



‘You didn’t take Lucy’s skirt off’: The effect of misleading information on omissions and commissions in children’s memory reports

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Purpose. The current study explored how misleading information affects children’s omissions and commissions over time.

Method. Fifty-nine younger ($M_{\text{age}} = 4.16$) and fifty-nine older ($M_{\text{age}} = 9.44$) children were instructed to remove three pieces of clothing from a puppet. Half of them were provided with false evidence that they had removed only two items, while the other half were provided with false evidence that they had removed a fourth piece of clothing. In three neutral interviews separated by 1-week intervals, children had to report which pieces of clothing they had removed.

Results. Overall, omission and commission errors significantly decreased over time, although this pattern was more pronounced for omission errors. Younger and older children were equally likely to make omission errors, whereas commission errors were more typical for younger than for older children. Also, we found that commission errors more readily occur than omission errors.

Conclusion. Even when children’s memory reports pertain to an event in which they actively participated, misleading information may elicit omission and commission errors, with especially the latter category being very persistent over time.

Although many studies show that misleading information can elicit memories for details of an event that were not present (i.e., commission errors; Loftus, 2005), little is known about the effect that misleading information may have on omission errors (i.e., leaving out details). Obviously, the latter issue bears relevance to those legal cases (e.g., child sexual abuses cases) in which perpetrators repeatedly told their victims that certain events did not happen. With such cases in mind, the question arises to what extent children consistently exclude accurate details from their reports when they have been presented with misleading information. Our study addressed this question. Thus, we were particularly interested in the effect that misleading information may have on the course of omission errors over time.

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Studies in which children are exposed to misleading information show that many children tend to include such information into their subsequent reports (e.g., Bruck, Ceci, Francoeur, & Barr, 1995; Ceci, Ross, & Toglia, 1987; Poole & Lindsay, 1995). These studies typically rely on the misinformation paradigm (see Loftus, 2005). Specifically, children experience or witness an event and then receive misleading information (i.e., misinformation) about the event in the form of, for example, suggestive questions. Following this, they are instructed to recall the event as detailed as possible. The upshot of these studies is that a non-trivial percentage of children comes to accept the misinformation and reproduces it as though it was part of the original event (e.g., Bruck, Ceci, & Hembrooke, 2002; Sutherland & Hayne, 2001). For example, in the Bruck *et al.*'s (1995) study, children visited a paediatrician and then half of them received misleading information about the paediatrician. Children who had been given this information more readily made false allegations about his behaviour than children who had not been exposed to the information. Furthermore, studies indicate that this misinformation effect decreases with age, with younger children being more susceptible to misinformation than older children and adults (Saywitz, 1990; Sutherland & Hayne, 2001).

Although studies have repeatedly demonstrated that it is relatively easy to contaminate both adults' and children's memory with misleading information such that commission errors (e.g., falsely reporting a yield sign) occur, few studies have looked at whether misleading information may create persistent omission errors (i.e., consistently leaving out details) in memory reports (see Wright & Loftus, 1998). Nevertheless, both from a theoretical and practical point of view, this issue is relevant. From a theoretical perspective, it is informative to know whether suggestions can make memories less accessible or memory details less likely to be reported and if so, whether this is a stable effect evident over repeated testing sessions. From a practical perspective, the issue of omission errors in reports bears significance to those legal cases (e.g., sexual abuse cases) in which perpetrators told their victims that an event (e.g., abuse) did not happen, when in fact it did. The practical significance of this issue has also been noted by Williams, Wright, and Freeman (2002) and Zajac, Gross, and Hayne (2003).

Williams *et al.* (2002) examined whether incomplete misleading information can promote children's omission errors. Specifically, in their studies, child participants took part in an interactive event. After this, half of them were presented with post-event information excluding a specific scene of the event. On a subsequent test, they were asked to report what they had seen. Results showed that children who had been given the incomplete information less frequently claimed to have seen the specific scene than control children who were not presented with the incomplete post-event information (Williams *et al.*, 2002; for similar results with adult participants see Wright, Loftus, & Hall, 2001). Children's memories of a scene were less likely to be reported when the particular scene was omitted during the presentation of the post-event information.

