

CCTV, Live and Videotapes

How Presentation Mode Affects
the Evaluation of Witnesses

Sara Landström

Department of Psychology



UNIVERSITY OF
GOTHENBURG

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The medium is the message

Marshall McLuhan

Abstract

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Videotaped and closed circuit testimonies are often used in legal procedures, but little is known about the psychological effects of these courtroom technologies. The present thesis examines how different presentation modes affect observers' perception, veracity assessment and memory. In **Study I** truth-telling and lying adult witnesses were interviewed. Mock jurors ($N = 122$) viewed the testimonies, either live or on video, and rated their perception and assessed the veracity of the witnesses' statements. Live observers rated the witnesses' appearance in more positive terms and assessed them as being more honest than did video observers. Furthermore, both live and video observers' deception detection performance was at chance level (49.2% vs. 50.8%). Live observers incorrectly believed they had a better memory of the witnesses' statements than video observers. **Study II** was structurally similar to Study I (but used child witnesses). Mock jurors ($N = 136$) viewed truth-telling and lying children's testimonies (either live or on video), rated their perception of the children and assessed the children's veracity. Live observers rated the children's statements as being more convincing than did video observers. The overall deception detection performance was 59.6%, which was significantly different from the level of chance. Live observers were better than chance, but not better than the video observers, in assessing veracity. Moreover, live observers believed they had a better memory of the children's statements than video observers, and they also showed a significantly better memory performance. In **Study III** truth-telling and lying children were viewed and assessed by adult mock jurors ($N = 240$) either live, via two-way closed-circuit television (CCTV), or via pre-recorded video. The mock jurors rated their perception of the children's testimonies and assessed the children's veracity. The results showed that live observers perceived the children in more positive terms than did the CCTV observers, who in turn perceived the children in more positive terms than did the video observers. The observers' overall deception detection accuracy was mediocre (58.3%). **Study IV** investigated the effects of different camera perspectives on adults' perception and assessment of videotaped child testimonies. Truth-telling and lying children were interviewed and videotaped simultaneously by four cameras, each taking a different visual perspective (close-up shot/child only, medium shot/child only, medium shot/child and interviewer, long shot/child and interviewer). Mock jurors ($N = 256$) rated their perception of the children and assessed the veracity of the statements. Children seen in long shot were perceived in more positive terms, and children seen in close-up were perceived as having to think harder. The adult's deception detection accuracy was at chance level. Taken together, the results showed that the presentation mode affected the observers' perception of the witnesses' testimonies. Thus, the thesis suggests that legal policy-makers should consider the outcome of psycho-legal research on different presentation modes when establishing and/or reforming standards for police interviews and courtroom procedures.

Key words: Presentation Mode, Live, Video, Two-way CCTV, Deception Detection

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Sara Landström
Gothenburg, April 2008

List of Publications

This thesis consists of a summary and the following four papers, which are referred to by roman numerals:

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- II. Landström, S., Granhag, P.A., & Hartwig, M. (2007). Children's live and videotaped testimonies: How presentation mode affects observers' perception, assessment and memory. *Legal and Criminological Psychology*, *12*, 333-347.
- III. Landström, S., & Granhag, P.A. (2007). *In-Court vs. Out-of-Court Testimonies: Children's Experiences and Adults' Assessment*. Manuscript submitted for publication.
- IV. Landström, S., & Granhag, P.A. (in press). Children's truthful and deceptive testimonies: How camera perspective affects adult observers' perception and assessment. *Psychology, Crime and Law*.

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Introduction

Most criminal court cases are complex in that many different pieces of evidence must be evaluated and integrated. In some cases there is physical evidence (e.g., blood, semen and fingerprints) and medical evidence (e.g., medical reports). But much more commonly, the court is faced with eyewitness evidence (i.e., testimonies given by victims, witnesses and suspects). In many cases (and particularly so in cases of alleged sexual abuse against children and women) physical evidence is absent, and in order to decide on the case the court has to rely on eyewitness testimony. In brief, eyewitness testimony is the most common form of evidence in criminal cases. Considering that judges and jurors have to rely on eyewitness testimonies to determine facts about criminal cases, it is important to investigate different psychological factors that might influence the reliability (i.e., the accuracy) and completeness of such testimony. Psychologists have addressed this topic since the early twentieth century. For example, Hugo Münsterberg, one of the pioneers in this field, wrote *On the Witness Stand* (1908), in which he discussed different psychological factors, such as the reliability of the eyewitness testimony, which could affect trial outcome. However, the more modern era of witness psychology began in the 1970s greatly owing to Elizabeth Loftus's extensive work on the malleability of eyewitness memory (e.g., Loftus, 1996). Since the 1970s, numerous studies on eyewitness reliability have been published and a large number of factors influencing the accuracy of eyewitness testimonies have been identified. For example, it has been found that witnesses are suggestible to social influence (e.g., Gabbert, Memon, & Allan, 2003), and leading questions (e.g., Loftus, 1975).

In addition to factors affecting the quality and accuracy of eyewitness testimony, researchers have addressed different psychological factors that may influence how judges, jurors and other legal representatives evaluate the testimonies offered by eyewitnesses. For example, research has found that judges and jurors have a tendency to search for and/or interpret information in ways which confirm their preconceptions, and that they tend to avoid information that challenges those initial beliefs (Koriat, Lichtenstein, & Fishhoff, 1980). This tendency is called the *confirmation bias* and can affect the evaluation of eyewitness evidence (Evans, 1989; Nickerson, 1998). In addition, judges and jurors tend to believe that confidence predicts accuracy. That is, they trust a confident eyewitness to be an accu-

rate eyewitness (e.g., Bradfield & Wells, 2000). However, research has shown that the relationship between confidence and accuracy is weak (e.g., Sporer, Penrod, Read, & Cutler, 1995).

Yet another factor which may affect how witnesses are evaluated is the presentation mode via which the witness is shown. An eyewitness can present his or her testimony in front of the judge and jurors in court (which is the most traditional form). However, due to new courtroom technology, an eyewitness testimony can also be presented via a Closed-Circuit Television (CCTV), via a pre-recorded video, or via a telephone hearing. The major aim of the present thesis is to shed light on three different presentation modes used within the legal setting, and to investigate how these affect how eyewitnesses are evaluated. The rationale for conducting this research is that presentation modes, such as CCTV and videotaped testimonies, are important aids to many legal procedures. Thus, if legal representatives evaluate eyewitnesses differently due to the presentation mode used, it may have relevance for issues pertaining to criminal justice.

