Memory: Reliability and Personality

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In June 2008, the *Second Nordic PhD Course in Legal and Investigative Psychology* was held in Göteborg, Sweden. The course was organized by *The Nordic Network for research on Psychology and Law* (NNPL) and was officially sponsored by NordForsk. In all, 11 students participated in the course (from Iceland, Norway, Finland, Germany, The Netherlands, China, Pakistan, and Sweden).

One of the sub-goals of the course was to acknowledge issues pertaining to the dissemination of scientific work to practitioners and policy makers. Hence, as a part of the examination the students wrote an individual review paper, on a self-selected topic within psychology and law.

Interestingly, the lions’ share of these papers dealt with different aspects of human memory. More specifically, issues pertaining to the reliability of memory and the link between memory and personality. In the first paper, *Else-Marie Augusti* (Norway) reflects on children as witnesses, from both a cognitive and a social perspective. Then, *Katja Björklund* (Finland) discusses a highly relevant issue pertaining to personality disorders: stalking behaviour. In the next paper *Franziska Clemens* (Germany/Sweden) provides a link between memory and personality by discussing the strategies used by lying and truth telling individuals when offering accounts about their past actions. *Brynjar Emilsson* (Iceland) then presents an up to date review on ADHD, and – among many other factors – acknowledges the memory problems that might follow such attentional problems. In the fifth paper, *Henry Otgaar* (The Netherlands) explores the link between (a) the paradigms used for studying false memories and (b) reliability assessments done by the court. In the next paper *Farhan Sarwar* (Pakistan/Sweden) discuss what type of information eyewitnesses remember, and acknowledge the problems that might appear when researchers categorize different types of information. Then, *Saskia van Bergen* (The Netherlands) presents a provocative paper on the peril that might follow from not trusting one’s own memory. In the last paper, *Lisa Öhman* (Sweden) continues the discussion on children as witnesses, focusing on the much under-researched theme of children as ear-witnesses.

Speaking from an editing point of view, we are very impressed by the papers in this volume. They are all up to standard when it comes to forensic relevance and scientific quality, and – importantly – each paper is characterized by an accessible style of writing.

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Children as Witnesses: Cognitive and Social Considerations

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Media, professionals, and research report on children that have come to the attention of the legal system as victims and witnesses of crimes. These reports represent different views on the child in this vulnerable situation. In the present paper the main focus is on research done on children as witnesses, with a particular focus on memory in general, and memory accuracy more specifically. First, a short overview of the basics of children’s memory development will be presented, followed by research on children’s eyewitness memory. Third, research on suggestibility will be reviewed. Lastly, internal (e.g., individual difference factors) and external (e.g., social support) that might affect accuracy will be presented.

Memory Development

In general, memory is thought to undergo tremendous development in a child’s early years of life. A large body of research has investigated the mechanisms underlying children’s memory development. Howe and his colleagues (Howe, 1995, 2002; Marche & Howe, 1995) have in a series of studies found that the ability to retain memories over time is developing during early childhood, and thus enabling children to better recall previously experienced events. Taken as a whole, the research that Howe and his colleagues have conducted has shown that children seem to have more difficulties storing information than retrieving already stored information (Courage & Howe, 2004).

The trace integrity theory has been presented as evidence for the findings reported by Courage and Howe (2004). In this theory it is proposed that memory traces are less stable and cohesive and thus easily disintegrate in young children’s memory, leading to less stable memories. This type of memory functioning is believed to exist in adults as well, however, the cohesiveness and stability of the traces are better enabling adults to keep information for a longer period of time in memory. There are many developmental factors that contribute to the advances in children’s storage. Some of them are increase in knowledge base and strategies such as for instance rehearsal and scripts. With experience these techniques will develop and aid memory. Moreover, specific abilities to monitor memory
and own experiences develop and improve with age, enabling children to apply acquired knowledge to evaluate their memories (Courage & Howe, 2004).

**Source monitoring.** The concept of source monitoring has been widely studied and can be characterized as “...the set of processes involved in making attributions about the origins of memories, knowledge, and beliefs” (Johnson, Hashtroudi, & Lindsay, 1993, p.3). Children’s poor memory for previous events has by some researchers been explained as a lack of accurate source monitoring (e.g., Thierry & Spence, 2002). When Thierry and Spence (2002) conducted a study on children’s ability to correctly monitor the sources of their memory, they also employed a phase consisting of intensive training in source monitoring. They found that focused source monitoring training did improve children’s ability to discern between a live experienced event and a similar video recorded event. However, rarely, if never, are children trained prior to a interview on being critical when evaluating the sources of their memory. The tendency children often have in confusing the origin of an event, leading to source monitoring errors, is therefore a great basis for errors (Ackil & Zaragoza, 1995).

When misinformation is presented, both children and adults are easily misled. That is, when suggestive information is embedded in questions that the child is being asked, the likelihood of reporting this information as remembered is high (Ackil & Zaragoza, 1995). This is thought to happen because the misinformation presented supposedly fills in the gaps in the memory of the real event (Loftus, 1979). Thus, research findings strongly suggest that children easily can be mislead and that they do so to a great degree (Leichtman & Ceci, 1995). Although these findings have been repeatedly reported in research another important, and already mentioned pattern was also revealed in these studies, namely that questions encouraging critically source monitoring bolstered memory (Ghetti, Papini, & Angelini, 2006). The rapid memory development and understanding of its applied implications is important, and in the next paragraph we turn to the investigation of children’s performance in mock forensic interviews.

**Children’s Eyewitness Memory**

Generally, young children (3-4 year olds) do perform poorer on eyewitness memory tasks compared to older children and adults (Goodman, 2005). This age difference is often explained by proneness to suggestibility (Quas, Wallin, Papini, Lench, & Scullin,
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2005), as well as source monitoring errors (Thierry & Spence, 2002). In settings related to legal testimonies the accuracy of memory reports are paramount in order to protect the defendant from false conviction and also to protect the child if the alleged abuse did in fact occur. Since the 1980s a debate has existed among researchers about children’s credibility as witnesses and the validity of their memory reports (Goodman, 2006). Several approaches have been taken to investigate children’s memory for different types of events. Everyday, mundane experiences, as well as emotional and abuse related events have been applied experimentally.

In Goodman and colleagues’ (Goodman, Batterman-Faunce, Schaaf, & Kenny, 2002) study the goal was to investigate the robustness of children’s memory for a mundane lab experiment that they previously had participated in. The event in question had happened 4 years earlier when these children were 3 and 6 years old. The researchers found that generally, for both the younger and older age groups, the memory for the event was quite poor. This was not surprising because the event was not particularly significant and memorable in nature and since the delay was extensive. However, more importantly, misleading and suggestive questions regarding abuse were robustly resisted (Goodman et al., 2002). This shows how certain types of events seem to be regarded also by children as too special to be remembered unless it actually happened. This indicates that when something extraordinary is suggested children are less willing to agree with the interviewer. Although the children participating in Goodman et al.’s (2002) study made very few commission errors a few statements could have been of concern in forensic settings, as they easily could have been interpreted as indication of abuse. However, even if the utterances alluding to abusive experiences could have made great impact on a decision in court, these statements might as well be due to children’s less eloquent and elaborate language as to commission—an important consideration to keep in mind.

Thus, when conducting interviews with children as witnesses it is important to keep their weaknesses in mind, as well as their strengths. Next, the degree to which children comply with new information is reviewed.

Suggestibility. Pezdek and Roe (1995) conducted a study investigating the development of proneness to suggestibility and found that memory trace strength predicted the ability to resist suggestion. By virtue of manipulating the number of the to be remembered stimuli that was presented, these researchers found that more frequently presented items were better retained and less
subject to false memory. This was true for both 4 year olds and 10 year olds participating in the study and supports the theory also suggested by Courage and Howe (2004) emphasizing encoding as a critical component in strength and accuracy of memory.

Using a different design, Shapiro and Purdy (2005) looked at how forced confabulations and misinformation would affect suggestibility at a later interview (1 week delay). A main finding, important to applied forensic psychology, was that children in this study would not alter their responses unless told so by an adult. This finding was not replicated in a situation where children were exposed to a suggestive type of interview where wrong information was not overtly presented to the child. It is possible that when wrong information is presented and the child is asked to elaborate on this fictitious event, the false information will be stored in memory as correct. Time also weakened the memory in general, as already suggested in previous paragraphs, leading children in the confabulating as well as suggestive group to fill in gaps in memory with the false information.

It is important to note, however, that the research reviewed thus far does not acknowledge the effects of factors aside from memory development and functioning to influence children’s behavior as witnesses and memory accuracy. In the following paragraphs, individual difference factors and external influences on children as witnesses will be addressed.

**Individual Difference Factors and Children’s Eyewitness Memory**

*Psychopathology and Children’s Memory.* In real-life situations, when children are subject to interviewing, abuse or maltreatment is often suspected. However, the literature reviewed so far has not considered the effects trauma potentially might have on children’s memory. In the adult literature memory deficits are found in abused women as well as in adults with non-abuse trauma related past experiences (Bremner, Shoeb, & Kihlstrom, 2000; Brewin, 2003). The effects maltreatment may have on memory are not investigated to the same extent in children as in adults. One study looked at the possible relation between trauma and memory in children (Eisen, Goodman, Qin, Davis, & Crayton, 2007). The aim of this study was to further explore the association between psychopathology resulting from previous trauma and memory accuracy and suggestibility. One of the main findings in this study was that children with symptoms of psychopathology did evince poorer memory for a medical exam (anogenital). More specifically,
dissociative tendencies were related to more memory inaccuracies, whereas absence or less dissociative symptoms were not associated with memory error. Another interesting observation was that sexual and/or physical abuse was associated with greater memory accuracy (Eisen et al., 2007). This is consistent with what Alexander and colleagues (Alexander, Quas, Goodman, Ghetti, Edelstein, Redlich et al., 2005) found in a prospective study on adults sexually abused as children. Nevertheless, Eisen, Goodman, Qin, and Davis (1998) found that the more stressed, or psychologically affected children, were less able to resist misinformation. Unfortunately, not much research has been conducted concerning the relation between trauma and cognitive functioning in children, and even less specifically related to children’s eyewitness memory performance.

However, researchers have presented theories yet to be empirically tested suggesting relations between trauma, psychopathology, and memory. Eisen and Goodman (1998) suggest that children experiencing severe trauma accompanied with psychological distress, will be less attentive to the target event at encoding. Alternatively, it may be that it is not memory or cognitive factors per se that influences the child’s performance when interviewed, but rather that the interview situation in itself causes stress and decreases accurate responses and make the child confused and inattentive to the questions. This last hypothesis would be more plausible given the findings reported by for instance Alexander et al. (2005). Thus, individual and situational differences seem to play a role in how children respond to questions about past events.

**Attachment.** Stressful and threatening situations are highly likely to activate the child’s attachment system (Bowlby, 1969), thus the parent’s attachment working model might be of particular importance in children’s coping and memory for the stressful event. A large amount of studies have investigated the relation between parental attachment and memory for stressful situations (often medical procedures). The findings seem to be uniform. Parental attachment influences distress shown during the medical examination as well as delayed memory for the stressful event (Quas, Goodman, Bidrose, Pipe, Craw, & Ablin, 1999). According to a study by Alexander, Goodman, Schaaf, Edelstein, Quas, and Shaver (2002) the way parents prepare their children for a stressful event (e.g., by talking about the event prior to it happening) and also respond to the child’s emotions related to that event is linked to parental attachment. Individual differences in parents’ attachment patterns can influence patterns of talking and thinking about
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stressful events and therefore also the memory for these attachment-related events. If the parent has a relational style that promotes, or encourage effective coping style in a stressful situation this may later influence the child’s memory for this event in a positive way (Quas et al., 1999). Relatively recent research has found that parent-child interaction patterns influence on children’s memory also for everyday events (e.g., Haden, Hayne, and Fivush, 1997). Supportive and responsive caregiving might prove fruitful in situations when a child has experienced something stressful or threatening as well as in situations of a more mundane everyday nature. Furthermore, Quas et al. (1999) have found that adult attachment as measured by adult attachment self report measures predicts children’s emotional reactions to and memory for a stressful medical procedure. This is interesting, as not only characteristics directly related to the child, but his or hers surroundings are influential on memory. This is also found in relation to non-familial characteristics such as interview structure.

External Factors Related to Children’s Eyewitness Memory

Repeated questioning. Several cognitive explanations for children’s greater suggestibility are discussed in previous paragraphs in this chapter. However, some aspects about the actual questioning, not necessarily directly related to cognitive abilities, have also been investigated in recent years and have been found to influence the way children respond in mock forensic interview settings and similar experimental situations (e.g., Quas & Schaaf, 2002).

Poole and White (1991) were one of the first to investigate the effects of repeated questioning on children’s performance on interviews. One main finding was that children were as accurate as adults when responding to repeated open-ended questions, but when repeatedly asked yes-no questions children were significantly more likely to change their response. Furthermore, they found that children were more likely to provide more accurate information regarding personally relevant memories, and thus not much prompting was necessary to elicit important information. However, this study did not take into account that in forensic settings children may be exposed to several interviews asking about the same event.

Quas and Schaaf (2002) conducted a study where number of interviews was manipulated. Some children were exposed to multiple interviews, whereas other children only experienced one interview. They found a main effect of age indicating that the 5 year olds in the study had more accurate memory than the 3 year olds.
Furthermore, when 3 year olds were asked repeatedly about a false event, they would produce more errors to specific questions, however, this did not replicate when 3 year olds were asked several times about true events. To the contrary, 5 year olds were very accurate responding to questions about false events by denying the occurrence of these types of happenings. This was particularly true for events suggesting body-touch. This proves to show that even when interviewers do embed misleading and suggestive information in their questions, 5 year olds are able to resist confirming this information even when asked many times. These findings were further supported in a follow up study (Quas, Malloy, Melinder, Goodman, D’Mallo, and Schaaf, 2007). Similarly to the previously described findings, older children (i.e., 5 year olds) had a more accurate memory except from when interviewed once after a 3 week delay, under which condition 5 year olds evinced more false memories than 3 year olds regarding having interacted with a man. However, important in relation to repeated interviewing was the fact that repeated interview sessions starting 1 week after the incident did result in less false memories than one, 3 week delay interview, both under highly suggestive interview conditions. In this latter study the impact of repeated questioning compared to delay is therefore carefully evaluated and reveals that reiteration even under highly suggestive conditions does not necessarily imply false assents (Quas et al., 2007). Maybe some of these findings can be explained not only by the cognitive development, but also by the environment in which the interview is conducted.