Whereas the Williams *et al.* (2002) and Wright *et al.* (2001) studies focused exclusively on omission errors, Pezdek and Roe (1997) examined children's propensity for making omission, commission, and change errors. In their study, 4- and 10-year-old children were touched in a certain way or not touched at all. Next, they were presented with information that they had not been touched when in fact they had (i.e., omission suggestion), that they had been touched when in fact they had not (i.e., commission suggestion), or that they had been touched in a different way (i.e., change suggestion). Children's memories could be easily changed, but commissions or omissions were less likely to occur.

Candel, Hayne, Strange, and Prevo (2009) also examined how misleading questions affect omissions and commissions in children's reports. In their study, children had to listen to a class presentation about China. Three days later, they were asked suggestive questions which consisted of three types: questions suggesting that certain details were mentioned when in fact they were not (commission suggestion), questions implying that some details were absent (omission suggestion), and questions suggesting that details were presented differently (change suggestion). The next day, children were presented with a recognition task that also included items referring to the information relating to the suggestive interview. As was the case in Pezdek and Roe's (1997) study, children were more likely to show change errors than omission and commission errors. Also, there was no statistical difference between the proportion of children who made a commission error and the proportion of children who exhibited an omission error (see, for a similar pattern in adults, Merckelbach, van Roermund, & Candel, 2007).

Most studies cited above have two limitations. First, the majority of them relied on a single follow-up test to determine omission and commission errors. Second, so far, no study explored the omission and commission eliciting effects of misleading information on children's memory reports of an *interactive* (i.e., an event in which children themselves play an active role) and therefore probably more realistic event. For example, in the Pezdek and Roe's (1997) study, children participated in a rather passive event, i.e., they were or were not touched. Similarly, in the Candel *et al.* (2009) study, children listened to a presentation. Memory for such passive events may be vulnerable to misleading information. From a theoretical perspective, one would expect that because of the motor action implied in interactive events memory strength for this class of events is greater than for passive events (see for the action-superiority effect, Engelkamp, 1995; Engelkamp, Seiler, & Zimmer, 2004). Memories for interactive experiences are probably more in line with how children remember aversive events (i.e., touching body parts of the perpetrator). Thus, the question arises whether this type of memory is sensitive to omission and commission errors due to misleading information. With these considerations in mind, the aim of the current study was to examine whether misleading information could provoke omission and commission errors in children's reports for an interactive event over repeated interviews.

In the present study, both younger and older children were instructed to take-off three pieces of clothing from a puppet. Half of the children were provided with false evidence showing that they had removed only two items (i.e., omission suggestion), while the other half were provided with false evidence indicating that they forgot to mention one piece of clothing (i.e., commission suggestion). During three neutral follow-up interviews, children had to indicate which pieces of clothing they had removed. Crucially, different interviews were conducted by different interviewers so as to decrease children's tendency to comply with the interviewers' expectations and wishes (see Candel, Merckelbach, Luyen, & Reyskens, 2005; Meyer & Jesilow, 1996; Ost, Foster, Costall, & Bull, 2005; Ost, Ghonouie, Cook, & Vrij, 2008).