In Sweden, CCTV (or videotaped testimonies) is used primarily to serve the following purposes: (a) To protect witnesses who are anxious and/or afraid, and do not want to appear in court (e.g., people that testify about organized crimes, honor related crimes, women abuse, or sexual assault), (b) to make the courtroom procedure more efficient, (e.g., a witness can be heard through CCTV in order to reduce traveling costs and other expenses), and (c) to facilitate for witnesses and plaintiffs who are too young or immature to appear in court. The use of innovative courtroom procedures, such as CCTV and videotaped testimonies, has increased immensely over the last two decades. This is largely due to the fact that these procedures have been found to be useful not only for questioning vulnerable witnesses, but also to make the court more suitable for all parties involved in the legal process. For example, by using CCTV an expert witness could testify from his (or her) office in the south of Sweden to a district court in the north. In addition, on November 1, 2008 a new reform will be put into effect in the Swedish courts. The purpose of the reform is to efficiently modify courtroom procedures and to create a modern court that meets the demands of legal security and efficient handling of legal cases. The principle lines of the proposition are to utilize modern technology, renew the procedures in the court of appeal and allow for adjustments to efficiently meet needs in individual cases (Prop. 2004/05:131). "To utilize modern technology" implies (among other things) that all hearings in the district courts will be videotaped and later serve as evidence in the court of appeal. Thus, the advantages of new courtroom technology are many; however, remarkably little is known about the psychological effects that might follow.

In the present thesis I will investigate how observers' perception and assessments are affected by the presentation mode via which a testimony is presented. Specifically, the thesis will focus on the effects of three presentation modes used in court: Live, CCTV and videotaped testimonies. The thesis is organized as follows: First, I will give a brief introduction to some psychological aspects on evidence in court, followed by the theoretical groundwork for the thesis. Second, I will provide an overview of previous research on different presentation modes used in court, and discuss some implications of this research. Third, I will summarize previous research on people's deception detection ability, as this is yet another issue in the thesis. In the fourth section I will summarize the empirical research of this dissertation, which will be followed by a general discussion of the main results.

Psychological Aspects of Evidence in Court

As mentioned above, the judge and the jury are often faced with many different pieces of evidence. Both physical evidence and testimonial evidence can be presented to the court via different presentation modes. For example, physical evidence can be described via pictures, computer animations, or video presentations. Eyewitness testimonies can be given live in court, via CCTV, videotaped hearings, audio taped hearings, or through transcripts. Although judges and jurors are strictly instructed to consider only the formally presented evidence when assessing the case, and reaching a verdict, they may fail to do so as they might be influenced by extra-legal factors. That is, factors not regulated or sanctioned by law, such as for example; the victim's gender, ethnicity, attractiveness, emotions, and different presentation modes. Before turning to the main focus of the present thesis (the effects of different presentation modes) I will give a brief presentation of a number of other extra-legal factors that may affect perception and assessment of eyewitnesses.

At this point it is important to recognize that a good deal of the previous research in this area has been conducted in the United Kingdom and the USA, and therefore used mock jurors to represent potential jury panels (i.e., a body of persons without legal training). Even though Swedish courts do not include jury panels, the results from these studies may still be of considerable relevance in a Swedish context as the courts do include lay-judges (i.e., not legally qualified judges). In this thesis I will refrain from using the term 'lay-judge'. Instead, the terms judges and jurors (legal representatives) will be used when discussing legal implications of previous research findings (and in later sections, the results of the research of this thesis).

Extra-Legal Factors

Previous research has shown that the defendant's gender can affect the credibility of this person and the penalty he (or she) receives. In a study by Forrest and Feldman (2000) it was found that female judges rated same gender targets as more honest than male targets. Similarly, male judges perceived same gender targets as more honest. In addition, male suspects tend to receive more severe penalties than women, for exactly the same crime (e.g., Cramer, 1992). Research

has also shown that physical attractiveness can affect eyewitness' credibility. Not only are more attractive individuals considered more poised, sociable, mentally healthy, and intelligent than less attractive individuals (Brigham, 1980; Diener, Wolsic, & Sujita, 1995); attractive individuals are also less likely to be found guilty of criminal behavior and tend to be viewed as more honest (Efrani, 1974; Zebrowitz, Voinescu, & Collins, 1996). In addition, attractive suspects who are convicted tend to receive a less severe penalty than less attractive suspects (Dion, 1972).

Moreover, black suspects have been found to be perceived as less credible to white police officers than white suspects (see Vrij, 2008). In a recent study by Lindholm (2008) it was found that Swedish witnesses (with a good memory for an event) were perceived as more credible than immigrants (with equally good memory for the event). These findings suggest that legal decision makers may be influenced by an ethnicity-bias. Yet a factor that may influence witness credibility is the display of emotions (e.g., Rose, Nadler, & Clark, 2006). In a study by Kaufmann, Drevland, Wessel, Overskeid, and Magnussen (2003) it was found that when an alleged rape victim displayed emotions of despair she was perceived as more credible, than when not showing such emotions. In short, by displaying emotions that are congruent with stereotypical beliefs about how a rape victim should behave, the victim is more likely to be believed. Furthermore, Goodman and her colleagues (1992) found that victims (of child sexual abuse) that did not display emotions congruent with stereotypical beliefs about how abuse victims should behave (i.e., they were not upset and they did not cry), were less likely to be believed than those children who showed emotions of despair and expressions of grief. The results are somewhat disturbing as child sexual abuse victims generally act calmly and do not show strong emotions when they talk about the abuse (Wood, Orsak, Murphy, & Cross, 1996).

In sum, a host of extra-legal factors might influence how an accused person, a victim or a witness is perceived and assessed. In addition to the above, judges and jurors tend to be more persuaded by vivid than pallid information, which is called the *vividness effect* (Nisbett & Ross, 1980). The vividness effect is paramount for the present thesis and will be discussed in greater detail below.

The Vividness Effect

Evidence in court can be considered vivid if it is "(a) emotionally interesting, (b) concrete and imagery-provoking, and (c) proximate in a sensory, temporal, or spatial way" (Nisbett & Ross, 1980, p. 45). Hence, eyewitness testimonies are

more vivid and persuasive if more detailed and more substantial. Research has shown that vivid testimonies attract more attention, are perceived as more credible, and are better remembered (Bell & Loftus, 1985). In addition, it is suggested that vivid information may lead to more emotional responses than pallid information, as it excites the observers' imagination to a greater extent (Bell & Loftus, 1985). Thus, one can predict that vivid information will influence legal decision-makers more than pallid information.