**Social support and children’s eyewitness memory.** The environment in which children are interviewed might be an important factor to consider when evaluating children’s eyewitness memory. For instance, social support may influence how children perform during an interview. This indicates that there is a gain in having a supportive adult conducting interviews in order to elicit more accurate information.

Research findings also suggest that less intimidating and more supportive environments are effective in facilitating children’s memory for stressful events. However, the question of what drives the accuracy of memory in familiar and/or supportive environments still needs to be answered. Is it that the child needs a certain level of comfort and trust to be able to focus and retrieve the accurate information, or is it reluctance to share in certain environments that drives the level of accuracy (Quas & Lench, 2007)?

Recent research applying new ways of analyzing the interview situation has underlined the importance of looking at the dyadic
relationship between interviewer and interviewee. In this line of research, using lagged sequential analysis to investigate the mutual influence child and adult has on each others behavior, Gilstrap and Ceci (2005) found that it was possible to predict children’s answering behavior directly from the child’s own past behavior. In other words, and somewhat different than findings in more traditional child witness research, adults do not necessary have that much influence on children’s tendency to acquiescence to false information introduced in an interview. Nevertheless, the way adults show support is an important factor to consider (Garven, Wood, Malpass, & Shaw, 1998). In the Garven and colleagues’ study interviewing techniques used in the McMartin preschool case was replicated to test multiple interviewing approaches when asking children about past events. Interestingly, but maybe not surprising, the main finding in this study was that the social incentive approach elicited 3 times more false reports than did simple suggestive questions by the interviewer (e.g., referring to other people’s reports, promising rewards for certain answers, etc.). These results did not reflect any significant age effects, indicating that children, at least between 3 – 6 years old, are generally equally likely to report false information in abovementioned interview situations. Thus, social support, if used in inappropriate ways can lead to false reports by children which again can result in false legal decisions.

**Conclusion**

This paper has mainly focused on the applied implications of interviewing children and how some internal and external factors to the child influence memory. In sum, the picture is still incomplete and many questions remain unanswered as to how best to understand children as witnesses and what influence their reports. However, some of the findings reported in the reviewed research do indicate some common tendencies when evaluating children in an interview situation. First, children are more vulnerable to misinformation and poorer at source monitoring than adults. Moreover, memory in general undergoes significant development throughout the preschool years and is therefore associated with how children talk about their experiences and what they tell. Nevertheless, it is important not to forget the factors that possibly influence memory and the ability to disclose sensitive and sometimes traumatic experiences. Some of the research conducted on individual differences and interview circumstances clearly
demonstrate that several sources within and external to the child witness is of importance in the forensic interview setting.

References


Stalking is often still seen as a violent crime evolving from mental illness and targeted towards celebrities. Indeed stalking did not receive much recognition until the harassment of some celebrities (e.g. Jodie Foster, Madonna) in the United States, which gained much media attention (Mullen, Pathé, & Purcell, 2000). Research has however shown stalking tends to emerge from close relationships, not strangers or sick individuals perpetrating people in highly visible jobs. (Spitzberg, 2002). Even if stalking only recently received criminal status, it soon became clear that it represented a significant social problem, rather than a small number of celebrity cases presented by the media. (Sheridan, Blaauw & Davies, 2003)

What is Stalking?

Stalking is a behaviour in which a person engages in an abnormal or long-term pattern of threats or harassment directed at a specific person (Tjaden & Thoennes, 1998). Stalking often begins with relatively harmless form of contact. If the overtures are not met or turned down the behaviour of the contact seeker might progress to more intrusive or frequent behaviour such as direct face to face encounters or waiting near the victim's home or working place. One of the major causes of concern over stalking is the fear that relatively mild forms of harassment (e.g. telephone calls, SMS or emails) might escalate into potentially dangerous behaviour (Rosenfeld 2000).

Varieties of stalking behaviour often consist of following, spying, pursuit of a target, breaking into a target’s home and trespassing. Also phone calls, emails, letters and delivered packages are common. In some cases the stalker orders goods in the victim’s name, spreads rumours about him/her and makes false announcements (Kamphuis & Emmelkamp, 2000; Tjaden & Thoennes, 1998). Of these, the most common stalking behaviours found in meta-analysis include, telephone calls, personal appearances and contact, following and surveillance (Spitzberg, 2002). Conclusively, stalking behaviour can be broadly grouped in three categories Firstly, there is communication by means of
telephone calls, letters and emails. Secondly, the contact can be by means of approaching and/or following the victim and/or maintaining surveillance. Associated behaviours can include ordering goods etc. Finally, threats, property damage and assault may accompany stalking (Nadkarni & Grubin 2000).

**Problems of Defining Stalking**

Defining the offence of stalking is undoubtedly a complex and problematic task (e.g. Kamphuis & Emellenkamp, 2000). For example, there are several different terms and labels for stalking and several definitions of stalking exist. However, even if there is lack of agreement among definitions within stalking literature most of the definitions share several key elements; an occurrence of repetitive, unwanted contact that is perceived by the victim as intrusive and/or threatening (Sheridan et al., 2003; Rosenfield, 2004).

Furthermore, there are not only differences with the respect to what behaviours comprise stalking but also with the respect to the minimum number of occasions required, stalking duration, presence and intent and/or fear (e.g. Blaauw, Sheridan & Winkel, 2002; Mullen, Pathé & Purcell, 1999; Sheridan, et al., 2003). On the other hand, because stalking does not apply to a distinct single action or actions and encompasses a multitude of activities, it may consist of no more than the targeted repetition of an ordinary behaviour (Sheridan, Davies & Boon, 2001). Conclusively, even if there has been much debate over what elements comprise stalking, it is clear that the researchers are referring to the same phenomenon and that there exists a shared literature (Sheridan, et al., 2003).

Legislative definition of stalking may be a necessary requirement for a shared public knowledge of what behaviours constitute stalking, yet legal definitions vary between countries and states (Sheridan, et al., 2003; Sheridan, Gillet & Davies, 2002). A criminal offence usually requires both criminal intent and an action. A significant proportion of stalkers, however, have no obvious criminal intentions. For example, they might try to initiate a new relationship or restore a lost one. It is the way in which they pursue their apparently benign goals that a person might find distressing and frightening (Mullen, Pathé & Purcell, 2000). Central to stalking both as a concept and offence are the victim’s perception of being stalked and rendered fearful. So it is not just the intention and the behaviour of the perpetrator that create stalking event, but how the actions are experienced and articulated by the victim – stalking is
predominately a victim defined crime (Mullen et al., 2000). Furthermore, stalking legislation has been criticised for only recognising fear as a criterion of stalking, while a significant proportion of stalking victims experience a broad range of symptoms and effects. Spitzberg (2002) presented a seven-cluster typology of stalking symptomatology labelling the clusters as: general distress (e.g. PTSD), affective symptoms (e.g. depression, anxiety), cognitive health (e.g. loss of self-esteem, helplessness), physical health (e.g. problems with alcohol, appetite, and/or sleeping), social health (e.g. deterioration in social relationships), and resource health (disruption of work or school). The seventh cluster was named as resilience referring to victims who may find productive rather than counterproductive ways of surviving victimisation (Spitzberg, 2002).

Undetected or Overpathologised?

Studying stalking and other forms of intrusive contact is complicated because the threshold between reasonable and unreasonable contact can be unclear particularly when it comes to people who know each other. Distinguishing pathological and criminal behaviour from normal in the context of failed relationship has been proved difficult, and in the end it often rests primarily on the victim’s reaction. It can be especially difficult when it comes to young adults because many of them have their first serious dating relationship during the high school or college years and therefore have little experience in distinguishing appropriate behaviour of inappropriate behaviour (Haugaard & Seri, 2004; Rosenfield, 2000).

It has been argued that much of what has come to be labelled as stalking has grown out of issues or complications involved in a normal relationship process (e.g. Emerson, Ferris & Gardner, 1998). Furthermore, it has also been feared that as a result of growing public awareness of stalking many individuals may characterise any attempt to renew a failed relationship as harassment i.e. overpathologising certain normal relational behaviour as stalking. (Rosenfield, 2000). On the other hand, many stalking victims fail to recognise or interpret the harassment they are subjected to as stalking and therefore, they might neglect to seek appropriate help or take protective measures that might be necessary. Even when stalking is accurately recognised, individual reactions vary with some victims moving to another town and other victims continuing
their lives seemingly without significant interference. (Phillips & Morissey, 2004).

Prevalence of Stalking in the Light of Studies

A number of studies have attempted to examine the actual prevalence or nature of stalking within specific groups or larger communities but it has been difficult to obtain reliable data regarding the prevalence and incidence of stalking (Meloy 1998). Prevalence rates are very much dependent on the definition of the stalking and the study sample and may be attributed to the conflicting definitions employed by various research studies or cultural differences (Dressing, Henn & Gass, 2006; Sheridan, et al., 2002). Most studies on stalking can be classified according to sampling into three groups: clinical/forensic samples, general population and, college samples. Studies indicate that 2-13 % of males and 8-32 % of females will be stalked at some point of their lives. Furthermore, when prevalence estimates were averaged across 175 samples, 25 % had experienced stalking (Spitzberg & Cupach, 2007). As a whole, the research on stalking has come to the same conclusion – the problem of stalking is pervasive.

Extensive community surveys show that the experience of having being stalked is significantly more common among younger than older respondents and young men and women were more likely to have experienced persistent and unwanted behaviour young women being particularly at risk (Budd & Mattinson, 2000; Purcell, Pathé & Mullen, 2002). It has been argued that prevalence rates among college students are even higher than in the general population due to e.g. developmental deficits in social skills or the structure of college life (Ravensburg & Miller, 2001). Furthermore, easy access to Internet puts also the younger population at heighten risk for stalking. Thus, cyberstalking is already a part of the larger stalking problem in college campuses (Finn, 2004). However the mean average prevalence rate in meta-analysis of 175 samples was only slightly higher for college population (21 %) than for general population (18 %) (Spizberg & Cupach, 2007).

What Do We Know About the Stalkers, Their Victims, and The Consequences of Stalking?

Most stalking cases involve men harassing women, but in 10-20% of the cases women are the perpetrators and men the targets. Furthermore, research has consistently shown that most victims
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(approximately 80%) know their stalkers and in most cases the stalker is a former partner. Currently stalking is often referred to as a relationship-centered phenomenon, a variant of intimate violence (Spitzberg & Cupach, 2007).

As many as half of the stalking cases involve some issuance of threat, one in three involve physical violence and about ten percent involve sexual violence (Spitzberg & Cupach, 2007). However, the concerns of risks in stalking do not only include the risk of violence even if it was the link with violence, which led to its criminalisation (Mullen et al., 2006). It is the prolonged duration causing greater potential psychological and social damage regardless of the presence or absence of actual assault (Blaauw, et al., 2002). The average duration of stalking is approximately two years (Spitzberg & Cupach, 2007). It is a long period of time living in uncertainty and fear of never knowing when the stalker will show up next time at places you frequently visit or contact you by e-mail or phone, or when the stalker will show up at your door. The victim can not know for certain if the stalking has stopped or if is it going to start again, and whether it is going to escalate to violence.

A broad range of negative social, economical, psychological, and psychiatric effects on victims have been well documented in the past 20 years (Blaauw, et al., 2002; Turmanis & Brown, 2006). It has also been shown that victims of repetitive, enduring, interpersonal violence are a particularly vulnerable group of victims. Stalking can be seen as a prime example of this kind of enduring pattern of intrusive communication causing a sense of threat in its targets (Kamphuis & Emellenkamp, 2005). Unfortunately, there is not sufficient professional help available for stalking victims as knowledge about stalking is not widespread in continental Western Europe and Northern European countries (Dressing, Gass & Kuehner, 2007). Furthermore, most stalking victims contact professionals for help only rarely but confide more often in friends and family (Tjaden & Thoennes, 1998).

Different Approaches to Understanding Stalking

Stalking research is prominently grounded on empirical studies, yet some theoretical perspectives (e.g. routine-activity theory, attachment theory) have been proposed to explain the development of stalking behaviour. Theoretical approaches to stalking are however in relatively early stages (Spitzberg & Cupach, 2007). Routine activity theory is one of the theoretical frameworks, which have been presented in order to understand stalking victimisation.
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It focuses on the contextual activities (e.g. lifestyle, daily activities, personal behaviours and characteristics) that may increase the likelihood that people will come into contact with their pursuers. The idea of routine activity theory is that when people move into the public domain their risk for victimisation increases, i.e. certain victim characteristics and actions render them more accessible and vulnerable for potential stalkers. For example, employment has been found to increase the risk of being stalked as it can offer easy access for the stalkers to pursue their victims and vice versa, the victims can not easily give up their jobs. Furthermore, because of certain routine activities typical for college years college students have been found as easy targets and therefore more likely to be stalked (Mustaine & Tewksbury, 1999; Fisher et al., 2002). Moreover, these lifestyle characteristics and routine activities could at least partially explain the high prevalence rates among college students.

Research has also tried to identify certain typologies mainly focusing on the a) type of underlying disorder, b) the type of stalker-victim relationship or c) the source of primary motivation in order to explain the stalking phenomenon. (Spitzberg & Cupach, 2007). Typologies have been criticised for not being ultimate explanations or complete theories, having important implications for understanding the stalker and the stalker’s behaviour and motivations (Mullen, et al. 2006; Spitzberg & Cupach, 2007). One of the most interesting typology has been presented by Mullen and his colleagues (1999). They studied stalking in relation to its situational context. Stalkers were distinguished into: rejected stalkers (where stalking becomes a substitute for a lost relationship), intimacy seeking stalkers (including erotomanic stalkers), incompetent stalkers (those having a below average intellect), resentful stalkers (those who stalk in order to frighten the victim) and predatory stalkers (those who prepare a violent and/or sexual attack).