Based on Candel *et al.*'s (2009) and Merckelbach *et al.*'s (2007) findings, we expected that misleading information would yield comparable rates of omissions and commissions in children's reports. We had no strong predictions about how omissions and commissions in reports would develop after repeated questioning. This was due to two reasons. First, in fact, so far studies have only looked at the temporal pattern of commission errors and revealed mixed findings. Some studies (e.g., Bjorklund, Bjorklund, Brown, & Cassel, 1998; Otgaar, Candel, & Merckelbach, 2008) show that children's commission errors increase, while others (e.g., Ceci, Huffman,

Smith, & Loftus, 1994; Powell, Roberts, Ceci, & Hembrooke, 1999; Salmon & Pipe, 1997; Strange, Hayne, & Garry, 2008) show that children's commission errors decline or remain stable across multiple interviews. Second, some of these studies presented suggestions repeatedly (e.g., Otgaar *et al.*, 2008) while the current study uses a single suggestive manipulation. To the best of our knowledge, no study examined the course of omission rates over repeated interviews. On the basis of an extensive body of literature (e.g., see for an overview Bruck & Ceci, 1999; Ceci *et al.*, 1987), we also hypothesized that younger children would more often make omission and commission errors as a result of misleading information than older children.

Method

Participants

Participants were 118 elementary schoolchildren classified as younger ($N = 59$, $M_{\text{age}} = 4.16$, $SD = 0.36$, range = 4–5) or older ($N = 59$, $M_{\text{age}} = 9.44$, $SD = 0.70$, range = 8–11) children. Children's teachers and parents provided informed consent. All children received a small present for their participation. The study was approved by the Standing Ethical Committee of the Faculty of Psychology and Neuroscience, Maastricht University.

Materials

Puppet

An 80 cm tall puppet, named Lucy, was used in our study. This puppet wore pink-coloured clothes (e.g., hat, skirt, shoes, pants, jacket).

Questionnaire

Children's parents received a questionnaire 1 week after the second interview. They were instructed to question their child about the experiment (e.g., 'Which pieces of clothing did you take off?').

Design

The study employed a 2 (age: younger children vs. older children) \times 2 (misinformation: omission suggestion vs. commission suggestion) \times 3 (time: Interview 1 vs. Interview 2 vs. Interview 3) mixed design with the latter being a within-subjects factor. Children were randomly assigned to the omission-suggestion ($N = 60$) and commission-suggestion condition ($N = 58$). Children were tested individually three times, each with an interval of 1 week. All interviews were recorded with a digital voice device. To minimize demand effects, each child was interviewed by three different (female) confederates on three different occasions. To counter order effects, the interviewers were pseudo-randomly assigned to each interview.

Procedure

Our study consisted of six phases. At the start of Phase 1, children were informed that we were interested in their memories of events. Next, children were instructed as follows: 'You are now going to another room, a changing room, to remove some pieces

of clothing from a puppet called Lucy. When you are done, I will ask you what you remember of this'. Then, confederate 1 asked children to remove the skirt, hat, and shoes of the puppet in the changing room and to place them next to the puppet on the table. The sequence of actions was counterbalanced across all children. When they had completed these actions, confederate 2 asked them to return to the interview room. During Phase 2, a baseline interview was conducted by confederate 2 who asked children which actions they had to perform.

At Phase 3, children received either the omission suggestion or the commission suggestion. In the omission-suggestion condition, children were told that they could not have taken off the second piece of clothing and that their memory was incorrect about this. To provide them with evidence that they did not perform this action, confederate 2 took them back to the changing room. Before they entered the room, the critical piece of clothing that they had taken off was placed back on the puppet again. Children were then told they misremembered the critical action, because the critical piece of clothing was still on the puppet and was not placed on the table.

For children in the commission-suggestion condition, the procedure was similar except for the following. When they recalled the clothes they took off, they were told they forgot to mention one piece of clothing; the jacket of the puppet. To substantiate this, children had to go back to the changing room. Before children entered the changing room, a confederate had placed the jacket on the table next to the puppet so that children were led to believe they had taken it off. The sequence and timing of the interviews were the same as those for the omission-suggestion condition.