Research has shown that mock jurors are more likely to believe (and recall) testimonies that includes vivid and colorful details (e.g., the defendant staggered against a serving table, knocking a bowl of guacamole dip to the floor and splattering guacamole on the white shag carpet; see Bell & Loftus, 1985; Reyes, Thompson, & Bower, 1980). The vivid-pallid dimension can also be used to describe other forms of evidence. For example, Kassin and Dunn (1997) found that a computer-animated representation of a physical event had greater impact on mock jurors than had an oral testimony given by an expert witness. This could be explained by pictures, videotapes and computer-animations being more vivid than non illustrative communication, such as oral testimonies (as it to a greater extent attracts and maintains peoples' attention and excites their imaginations).

As described above, the vividness effect consists of three components: How emotionally interesting; how concrete and imagery-provoking; and how proximate, the information is. For this thesis, the proximity component is of particular relevance, both temporal and spatial proximity. Temporal proximity refers to immediacy in time, and spatial proximity refers to imminence in space. Consider the following example: You run into an old friend that you have not seen for a long time. The two of you have a lot to talk about and you invite Emma over for dinner later that week. On your way home you decide to invite another friend, Daniel, to this dinner party. Thus, you call Daniel on his cell phone and leave a message on his voicemail. In terms of proximity, when you invited Emma to your dinner party, the information you gave her was both temporally (i.e., "right now") and spatially (i.e., "right here") proximate. However, when you invited Daniel you did this in a more spatially and temporally distal manner, since you did not speak to him directly but on the phone (i.e., spatially more distal) and the information was recorded and not direct (i.e., temporally more distal). Thus, although you used exactly the same phrase to invite them, the information differed in terms of proximity.

According to the vividness effect, information that is spatially and temporally proximate is more intense and emotionally involving (Nisbett & Ross, 1980). It is therefore logical to assume that the presentation mode, via which the information is presented, will influence how vividly the person/message will be perceived. In-

court testimonies are spatially proximate, in contrast to out-of-court testimonies (i.e., CCTV and video recorded testimonies). Furthermore, live and CCTV testimonies are temporally proximate, which pre-videotaped testimonies are not.

In an attempt to explore the vividness effect, Taylor and Thompson (1982) reviewed research investigating different sources of more vivid (or pallid) information in order to examine how these sources affected people's judgments. The overview included studies investigating the persuasive impact of video presentations in comparison to other presentation modes (e.g., text and audio). The result showed that five (of thirteen) studies found that video (vs. audio or text) presentations had a greater impact on the observers' judgments. In addition, the overview included studies on the impact of direct experience (i.e., face-to-face interaction), and found that only two (of nine) studies showed that face-to-face interactions had a stronger impact on the observers' judgments than video or written information. The results indicated that although the vividness effect does occur in some cases, proximal presentation modes are not always more influential than more distal presentation modes.

However, it should be noted that the variability between the studies in terms of both the observers' judgments and type of presentation modes was very large. Furthermore, far from all studies covered by the overview were applicable to legal settings. To summarize, the vividness effect provides a theoretical basis for predicting that the mode via which the evidence is presented may affect the decision making in court. In essence, the more proximal the presentation modes, the more vivid the witness' statement and appearance will seem. In turn, the more vivid the statement is, the more positive the evaluation of the statement.

Construal Level Theory

Another theoretical framework focusing on proximal and distal information is the *construal level theory* (Liberman & Trope, 1998; Trope & Liberman, 2003). The underlying principal for this theory is that people directly experience themselves and their surroundings at the present moment. Everything that is not present, "right here" and "right now", is distal and, thus; mentally constructed. This type of distance is called *psychological distance* and can be divided into four dimensions; (i) temporal distance, (ii) spatial distance, (iii) social distance and (iv) hypothetical distance. In brief, the construal level theory suggests that when we move away from direct experience of things, we have less information about those things. Consequently, we form more abstract (simpler, less ambiguous and more prototypical) representations of psychologically distant things whereas

proximal entities are represented in a more concrete and detailed manner. The same information is represented differently depending on whether it is psychologically proximate or distal (Trope & Liberman, 2003). For a more detailed discussion and implications of construal level theory see Liberman, Trope, and Stephan (2007)

For the present context the distinction between psychological and physical proximity should be acknowledged. The focus for the thesis is to investigate how different presentation modes affect the evaluation of eyewitnesses. That is, the thesis will focus on direct experience (i.e., zero psychological distance) of information that is presented in a physically proximate or distal manner. In brief, the focus of this thesis is on physical, not psychological, distance.

Eyewitness Testimony and Presentation Mode

Two of the main principles in Swedish court proceedings are the principle of orality and the principle of immediacy. The *principle of orality* is meant to ensure that all evidence should be presented orally at the main hearing in court (i.e., the plaintiff, legal attorney and witnesses are not allowed to read out loud from pre-written material, but must speak freely in court). The *principle of immediacy* is intended to make sure that what is presented at the main hearing should constitute the basis for the final judgment. Thus, the purpose of the principles of orality and immediacy is to ensure the best possible examination of evidence (The Swedish Code of Judicial Procedure, chapter 43). Hence, according to Swedish court praxis, testimonies shall be given orally and directly to the court.

However, there are several reasons for witnesses, plaintiffs and defendants to be unable, unwilling or not required to appear in court. For example, in Sweden, witnesses are allowed to testify via a telephone hearing if their court participation would result in unnecessary expenses and inconveniences that do not stand in proportion to the evidential value of their testimony (e.g., if the crime committed would not result in more than two years imprisonment). Furthermore, in cases such as adult sexual assault and child sexual abuse, the witnesses could be offered to testify via CCTV or via videotaped testimonies. Schelin (2006) analyzed 216 different cases brought to the Swedish district court (between 1994 and 2003), and found that when plaintiffs appeared in court (compared to plaintiffs who appeared on videotape) the court assessed their testimonies as more reliable and perceived them as more 'self experienced'. Thus, from a legal point of view, out-of-court testimonies do not seem to have the same evidential influence as in-court-statements. I will now turn to psychological research addressing this particular issue.

Adults and Presentation Mode

In order to investigate how observers' evaluation of a witness testimony can be affected by different presentation modes; researchers often ask the witness to give his or her statement in front of a video camera. This video recording can later be transferred to an audiotape, which in turn can be transcribed. Subsequently, the 'same statement' is presented to the observers via different presentation modes

(i.e., video, audio, or text). In a study by Strömwall and Granhag (2003) it was found that those observers who (a) watched a videotaped statement or (b) listened to the same statement, made higher ratings of consistency, details, logical structure and completeness than did those who (c) read the transcript. In short, the observers who watched or heard the testimony assessed it more positively than did those who only read the transcript. In addition, it has been found that presentation mode can affect the observers' veracity assessments. Lindholm (2005) found that observers who saw a witness on video perceived the testimony as more credible, than did those who read exactly the same testimony.