Conclusions/Summing up

Various issues concerning stalking were discussed in this overview, such as the nature of stalking, defining stalking, stalking prevalence, consequences of stalking and, different approaches explaining stalking. The combined research findings show that despite the fact that studies have adopted different definitions of stalking and employed different types of samples, it is clear that stalking affects a large variety of people (Sheridan, et al., 2003). Furthermore,
distinguishing pathological and criminal behaviour from normal in the context of failed relationship has been proved difficult. On the other hand it has also been stated that: “As far as the general public is concerned it might be that stalking is like great art: they can not define it, but know it when they see it.” (Boon & Sheridan, 2002, pp. xxii).

References


Deception detection research has shown that people, both lay persons and presumed lie experts working within the legal field, are not very skilled in distinguishing between truthful and deceptive statements, with hit rates generally around the level of chance (Vrij, 2008). However, especially within legal settings it is an important issue to correctly discriminate between truth and deceit, since an incorrect judgment could have serious consequences – just imagine the possibility of a guilty suspect walking free or an innocent suspect getting wrongfully convicted. Therefore, to increase people’s ability to distinguish correctly between truth and deceit is one of the biggest challenges and concerns within legal psychology. Empirical evidence supports the assumption that a suspect’s state of mind shows in his applied strategies and these in turn show in his behaviour. Psychology of Guilt and Innocence research states that at the most basic level both guilty and innocent suspects are assumed to view an upcoming interrogation as a threat. However, the difference is that the guilty suspects fear that the interrogator may come to know what they know (that they did commit the crime) whereas the innocent suspects fear that the interrogator may not come to know what they know (that they did not commit the crime). Thus, although guilty and innocent suspects have the same goal (to be perceived as innocent), there is reason to believe that the applied strategies will differ depending on the suspect’s honesty status. To get a general idea about the different strategies applied by innocent and guilty suspects in order to appear credible during an interrogation, can help us to understand why and when innocent and guilty suspects’ responses will differ and when they will not. These response differences in turn are observable and can be used as indicators for either truth or deceit and can thus increase people’s ability to detect deceit.

Truth Tellers and Liars – Which Strategies do they Apply?

Since truth telling and lying suspects have different goals during an interrogation (truth tellers want the interviewer to know what they know, whereas liars do not want the interviewer to know what they know), it can be expected that they use different strategies in order
to achieve their goals. To find out about these applied strategies it is best to ask the suspects themselves. This is what was done in a study by Strömwall, Hartwig, and Granhag (2006). Undergraduate students committed either a mock crime or a non-criminal act and were afterwards interrogated about that act by a police officer. The truth tellers were instructed to tell the truth about what happened and the liars were told to lie about their actions. Subsequently, the suspects had about two hours time to prepare their statements before the interrogation started. The police officers were blind to the truth status of the suspects and they were free to conduct the interrogations in the manner of their choice. After the interrogation the participants were asked to write down in a questionnaire with open-ended questions the strategies they had used in order to appear both credible in their nonverbal behavior and in the verbal content. The results show that truth tellers and liars did not differ significantly in their choice of their nonverbal strategies. Liars’ as well as truth tellers’ most common nonverbal strategies were to not make any excess movements and to maintain eye contact. However, looking at the reported verbal strategies, a significant difference between truth tellers and liars was found. Liars favoured to keep the story simple strategy, while truth tellers used keep it real as their principal strategy.

These results differ partly from those in the study of Hartwig, Granhag, and Strömwall (2007). Here again adult participants committed either a mock crime (a mock theft) or a non-criminal act (to look for a hole punch in a box with stationery items) and were afterwards interviewed about it. Like in the study of Strömwall et al. (2006) the guilty suspects were instructed to lie about the fact that they had committed the mock theft as they were interrogated and the innocent suspects were told to give a truthful account of what had happened. So the main task - to act as convincingly as possible - was the same for both truth tellers and liars. All suspects were given approximately ten minutes time to prepare for the interrogation. After the interrogation innocent as well as guilty suspects were asked to answer whether or not they had had a strategy before entering the interrogation and if they had, they were asked to write this strategy down. In addition the suspects also wrote down which strategies regarding exclusively the verbal content of their statement they had applied during the interrogation. Liars’ reported strategies like stay calm and relaxed, avoid lying, firmly deny guilt, avoid incriminating details, play the role of innocence and be pleasant in order to appear credible. In contrast, truth tellers’ reported strategies like tell the truth about what happened, be calm and
relaxed and firmly deny guilt. Exclusively looking at the verbal content of their statements, liars claimed to have applied strategies like: tell a detailed story, avoid lying, tell a consistent story, have an alibi, make it seem like an unrehearsed story. In contrast, truth tellers’ most commonly reported strategies were: tell the truth like it happened and be cooperative.

Repeated Interrogations

Since there is a high likelihood that in real-life legal situations a suspect will be interrogated on numerous occasions (e.g., Miller and Stiff, 1993), the study of Granhag and Strömwall (2002) focused on the applied strategies of truth tellers and liars in the context of repeated interrogations.

The participants were undergraduate psychology students that saw a staged event which was performed by semi-professional actors. Afterwards, the students were either assigned to the truth teller group (they were instructed to recapitulate what they had seen truthfully) or the liar group (they were instructed to distort what actually happened). The participants were given extensive time to plan their story (liars) or to recapitulate the event (truth tellers) and they were informed that they would be interrogated on three occasions during the following days. The interviewers in all three interrogation situations were blind to whether or not the suspects they interrogated were telling the truth. In the first interrogation the interviewers were instructed to actively listen and encourage the suspect to tell as much as possible but not to ask her or him any questions. In the second interrogation, which took place four days later, each interrogator (not the same as in the first interrogation) received background information about the event and was told that the person s/he is going to interview could either lie or say the truth about what happened. This time the interrogator additionally received written instructions regarding the questions s/he was supposed to ask, and the order in which to ask them. During the interrogation the interviewer followed a step-wise procedure meaning that the suspect was first asked to give a free recall and after that to answer a couple of directed crime-related questions. One week after the second interrogation the suspects were asked to return to be interrogated one more time. This third interrogation was almost identical to the second one with the exception that the interrogators were now additionally allowed to ask questions of their own. After that interrogation the suspects were among other things asked to state what they had done to make their testimonies
as credible as possible. The two most common strategies among liars were to act calm, not to make too many gestures and not to give a too detailed testimony. The truth tellers instead reported strategies like to only tell things they were very confident in and to talk spontaneously.

Suspects’ Reasoning for Piping up in an Interrogation

Suspects in the U.S. that are apprehended have the rights to silence and to counsel (Miranda rights). Since equivalent rights exist in other countries, the question: “How do innocent and guilty suspects’ strategies differ when it comes to waiving or not waiving their Miranda rights?” is of interest to researchers working within the legal field.

Kassin and Nowick (2004) looked at the reasoning of truth tellers and liars to waive their Miranda rights in a situation where they think they are going to get interrogated about a mock theft they had or had not committed. Before the interrogation started a man in civilian clothing came to the suspects and introduced himself as a detective. He stated that the participant was under suspicion of recently stealing money. The detective - who was blind as to each participant’s guilt or innocence - read the Miranda rights to the suspects. Afterwards, the detective handed a waiver form and a pen to each participant in which s/he had to sign either the statement: “I am willing to make a statement and answer questions at this time.” or the statement: “I am not willing to make a statement and answer questions at this time.”. Subsequently, the participants got asked if they were sure of the decision they made. At that point the experiment was over and the participants got informed about the fact that they would not get interrogated. The results of the study show that significantly more innocent than guilty suspects waived their rights. Almost all of the guilty suspects waiving their rights articulated strategic self-presentation reasons for the waiver (e.g., “if I didn’t, he’d figure I was guilty”, “I would’ve looked suspicious if I chose not to talk”). Even though some of the innocent waivers expressed similar concerns, the majority of them explained that they waived their rights precisely because they were innocent – believing, apparently, in the power of this truth to prevail (e.g., “I did nothing wrong”, “didn’t have anything to hide”).
Do Children have Different Strategies?

Because of their lower age and developmental status children’s lies could be expected to be easier detected than adult’s lies. However, research has shown that adults are not very good at detecting children’s deception (see Vrij, 2002, for a review). To investigate this problem it could be helpful to look at the children’s strategies when lying in order to find out whether or not these differ from the ones applied by adult liars. In a study by Strömwall, Granhag, and Landström (2007) children aged 11-13 years provided oral reports on their verbal as well as their nonverbal lie-telling strategies. In this study the factor “preparation” was manipulated (comparison of prepared vs. unprepared statements), so it was possible to see whether the strategies of lying children differed over these conditions. The children initially answered a 13 items Live Event Inventory questionnaire on paper which included age-appropriate events. After doing so, the children were randomly divided into two groups. The groups differed in the way that the children in the “prepared” condition got informed about the two events in the questionnaire that they would get interviewed about - one that they had experienced and one that they had not experienced. Afterwards they had a couple of minutes to prepare their statements. In contrast, the children in the “unprepared” condition merely got informed that they were to be interviewed about two events from the form (one that they had experienced and one that they had not) but they did not receive any information about which two events.

After being interviewed the children were asked to write down the strategy or strategies they had used to be successful in lying. Thereby it showed that prepared children seemed to favor nonverbal strategies over verbal strategies. Unprepared children, in contrast, reported the opposite pattern. However, these differences did not reach statistical significance. Disregarding the preparation condition, the most frequently reported verbal strategy when telling lies was to use own or other’s experiences or to add details. The most commonly reported nonverbal strategy was to stay calm.

Conclusions

Taken together, the research on the strategies liars and truth tellers apply in order to be judged as truthful has shown that liars significantly more often report the use of such strategies. Therefore, the bandwidth of strategies they apply is higher than for truth tellers. All the presented studies point in the direction that guilty
suspects try to control their behaviour in order not to leak deceptive cues. Thereby, they act on their stereotypical believes about cues to truthfulness and try to imitate the behaviour of an innocent person. **Be consistent** in the statement, **make the statement sound unrehearsd and to act calm** are only some of the applied strategies that guilty suspects reported. But on the other hand they also apply strategies that just make it easier and more comfortable for them to lie and that will therefore probably have an effect on how the interviewer is going to perceive and judge them. **Avoid lying whenever it is possible and keep the story simple** are two examples of how lying interviewees try to be judged as truthful during an interrogation. In contrast, the applied strategies reported by innocent suspects were much more homogeneous over the examined studies. Simplistically said, they trust in their honesty and therefore do not apply many strategies to be believed. However, one fact that got clear over all the studies was that innocent suspects also have a fear of not being believed and therefore they also work for making a truthful impression. **Be cooperative during the interrogation, answer spontaneously and not to make any excess movements** were strategies mentioned by innocent suspects that clearly point in the direction that they make up their minds about how not to make a suspicious impression.

Unfortunately, there only exists a small amount of research on the strategies of innocent and guilty suspects and the studies that do exist, differ strongly in their designs (e.g., differences in preparation time that the interviewees get, differences in the pre-interview training the interviewers get). Thus, although the existing studies give a good overview of what has been done, their results are hardly comparable since it is likely that the different mentioned strategies are due to the different experimental designs. However, the available results can and should nevertheless be used to improve the existing deception detection instruments. Current research efforts by Granhag and colleagues resulted in the development of a verbal interview technique that is based on the different strategies applied by truth tellers and liars (for more information about the “Strategic Use of Evidence technique” see, Hartwig, Granhag, Strömwall, & Vrij, 2005). First research findings based on the use of this new technique show promising results in terms of the obtained accuracy rates and bring us therefore one step closer to our goal of increasing people’s deception detection accuracy in general.
References