Phase 4 consisted of the immediate post-suggestion interview (i.e., Interview 1). Specifically, children were interviewed by confederate 3 about which actions they had performed. Specifically, they were told that confederate 2 had to leave and that therefore confederate 3 had to interview them. After a 1-week interval, confederate 1 asked children to recall once more which actions they had carried out a week earlier (i.e., Phase 4; Interview 2). Finally, using a structured questionnaire, parents asked their children what the experiment was about and what pieces of clothing they removed during the experiment (i.e., Phase 5; Interview 3). When the parental questionnaires were returned, children were debriefed using ethical guidelines for false memory research with children (Phase 6; Goodman, Quas, & Redlich, 1998).

Scoring

One point was assigned to each piece of clothing that children correctly reported to have taken off. If they reported a piece of clothing semantically related to the critical items (e.g., cap, dress, boots), a point was assigned. Children made an omission error when they did not mention the critical piece of clothing *and* correctly reported the two other pieces of clothing. Furthermore, a commission error was made when children indicated that they remembered removing the jacket of the puppet *and* correctly reported the other three pieces of clothing. To ensure that children's responses were related to our manipulation and not due to other factors (e.g., forgetting), data from children who did not report the two (omission condition) or three (commission condition) other pieces of clothing correctly, were excluded from subsequent analyses.

Results

To investigate whether children spontaneously omitted or added pieces of clothing, we examined whether children correctly recollected the pieces of clothing they had to

remove. Prior to the first interview (at baseline), 95% ($N = 112$) of the children correctly remembered removing the three pieces of clothing. Results showed that in both conditions, it was quite rare that children reported nothing or only one piece of clothing. Specifically, at Interview 2, one child (1%) did not seem to recall a single piece of clothing and at Interview 3, one child (1%) said to have taken off only one piece of clothing. Only in the commission-suggestion condition, some children spontaneously added pieces of clothing (e.g., claimed that they had taken off five pieces of clothing). More precisely, two children reported to have taken off five pieces of clothing (i.e., indicating spontaneous commission): one (1%) at the first interview and the other (1%) at the third interview.

Analyses were only performed for children who correctly indicated removing the two other pieces of clothing (omission condition) or the three other pieces of clothing (commission suggestion). In total, we included 113 children from Interview 1, 113 from Interview 2, and 80 from Interview 3. The decrease in participants at the third interview occurred because only 80 parents completed the questionnaire in a correct way and returned it. To investigate whether our omission and commission suggestions were successful at each of the three interviews, we conducted chi square analyses in which we compared each condition with a control condition. For the omission-suggestion condition, our control group consisted of all children of the commission-suggestion condition in which one of the three pieces of clothing was randomly selected to be their critical item. For each of the three interviews, we found that the omission-suggestion group was more likely to omit the critical item than the control group (Interview 1: $\chi^2(1) = 27.47$, $p < .001$, Cramer's $V = .48$; Interview 2: $\chi^2(1) = 4.49$, $p < .05$, Cramer's $V = .19$; Interview 3: $\chi^2(1) = 4.55$, $p < .05$, Cramer's $V = .24$). As a further check on our data, we compared the omission-suggestion and control group with respect to the mean number of non-critical items omitted by the children at each interview separately using independent samples t tests. For none of the interviews, there were significant differences between the omission suggestion and control group in terms of omitting non-critical items (all t 's < 1 , $ps > .05$). For the commission-suggestion group, children in the omission-suggestion condition served as our control group. Since none of the control children reported to have taken off the jacket, our suggestive manipulation proved to be successful.

An additional control group ($N = 35$, $M_{\text{age}} = 7.54$, $SD = 0.61$, range = 6–9) in which children did *not* receive suggestive information was tested and compared with the omission and commission group. Results showed that children in the omission-suggestion group were more likely to omit the critical piece of clothing than the control group ($p < .05$). Likewise, commission errors were more likely to occur in the commission-suggestion group than in the control group ($p < .05$).