Moreover, presentation mode does not only affect the evaluation of a witness, research findings also suggest that people who listen to speech are better at discriminating between truthful and deceptive statements than those who pay attention to overt behavior (Bond & DePaulo, 2006; Mann, Vrij, & Bull, 2004). That is, one can predict that those who listen to a testimony via an audiotape might be better lie catchers than those who watch the testimony live or on video. In a recent meta-analysis (Bond & DePaulo, 2006) it was found that lie-catchers were more correct at discriminating lies from truths in audiovisual, audio, or text presentations than in video-only presentations. Thus, using visual cues seem to result in less accurate deception judgments. In sum, findings from previous research imply that video observers (a) tend to perceive witnesses in more favorable terms and assess them as being more reliable, but (b) may have a reduced ability to correctly assess their veracity.

Up until this point I have reviewed empirical research pertaining to three presentation modes; video, audio and text. I will now turn to research investigating the difference between live and videotaped testimonies. Only a few studies have addressed the issue of the perception and assessment of adult's testimony as a result of whether the testimony is given live or on video. Below I will review these studies, and then turn to an overview of a related topic; active interrogators versus passive video observers.

Live versus Videotaped Testimonies

Miller and Fontes (1979) pioneered the research area of live and videotaped testimonies with a series of experimental studies. Without any strong theoretically based expectations, they set out to investigate if jurors' perception of the attorney's and the defendant's accounts, and case verdict, differed as a function of presentation mode. In their first experiment, they failed to find any differences between jurors who had been exposed to a live trial and those who had been exposed to a videotaped trial in terms of perception of the attorney's credibility, the defendant's guilt, and case verdict. However, as jurors rarely watch an entire

videotaped trial, Miller and Fontes conducted a second study in which they only varied the presentation mode via which the witnesses were shown. This experiment showed that both the plaintiff and the plaintiff's expert witness (but not the defendant and the defendant's expert witness) were perceived in more favorable terms (e.g., more sociable, competent and credible) when presented live compared to when presented via video. Miller and Fontes concluded that this somewhat puzzling finding could be explained as follows: "The relative impact of a given presentation mode is highly dependent on the ability of the particular communicator to use that mode" (1979, p.84). Interestingly, this conclusion is quite similar to what Taylor and Thompson (1982) concluded based on their review on the vividness effect: Vividness can never be a simple effect of the presentation mode, the sender, or the receiver. Instead the presentation mode ought to be viewed as a mediating factor of the vividness effect.

Moreover, in a more recent study, Taylor and Joudo (2005) investigated the impact of different presentation modes (live vs. CCTV or video) on mock jurors' perception in a sexual assault case. The main finding was that the presentation mode had little or no impact on the jurors' perception of the plaintiff, the defendant or on the case verdict. However, it should be noted that all the jury panels in this study found the defendant not guilty.

Interrogators versus Observers

A few studies have examined differences in deception detection accuracy as a result of interactive and non-interactive contexts (for a fuller account on deception detection, see a later section of this thesis). This line of research mirrors a situation where an active interrogator is trying to assess a suspect's veracity when conducting an interrogation, and then his or her colleague assesses the same suspect's veracity by watching the videotaped version of the same interrogation. The general finding from these studies is that passive lie-catchers (who watch the suspect on video) are as accurate (Burgoon, Buller, White, Afifi, & Buslig, 1999; Feeley & deTurck, 1997; Hartwig, Granhag, Strömwall, & Vrij, 2002; Hartwig, Granhag, Strömwall, & Vrij, 2004), and in some cases even more accurate (Buller, Strzyzewski, & Hunsaker, 1991; Granhag & Strömwall, 2001a), as are active lie-catchers. One possible explanation for this finding is that the active interrogator must spend cognitive resources monitoring both himself (herself) and the suspect. In short, the task of interrogating is cognitively demanding (Feeley & deTurck, 1997; Granhag & Strömwall, 2001b). In addition, the results show that active interrogators have a more pronounced truth bias (i.e., they tend to judge the suspect as truthful more often than deceptive) than passive observers (Buller et al., 1991; Granhag & Strömwall, 2001a; Feeley & deTurck, 1997). The explana-

tion for the truth bias might be that those present in the same room as the suspect may be more influenced by general conversational conventions, prescribing that one should not act too critically towards a conversational partner (Granhag & Strömwall, 2001a). However, it should be noted that police officers generally do not show a truth bias, and this has been attributed to their more suspicious frame of mind (e.g., Kassin & Fong, 1999).

In contrast to the studies on interactive versus non-interactive observers, the present thesis focuses on passive live and passive video observers, both with respect to (a) their ability to assess veracity and (b) their perception of the witnesses. Passive live and passive video observation mirrors adversarial court settings where judges and jurors (more or less) passively receive information from alleged crime victims, witnesses and suspects (van Koppen & Penrod, 2003). Hence, the studies presented in the current thesis are more valid for adversarial court settings, compared to previous work on interactive and non-interactive contexts (which are more applicable to pre-trial phases).

Memory and Presentation Mode

There are very few studies on memory performance as a function of different visual presentation modes, such as live and videotaped testimonies. However, it has been found that information is better remembered if it has been dually coded (e.g., visually and auditorily) than if unimodally coded (e.g., only auditorily) (Clark & Paivio, 1991). This so-called *dual coding theory* was first presented as an explanation for bilingual processing (Paivio, 1986) and later as a general framework for educational psychology (Clark & Paivio, 1991). Today, the dual coding theory is applicable to many different cognitive processes, such as mnemonics, problem-solving, concept learning and language. In addition, the dual coding theory has found support in recent psycho-legal research by Campos and Alonso-Quecuty (2006), showing that eyewitnesses (who both saw and heard a mock criminal conversation) recalled more correct information than did earwitnesses (who only heard the conversation).

Although the vividness effect suggests that proximal information may lead to enhanced memory performance, the few studies addressing observers' memory performance as a function of presentation mode have actually found the opposite. Both in a study by Swim, Borgida, and McCoy (1993), and in a study by Thomson (1989, cited in Davies, 1999) it was found that observers remembered more detailed information when watching a child testify on video than when testifying live. However, there are some important limitations to both these studies. In the study by Swim and colleagues the 'live testimony condition' was actually presented on video, and the video condition was presented as a video of a video. That

is, there was actually no real 'live testimony condition'. In the study by Thomson the video observers were better at recalling details of the children's statement after a group discussion (simulating a jury deliberation), which might be explained by the fact that they discussed the children's testimony for a longer time than did the live observers.