In recent years the diagnosis of attention deficit hyperactivity disorder (or hyperkinetic disorder) has increased rapidly with children and so has medication treatment, mostly with stimulants. In just a few years this condition was becoming so common that media reports in USA and other western countries portrayed this as a “bogus” disorder and worried that too many children were put on stimulant treatment. There was even discussion in the media that this was not a real medical condition but rather that there was an intolerance in the community to deal with difficult children. This lead many of the main researchers in child psychology and psychiatry lead by Russel Barkley to write an international consensus in 2002 stressing the numerous studies and data that supported the validity and severity of the disorder and the negative effect it has on those who suffer from it. In this consensus it was pointed out that "ADHD leads to impairments in major life activities, including social relations, education, family functioning, occupational functioning, self-sufficiency, and adherence to social rules, norms, and laws" (Barkley et al., 2002, p. 90). They further pointed out that research has shown that about 40% of children with ADHD drop out of school and only about 5-10% complete college. They pointed out that about 50-70% of ADHD children do not have friends, that up to 50% on them engage in antisocial activities and when they get older 70-80% of them under perform at work. This is just a fraction of the negative variables associated with ADHD. But although many found that this consensus was necessary there is a reason that the public worried about over-diagnosis and stimulant treatment. This is especially important because stimulants are easy to misuse and the long term effect on children was not fully known at this time. In all societies there are laws and protocols regarding appropriate behaviours and social interactions. In western societies children are required to attend school and in the classroom there are several rules and appropriate behaviours that require listening skills, concentrating, keeping quiet and patience. But what happens when children do not have these skills because of developmental impairment? Attention deficit hyperactivity disorder
or hyperkinetic disorder (ADHD) is characterised by symptoms of impaired attention and memory, hyperactivity, impulsivity, poor organizational skills and distractibility and affects about 5% of children in western societies (Polanczyk, de Lima, Horta, Biederman & Rohde, 2007). Most people do not realise that for these children sitting still and listen to the teachers can be extremely hard. It takes an enormous energy and self-control just to sit still for half an hour and many children are exhausted if required to concentrate for a whole day. But ADHD is a bit different from some common disorders like depression and anxiety because it is a chronic developmental disorder and does not come in episodes but is constant during childhood and adolescence and for many it continues to impair during adulthood. ADHD is also different from some common disorders in that the disorder itself does not cause negative emotions like for example depression. Depressed people feel sad, experience diminished pleasure and generally feel really bad in most if not all situations. These negative emotions and thoughts do however come in episodes and for some these episodes are persistent through the lifespan. This does however not apply to ADHD because the main problems are persistent developmental deficits in memory, concentration, impulsivity, organizing etc. The real difference here is that the problems are the inability to follow the protocols of certain settings or situations such as the classroom. So the problem is not primarily emotional. These children would probably be able to learn well in a different environment that would allow them to walk while learning and taking more brakes. The typical school environment has however no room for that and these children become disruptive for the other children and the teacher. So by changing the situation the aversive effects of the disorder can be greatly lessened. This is not to say that children and adults with ADHD do not feel bad, and research shows that they actually feel a lot worse than most, but that this is the result of the demands of the society and not the disorder itself. Many adults with ADHD can not work in situations that require people to sit still and quiet, to concentrate or remember things. Some adults with ADHD then either select a job that is more better suited for them or receive medication treatment. This is often a result of co-workers and employers that do not like working with people that can not sit still during meetings or they talk too much and too fast. So many adults with ADHD receive medications because of the demands of other people. But what do we know of ADHD? Most people have heard the term and probably think of a difficult boy that runs around in the classroom, does not obey adults and bullies other children. This is a
stereotype that probably is not that far from reality. Children diagnosed with ADHD are mostly boys and they are often difficult to handle and yes they sometimes bully other children. Many of these children are medicated and generally with stimulants such as Ritalin or Concerta. Many children with ADHD and their families also receive behaviour modifications and parental training to help them in school and at home so that they can concentrate on studying and reduce conflicts. Most people however probably do not know what happens when these children grow up and may think that this disorder just disappears during adolescence. This is actually not so because about half of these children still have ADHD in adulthood (Barkley, Murphy & Fischer, 2008). We however probably do not see adults with ADHD running around the office and climbing in curtains. This is because the symptoms change during adolescence and many adults with ADHD learn to cope with some of the symptoms using effective strategies. Adults are therefore not as hyperactive as children but their main problem is distractibility, impulsiveness, poor concentration, poor working memory and organization (Barkley et al., 2008). There are however many adults with ADHD that do not cope and receive no treatment. Many of these engage in antisocial practices and may start using drugs or misusing prescribed ADHD medications. There is no surprise that when the main problem of ADHD children and adolescents is to follow instructions, concentrate and sit still that they become frustrated of being scolded for things they can not control. Also it probably comes to no surprise to learn that some of these children show difficult behaviours in defying rules and laws of society often with violence and other criminal behaviours. Is there a surprise than that up to half of ADHD teenagers engage in antisocial behaviours and are more likely than others to experience teen pregnancy, drive to fast, have car accidents, smoke more, use more drugs and are more likely to have sexually transmitted diseases? As ADHD children and adolescents engage in antisocial and often harmful behaviours it leads us to look at how these children fare in adulthood. How common is ADHD in the adult population and how many of them engage in criminal activities? If this is a real problem with offenders and in prisons how can authorities help in treating them and help them lead a normal life?

Adult ADHD and Criminality

Studies have shown that about 25-75% of diagnosed children still have core symptoms of ADHD in adulthood (Richters et al., 1995)
and that prevalence rate for adults with ADHD is about 3-7% of the population (Fayyad et al., 2007). Barkley et al. (2008) estimate that about 5% of the adult population in the USA have ADHD. If one would convert this into numbers it would be about 15 million people in the USA, 3 million in the UK and 450 thousand people in Sweden. Several studies have found strong connection between ADHD and antisocial problems and it is well known in the literature that children with ADHD often show difficult behaviours and oppositional or conduct disorder. As was mentioned earlier ADHD does not disappear during adolescence and neither does negative behaviour. This means that many children with ADHD that engage in antisocial practices also continue this in adulthood. This does not mean that problematic behaviours are directly resulted by ADHD but it probably is not helping. There are other things that could play a part in this, for example, that disruption in the classroom leads to more drop-out from school and more difficulties within the family. This in turn would probably get children more vulnerable to anger or oppositional problems and therefore engaging in defiant behaviours. But like ADHD symptoms, antisocial behaviours also change from childhood to adulthood. Adults are no longer at the schoolyard picking on other children nor are they stealing candy from the local groceries. They are now more likely to have developed their problematic behaviours and are now becoming more antisocial and engaging in such behaviours as illegal drug use and assault and some of them end up in prison. In recent years studies have supported this and have shown that large numbers of offenders suffer from ADHD. A study by Eyestone & Howell (1994) showed that 25% of prison inmates had a diagnosable adult ADHD. Similarly, Weiss, Hechtman, Milroy & Perlman (1985) found that 23% of adults with ADHD met criteria for antisocial personality disorder. A recent study in Iceland showed that approximately 50% of prison inmates had symptoms of ADHD during childhood and about 30% were symptomatic as adults (Gudjonsson, Sigurdsson, Bragason, Newton & Einarsson, 2008). Further studies have shown a large prevalence of ADHD within offender populations. A study by Semiz and colleagues (2008) showed that 65% of male offenders with antisocial personality disorder met criteria for ADHD and another study on young male inmates (Rösler et al., 2004) showed up to 45% prevalence rate of ADHD. A study by Rasmussen, Almvik & Levander (2001) found that about 46% of Norwegian prison inmates had ADHD. Further studies highlight the connection between ADHD and antisocial behaviours. A study by Satterfield and colleagues (2007) showed that, compared to controls, adults
with ADHD had higher arrest records, convictions and incarceration rates. Torgersen et al. (2006) found that adults with ADHD had high rates of criminal behaviours, drug abuse and antisocial personality disorder. In a large study (The UMASS study), (Barkley et al., 2008) it was found that compared to both controls and clinical samples, adults with ADHD had significantly higher rates of shoplifting, stealing without confronting the victim, breaking and entering, assaults with fists, carrying an illegal weapon, being arrested and sent to jail. The same trend was found in another large study (The Milwaukee Study) as compared to a community control group, adults with ADHD had higher rates of breaking and entering, assaulting others with fists and with weapons, carrying illegal drugs, stealing, carrying and selling illegal drugs, engaging in disorderly conduct and had more arrests and were jailed more often (Barkley et al., 2008). These studies also found that adults with ADHD were more likely to use marijuana, smoke more cigarettes, and drink more. So it is clear that there is a strong association between adult ADHD and a wide variety of antisocial practices and that large number of offenders and prison inmates have ADHD symptoms that impair them in daily life.

**Treatment of ADHD and Criminality**

Although prescriptions for ADHD medications have increased rapidly few adults receive any psychological treatment specific for ADHD. In fact if one looks at the numbers of adults (and children) with ADHD it seems that media reports of that too many are on medication is just a myth. In fact, it seems that only a small portion of those with ADHD receive any treatment for their symptoms (Kessler et al., 2006). The story is still worse regarding psychological treatment opportunities for adults with ADHD. In Europe, adults with ADHD receive almost no psychological treatment specifically for ADHD (Fayyad et. al., 2007). Similarly, treatment outcome studies are only a handful and some of them limited methodologically. A literature search (Weiss et al., 2008) found only five empirical studies of psychological treatment for adult ADHD out of over 1400 articles on adult ADHD. This shows that psychological treatments are far behind psychopharmacology in treating adults with ADHD. Treatment outcomes for ADHD medications have been well documented in the literature and these medications are usually the primary treatment for ADHD. Medicines have however been subject to criticism, not just from the media as mentioned earlier but also from the same researchers that
wrote the 2002 consensus. There has been a question of limited durability of symptom reduction during follow up (MTA Cooperative Group, 2004), many core symptoms of ADHD are not reduced by medications (Safren, 2006) and these medications do not work for up to 50% of adults (Wilens, Spencer & Biederman, 2002). Recent studies have however looked at psychological interventions for adults with ADHD and results from these studies look promising. A study by Hesslinger et al. (2002) showed for example that a group treatment based on Linehan’s Dialectical Behaviour Therapy resulted in improvement in various areas. This research however lacked a control group and is therefore limited methodologically. Virta et al. (in press) found that cognitive-behavioural treatment had beneficial effects on ADHD symptoms but this study had no control group. A study by Rostain & Ramsey (2006) indicated beneficial effects of psychological treatment in addition to medications but this study also lacked a control group. In a randomized controlled study Stevenson, Whitmont, Bornholt, Livesey & Stevenson (2002) found significant decrease in symptoms, improvement in organizational skills and reduced anger for those who completed a cognitive remediation programme. The group difference was still found regarding ADHD symptoms and organizational skills during one year follow up. Safren et al. (2005) compared CBT treatment for adults with residual symptoms of ADHD on medications to controls that only received medications. This study showed that combined treatment did much better than medications alone. Not only did the combined treatment have bigger impact on specific ADHD problems but also on secondary variables such as depression and anxiety. A new study on cognitive-behavioural group treatment (Brahmham, Young, Bickerdike, Spain, & McCarten, in press) shows also good results. This study compared group therapy plus medication to a medication alone control group. Treatment was one whole day a month for three months and the results showed that the experimental group improved more than controls on measures of knowledge about ADHD (an ADHD knowledge quiz), self-efficacy (Self-Efficacy Scale) and self-esteem (Culture Free Self-Esteem Inventory). Although ADHD is common among offender population no studies have been conducted on treatments of ADHD specific treatments for this population. This is probably because adult ADHD is a fairly new concept in the literature and that prison authorities and scientists have not specifically addressed this until recently. Treatment of ADHD in prisons is also difficult because the principal treatment is stimulant medications (e.g. amphetamines, Ritalin) and these drugs are
popular for drug abusers. So drug treatment has been difficult to implement but recently other medications such as atomoxetine has been showing good promise in treating ADHD (Adler, Spencer, Williams, Moore & Michelson, 2008).

**Discussion and Implications**

What we know now is that ADHD is not only common among children but that it persists into adulthood. We also know that about 3-7% of the adult population in western countries have ADHD symptoms that impair them in daily life. These are large numbers of people and few get medical treatment for this and almost no one receives psychological treatment for ADHD. We know now that ADHD is common among offenders and that up to half of prison inmates suffer from ADHD. This is extremely important information for prison authorities and decision makers within the judicial system and should lead to changes in screening procedures and treatment offers for offenders. Reflecting on ADHD symptoms it is clear that treatment should be less of a lecture type and more open and active because adults with ADHD have difficulties in concentration and attention. Treatment should also emphasize on ADHD symptoms such as improving attention and memory and helping people organize in addition to working with empathy and social skills training. In light of the situational emphasis on ADHD treatment should be validated not merely by looking at symptoms but impairment in daily life and quality of life. This is important for ADHD because research has shown that on average ADHD symptoms only predict up to about 25% of impairment in daily functioning (Gordon et al., 2006). Other factors are therefore more important in evaluating treatment effectiveness, specifically factors that lead to impairment and lessen the quality of life for the individual. So just by measuring ADHD symptoms you could miss out on important factors that are actually more important than decreasing symptoms. An example is a person with memory problems, who receives treatment resulting in that his memory problems do not longer impair him in daily life. But do we know if the treatment is really working on memory? The patient may either be gaining improvements in memory at a neurological level or he/she may in fact just have learned ways to remember things better because he or she has learned effective skills to organize better. So the treatment may either be improving memory or helping the patient cope with impairments in memory. It is however likely that by just measuring symptoms that you could miss out on other things
that are directly the results of treatment. So you could feel less impaired and have gained increase in quality of life although your memory has in fact not improved. This is important because at the end of the day, the primary purpose of psychological treatments is to help people feel better and to decrease things that impair them in life. Since studies on treatments for adults with ADHD are few, prison authorities would spend their money well in the long run by doing treatment studies because the cost-effectiveness on doing evidence based practice could be enormous. But doing research and treatment is not enough because without appropriate screening process, prison authorities could either miss out on offering evidence based treatment to those who need it or just waste money and resources on offering treatment that does not work for adults with ADHD.

References


Not all False Memory Paradigms are Appropriate in Court

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Whether children’s testimonies are applicable in legal cases has excited extensive scientific interest. That is, although children’s recall of events can appear trustworthy, a bulk of studies show that children are easily brought into remembering non-existing events, also dubbed false memories (see for an overview Loftus, 2004). Furthermore, even legal cases, as the McMartin Preschool trial, demonstrate that children can develop full-blown false memories of non-occurring traumatic events. Specifically, in this case, children for example falsely remembered watching a horse being beaten to death with a baseball bat or riding naked on a horse (see Garven, Wood, Malpass, & Shaw, 1998).

The pivotal issue in the majority of these legal cases is that children’s false memories were triggered by suggestive interviewing techniques by parents, therapists or interrogators (see Ceci & Bruck, 1993). Inspired by these sexual abuse cases, researchers have devised different methods to study false memories and altogether, these methods are used to explain children’s questionable accounts of events. More precisely, three main paradigms are used to elicit false memories, i.e., the Deese/Roediger-McDermott (DRM) paradigm, the misinformation paradigm, and the implantation paradigm. Numerous studies have shown that these paradigms can lead children to recollect details/events that did not happen.

However, one may wonder whether the above-stated false memory paradigms are equally appropriate to explain the questionable accounts of children that were the result of suggestive manipulation. In the present article, these false memory paradigms will be examined and I will question the usefulness of the above-mentioned paradigms in court. Importantly, since this review will focus on children’s false memories, studies with adults’ false memories will be discussed only when necessary.

False Memory Paradigms

In the DRM-paradigm – originally developed by Deese (1959) and revived by Roediger and McDermott (1995) –, participants have to memorize lists of thematically related words (e.g., *wet, tears, laugh, and sorrow*). Next, participants are instructed to recall/recognize
these words. Results show that participants are tended to falsely remember non-presented semantically related words, also called the critical lures (e.g., cry). A wealth of studies has concentrated on inducing false memories in adults and children using the DRM-paradigm. Brainerd and colleagues (2002) for instance focused on the developmental trend of the DRM memory illusion. Their study showed that the DRM intrusion was significantly reduced in young children compared to older children, adolescents and adults. Sugrue and Hayne (2006) also examined how children and adults would perform in the DRM-task. They as well found that children exhibited lower levels of the false memory illusion than adults. Thus, studies focusing on the DRM illusion have generally found that younger children are less likely to falsely recall/recognize the critical lure than older children and adults (but see Ghetti, Goodman, & Qin, 2001).