In the omission-suggestion condition, 45% ($N = 27$) of the children in this condition failed to mention the critical piece of clothing at Interview 1. This percentage dropped to 20% ($N = 12$) at Interview 2, and 13% ($N = 6$) at Interview 3. In the commission-suggestion condition, 66% ($N = 38$) of the children falsely reported to have taken off the puppet's jacket at Interview 1, but this percentage was smaller at Interviews 2 (55%; $N = 29$) and 3 (42%; $N = 14$). To examine the time course of children's omission and commission errors, Cochran's Q nonparametric tests were conducted. Importantly, we restricted our analyses to the 80 children that participated in all three interviews. Figure 1 shows the percentage of the 80 younger and older children who made omission and commission errors at the three interviews. Specifically, 45% ($N = 21$) of the children in the omission-suggestion condition developed an omission error at the

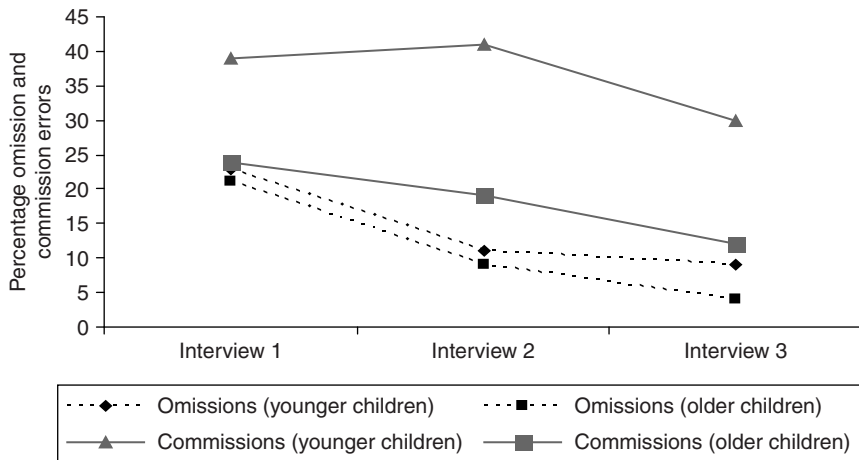


Figure 1. Percentage of young and older children's memory omissions and commissions across three interviews.

first interview and this percentage dropped significantly to 19% ($N = 9$) at Interview 2 and 13% ($N = 6$) at Interview 3 (Cochran's $Q(2) = 22.24$, $p < .001$). Also, across the three interviews, each piece of clothing was equally likely to be omitted (all $ps > .05$). Thus, there were no significant differences between target items in their likelihood of being omitted. As for the commission-suggestion condition, 66% ($N = 21$) of the children falsely reported to have taken off the puppet's jacket at Interview 1, but this percentage significantly decreased at Interviews 2 (59%; $N = 19$) and 3 (44%; $N = 14$): Cochran's $Q(2) = 7.80$, $p < .05$.

To compare younger and older children, separate chi square analyses were carried out. These analyses indicated that younger and older children were equally likely to omit the critical pieces of clothing across the three interviews (all $ps > .05$). Interestingly, a different age pattern emerged for commissions. Specifically, at Interview 1, younger children were about twice as likely to report a memory commission than the older children: $\chi^2(1) = 7.63$, $p < .01$, Cramer's $V = .36$. Similar findings were found for Interviews 2 ($\chi^2(1) = 8.65$, $p < .01$, Cramer's $V = .40$) and 3 ($\chi^2(1) = 5.13$, $p < .05$, Cramer's $V = .39$). When we performed analyses on the 80 children that participated at all three interviews, we found an identical pattern of results in the omission-suggestion condition: younger and older children were equally likely to omit the critical piece of clothing (all $ps > .05$). In the commission-suggestion condition, the same age effect appeared at all interviews: younger children were more at risk for making a commission error than older children at all interviews (Interview 1: $\chi^2(1) = 4.16$, $p < .05$, Cramer's $V = .36$; Interview 2: $\chi^2(1) = 8.72$, $p < .01$, Cramer's $V = .52$; Interview 3: $\chi^2(1) = 6.03$, $p < .05$, Cramer's $V = .43$; see Figure 1).