Children and Presentation Mode

The legal system is established with the adult defendant and the adult witness in mind, and does not easily accommodate children's special needs. However, innovative courtroom procedures can be employed to assist children and allow them to testify more effectively as witnesses. One innovative method that has proven to be helpful is to prepare the child for court participation (e.g., Saywitz & Snyder, 1993). Another innovative procedure is to allow the children to testify out of court, for example via CCTV or via video recorded testimonies. CCTV was initially used in the state of Texas in 1983 and has since been adopted in well over 30 states in the USA. The use of CCTV was running slow for a number of years, but in 1990 a sexual abuse case of a young girl came to mark a turning point for this courtroom procedure. In this particular case, *Maryland vs. Craig* (1990), the court ruled that the Sixth Amendment's Confrontation Clause, which provides criminal defendants with the right to confront witnesses, did not stand in conflict with the use of a one-way CCTV to present the testimony of an alleged child sexual abuse victim. The girl was suffering from severe emotional trauma and was reportedly unable to testify in the physical presence of the defendant. As a result, the court set the girl up in a separate room with the judge, the prosecutor, and the defense attorney so that the defendant and jury could watch her testify via the live television screen in the courtroom, but she could not watch them. The girl testified, the defendant was convicted, and from this date forth courts in the USA are being asked to rule based on the use of CCTV in individual cases to minimize the pressured traumatic effects on children of court appearances, and to maximize children's ability to provide accurate testimonies.

The use of CCTV was then spread to several countries, including Canada, Australia, New Zealand and the United Kingdom. However, in these countries the arrangement concerning CCTV is rather different than in the USA. Instead of the one-way CCTV, these countries employ a two-way CCTV (also called a 'live link'). When using a two-way CCTV the judge, the prosecutor and the defense attorney remain seated in the courtroom. They ask the child, who is seated in a separate room, questions through an interactive link. Thus, the child can see and

hear the persons posing the questions, at the same time, the court can see and hear the child answering the questions.

In Nordic countries such as Sweden, Finland and Norway, children under the age of 15 are generally not asked to stand trial. Instead the preliminary police interviews are video recorded and later shown in trial as evidence. During the police interview, the prosecutor and the defense attorney (and in some cases the defendant) can see and hear the interview from a nearby room. This is arranged so that the prosecutor and the defense attorney should be able to ask the child additional questions via the police interviewer at the end of the interview. To date, in the Nordic countries a two-way CCTV is only used in cases involving adults (plaintiffs, witnesses and defendants).

Empirical Research

Several empirical studies have investigated children's in- and out-of-court statements. These studies were carried out in the USA and hence, out-of-court statements refer to a one-way CCTV (or a videotaped) statement. The main focus of these studies has been to investigate (a) how children experience testifying in court versus testifying out of court, and (b) how observers perceive children's in-court versus out-of-court testimonies. Research has shown that children who are allowed to testify out of court (via CCTV) tend to show less pretrial anxiety and are more relaxed during the trial, than the children who testify in court (Goodman et al., 1998). This finding is in accordance with previous courtroom research (conducted in real-life court cases), showing that children who are asked to testify in cases of alleged sexual abuse may experience severe stress and anxiety, especially if they have to give their testimonies face to face to the defendant in open court (Goodman et al., 1992). The children who testify via CCTV are also able to provide more complete and detailed statements (Goodman et al., 1998; Tobey, Goodman, Batterman-Faunce, Orcutt, & Sachsenmaier, 1995). Furthermore, testifying live in open court appears to be more problematic for younger children (5-6 year olds) than older children (8-9 year olds). Specifically, younger children have been proven to be more suggestible to misleading questions, and to make more commission and omission errors, when testifying live in court compared to when testifying via CCTV (Goodman et al., 1998; Tobey et al., 1995). In sum, the results suggest that from the perspective of the child, it is much more preferable to testify out of court than in court.

The finding that children, allowed to testify out of court, seem to be more relaxed is of course a positive finding. However, the observers assessing the children's statements do not seem to share this positive view when it comes to out-of-court statements. Specifically, research on jurors' perception has shown that children

who give out-of-court testimonies are perceived in more negative terms than are children who give in-court testimonies (Goodman et al., 1998; 2006; Orcutt, Goodman, Tobey, Batterman-Faunce, & Thomas, 2001; Tobey et al., 1995). Children testifying out of court are perceived as less believable, honest, accurate, attractive, intelligent, and confident than are children testifying in court (Goodman et al., 1998; Orcutt et al., 2001; Tobey et al., 1995). In accordance with this, observers have been found to show greater sympathy for children testifying in court than children testifying out of court (Goodman et al., 2006). Moreover, when children testify live, the observers are more likely to find the defendant (of alleged abuse) guilty than when the children testify via a pre-recorded video (Ross et al., 1994).

Moreover, as mentioned previously, people that pay attention to the actual content of a statement tend to be better at assessing veracity than those who pay attention to a person's demeanor (e.g., Mann et al., 2004). In the early work by Miller and Fontes (1979) on video technology, a trend was noticed suggesting that those who watched videotaped statements seemed to be concentrating more on what the witnesses actually said, than on the witnesses' nonverbal behavior. For this reason it has been speculated that video technology may improve peoples' ability to discriminate between truthful and deceptive statements (Davies, 1999). Thus, an important question is whether jurors are better at detecting deception when the child is seen on a TV screen, as compared to when the child is seen live in court. The answer seems to be negative. Jurors' ability to assess the children's veracity does not seem to be moderated by the presentation format. Overall, their ability to distinguish between children's truthful and deceptive testimonies seems to be poor regardless of the trial settings (Goodman et al., 2006; Orcutt et al., 2001).

Thus, the results show that jurors' perception of children's testimonies are indeed affected by the presentation format, and children testifying via CCTV (or via video) are perceived as less credible than children testifying live in court. This finding is explained by the fact that the live testimonies are more immediate and have a more emotional impact on the jurors who therefore perceive the testimonies as being more credible than CCTV and video based testimonies (Goodman et al., 1998). However, it is important to balance this loss of immediacy against the reduced stress for the child. That is, even if children's out-of-court testimonies might not have the same impact on the jurors, the children still benefit from the out-of-court procedure as they do not have to testify in the proximity of the defendant.

Courtroom Research

In addition to the empirical work reviewed above, a few studies have evaluated real-life court cases with respect to children's in- and out-of-court participation. In contrast to the experimental studies reviewed above, the studies in this section have been conducted in countries employing a two-way CCTV. Davies and Noon (1991) investigated judges', legal representatives', police officers' and social workers' views on the usage of CCTV in the United Kingdom after the first two years of its use. A majority of the respondents were positive to the use of CCTV in court, and believed that it would be beneficial as it would protect the children from the defendant, and would reduce the children's level of stress. Their main concern was that CCTV statements might have a lesser impact on the jury.