While false memories induced by the DRM paradigm typically develop spontaneously (see Brainerd, Reyna, & Ceci, 2008) –i.e., due to internal processes-, false memories evoked by the misinformation and implantation paradigm evolve due to the provision of suggestive information. A classical misinformation experiment involves three stages. First, participants have to view a certain scene (e.g., man drinking a Coke). Then, they are exposed to suggestive information (i.e., misinformation) about this event (e.g., man drinking a Pepsi). Finally, when participants are instructed to recall what they have seen, about one-third of the participants is completely convinced having seen the misinformation. However, although the statements of the participants can appear quite compelling, one could ask themselves whether the participants are truly convinced or whether they say (i.e., compliance) they are convinced. Indeed, solving this issue requires further investigation.

Loftus, Miller and Burns (1978) were the first demonstrating this misinformation effect. They led participants view an automobile accident at an intersection with a stop sign. Half of the participants were told that the traffic sign was a yield sign. When they were instructed to state which sign they originally witnessed, participants tended to claim to have seen a yield sign. Interestingly and in contrast with the DRM illusion, the misinformation effect decreases with age with younger children being more prone for suggestive information than older children and adults (see Saywitz, 1990; Sutherland & Hayne, 2001).

One crucial point, however, is that the DRM and misinformation paradigm are focused upon false memories for details (e.g., critical lure, yield sign), while in legal cases children more often falsely
remember entire events (Ceci & Bruck, 1993; Garven et al., 1998). Therefore, the crux of the implantation paradigm is the insertion of entire fictitious events into memory. More precisely, in this paradigm, participants are presented with narratives and/or photographs describing that certain events happened to them in their childhood. However, unbeknownst to them is that one of these narratives/photos is fabricated and refers to a non-experienced event. Then, during multiple interviews, they are encouraged to report as much as they can remember about these events. Studies show that many people fall sway for these suggestions and falsely assent to these narratives.

For example, Loftus and Pickrell (1995) presented participants with a false narrative indicating that they had been lost in shopping mall in their childhood. Across two interviews, participants had to report everything they could remember about the events. Results showed that 25% (n=6) of the participants falsely remembered being lost in a shopping center in their childhood and reported additional details of the non-existing event.

Since then, a wealth of studies has been conducted showing that people can falsely remember an enormous variety of events ranging from plausible (e.g., taking a hot air balloon ride; Wade, Garry, Read, & Lindsay, 2002) to implausible (e.g., being abducted by a UFO; Otgaar, Candel, Merckelbach, & Wade, in press). Moreover, these studies have shown that people more readily develop false memories for a plausible (e.g., lost in a shopping mall) than an implausible event (e.g., receiving a rectal enema; Pezdek, Finger, & Hodge, 1997; Pezdek & Hodge, 1999; but see Otgaar et al., in press; Strange, Sutherland, & Garry, 2006) and for a negative (e.g., being accused for copying off; Otgaar, Candel, & Merckelbach, 2008) than a neutral event (e.g., moving to another classroom; Otgaar et al., 2008; Porter, Taylor, & ten Brinke, 2008). Crucially, similar to the misinformation paradigm, children are more likely to give rise to an implanted false memory than adults.

Although all three false memory paradigms are involved in false memory formation, the DRM memory illusion is induced by semantic networks, whereas false memories produced by the misinformation and implantation paradigm are the result of age-related changes in the acceptance of suggestive information. In the next section, theoretical accounts of false memories are discussed and the difference between suggestibility and semantic networks will be highlighted.
Theoretical Accounts

Theoretical accounts for false memories have been provided by the Fuzzy Trace Theory (FTT; Brainerd et al., 2008) and the source monitoring framework (Johnson, Hashtroudi, & Lindsay, 1993). According to the FTT, memories are stored along two traces, i.e., gist traces that contain semantic information and endure long in memory and verbatim traces which process surface information and details and persist much shorter in memory than gist traces. FTT predict that false memories are predominantly based on gist traces.

With respect to the DRM paradigm, false memories evolve because learning a list of related words (e.g., wet, tears, laugh, and sorrow) activates the shared underlying meaning of these words (e.g., cry). Hence, when tested, people erroneously recall/recognize these non-presented related words (i.e., critical lures). Since younger children have less extensive semantic networks than older children and adults, they will less likely to develop false memories for these words than older children and adults.

According to the FTT, false memories elicited by the misinformation and implantation paradigm develop since suggestive information forms verbatim traces which oppose the original information (Brainerd & Reyna, 2002). Because of the fact that younger children rely more on verbatim traces, younger children will more likely include suggestive information into their memory than older children and adults (but see Brainerd et al., 2008).

Another theoretical framework to explain the formation of false memories is source monitoring (Johnson et al., 1993). According to the source monitoring framework, people attribute different sources to their memories. When people rely on the wrong sources of their memories, a source monitoring error occurs which ultimately can lead to a false memory. Since younger children are less able to correctly ascribe their sources of memories than older children and adults, one would expect to find an age-related increase in false memory generation. As already stated, indeed, false memories as the result of suggestion show this developmental rise of false memories. However, the DRM illusion shows the opposite developmental pattern. A recent adaptation of the source monitoring framework, the activation-monitoring theory resolves this contradiction (Roediger, Balota, & Watson, 2001). According to this theory, besides inadequate source monitoring, false memories also arise due to age-related differences in spreading activation levels of semantic networks. Hence, since younger children evince
lower spreading activation levels than older children, they will likely develop the DRM memory illusion (see also Carneiro, Albuquerque, Fernandez, & Esteves, 2007).

Taken together, one can state that DRM false memories are more based on semantic networks (Brainerd & Reyna, 2002) while false memories triggered by the misinformation and implantation paradigm rely more on the acquiescence of suggested information (Bruck & Ceci, 1999). Therefore, since younger children have less evolved semantic structures than older children and adults, the DRM illusion evinces a developmental increase. At a similar time, since younger children are more suggestible than older children and adults, false memories are more prevalent among younger than older children and adults. However, at this point one may wonder whether legal cases in which children developed suggestion-based false memories could equally benefit from the previously mentioned false memory paradigms. Therefore, in the following paragraph, we will turn to the link between results from false memory paradigms and children’s questionable accounts in legal cases.

**Legal Cases and False Memory Paradigms**

In legal cases in which children developed false memories for sexual abuse, entire fictitious event are erroneously remembered, often due to suggestive influence. With this in mind, one may notice that only the misinformation and implantation paradigm focuses on false memories which arise as the result of suggestion whereas the other paradigm concentrates on semantic-based false memories. Whether all three false memory paradigms are equally apt for explicating real life situations concerning the judicial system, has recently been debated. Pezdek and Lam (2007) limit the generalization of findings from false memory research to real world settings. Specifically, they argue that it is “inappropriate to generalize directly from false memory research that did not involve planting entire new events in memory to real world situations that do involve planting entirely new events in memory” (p. 8). However, Wade and colleagues (2007) denoted that it is justified to expand false memory findings to real world situations since “some memory illusions can occur across different stimuli and different subject groups” (p. 26; see Arnold & Lindsay, 2002; Geraerts, Arnold, Lindsay, Merckelbach, Jelicic, & Hauer, 2006; Schooler, Ambadar, & Bendiksen, 1997).

The underlying point, however, is that different precursors are responsible for false memory formation in the different paradigms. As previously stated, DRM false memories arise due to activated
semantic networks whereas false memories in the misinformation and implantation paradigm are largely determined by the acceptance of suggestive information. One may therefore question whether semantic-based false memories are akin to suggestion-based false memories. Clearly, insight in this issue could illuminate the debate about the generalization of false memory findings to real life situations.

Hence, Otgaar and Candel (2008) took up this challenge and sought to examine whether different false memory paradigm would produce similar findings. In their study, children from different age groups (5/6-years-olds to 11/12-years-olds) were involved in a DRM task. Furthermore, they were asked suggestive questions about a story using a children’s suggestibility measure (i.e., Bonn Test of Statement Suggestibility; BTSS-NL; Candel, Merckelbach, & Muris, 2000; Endres, 1997). Results showed a developmental increase in falsely remembering the critical lure, yet an age-related decline in children accepting suggestive information. Crucially, no significant relationship was found between children’s vulnerability for the DRM memory intrusion and assenting to suggestive information.

With respect to this study, two important findings emerged which are of significance for legal settings. First, Otgaar and Candel (2008) replicated a well-know pattern of results in one single study. That is, their results are in accordance with on the one hand studies showing that the DRM memory illusion is positively associated with age (Brainerd & Reyna, 2002; Sugrue & Hayne, 2006; but see Ghetti et al., 2002) and on the other hand studies showing that the susceptibility for suggestive information declines with age (Ceci, Ross, & Toglia, 1987; Sutherland & Hayne, 2001; for reviews, see Bruck & Ceci, 1999; Ceci & Bruck, 1993). Strikingly, however, they showed that semantic-based false memories and suggestion-based false memories were unrelated to each other, at least in children. Obviously, these findings have far-reaching implications for the legal domain in which children can develop suggestion-based false memories of entire events. Although different false memory paradigms have been developed, it seems that only paradigms which concentrate on suggestion can been used in legal cases in which children’s false memories were elicited by suggestive interviewing techniques.

Conclusion

The aim of the present review was to examine whether different false memory paradigms are equally useful in court. This review
Not all False Memory Paradigms are Appropriate in Court

shows that there are actually two types of false memory paradigms. That is, false memory paradigms can be divided into semantic-based (i.e., DRM) and suggestion-based (i.e., misinformation and implantation) paradigms. Importantly, studies show some opposing results with respect to age with younger children being less prone for the DRM illusion than older children and adults (Brainerd & Reyna, 2002; Sugrue & Hayne, 2006; but see Ghetti et al., 2002), yet more at risk for the incorporation of suggestive information than older children and adults. Moreover, research suggests that these semantic- and suggestion-based false memories are not associated with each other (Otgaar & Candel, 2008; but see Brainerd et al., 2008).

The above-mentioned results are of extensive practical importance since in the legal domain, children can come up with highly credible accounts of non-existing events as the result of suggestive interviewing techniques (Ceci & Bruck, 1993; Garven et al., 1998). If false memory researchers using the DRM paradigm would reflect on these children’s reports, they would conclude that children are less likely to develop false memories than adults while if researchers using suggestion-based paradigms would explain these accounts, they would assert the opposite. Clearly, it seems that a huge mismatch would exist when false memory researchers using different false memory paradigms would have to opine on such cases. However, the current review evidently shows that children’s suggestion-based false memories would not benefit from findings from the DRM paradigm since semantic-based and suggestion-based false memories are not alike.

Therefore, in legal cases in which children develop false memories caused by suggestion, only suggestion-based false memory paradigms should be used. Of course, this does not imply that findings from the DRM paradigm are not valuable to be generalized to real life settings. There are situations in which DRM findings are absolutely useful. Holliday, Reyna, and Brainerd (2008, p. 76) for example state that “False memories induced by meaning related information embody several features of forensically relevant memories. For child witnesses of domestic violence, for example, such violence is not usually a single episode but rather a series of repeated events that are substantially similar but not exactly the same [...] Likewise, in cases of repeated experiences of sexual abuse, young children because of limited gist-extraction abilities, will be less likely than older children and adults to incorporate gist-consistent events (that did not take place) in their memory reports.” Also, Wade and colleagues (2007) assert that false memory studies
using simple stimuli (e.g., words) can act as a starting point for examining more complex stimuli (e.g., autobiographical memories).

Although such examples would profit from DRM false memory findings, in the present review our focus of attention is not on such instances. This review stresses that in legal situations in which children develop false memories due to suggestion, findings from suggestion-based false memory paradigms are only valuable. In these cases, DRM false memory findings would provide contrasting explanations which could detrimentally affect these legal cases. To recap, when children falsely remember entire events through suggestive influence, only false memory findings in which suggestion was used can be employed. In these situations, not all false memory paradigms are appropriate in court.

References


Not all False Memory Paradigms are Appropriate in Court


Three basic questions in any crime investigation are: First, what happened? Second, how that happened? And third, who did this? The first two questions can be answered by knowing the action details of a crime. For example, the suspect put the gun at the victim’s head and fired. The last question can be answered by describing the suspect. For example, suspect’s physical features like height, weight, hair color, race, and what was suspect wearing? What was the color of his cloths?, etc. An eyewitness is a prime source of information about the crime scene and the only competent person to answer the above mentioned three questions. If an eyewitness provides credible answers to these three questions then further investigation is not needed. The case is solved and the task of the police is to arrest the culprit and present him before the court is sent to trial. When eyewitnesses fail in providing credible information or eyewitnesses are unavailable, secondary expertise, for example finger prints, blood tests, DNA tests, and etc, are used to find and establish the relationship between the crime and the suspect. But these only prove the presence of suspect at the crime scene. These secondary expertise do not prove that the suspect actually did commit the crime. Hence, eyewitness’s reports have a primary role in solving the crime and bringing the responsible to justice. Research literature also shows that eyewitnesses’ memory is very fragile and vulnerable to distortion and misinformation. The factors which can affect eyewitness memory are for example, eyewitness’s discussion with co-witnesses, eyewitness’s exposure to media coverage of the criminal event, eyewitness interview by an investigator and, etc. The nature of the information also affects how an eyewitness is going to remember it afterwards. What kind of information is more vulnerable to distortion and misinformation is not only a relevant question but also an important question. This question would also influence how an eyewitness would satisfactorily answer the above mentioned three questions. The aim of this paper is to discuss what type of information is well preserved as compared to the other type of information? What type of information is more vulnerable to distortion and misinformation as compare to the other type of information? This is an effort to
understand to what extent an eyewitness is capable to answer the above mentioned three questions.

Classifying Information into Different Categories

Researchers basically classify the information into two major categories called central information and peripheral information. The information which researchers consider important, essential or central is classified as central information. The information which they consider less important, not essential or peripheral is classified as peripheral information. However, researchers have different opinions about which information is important, essential or central and which information is less important, not essential or peripheral.