To test whether children's memory reports are equally vulnerable to omissions and commissions, we conducted three-way (misinformation: omission suggestion vs. commission suggestion; manipulated reporting error (omission or commission): yes vs. no; age: young vs. old) log-linear analyses at each of the three interviews. At Interview 1, we found that both younger and older children were more likely to develop a memory commission than to omit the critical piece of clothing ($LR(2) = 1.79$, $p > .05$; $\chi^2(1) = 5.02$, $p < .05$). Similar results were found at Interviews 2 ($LR(2) = 2.71$,

$p > .05$; $\chi^2(1) = 14.22, p < .001$) and 3 ($LR(2) = 0.36, p > .05$; $\chi^2(1) = 5.87, p < .05$). When we limited our log-linear analyses to the 80 children involved at all interviews, we also found that commission errors were more prevalent in younger and older children than omission errors (Interview 1: $LR(2) = 0.83, p > .05$; $\chi^2(1) = 8.64, p < .05$; Interview 2: $LR(2) = 2.88, p > .05$; $\chi^2(1) = 13.45, p < .001$; Interview 3: $LR(2) = 0.36, p > .05$; $\chi^2(1) = 5.87, p < .05$).

Finally, we examined children's patterns of responding across the three interviews. As can be seen in Table 1, there are eight such response patterns. Table 1 shows that a pattern of delayed endorsement of suggested omissions and commissions (incorrect-incorrect-correct; incorrect-correct-correct) was relatively rare. Also, persistent endorsement (correct-correct-correct) was more typical for commissions than for omissions: $\chi^2(1) = 11.63, p < .001$. Although initial endorsement (correct-correct-incorrect) seemed to be more prevalent for omissions than for commissions, this difference was not significant ($p > .05$).

Table 1. Frequency of response patterns across three interviews for omission and commission errors

Response patterns	Condition	
	Omission	Commission
Incorrect-incorrect-incorrect	27 (57)	9 (28)
Incorrect-incorrect-correct	0 (0)	0 (0)
Incorrect-correct-correct	0 (0)	2 (6)
Incorrect-correct-incorrect	0 (0)	0 (0)
Correct-correct-correct	4 (9)	13 (41)
Correct-incorrect-incorrect	9 (19)	4 (13)
Correct-correct-incorrect	5 (11)	4 (13)
Correct-incorrect-correct	2 (4)	0 (0)

Note. Incorrect, no omission/commission error; correct, omission/commission error; Data represent number of cases (percentages between parentheses).

Discussion

Our major findings can be catalogued as follows. To begin with, we found that in the omission condition, the number of children failing to mention the critical piece of clothing decreased significantly over time. Similarly, the high rates of commission errors made immediately after the suggestive interview were not stable over 3 weeks. Instead, the number of children making such errors became smaller as a function of repeated interviewing. Furthermore, across the three interviews, younger and older children's memory details were equally likely to be omitted, whereas adding details were more likely to occur in younger than older children. Also, our study showed that, on the whole, persistent commission errors were easier to elicit than persistent omission errors in children's reports.

This is the first study demonstrating that a single suggestive manipulation may have a dramatic impact on omission errors in children's reports. That is, at the first interview, 45% of the children in the omission-suggestion condition did not report an action that they performed themselves. However, we also found that this impact is less likely to persist over time. Specifically, our results showed that across three interviews, the

number of children omitting the critical piece of clothing significantly became smaller. Thus, it seems that although misleading information can lead children to omit details from their memory reports, this is not a persistent phenomenon. Still, at the third interview, 13% ($N = 6$) of the children continued to omit the critical piece of clothing.