Moreover, the study showed that judges and legal representatives who were experienced with the usage of CCTV, perceived children who testified via this presentation format as less stressed, more resistant to leading questions, more positive, forthcoming and informative, compared to the children who testified in court. In contrast to the study by Davies and Noon (1991), Murray (1995) found – in a Scottish evaluation of the usage of CCTV – that the children who testified in open court were perceived as providing more details, more audible and more resistant to leading questions. Furthermore, both the children and their parents were interviewed before and after the actual testimony, and a vast majority of the children who testified via CCTV reported that they were content with this procedure (Murray, 1995). In addition, the majority of the parents of those children who testified via CCTV stated that their children would be unable to testify in court. In a similar evaluation of CCTV in Australia it was found that legal representatives, child witnesses and their parents were supportive of the use of CCTV (Cashmore & de Haas, 1992). However, in this study the type of presentation mode did not seem to affect the legal representatives' perception of the children's testimonies.

In sum, courtroom research on children's in- and out-of-court participation shows that legal representatives, the children's parents and (most importantly) the children themselves, consider the use of CCTV to be beneficial and stress reducing. Furthermore, the results are mixed when it comes to how CCTV affects the jurors' perception of the child. One study shows a positive effect (Davies & Noon, 1991), one study shows a negative effect (Murray, 1995), and a third study shows no effect (Cashmore & de Haas, 1992) in terms of the jury's perception of the children's testimonies. Importantly, it has not been shown that CCTV trials (vs. regular trials) bias the jurors against the defendant (i.e., finding him or her guilty to a greater extent).

Videotaped Testimonies

In cinematography it is a well established fact that editing can make or break a movie. A successful videographer can frame what he or she wants the audience to see, exclude what he (she) does not want them to see, and manipulate their perspective. A familiar example is to shoot the villain or the hero from below (frog perspective) to make him (her) appear big and powerful while the victim is shot from above (bird perspective) to make her (him) appear small and vulnerable. Furthermore, Baggaley (1980) found that a person talking for one minute on the popular TV show “Law and order” was considered less reliable and professional when shown in a direct shot from the front, than when shown in profile.

However, in the legal system video recordings have been introduced as a panacea. By videotaping interrogations and interviews legal decision makers can go back and look for any signs of coercion, misleading questions and – if necessary – reuse the videotaped information in an appeal. The legal system trusts the video camera to be an objective bystander to the legal proceedings. It is true that audio-visual recordings offer considerable benefits to the criminal system, but if used unwisely it could have serious consequences and result in biased verdicts. The major problem with respect to the growing interest in using video recorded evidence is that these can vary vastly when it comes to camera perspectives. When evaluating videotaped testimonies it is therefore important to consider (a) the angle from which the observer views the witness, (b) the distance between the camera and the witness (i.e., the camera shot), and (c) if the camera is focused on the witness, the interviewer, or both.

Camera Angle

The camera angle marks the specific location at which the camera is placed to take the shot. A ‘high-angle shot’ is when the camera is located high on the vertical axis and the shot is angled downwards, whereas a ‘low-angle shot’ is a shot from a camera positioned low on the vertical axis angled upwards. A ‘neutral shot’ is achieved by positioning the camera at the same level (i.e., at eye-level) as the target. The angle can affect the viewers’ perception of the target on screen (Kepplinger, 1991). Thus, when video recording a person in the legal arena, may it be a suspect, a witness or a plaintiff, it is important to position the camera at an

angle of 90° to the vertical plane (i.e., at the same level as the target), since diversion from this 'neutral shot' can have a biasing effect on the observers (Kepplinger, 1991).

Camera Shot

There are three main types of camera shots used in the legal arena. First; the 'close-up shot' which is a shot of the target's face (or face plus upper body). Second; the 'medium shot' which could vary from a full body view, to a shot of the target from the waist up. Finally; the 'long shot' which is a shot of the target (or targets) in full body view. From the perspective of video production, Millerson (1979) reviewed the utility of these three different camera shots, and concluded that the long shot primarily serves to personalize the depicted person within the setting. The medium shot, on the other hand, emphasizes the individual's body gestures and facial expressions. When the videographer wants to draw the viewers attention to reactions, emotions, and facial details the close-up shot is used, which is also described as the most powerful shot of the three.

In court, the video recordings of children's testimonies can vary from a close-up shot to a long shot. For example, when children testify via CCTV they are shown in a close-up shot (head and shoulder), whereas in videotaped police interviews children are often recorded by a medium or long shot (G.M. Davies, personal communication, February 5, 2007). Videotaped police interviews with children are recorded either by a fixed camera positioned in the far corner of the room (i.e., from a long shot), or by a camera positioned behind a mirror handled by a cameraman who can alter the shot (from a medium shot of the child only, to a long shot of both the child and the interviewer).

MacFarlane and Krebs (1986) suggest that when videotaping children, one should try to keep the camera out of sight (or at least out of the child's focus) as the child otherwise might become camera shy, too self conscious, or preoccupied with the camera. MacFarlane and Krebs (1986) also stress the importance of always keeping the child in view, and of using a close-up shot when the child is discussing feelings and displays emotional reactions. On the other hand, the same authors argue that the use of close-up shots may reduce cues to the child's height and size, which in turn might lead juries to misjudge the child's maturity and build. In a research overview on children's televised testimonies, Davies (1999) argues that the loss of age cues can be problematic for the use of CCTV and close-up shots. Moreover, Westcott, Clifford, and Davies (1991) found that children seen in medium shot were perceived as more credible than children seen in close-up. This

finding is in line with previous research on camera shot and adult targets showing that a close-up shot (of the target's face) creates a less favorable impression than a medium shot of the target's face and upper torso (Kepplinger & Donsbach, 1987, cited in Kepplinger 1991). In sum, the findings show that legal decision makers are affected by the different camera shots used when video recording children's testimonies.

Camera Focus

For this context, the camera focus is used to describe if the camera is focused on the witness, the interviewer, or both. According to Swedish governmental guidelines, in cases of alleged child abuse and sexual assault, videotaped hearings should show both the child and the interviewer (Eriksson & Martinsson, 2002). However, in for example England and Wales there are variations with respect to the camera focus in pre-recorded hearings with children (see Home Office et al., 2001). To my knowledge, there has been no research conducted on the psychological effects of camera focus with respect to the perception of children's testimonies. However, extensive research has been conducted on the psychological effects of camera focus on how adults perceive other adults. In a series of studies, Lassiter and his colleagues have investigated if the focus of the camera biases the perception of adult suspects confessing during an interrogation (see Lassiter, 2004).