Visual attention model. According to the visual attention hypothesis, information of a crime scene which is about the central character that is in the focus of visual attention and source of arousal is considered central. For example, the gist of the event and its central details like color of the shirt and height of the suspect are considered central. Such information which is about a peripheral character that is not the focus of attention and irrelevant to the source of arousal is considered peripheral. For example a car parked on other side of the street (Easterbrook, 1959). Vandermaas, Hess and Baker-Ward (1993) also followed the visual attention model to differentiate between central and peripheral information but they were more explicit in a way that they operationally defined every event or object, which touched the child in some way, as central. Peripheral information was defined as events and objects which did not touch the child.

Plot relevancy model. According to this model central and peripheral information are defined in terms of plot relevancy. Information or fact related to the story that cannot be changed without changing the story is considered as central. For example, the suspect put a gun at the victim’s head. Information or facts that can be changed without changing the story are considered peripheral. For example, the suspect was wearing a blue shirt (see for example, Heuer & Reisberg, 1990).

Combining the visual attention and plot relevancy model. Some researchers have proposed a comprehensive model by combining the visual attention model and plot relevancy model. Burke, Heuer, and Reisberg (1992) divided the information into different categories at two stages. At the first stage they divided the items into central and peripheral information. At the second stage the central information was further subdivided into gist and basic level visual
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information, and the peripheral information was divided into central details and background details. Ibabe & Sporer (2004) also divided the event information at two levels. At first all information was divided into actions and descriptive details and then this information was subdivided into their respective central and peripheral categories.

**Empirical classification model.** Some researchers used a kind of empirical method to classify the central and peripheral information. Attempting this, Saywitz et al. (1991) asked 5 judges to rate the items on a 5-point scale ranging from 1 (very central) to 4 (very peripheral). Items with mean ratings below 2.9 were considered central and items with mean rating above 3 were considered peripheral and it is not clear from their research what instructions were given to the judges or were they asked to use some certain criteria or not. Heath and Erickson (1998) asked the participants to rate the importance of the actions and props in the story on a 6 point scale where 1 means very peripheral and 6 means very central. Actions and props with the mean score of 5 or more were considered central and actions and props with the mean score of 3 or less were considered peripheral and these items were then tested in the main experiment. Roberts and Higham (2002) used four police officers and one crown counsel as reviewers; these reviewers classified the information into correct relevant, correct peripheral, errors, and confabulations.

**Other models.** In their attempt to distinguish the central and peripheral items, Memon & Vartoukian (1996) showed a recording of a staged event to a group of 8 students. Then asked them to list as many details as they remember from that event and the items mentioned by four or more people were considered central and the items mentioned by less than four participants or mentioned by none were considered peripheral. Yuille & Cutshall (1986) rather than dividing the information into central and peripheral items divided the items into actions, person descriptions and object descriptions.

**Quantity and Quality of Central vs. Peripheral Information**

Do people remember central information better than peripheral information? It can be seen at the first place in the total amount of information recalled in each category. At the second place it can be seen in the amount of correct information recalled in each category. The research literature shows that people recall more central information as compared to the peripheral information (See for
example, Wessel & Merckelbach, 1997). People also recall more central information as compared to the peripheral information of the event they only have imagined. For example, Jelicic et al. (2006) asked the participants if they have seen the non-existent video footage of the murder of Dutch politician Pim Fortuyn and 63% of the participants said that they have seen the non-existing footage while only 23% could provide details of the event. When it is a matter of accuracy, as has been mentioned above, people are more accurate about information which is central to an event than the information peripheral to the event (see for example, Wessel & Merckelbach, 1997). Even if people are asked descriptive and focused questions they perform better on central questions than peripheral questions (see for example, Parker & Carranza, 1989). This is the case with children as well; children are also more accurate about central information than peripheral information (Memon & Vartoukian, 1996). Younger children (4-5 yrs) perform even poorer on peripheral items as compared to the older children (7-8 yrs) (Vandermaas, Hess, & Baker-Ward, 1993).

The Misinformation Effect on Central vs. Peripheral Information

When people are provided with misleading information about an event it may cause a memory alteration of that event. This phenomenon is called the “misinformation effect” and it can distort the memory of some certain event (Loftus, 1979). People can even include such information into their reports which they know does not belong to that event (Allen & Lindsay, 1998). This makes it even more important in forensic situations to know which kind of information is more vulnerable to misinformation. Adult studies show when people are exposed to misinformation it effects the peripheral information more than the central information (Heath & Erickson, 1998). Children studies show that children are also more susceptible to suggestions regarding peripheral information as compared to the suggestions regarding central information (Roebers & Schneider, 2000). When people are not exposed to misinformation they tend to include more information related to the central information to fill the gaps in the memory of central information (Greenberg, Westcott, & Baily, 1998). If the attention was divided during experiencing the crime situation it can also increase the vulnerability to accept suggested item as these items had been experienced (Lane, 2006).
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The Impact of Emotions on Central vs. Peripheral Information

Forensic situations are emotional in nature and it is important to understand how emotional arousal affects the memory of an event. The research literature shows conflicting results about the impact of emotions on the kind of information remembered better. The Easterbrook hypothesis (1959) claims that arousal results in the narrowing of attention. As a result, during arousal people increase the processing of central information but at the cost of neglecting the processing of peripheral information. An excellent example of attention narrowing is the “weapon focus effect”. As a result, victims focus most of the attention on the weapon and neglect the other information about the perpetrator. Many laboratory studies have successfully demonstrated the weapon focus effect (For example, Loftus, 1979). Other researchers could not find support for attention narrowing hypothesis (for example, Heuer & Reisberg, 1990). Their findings claim that arousal facilitates memory of both central and peripheral details. Still there are researchers who found partial support for attention narrowing hypothesis. For example, Wessel and Merckelbach, (1997) found no improvement in the memory of central details for the spider phobic group as compared to the control group. The control group performed better than the phobics on central information but phobic participants provided fewer peripheral details than the controls. The authors also discuss that it could be due to their definitions of central and peripheral information. Basically they confirmed the results of Burke et al. (1992). The classification used by Burke et al. (1992) was complex and if their results are observed closely it is clear that they did not find any support for enhanced performance on central information (gist and basic level visual information). Participants in arousal condition performed worse on peripheral information (details not associated with the event’s main theme) as compared to the control group. Some researchers also claim that attention narrowing is a temporary phenomenon and repeated recall can neutralize the effect of arousal and participants show better memory in delayed recall (Bornstein, Liebel, & Scarberry, 1998). Repeated recall of an experienced event results in the increased amount of central information while the amount of peripheral information decreases (Memon & Vartoukian, 1996).
Realism in Confidence Judgments: Central vs. Peripheral Information

The confidence expressed by the witnesses about the accuracy of their reported memories is another important type of evidence in the forensic process. Such judgments are called confidence judgments and are important when the court considers the correctness of the witness’ statements (Wells & Bradfield, 1999). Surveys of police, prosecutors, defence attorneys and jury-eligible samples also identify eyewitness confidence as an important indicator of eyewitness accuracy (Brewer, Potter, Fisher, Bond, & Luszcz, 1999).

The confidence–accuracy relationship is traditionally measured through a point–biserial correlation, and shows a very week relationship (Bothwell, Deffenbacher, & Brigham, 1987). However, other researchers have noted weaknesses in this calculation method and pointed out that the correlation size in a non-relevant way depends on the spread of the confidence judgments over the total confidence judgment scale (see for example, Juslin, Olsson, & Winman, 1996). These and other researchers have instead recommended the use of calibration methodology which gives a more differentiated and informative understanding of realism in confidence judgments. For detail description of calibration measures see Olsson (2000). To the author’s knowledge, unfortunately no research has been conducted so far on calibration measures for central and peripheral information.

In research where simply mean confidence scores for central and peripheral information is compared, it has been found that people are more confident on central information as compare to the peripheral information (Roberts & Higham, 2002). People are more confident on central action details as compared to the peripheral action details. In the same manner, people show high confidence for central descriptive details as compared to peripheral descriptive details (Ibabe & Sporer, 2004).

Outcome of the Findings from Different Models

A summary of general findings from all the research based on different models of classification is that eyewitnesses remember central information better then the peripheral information. This is true for children as well. Central information is more susceptible to misinformation as compare to peripheral information. People are more confident about central information then peripheral information. These are very surprising findings when we know that
different researchers are defining central and peripheral information opposite to each other. For example the color of the suspect’s or victim’s hair or shirt is considered as central information by some and considered peripheral by others. The question is how can this be possible? Basically, their results contradict each other. Then there are researchers who defined the central and peripheral information in their own fashion. The question is how this information would help us in understanding eyewitness memory? And out of the above mentioned three questions which question can be answered better by an eyewitness?

In the visual attention hypothesis, both action and descriptive details which is the focus of visual attention are considered central information, and actions and descriptions which are not the focus of visual attention are called peripheral information. This model basically distinguishes only between forensic and non-forensic information. It does not help to find answers to our question. Their results are also logical in a sense that people would definitely tell more about the asked event because they are asked specifically to describe that event. The other things most probably would be described only when necessary. Especially in forensic settings people know that it is important to tell about the criminal event and not about the house or shop in the same street. Another important point is the information we explicitly need from an eyewitness is about the crime and not about the surroundings because an investigator may visit the crime scene and get that information but he cannot recreate the crime scene again. Gestalt principle of figure ground relationship is relevant here as well. Normally, people focus more on figure details than on background details (Rock & Palmer, 1990).

In the plot relevancy model, information regarding all the actions is considered central while information regarding the description of all the characters is considered peripheral. The results from this research could be useful in answering the above mentioned three questions because they are measuring the actions and descriptive details. However, this model does not distinguish between forensically relevant information and non-forensic information. Consequently non-forensic information could add extra valence to the results. For example, researcher use crime scene videos with varied lengths which have a beginning and an end, and they are testing people for the whole video not for the crime part only.

Third, the comprehensive models used by Burke, Heuer, and Reisberg (1992) and Ibabe & Sporer (2004) are basically a blend of the plot relevancy model and the visual attention model. This is a
quite good way of understanding eyewitness memory because it provides answers to the three basic questions while taking care of the non-forensic information. The criteria used by Yuille & Cutshall (1986) is also a step in right direction, where central and peripheral items were divided into actions, person descriptions and object descriptions.

The empirical techniques used by Saywitz et al. (1991) and Heath and Erickson (1998), where they simply asked the students to rate the items on a scale to categories them into central and peripheral information sounds a very good technique in academic settings but in applied settings it may not be correct to assume that the students would be a relevant sample to ask that question. Though Roberts and Higham (2002) removed this weakness in their research and instead ask four police officers and one crown counsel to classify the information into correct relevant, correct peripheral, errors, and confabulations.

Last but not least, Memon & Vartoukian (1996) considered most reported items central while least or not reported items were considered peripheral. This research is more informative in what people report in general. As the participants were not given any specific instructions so it would be hard to assume that eyewitnesses would report the same thing because in real life settings eyewitnesses are explicitly instructed to report everything in as much detail as they remember and even if they miss to report something it has been covered through the questions asked by the investigators. So the need here is not what you report rather the need is to know how much and what kind of information is remembered better.

*A Proposed Model for Information Classification*

In the light of the above discussion it would be rational to say that the terms central and peripheral are misleading, since they are somehow directing the importance of one kind of information over the importance of other kind of information. These two terms are also not representing the information needed to find answers to the above mentioned three questions. In the authors’ opinion, first all the information provided by an eyewitness should be classified into forensic information and non-forensic information. At the second stage forensic information should be classified into actions and descriptive details and analyzed. Eyewitness’s performance on non-forensic information should not be allowed to influence eyewitness
performance on forensic information. In this way it would be possible to find answers to the three basic questions.

Conclusions

If the outcome of the above mentioned studies would be interpreted in the light of the suggested model, it would mean that people in general are good at remembering the witnessed event. However, they are only capable of describing the action details. It is difficult for people to remember the descriptive details of persons and objects. So people can answer the first two questions (what happened there? How did that happen?) very well. But it is comparatively hard to provide a credible answer to the third question (description of the suspect). In future research this model may be tested with calibration measures.

References


Andrew Evans is a forgetful young man with low self-esteem. He left the army the day after a 14-year-old girl was murdered. The girl had been cycling in the neighborhood of the barrack where Evans was stationed. Because he had been around the murder scene at the day she was murdered, Evans was asked by the police to complete a form some weeks later. He testified that he had been inside the barracks for the whole day and that three other soldiers would be able to confirm this. Two months later, two police officers interrogated him about some inconsistencies in this testimony. According to the police, Evans behaved very nervously. That night, Evans dreamt about an unknown girl. This distressed him and he decided to go to the police station to ask for a picture of the murdered girl to check whether the two images would match. The descriptions he gave about the girl did not match those of the murdered girl. During subsequent interrogations, Evans behaved agitated. The girl’s face continued to intrude his mind. He became convinced that he must have something to do with her murder. When Evans was taken to the crime scene, he recognized some houses, but he identified the location of the girl and her bike falsely. Forty-eight hours after entering the police station, he confessed to the murder.

The physician who investigated Evans stated that his memories about the murder were poor. According to the doctor, this could be explained by hysterical memory loss. During the court hearing, Evans testified that he had not left the barracks at the day of the murder. But later, he changed his testimony and stated that he might have been at the crime scene at that day. Evans was convicted for murder on April 13, 1973. This conviction was merely based on his confession. But also the statement of his doctor about his amnesia was considered. Twenty years later, Evans became more and more convinced of his innocence. Psychological tests that were administered around this time, and a reconstruction of the interrogations, made clear that his confession had been false. On December 3, 1997, Evans was acquitted.

This case was described in detail by Gisli Gudjonsson and his colleagues (1999). It is not an isolated case. There are more similar cases reported in the literature (Doyle, 2005; Scheck, Neufeld, &
Dwyer, 2001). These cases show that false confessions may result from false memories. Since the 1970s, a vast amount of research has been conducted about the origin of false memories. The American memory expert Elizabeth Loftus can be seen as the initiator. She showed in a series of innovative experiments that it is relatively easy to implant misinformation in people’s memories, which they later recall with great confidence (Loftus, 1997). For some decades, more and more research has been conducted in this field which focuses on the different types of false memories. Despite this, it is still unclear why people like Andrew Evans false confess. Would people also confess when they had not had doubt about their original memories? This paper addresses this issue of memory distrust. It aims to assemble findings from different fields of psychology to get more insight into this topic.