Like omission errors, commission errors were found to decline across the three interviews. As previously noted, studies have reported mixed results with respect to commission errors and repeated interviews. Specifically, some studies (e.g., Bjorklund *et al.*, 1998; Otgaar *et al.*, 2008) showed that commission errors increase over time and with repeated interviews, while other studies (e.g., Ceci *et al.*, 1994; Powell *et al.*, 1999; Salmon & Pipe, 1997; Strange *et al.*, 2008) found that commission errors decline or remain constant after multiple interviews over time. However, in the majority of these studies (e.g., Bjorklund *et al.*, 1998; Otgaar *et al.*, 2008), participants were presented repeatedly with misleading information, whereas in our study, children were exposed only once to false suggestions. Apparently, then, this single suggestive manipulation in the commission-suggestion condition was not powerful enough to keep children's commission errors at a constant high level.

Our study clearly shows that omission and commission errors follow a uniform time course. This could mean that similar mechanisms underlie omission and commission errors. Although they may be (partly) driven by social aspects of memory (e.g., conformity; Gabbert, Memon, & Wright, 2006), it could also be that omissions and commissions are the result of profound reality monitoring errors. Indeed, studies focusing on commissions provide strong evidence that they are related to fundamental memory errors (Loftus, 2003; Otgaar, Candel, Memon, & Almerigogna, 2010). Relatedly, future studies should examine whether omissions only figure in verbal memory reports or whether they are really reflecting accessibility of memory traces. The fact that persistent omissions are more difficult to elicit than persistent commissions might imply that omissions primarily reflect social demands. Furthermore, it could well be the case that the omission and commission errors were primarily the result of social factors (e.g., compliance; Ceci & Bruck, 1993) at Interview 1 while at Interviews 2 and 3 these two types of errors were mainly driven by faulty memory mechanisms. Indeed, the finding that rates of omission and commission errors decreased significantly after multiple interviews suggests that social factors played a role in the development of these errors. Obviously, further research is needed to elucidate this issue.

We also found that over the course of repeated interviews, younger and older children did not differ in their tendency to omit critical items from their reports. This is in sharp contrast with multiple studies demonstrating that younger children are more likely to accept suggestive information than older children (see for an overview Ceci & Bruck, 1993). Although at Interview 3, young children more often failed to report the critical piece of clothing than older children, this difference was quite small (i.e., $N = 4$ vs. $N = 2$) and did not attain statistical significance. We *did* find, though, that commission errors are more prevalent among younger than older children, thereby replicating an effect that is consistently documented across a wide range of studies (see Ceci & Bruck, 1993).

Contrary to other studies (e.g., Candel *et al.*, 2009; Pezdek & Roe, 1997), children in our study participated in an *interactive* event in which they actively had to take off different pieces of clothing. Research shows that memory for self-performed actions is superior compared to memory for passive events (Engelkamp, 1995; Engelkamp *et al.*, 2004). Relatedly, information is well remembered when it pertains to the self (Symons & Johnson, 1997). So, it is reasonable to assume that children in our

study had relatively strong memories for removing the pieces of clothing. Nevertheless, their memories were not immune against the biasing effects of misleading information. Thus, even memories for interactive experiences are vulnerable to omissions and especially commissions as a result of misleading information.

Our findings are difficult to reconcile with Pezdek and Roe (1997), who found no significant differences between their omission/commission-suggestion groups and a control group in terms of omitting or adding details. We *did* find that our experimental manipulations (omission/commission suggestion) were successful relative to a control group. However, as Wright *et al.* (2001) have pointed out, Pezdek and Roe used small subsamples in each of their conditions ($N = 16$) which resulted in low statistical power. This may be the source of their null findings.

Children's reports were more likely to contain commission errors than omission errors. This seems to contradict Candel *et al.*'s (2009) study in which both types of errors were equally likely to occur. In terms of the discrepancy detection principle (Hall, Loftus, & Tousignant, 1984), our findings imply that children in the omission-suggestion condition were more aware of the discrepancy between the misleading information and their original memory record than children in the commission-suggestion condition. Thus, the first group was more likely to discard misleading information than the second group.