In countries such as Australia, Canada, the UK and the US actual police interrogations are usually recorded with the camera positioned behind the interrogator and focused directly on the suspect (e.g., Kassin, 1997). In Sweden, there are no specific governmental guidelines on how to record interrogations with suspects. Thus, the camera focus varies from video recordings of the suspect alone to a focus on both the suspect and the interrogator. The camera focus on the suspect alone is often considered to be a logical straightforward shot, as trial fact finders presumably must look directly at the suspect, as he is giving his statement, in order to best judge the veracity and voluntariness in his statement. However, Lassiter and his colleagues have found that observers watching a videotaped confession with the camera focused on the suspect only tend to perceive this confession as more voluntary and reliable, compared to those observers watching the exact same confession recorded from a different camera focus (e.g., equal focus on both the interrogator and the suspect) (Lassiter, Geers, Munhall, Handley, & Beers, 2001; Lassiter, Geers, Handley, Weiland, & Munhall, 2002). In addition, a recent study by Landström, Roos af Hjelmsäter, and Granhag (2008) shows that

this *camera perspective bias* also holds for real-life high stake situations. Lassiter and his colleagues argue that in order to reduce this bias (and minimize the prejudicial effects) one should make video recordings with equal focus on the suspect and the interrogator. Specifically since the camera perspective bias affects the observers' assessments of voluntariness, perceived likelihood of guilt and recommended sentences (Lassiter et al., 2001; 2002; Lassiter, Ratcliff, Ware, & Irvin, 2006). The combined research findings suggest that the camera focus can indeed bias the observers' perception. This bias is due to a phenomenon called *illusory causation*.

Illusory Causation

Illusory causation occurs when people assign unjustifiable causality to a stimulus because it is more prominent or salient than other stimuli (MacArthur, 1980). An early demonstration of this effect is found in an experiment by Taylor and Fiske (1975), in which observers were placed at different locations around a casual two-person conversation. After the conversation ended, observers rated each of the individuals in terms of the amount of causal influence that she or he exerted throughout the conversation. The results showed that the observers attributed greater causality to whichever person the observers happened to be facing (vs. not facing). Thus, the point of view from which the person observed the interaction influenced the observer's judgments of causality. This effect, which is called illusory causation, was determined entirely by the observers' seating position, an incidental factor that logically should not have any bearing on their causal judgments. Lassiter and his colleagues (2001; 2002) have demonstrated that the illusory causation phenomenon is not just a fascinating psychological quirk, but can produce prejudicial effects with respect to how people evaluate videotaped confessions.

By now it should be clear that the video camera is not a panacea and that the camera perspective could affect how a witness (or a victim or a suspect) is perceived and assessed. Thus, when reforming procedures for video technology in the court it is important to acknowledge possible effects of the camera angle, the camera shot and the camera focus. Under some circumstances the video camera could be a reliable mediator of the evidence at hand, but under other circumstances the very same mediator could lead to biased judgments.

Deception Detection

Legal decision makers are often faced with the task of having to judge the veracity of suspects, witnesses, and alleged crime victims. Such judgment can be of great importance as it could lead to imprisonment or acquittal of a suspect standing trial. In the following part of the thesis I will provide a brief introduction to research on deception detection.

Defining Deception

In this thesis deception will be defined, in line with Vrij (2008), as “a successful or unsuccessful deliberate attempt, without forewarning, to create in another a belief which the communicator considers to be untrue” (p. 15). This definition is frequently cited as sufficient for the study of deception in a legal context. Inherent in this definition is that lying is an intentional act, and that misremembering is not the same as lying. The definition also encompasses many different types of lies which typically are sorted into three categories; outright lies, exaggerations, and subtle lies (Vrij, 2008). Outright lies refer to when the liar makes up a statement that is completely different from what he (she) believes to be true. Exaggerations, on the other hand, refer to when the liar’s statement has a starting point in something true but includes overstatements or understatements to mislead. Subtle lies refer to when the liar intends to mislead by leaving out information or by falsely claiming lack of memory (or knowledge). In order to measure peoples’ ability to discriminate between truthful and deceptive statements the researcher must have access to the ground truth (i.e., whether or not the person is telling the truth or lying). Hence, in studies on deception detection people are often asked to lie (or tell the truth) about something specific (e.g., a previously experienced event, an opinion etc).

Adults’ Ability to Detect Adults’ Lies

For over forty years, researchers have mapped people’s deception detection skills. In a recent paper 263 studies investigating adults’ ability to distinguish between other adults’ truthful and deceptive statements were meta-analyzed (Bond & DePaulo, 2006). In the absolute majority of these studies the average accuracy rate ranged from 50% to 60%, with a mean average hit rate of 54%. Thus, people are able to discriminate between deceptive and truthful statements at a rate just

above the level of chance (50%). The average hit rate of 54% corresponds well with the average hit rate of 57% that has been found in previous overviews (e.g., Kraut, 1980). The meta-analysis by Bond and DePaulo also shows that people are somewhat better at identifying truthful statements (mean accuracy rate 61%) than identifying deceptive statements (mean accuracy rate 47%). This so called *veracity effect* (Levine, Sun Park, & McCornack, 1999) stems from the fact that people have a tendency to judge statements as truthful rather than deceptive. The tendency to judge statements as truthful more often than deceptive is called, as previously mentioned, *truth bias* (Buller & Burgoon, 1996). This truth bias may be a result of people being confronted with truthful statements more often than deceptive in daily life; therefore they expect statements to be truthful even in an experimental situation. Thus, in order to measure peoples' deception detection accuracy researchers often use percentage correct answers. It should be acknowledged that this method has been criticized and other measures have been suggested to be better fitting for measuring deception detection accuracy. However, analyses such as log odds ratio and signal detection measures also show an average hit rate of about 54% accuracy. Thus, it is safe to say that the different measures of deception detection accuracy are highly inter-correlated (Granhag & Strömwall, 2008)

Moreover, presumed lie detection experts such as police officers and other legal professionals are not noticeably better at discriminating between truthful and deceptive statements than lay people (DePaulo & Pfeifer, 1986; Ekman & O'Sullivan, 1991; Ekman, O'Sullivan, & Frank, 1999; Hartwig et al., 2004; Köhnken, 1987; Vrij, 1993; Vrij & Graham, 1997). Notably, in most of these studies the presumed lie experts have been placed in a context which mirrors poorly their day-to-day working situations. For example, in real-life police interrogation settings, police officers can regulate the number and type of questions asked, demand elaborations and so forth. In most studies on presumed experts' ability to detect deception, the police officers (and other legal representatives) have been asked to assess a mock suspect's (often a college student's) veracity, after watching a short video clip. Research has shown that police officers' lie detection ability can improve if (a) they are trained to interrogate in a strategic manner (Hartwig, Granhag, Strömwall, & Kronkvist, 2006), or (b) they are asked to detect real-life high stake lies (Mann et al., 2004; Vrij & Mann, 2001).