Memory distrust was introduced by Gudjonsson and MacKeith (1982). They defined the memory distrust syndrome as “some persons’ tendencies to be persuaded that they might have committed a crime because they do not trust their own memory due to previous memory impairment” (p. 265). More than 20 years later, Gudjonsson provided the syndrome with a broader denotation, namely “a condition where people develop a profound distrust of their memory recollections, as a result of which they are particularly susceptible to relying on external cues and suggestions” (p. 197). This latter definition will be used in the remainder of this paper when referring to memory distrust. After close examination of the scattered literature about this subject, it appears that two types of memory distrust exist: state memory distrust and trait memory distrust.

Attribution

Memory distrust does not happen to everybody. Most people believe, following their optimistic bias, that they have better memory capabilities than others (Crombag, Merckelbach, & Elffers, 2000). However, in the memory clinic this is different. A lot of research has been conducted on memory performance among the elderly and their memory judgments (Ponds & Jolles, 1996; Ponds, Van Boxtel, & Jolles, 2000). It was found that memory complaints that originated in stressful circumstances lasted longer and were deepened by concern about dementia, excessive attention for memory mistakes, and negative expectations about their own memory. The authors use subjective forgetfulness to refer to these
complaints, which corresponds with the concept of memory distrust.

Two factors seem to play a role when considering memory distrust in the clinic: age and education (Commissaris, Ponds, & Jolles, 1998). Both elderly people and lower educated people appear to blame their supposed memory complaints on internal causes, such as age, health problems, and permanent poor memory. In this case, there is a strong connection between memory distrust and an internal attribution style, which resembles trait memory distrust. Young adults and higher educated people, on the other hand, attribute their forgetfulness on external factors, such as stress, emotional problems, and lack of mental effort. These factors have a more temporal character which is closely related to state memory distrust.

In general, people are scared of forgetting information. This fear grows exponentially with age; older people believe that they have less control about memory functioning than young people. This is to some extent correct, as elderly people have more difficulty with remembering than young people (Commissaris et al., 1998). However, no direct relationship has been found between subjective memory complaints and objective memory performance (Ponds et al., 2000). This corresponds well with findings in the field of legal psychology that examined the relationship between confidence and accuracy of witnesses confronted with line-ups. This relationship is often found to be absent (Brewer, 2006; Tomes & Katz, 2000). More specifically, very confident eyewitnesses can often be wrong. But the contrary is also true, namely that eyewitness who have doubts about their memory can also make correct identifications.

**OCD**

Memory distrust as a trait is also noticeable in another domain of the clinical literature, namely that of the Obsessive Compulsive Disorder (OCD). This disorder is characterized by a chronic doubt in one’s own memory (Tolin et al., 2001). This doubt is the driving force behind compulsions. More specifically, the more often a patient checks an action (e.g., locking the door), the more familiar he/she gets with this action. As a result, these memories are less lively and detailed and therefore, more difficult to remember. This is a perfect breeding ground for memory distrust, which increases the need for checking. In short, repetitive checking causes memory distrust, which in turn causes even more checking (Van den Hout & Kindt, 2003a, 2003b). As with the elderly, this type of memory
distrust does not necessarily co-occur with objective memory problems. For example, research has shown that OCD patients are rather good in reality monitoring tasks (McNally & Kohlbeck, 1993; Merckelbach & Wessel, 2000). In other words, they can accurately distinguish between memories of actions they have actually performed and memories of actions they had only imagined. Moreover, several studies show that OCD patients have intact memory in other respects as well (Radomsky & Rachman, 2004; Tolin et al., 2001; Van den Hout & Kindt, 2004). For instance, OCD patients are better in remembering anxiety related information compared to patients who suffer from other anxiety disorders and healthy people. Nonetheless, they have more pessimistic views about their own memory than the other two groups. In other words, their subjective memory problems manifest themselves on a metamemory (i.e., beliefs that people have about their own memory) level.

**Forensic Practice**

Maneuvering people in a certain state can also influence this metamemory. This happens, for instance, during dubious interrogation techniques. The crux is that suspects are pressured by police officers to give more information (Henkel & Coffman, 2004; Inbau, Reid, Buckley, & Jayne, 2001). Research investigating the predictive value of traditional personality characteristics (e.g., neuroticism) of false confessions has not been successful so far (Horselenberg, Merckelbach, & Josephs, 2003). But memory distrust may put a different light on this issue and might turn out to be a relevant antecedent of false confessions (Gudjonsson, 2003; Gudjonsson & MacKeith, 1982). The close relationship between memory distrust and false confessions can be derived from forensic cases such as the one of Andrew Evans (Gudjonsson et al., 1999). But there is also evidence from experimental studies (Duijf, 2005; Van Bergen, Jelicic, & Merckelbach, in press-b).

In a study that examined the relation between memory distrust, false confessions, and several interrogation techniques, innocent undergraduate students were accused of exam fraud (Van Bergen et al., in press-b). To this end, five interrogation techniques were used (i.e., providing false technical evidence, providing false eyewitness evidence, minimizing, maximizing, and suggesting memory problems). It was found that suggesting memory problems had the largest impact on memory distrust. Furthermore, it appeared that people were most willing to confess when false technical evidence
was provided. Moreover, in all interrogation techniques, memory distrust scores correlated highly with false confession scores (with \( r \)s varying from .31 to .54). In all, it was shown innocent people started to have doubts about their memory after some interventions (i.e., interrogation techniques), and at the same time having a higher tendency to falsely confess.

Some false confessions can be seen as special types of pseudo-memories (Horselenberg et al., 2003). This is the case with internalized false confessions (i.e., false confessions in which people falsely believe that they have committed the crime). The scenario, on which this type of false confessions is founded, consists of a suspect who has doubts about his/her memory and which makes him/her more susceptible to suggestions made by others (e.g., police officers). This is closely related to the phenomenon of suggestibility. The standard instrument to measure suggestibility is the Gudjonsson Suggestibility Scale (GSS; Gudjonsson, 1997). This is a standardized procedure in which a narrative is read out loud to participants. Afterwards, 20 questions are asked, of which 15 are misleading questions. Subsequently, participants receive negative feedback and are asked to answer the questions again. One of the GSS parameters – the shift score – indicates the extent to which people change their answers as a result of the negative feedback.

The crucial factor regarding memory distrust is whether giving false feedback makes people more insecure. This is confirmed by research that showed a strong relationship between the extent to which people were negative about their memory (indexed by the Cognitive Failures Questionnaire; CFQ; Broadbent, Cooper, Fitzgerald, & Parkes, 1982) and their susceptibility to misleading information as indexed by the GSS (Merckelbach, Muris, Wessel, & Van Koppen, 1998). The type of memory distrust that is at hand in the GSS has both a state and trait component. The former is induced by the negative feedback, whereas the latter refers to the fact that not everybody incorporates the suggested information in their memory after receiving negative feedback. Also in the forensic setting, a combination of trait and state memory distrust occurs. An example is that of a crown witness who awoke from a coma, was subsequently interrogated in a suggestive way by the police, and finally gave an evidently false incriminatory testimony about the suspect (Merckelbach & Jelicic, 2005). In these cases, the trait component relates to the neuropsychological restraints of the witness that make it impossible to reconstruct the fact of the crime. And exactly in this situation, suggestive maneuvers – the state component – may result in pseudo-memories.
Besides providing false feedback such as in the GSS, other measures exist to elicit memory distrust. Winkielman and colleagues (1998) developed a method to manipulate the confidence of people in their memory. In their original study, participants had to recall either 4 or 12 childhood memories. In the end, they were asked whether they were able to remember large periods of their childhood. One would expect that participants who were able to recall many childhood memories would confirm this question, because the task should have them more secure. However, the opposite was true; participants gave a more negative memory judgment after completing a difficult task (e.g., 12 memories) than after an easy task (e.g., 4 memories). This effect has been replicated in several studies (Merckelbach, Wiers, Horselenberg, & Wessel, 2001; Van Oorsouw, 2006).

This is a paradoxical phenomenon because participants, who have to complete a difficult task, have recalled more than 4 memories and therefore, perform better than participants with an easy task. This finding suggests that people base their memory confidence on amount of the effort (i.e., more effort, less confidence) and not on the performance of that effort (i.e., more effort, more confidence). This can be explained by the attribution theory: participants blame the difficulty of the task on the poor state of their memory. This phenomenon is not solely relevant for lab studies; also the practical implications are clear. Imagine for instance a therapy session in which a patient has to recall many childhood memories, followed by questions like ‘what was your childhood like?’, “how did your parents react?”, leading to a negative judgment about the patient’s autobiographical memory, and in some cases, a feeling of being amnesic about the past.

Following a procedure like that of Winkielman and colleagues (1998), people can easily be made insecure about their childhood memories. This relates to state memory distrust. It should be noted that this type of distrust focuses on a specific memory aspect, namely childhood memories. But does this make people more susceptible to suggestive manipulations, such as imagination inflation? Although this would be expected based on previous research (for an overview see: Garry & Polaschek, 2000), more recent research into this topic has shown that it is not that straightforward. In two lab studies (Franssens & Peters, 2004; Van Bergen & Jelicic, 2007), the Winkielman procedure or an equivalent
procedure was followed by an imagination inflation session. During this session, students were instructed to imagine about implausible childhood events. Before and after the session, they were asked to indicate how confident they were that those and other events had taken place before their 10th anniversary. It was expected that the students, who were instructed to recall more events or who obtained negative feedback (which would make them less confident), would rate unlikely events about which they had imagined as more plausible than students who had recalled fewer events. This was, however, not found. An explanation for this might be that state memory distrust as induced by the Winkielman procedure in intelligent, healthy participants is not sufficient to make them more susceptible to suggestive manipulations.

Hekkanen and McEvoy (2002) provide an alternative explanation for the obtained results. They claim that people who have an optimistic attitude about their own memory use less stringent criteria and are, as a result, more susceptible to pseudo-memories. This would entail that people who distrust their memories are more critical towards new information and therefore set higher demands before they accept them as accurate information. As a result, memory distrust may immunize against suggestive information provided by others among healthy and intelligent people. Although this provides a plausible explanation for the above mentioned study, several other studies have shown that this relation between memory distrust and susceptibility to suggestions is not clear-cut. Research that looked into the relationship between memory distrust and misinformation incorporation has shown that people suffering from memory distrust were not critical at all and incorporated suggested information easily in their statements (Van Bergen, Beckers, Horseelenberg, Jelicic, & Merckelbach, 2008a). In another study, using different paradigms, it was found that memory distrust was not related to false memories and suggestibility (Van Bergen, Jelicic, & Merckelbach, in press-a). It should be noted that the latter two studies (Van Bergen et al., 2008a; Van Bergen et al., in press-a) both examined trait memory distrust, while the studies using the Winkielman-like procedure (Franssens & Peters, 2004; Van Bergen & Jelicic, 2007) investigated state memory distrust.

Concluding Remarks

Memory distrust seems to manifest itself within both clinical and forensic settings. This was already noticed by Gudjonsson and colleagues (1999) who claimed that “a memory distrust syndrome
makes some people susceptible to developing a false memory or confabulation” (p. 455). Accepting suggestive information was formerly trivialized as awe for authorities. Social-psychological concepts such as status, conformism and social pressure have dominated the literature since the experiments of Asch (1955). When considering Asch’s experiment with the unequal lines: if this was solely based on conformism, why did some participants rub their eyes and why did they start to sweat when they stated that the unequal lines were equal? This probably, and most likely, happened because they started to have doubts. It seems, therefore, that not the social-psychological mechanisms, but the extent to which they undermine people trust in their memory, is the decisive factor in accepting suggestive information.

To gain more insight in this, proper scales and questionnaires to measures memory distrust should be developed. The GSS, which has already been mentioned before, is a good start. Gudjonsson (2003) notices that the shift score of the GSS – which indicates the extent to which people are influenced by negative feedback – is a parameter to measure memory distrust. Furthermore, other questionnaires may help to get more insight in memory distrust. The CFQ gives, for instance, an indication of memory deficits during daily routines. It seems logical to assume that people who distrust their memory also report more cognitive failures on this questionnaire. The Squire Subjective Memory Questionnaire (SSMQ; Squire, Wetzel, & Slater, 1979) takes a closer look at the global judgments people have about their own memory. People who distrust their memory generally have a low score on this questionnaire (Van Bergen, 2008; Van Bergen et al., 2008a; Van Bergen, Brands, Jelicic, & Merckelbach, 2008b; Van Bergen et al., in press-a, in press-b). The GSS, CFQ, and SSMQ, all measure trait-like characteristics, which makes it possible to map potential relationships between memory distrust and other individual differences.

When studying state memory distrust, existing methods such as the Winkielman procedure and providing negative feedback have not had a lot of success yet. This can be explained to a great extent by the weakness of the manipulation of memory distrust. However, laboratory studies are limited by ethical constraints which make it fairly impossible to imitate for instance interrogative pressure. What can be concluded about the laboratory studies is that student populations are not preferable as they are generally more intelligent and suffer less from memory distrust.

In sum, the literature on memory distrust is very scattered and the concept is still in one’s infancy. More systematic study will
provide insight in state memory distrust and trait memory distrust. Only then, it is possible to see whether memory distrust is as an antecedent of pseudo-memories and/or false confessions. If this is established, practical tools can be developed to decrease its sometimes detrimental effect on patients and suspects.

References


Around 9:00 p.m. on March 1, 1932, the twenty-month-old son of the famous aviator Charles Lindbergh was kidnapped from his home. Several ransom notes later Lindbergh came in contact with the kidnapper’s voice on a cemetery. Without seeing him he heard the kidnapper utter some words. When they years later got a suspect, Lindbergh said in court that he recognised the defendant’s voice as the kidnapper. Lindbergh’s positive identification of the defendant by his voice almost three years after the offence was committed was accepted in court as material evidence against the defendant and the suspect was sentenced to the death penalty (McGehee, 1937).

This famous case raised questions and inspired to find out if it is possible to identify someone by the voice alone. Is it possible to recognise a one time heard unfamiliar voice after such a long time? Does the voice leave a voice-print equivalent to that of fingers?

