnesses: Understanding and improving testimony*. (pp. 25–45). New York, NY, US: Guilford Press.
- Pipe, M.-E., Lamb, M. E., Orbach, Y., & Esplin, P. W. (2004). Recent research on children's testimony about experienced and witnessed events. *Developmental Review*, 24(4), 440–468.
- Poole, D. A., Bruck, M., & Pipe, M.-E. (2011). Forensic interviewing aids: Do props help children answer questions about touching? *Current Directions in Psychological Science*, 20(1), 11–15.

- Poole, D. A., & Dickinson, J. J. (2011). Evidence supporting restrictions on uses of body diagrams in forensic interviews. *Child Abuse & Neglect*, 35(9), 659–669.
- Poole, D. A., & Dickinson, J. J. (2014). Comfort drawing during investigative interviews: evidence of the safety of a popular practice. *Child Abuse & Neglect*, 38(2), 192–201.
- Poole, D. A., & White, L. T. (1991). Effects of question repetition on the eyewitness testimony of children and adults. *Developmental Psychology*, 27(6), 975–986.
- Powell, M. B., Thomson, D. M., & Ceci, S. J. (2003). Children's memory of recurring events: is the first event always the best remembered? *Applied Cognitive Psychology*, 17(2), 127–146.
- Pozzulo, J. D., Dempsey, J., & Crescini, C. (2009). Preschoolers' person description and identification accuracy: A comparison of the simultaneous and elimination lineup procedures. *Journal of Applied Developmental Psychology*, 30(6), 667–676.
- Pozzulo, J. D., Dempsey, J. L., Crescini, C., & Lemieux, J. M. T. (2009). Examining the relation between eyewitness recall and recognition for children and adults. *Psychology, Crime & Law*, 15(5), 409–424.
- Pozzulo, J. D., & Warren, K. L. (2003). Descriptions and identifications of strangers by youth and adult eyewitnesses. *Journal of Applied Psychology*, 88(2), 315–323.
- Priestley, G., & Pipe, M.-E. (1997). Using toys and models in interviews with young children. *Applied Cognitive Psychology*, 11(1), 69–87.
- Rooy, D. L., & Lamb, M. E. (2010). What Happens When Interviewers Ask Repeated Questions in Forensic Interviews with Children Alleging Abuse? *Journal of Police and Criminal Psychology*, 26(1), 20–25.
- Rose, S. A., & Blank, M. (1974). The Potency of Context in Children's Cognition: An Illustration through Conservation. *Child Development*, 45(2), 499–502.
- Salmon, K. (2001). Remembering and reporting by children: The influence of cues and props. *Clinical Psychology Review*, 21(2), 267–300.
- Salmon, K., Bidrose, S., & Pipe, M.-E. (1995). Providing props to facilitate children's event reports: A comparison of toys and real items. *Journal of Experimental Child Psychology*, 60(1), 174–194.
- Salmon, K., & Pipe, M. E. (2000). Recalling an event one year later: The impact of props, drawing and a prior interview. *Applied Cognitive Psychology*, 14(2), 99–120.
- 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.

- Saywitz, K. J., Nathanson, R., & Snyder, L. S. (1993). Credibility of child witnesses: The role of communicative competence. *Topics in Language Disorders*, 13(4), 59–78.
- Siegal, M. (1991). *Knowing children: Experiments in conversation and cognition*. East Sussex: Lawrence Erlbaum.
- Sparling, J., Wilder, D. A., Kondash, J., Boyle, M., & Compton, M. (2011). Effects of interviewer behavior on accuracy of children's responses. *Journal Of Applied Behavior Analysis*, 44(3), 587–592.
- Steward, M. S., Steward, D. S., Farquhar, L., Myers, J. E. B., Reinhart, M., Welker, J., ... Ornstein, P. A. (1996). Interviewing Young Children about Body Touch and Handling. *Monographs of the Society for Research in Child Development*, 61(4/5), i–232.
- Teoh, Y.-S., Yang, P.-J., Lamb, M. E., & Larsson, A. S. (2010). Do human figure diagrams help alleged victims of sexual abuse provide elaborate and clear accounts of physical contact with alleged perpetrators? *Applied Cognitive Psychology*, 24(2), 287–300.
- Thierry, K. L., Lamb, M. E., Orbach, Y., & Pipe, M.-E. (2005). Developmental Differences in the Function and Use of Anatomical Dolls During Interviews with Alleged Sexual Abuse Victims. *Journal of Consulting and Clinical Psychology*, 73(6), 1125–1134.
- Troseth, G. L., Pickard, M. E. B., & DeLoache, J. S. (2007). Young children's use of scale models: Testing an alternative to representational insight. *Developmental Science*, 10(6), 763–769.
- U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2016). Child maltreatment 2014. Retrieved from <http://www.acf.hhs.gov/sites/default/files/cb/cm2014.pdf>
- Wachi, T., Watanabe, K., Yokota, K., Otsuka, Y., & Lamb, M. E. (2016). The relationship between police officers' personalities and interviewing styles. *Personality and Individual Differences*, 97, 151–156.
- Warren, A., Hulse-Trotter, K., & Tubbs, E. C. (1991). Inducing resistance to suggestibility in children. *Law and Human Behavior*, 15(3), 273–285.
- White, S., & Quinn, K. M. (1988). Investigatory independence in child sexual abuse evaluations: conceptual considerations. *The Bulletin Of The American Academy Of Psychiatry And The Law*, 16(3), 269–278.
- Willcock, E., Morgan, K., & Hayne, H. (2006). Body maps do not facilitate children's reports of touch. *Applied Cognitive Psychology*, 20(5), 607–615.

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