Our results can be interpreted along the lines of the *source monitoring framework* (Johnson, Hashtroudi, & Lindsay, 1993), which refers to the mechanisms involved in determining the sources of a particular memory. In the current study, source monitoring involves making reality monitoring decisions (i.e., internal-external decisions) in which one must decide between an internal source and an external one; e.g., 'Did interview X tell me that or did I see it myself?'). Here, memories based on an authentic experience are said to contain more perceptual, contextual, and affective details, while fabricated memories are believed to contain more cognitive information (see also Johnson & Raye, 1981). Crucially, people use these details when they have to decide whether their memories originate from a true or a fabricated experience. Children in this study had to identify the sources of their memories by evaluating whether these memories were created internally or externally. So, commission errors may arise when internally generated memories are rich in perceptual, contextual, and affective information. Alternatively, omission errors can occur when memories based on genuine experiences have little perceptual, contextual, and affective information. In our study, children had to remove three pieces of clothing. Source monitoring theory predicts that under these conditions it would be relatively difficult to elicit an omission error since children's memories are rich in sensory and contextual details and therefore hard to discount. However, in the commission-suggestion condition, source-monitoring errors would be likely to develop since these memories share the same perceptual information with the additional piece of clothing (i.e., jacket). Therefore, children might relatively easily misattribute the removal of the jacket to a genuine experience.

An alternative explanation can also account for our findings.¹ It is likely that our procedure created two types of memories: a memory of what the children did (i.e., removing three pieces of clothing) and a memory of the false physical evidence. So, in the commission-suggestion condition, children developed a commission error because they did not remember the precise actions they had to perform, but did remember that they saw the physical evidence. In the omission-suggestion condition,

¹ We thank an anonymous reviewer for bringing this explanation to our attention.

children had two explicitly conflicting memories: a memory of the actions they performed and a memory of viewing the doll depicting the opposite. This implies that omission errors are less likely to occur than commission errors as in omission errors, the parallel memory representations explicitly contradict each other. In commission errors, on the other hand, these memory representations are less contradictory.

All in all, our study demonstrates that it is far more difficult to delete a report than add to it, even when one uses a relatively strong 'delete' manipulation, i.e., a trusted person who tells the child that something did *not* happen and who supports that claim with physical evidence. We think that this type of manipulation comes close to the type of strong suggestions that is present when someone children trust tells them that they must have imagined an event. Still, one could counter that our misleading information consisted of a single trial. The issue of whether multiple 'delete' manipulations might create persistent omission errors in children's reports warrants further study. A second limitation of the current study has to do with the interactive event that we selected. By using this type of event, we hoped to elicit an outstanding experience, i.e., an experience that might be more analogous to the significant events seen in the forensic arena than passive events like listening to a presentation (e.g., Candel *et al.*, 2009). However, it would be informative to directly compare the course of omission and commission errors over time for interactive and passive experiences; a comparison that our study cannot make. Clearly, this is also an issue that warrants further study.

Another potential shortcoming of the present study is worth mentioning. As already stated, only 80 parents returned and completed the questionnaires in a correct way. Thus, there was a significant drop-out of participants from Interviews 2 to 3 ($N = 113$ vs. $N = 80$), which may have influenced our results. On the other hand, when we restricted our analyses to the 80 children that participated in all interviews, similar results were obtained as with the full sample, suggesting that the drop-out rate did not significantly affect our findings.

To recap, our study illustrates that in children's reports, commission errors are easier to elicit than omission errors. Meanwhile, during the first and second interview, omission errors were found in a substantial minority of children. Our findings bear relevance to the forensic context. While legal cases and memory research commonly focus on whether misleading information can result in the formation of commission errors, our knowledge about how misleading information can produce omission errors is limited. Admittedly, our study is not fully analogous to forensic situations. However, we believe that studies like the current one may illuminate cases in which children initially fail to report certain details of horrendous events because of misleading information of interviewers or perpetrators (e.g., Zajac *et al.*, 2003).

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