In a case like the above, the first impression might be that of course you would remember (and would never be able to forget) the voice of the kidnapper of your own child. People’s experience of easily recognizing the voices of relatives, friends, colleges, politicians and actors have created a myth that all voice recognition is accurate and reliable (Hammersley & Read, 1996; Yarmey, 1995). However, empirical studies have shown mixed results concerning familiar voices (Bartholomeus, 1973; Ladefoged, 1980; Read & Craik, 1995; Yarmey, 1995) and that we are not even always able to identify the voices of our own family members! (Yarmey, D., Yarmey, A. L., Yarmey, M. J., & Parliament, 2001). So the question remains: Can we trust our ears?

**Earwitnesses**

Observations made by victims and witnesses are the most frequent and also often the most important evidence in criminal cases (Kebbell & Milne, 1998). In most cases the victim has seen the perpetrator but sometimes the victim has only heard the perpetrator speak. An earwitness is a witness or a victim who has heard a perpetrator but has not been able to see the perpetrator for different reasons (Yarmey, 1995), and there are many possible situations in
which this may occur. For example in criminal situations under conditions of darkness or because the perpetrator was disguised, such as hooded rape or robbery; or over the phone such as obscene phone calls, ransom demands and threatening phone calls. While eyewitness identification has been given extensive research attention, victims’ and witnesses’ memory for voices is a comparatively neglected area. Based on this, I argue that the most important application of knowing if we can trust our ears is in the legal field and therefore will this paper have a forensic perspective.

There are many factors that may have an effect on the performance of an earwitness. The familiarity with the voice, the number of voices heard, the listening duration and the time elapsed between the encoding phase and test phase are examples of factors that have been investigated (see reviews by Bull & Clifford, 1984; Yarmey, 1995). Among the relatively few studies that have been conducted within this area, almost all have studied adults’ voice memory, despite the fact that it is not unusual that also children become victims or witnesses in cases where earwitness testimony would be of great value. Unfortunately, children too are victims of obscene phone calls or phone calls for example when criminals (contemplating a break-in) call them on the phone to find out if their parents are home. A child can also be in a situation in its daily life where it overhears something in connection with a crime. In kidnapping cases, it might be the case that a child is able to identify the voice of the one that has held the child hostage.

This paper is a review of what has been found in studies on children’s ability to remember voices. Only a handful of empirical studies concerned with children’s memory for voices were found and they focus on different aspects and with variable degree of forensically relevance. The experimental methods used in the studies which will be described in some detail, show a certain degree of methodological inconsistency. I will present the findings and sum up what conclusions that can be drawn so far on children as earwitnesses. This to be able to find out what the next step should be.

**Children’s Memory for Familiar Voices**

Bartoholomeus (1973) was the first (that I have found) to examine the ability of pre-school children to identify familiar voices. Children aged 4- and 5-years old were tested on how well they could identify their classmates by listening to tape-recorded voices. All children had been tape-recorded while saying: “Hi, I go to your school. Do
you know who I am?”. Later each child was asked individually to identify the voices of their classmates. They were tested on two different days; on the first day the children were asked to try to tell the name of the person who spoke and on the next day to point to the picture of the person they thought was speaking. The results showed on average an accuracy level of 60%, but a large variability in accuracy between the children. No significant difference was found between the two different types of tests (voice naming or voice-face matching) or between the two age groups. The author suggests that, even though no comparisons were made between the children and the adults (four teachers also took part in the tests), children aged 4 and older have an adult-like ability level for recognizing familiar voices.

Children’s ability to recognize another type of familiar voices, namely the voices of cartoon characters has also been tested (Spence, Rollins & Jerger, 2002). Children 3-, 4- and 5-years-old were asked to identify the voices of 20 cartoon characters by pointing to the picture of the cartoon character that they heard talking for around 4 seconds. As a measure of the familiarity with the character each child were afterwards presented with pictures of the cartoon characters and asked to name them. Even though the performance of all three age groups of children were impressively good and well above the level of chance, age differences were found. There was a significant age-related improvement between the age of 3 and 4 years but the 4- and 5-year olds did not differ from each other. Despite age, the accuracy level were found to be higher for the more familiar characters voices compared to the less familiar characters voices.

Based on the results from these two studies it seems like 4- and 5-years old are equally well in recognizing familiar voices, and even though the 3-years-old did not perform as well as the other two age groups, the results were well above the level of chance for all age groups. This suggests that children as young as 3-years old are capable of recognizing and accurately identifying the voices of familiar persons or characters. Findings concerning familiar voices, however, often have little relevance from a forensic point of view. In most criminal situations, where the testimony of an earwitness would be of interest, the voices are unfamiliar to the witness and it is not possible to generalise findings on familiar voices to identifications of unfamiliar voices (Cook & Wilding, 1997; Van Lancker & Kreiman, 1985). Furthermore, forensically it would be of greater interest to know how well a child is capable of recognizing the voice of an adult. Knowledge on how accurately a child can
identify the voice of another child or a cartoon character has therefore limited forensic value. Therefore, what is known about children’s ability to recognize the voice of an unfamiliar adult?

Children’s Memory for Unfamiliar Voices

The recognition of unfamiliar voices has been tested in children aged 6 to 16 years and in adults (Mann, Diamond, & Carey, 1979). The participants were first presented with four different one-target items: one voice that uttered a short sentence followed by a forced choice recognition test of two voice samples. After a rest period of five minutes the participants were presented with three two-target items: two voices, one at a time, followed by a forced choice recognition test between four voice samples. For half of the participants the same utterance was spoken at both the initial exposure and at the recognition test and for the other half the sentence spoken differed between the two occasions. The overall results showed that the number of correct identifications dramatically increased between the age of 6 and 10. The 6-year olds performed at chance level whereas the 10-year olds performed on the same level as adults (overall mean correct 75%). There was a decrease in performance for 11- to 13-year olds, and a return to adult-level at the age of 14. Furthermore, the one-target items were easier than two-target items to identify and the same-utterance condition was easier than the different-utterance condition. When looking more separately at the different conditions, the only exception in performance was in the easiest condition, one-target/same-utterance items were the 6-year olds performed better than chance and the 10-year olds did not reach the level of adults.

Even though this study concerned unfamiliar voices it still has little forensic value since the testing phase was directly after the hearing phase and in a real criminal case there is a longer delay between the witnessing situation and the time when the witness is asked to identify the voice. Further, the participants were presented with a forced choice test between two or four voices, which does not reassemble how a identification would be carried out in a real criminal investigation.

In a study designed more like a real-life situation, voice memory of both children and adults about a self-experienced event were tested (Clifford & Toplis, 1996). Children aged 5- to 6; 8- to 9-; and 11- to 12-years and adults watched when two unfamiliar persons entered their classroom to look for a lost purse, one female actor that had a central role and one male actor that had a peripheral role.
Immediately after the event the participants were individually asked (among other memory tests) to try to identify the voices of the two persons that had been in their classroom. They were presented with one lineup for the female voice and one lineup for the male voice, each lineup consisted of eight voices. For half of the participants the actual target voice was present in the lineup and for the other half of participants the actual target voice was not present in the lineup. The including of the male voice lineup was a test of suggestibility because the male actor never spoke. The results showed that voice identification was poor in all age-groups but false positive errors were found to decrease with age, where the 5- to 6-year olds made the most incorrect responses and showed to be prone to make false identifications. The 5- to 6 and 8- to 9-year olds were found not to be as competent as adults while 11- to 12-year olds were more on the same level as adults.

Although this study used a more realistic situation it still differs from a real criminal situation because of the lack of delay, as mentioned before, and also because of the absence of arousal. Is it comparable to witness two actors in the safe environment of your classroom with being the witness of a real crime? Imagine yourself as a child, you are on your way home from a friend and then all of a sudden without any forewarning, you find yourself in a situation where you overhear a scary masked person threatening and beating another person. Would your heart pound very fast and would you feel aroused? Most probably you would. Could that high level of arousal have an impact on your memory of that person’s voice when asked to try to identify the voice in a voice line-up a couple of weeks later?

It is not in line with ethical standards to make children subjects in a fictitious threatening and stressful criminal situation like the one above for the purpose of examining the impact of arousal on earwitness memory. Instead, what is needed is a naturally occurring situation that is known to produce high levels of fear and anxiety in many children. One such situation is a visit to the dentist. Peters (1987) sought to test the effects of naturally occurring stress on children’s memory and therefore tested children (aged 3 to 8 years) on their memory regarding a dental appointment. One purpose was to examine children’s ability to identify the voice of both the dentist and the dental assistant that they had met at the dental appointment. The approving parent was told not to inform the child about the study. All children were paid two home visits, the first time after 24-48 hours or 3 to 4 weeks after the dental appointment and the second time once again 24-48 hours or 3 to 4 weeks after
the first home visit. At the first home visit the child was given a voice recognition test on both the dentist’s and the dental assistant’s voice. The child was presented with two lineups both consisting of five voices which they heard for around 20 seconds each. At the second home visit the child once again was confronted with a voice lineup. This time the child was asked to identify the voice of the researcher that had visited them the first time. The idea was that if stress has an effect on accuracy then the identification of the dentist and the dental assistant would be less accurate (because of the higher arousal at the dental office) compared to the identification of the researcher (being at home would produce less stress). The results showed that the overall accuracy levels did not differ significantly from chance (20%) and no effect of stress, retention interval or age were found. It seems like it was a very difficult task for the children and the absence of effects of stress and retention interval can be masked due to floor effects, since the participants showed chance responding. A mentioned possible explanation for the low accuracy level is that the voice lineups contained very similar-sounding voices because great care was taken to get voices as similar sounding as possible which is not recommended (Hollien, 2002).

Are Children in the Shadow of Adults?

Even though the focus of this paper is not on adults’ voice recognition ability it is interesting to discuss the performance of children compared to the performance of adults. It is not easy to directly compare the performance of children and adults on their ability to recognising voices since very few studies have included a child- or an adult comparison group. Studies concerning eyewitnesses and memory for the content of a situation have shown that children are capable of giving forensically relevant information but that they are not as reliable as adult witnesses (Clifford & Toplis, 1996; Davies, 1996). When looking at it more closely, children as eyewitnesses have been found to have more difficulty in matching the performance of adults when it comes to free recall with high demand on detailed knowledge such as describing the culprits facial and bodily appearance (Davies, 1996) and free description of the crime (Cole & Loftus, 1987; Saywitz, 1987), than in a task like identification which rely more on recognition. This review concerning voice identification has shown that there are developmental improvements in voice identification of unfamiliar voices in contrast to the results on familiar voices, where it was
suggested that 3-year olds performed well above the level of chance and from the age of 4 at the same level as adults. When it comes to unfamiliar voices it seems like the demands are too high for children under the age of 10, with 3 to 6 years-old performing at chance level. The results for children 11- to 13-years old are ambiguous. While one study found a decrease in performance for 11- to 13-year olds the other study found that 11- to 12-year olds performed at the same level as adults.

Children performed at chance level in the only study (Peters, 1987) where the situation resembles a real life stressful investigation and where they were presented with an unfamiliar voice and without awareness that their voice memory would later be tested and with a realistic retention interval. A suggested typical result for adults to correctly identify an unfamiliar voice only heard once and for a brief amount of time in a voice line-up is around 30% (Read & Craik, 1995). Even though it is not possible to directly compare these results to the results in experiments using children as participants, they are at least an indication that adults are not much better but might perform slightly better than children, at least better than children aged 3 to 9 years in this type of situation.

Due to the fact that children’s memory for voices is such an unexplored area there are unfortunately no established theories concerning children’s ability to recognize voices. Research has shown that infants under 6 months of age can differentiate the voice of their mother from strangers (Friedlander, 1970) and this review shows that young children are quite capable at identify familiar voices. However, why does younger children perform poorer than older children and adults when it comes to unfamiliar voices? Basic memory research has shown that prior knowledge and understanding determines to a great extent what we can and cannot remember (Gordon, Baker-Ward, & Ornstein, 2001). In brief, things we understand is better remembered (Davies, 1996). Earwitness research conducted on adults has shown that language familiarity has a positive influence on speaker identification (Yarmey, 1995). People are better at identifying a voice when the voice speaks in a language that the listener understands and are familiar with. Taken together, the content of what the voice to be remembered said may be an important factor for children. If the child does not completely understand what the voice said, the memory for the voice may be impaired. This possible explanation needs to be further investigated. Furthermore, these scarce and ambiguous results which this review shows stress the notion that to be able to reach some level of
agreement about age-differences, more research on children and adults as earwitnesses is needed.

**Summing up**

There are currently rather few studies of children’s memory for voices but the ones there are show that identification of a voice, especially if it is unfamiliar, seems to be a very difficult task for a young child. However, it is not easy to compare the conducted studies concerning children’s ability to recognise voices because of the lack of methodological consistency. Another problem is that the majority of the conducted studies have not used a design that resembles a real witness situation and criminal investigation.

So, back to the question: Can we trust our ears? The results from the reviewed studies, and especially the ones which are of reasonable forensic relevance, do not show promising results. Unlike more objective evidence, like a fingerprint, a witness “voice-print” of a perpetrator is a highly subjective and error-prone kind of evidence. However, does that mean that it has no value and cannot be trusted at all? It is difficult to answer that question based on such a meagre empirical ground. In order to gain more reliable results that can guide legal practitioners about children’s ability to act as earwitnesses, this review makes it clear that the next step should be to conduct more studies with a forensically relevant design. To rely on your ears only when identifying a person is something that we are not used to, neither as children or adults. Therefore, possible ways on how to help an earwitness to enhance the ability to accurately recognize and identify a voice also needs to be investigated. The great variability between children in their performance is interesting – why are some children more accurate? Is it something that the other children can be taught? Or can some kind of a test show how reliable a given witness is?

These are interesting questions because wouldn’t you want to be able to help by correctly remember the voice of your or your child’s kidnapper? Or avoid to wrongly accusing someone who is innocent? Both letting a guilty person walk free and declare an innocent person guilty is a threat to the legal system. Even though the reviewed results are weak from a forensic point of view, I argue that it is too early to conclude that children as earwitnesses cannot be trusted and should be excluded from an investigation. However, the weight of an earwitness testimony must be based on more reliable empirical facts.
References