Adults' Ability to Detect Children's Lies

Research has shown that children at the age of about four are capable of consciously constructing and telling a lie (Leekam, 1992; Newton, Reddy, & Bull, 2000). As the child develops, he or she achieves a greater understanding of other

people's mental states and thus becomes a better liar (Leekam, 1992). A research overview by Vrij (2002) shows that adults' ability to correctly assess children's veracity usually falls below 60%. Adults tend to judge children's statements as truthful rather than deceptive, and as a result they are somewhat better at detecting truthful than deceptive statements (Chahal & Cassidy, 1995; Strömwall & Granhag, 2005; Westcott, Davies, & Clifford, 1991).

Subjective and Objective Cues to Deception

Adults' poor ability to correctly assess other adults' and children's veracity is often explained by a mismatch between how adults think a liar behaves (subjective cues to deception) and how a liar actually behaves (objective cues to deception) (Vrij, 2002; 2008). For example, adults tend to disbelieve children who are nervous and socially anxious, but research has shown that far from all lying children show signs of nervousness (Vrij, 2002). Besides, both truth-telling and lying children may act in a nervous manner. Furthermore, both lay people and presumed lie experts seem to believe that adults' deceptive behavior is associated with more speech disturbances (e.g., hesitations and speech errors), longer and more frequent pauses, more gaze aversion and an increase in smiling and movements (e.g., self-manipulations, hand/finger and leg/foot movements) (Akehurst, Köhnken, Vrij, & Bull, 1996; Granhag, Andersson, Strömwall, & Hartwig, 2004; Strömwall & Granhag, 2003; Vrij & Semin, 1996). However, research has shown that far from all liars act as people expect them to (DePaulo et al., 2003; Köhnken, 1989).

Research has identified very few behaviors that distinguish reliably between truth tellers and liars (Vrij, 2004). DePaulo and colleagues (2003) reviewed over one hundred studies and identified a few behaviors that are more likely to occur when an adult person is lying. Liars were found to be less forthcoming, tenser, include fewer unusual elements in their stories and tell less compelling stories (DePaulo et al., 2003). Lying (vs. truth-telling) children have been found to include fewer details in their statements than children who are telling the truth (Vrij, 2005). Moreover, Vrij and Winkel (1995) found that lying (vs. truth-telling) 5 year olds showed an increase in body movements, and had a greater latency period (pause between question and answer); however, lying (vs. truth-telling) 9 year olds showed a decrease in body movements and had shorter latency periods. The authors speculated that the younger children's lying behavior was characterized by signs of nervousness and hard thinking, while the behavioral cues exhibited by the lying older children were signs of attempted control.

Furthermore, adults trying to assess children's veracity tend to pay more attention to the actual statement than to the child's appearance and, as a consequence of this, report more verbal than nonverbal cues when asked to justify their veracity assessments (Strömwall & Granhag, 2005; Strömwall, Granhag, & Landström, 2007). To sum up, (a) there seems to be a poor overlap between peoples' beliefs about how liars behave and how liars actually behave and (b) there are only a few (very weak) cues that discriminate reliably between liars and truth tellers.

Indirect Lie Detection

To reiterate, when people are asked to assess veracity, they seem to pay attention to non-diagnostic cues. However, research suggests that peoples' lie detection accuracy may improve by rating a statement on other dimensions than explicit veracity (DePaulo & Morris, 2004; Vrij, Edward, & Bull, 2001). For example, in a study by Vrij and colleagues (2001) it was found that when explicitly asked to assess the veracity of adults' statements, the participants performed at the level of chance. However, when asked whether the suspect had to think hard, lying suspects were rated as having to think harder than truth-telling suspects. The rationale behind this is that lying (at least under some circumstances) is a cognitively more demanding task than telling the truth, and that observers might be able to pick up signs of cognitive load (Vrij, Fisher, Mann, & Leal, 2006). In addition, Anderson, DePaulo, and Ansfield (2002) found that observers watching truthful targets rated comfortableness, confidence, and level of information higher and suspiciousness lower than did those watching lying targets. Thus, lie-catchers were able to discriminate between liars and truth tellers, but only when they turned to other, more indirect aspects of veracity.

Memory and Deception

In terms of the link between memory and deception, research has been conducted on how distorting the truth can affect the liar's own memory (Polage, 2004). However, little is known about people's ability to remember other people's truthful and deceptive statements (Granhag & Vrij, 2005). On the basis of previous research, some differences in memories of truthful and deceptive statements can be expected. First, DePaulo and colleagues (2003) found that truth tellers' statements tend to make more sense than liars' statements. Specifically, truth tellers'

stories have been shown to be more plausible, more likely to be structured in a logical and sensible way, and more consistent, compelling and less ambivalent. Second, previous research has found that truth tellers tend to give longer and more comprehensive statements than liars (Vrij, 2004). In turn, observers who watch truthful statements will have more information to remember and tell, than will those who watch deceptive statements. Consequently, observers who watch truthful statements can be expected to give a more detailed memory report than will those who watch deceptive statements. In addition, it can be assumed that observers watching truthful statements will have a more structured memory than those watching deceptive statements. Basic memory principles indicate that what makes sense is generally more easily remembered (Baddeley, 1999). The combined evidence suggests that it can be expected that truthful statements will be better remembered than deceptive statements.

Summary of the Empirical Studies

Reformations of the judicial process are necessary in order to make the courtroom more suitable to all parties involved. For example, technologies make it possible to show animated versions of the crime scene and reconstruct the crime in detail based on the available evidence. Furthermore, a witness experiencing severe stress can testify via CCTV without having to face the defendant. However, systematic research is needed in order to investigate the psychological effects of different presentation modes. The empirical studies presented in this thesis are structurally similar and have the common aim of investigating the effect of different presentation modes on observers' perception and veracity assessments. The first two studies investigated adults' perception, veracity assessment and memory of adult (Study I) and child witnesses (Study II) as a function of the presentation modes live and video. Study III investigated the effects of three presentation modes; live, video and two-way CCTV on adults' perception and veracity assessment of children's testimonies. Study IV was conducted in order to investigate the effects of different camera shots and camera focus on adults' perception and assessment of videotaped child testimonies. Below each of these four studies will be described briefly.

Study I

Study I was designed to investigate observers' perception of adult witnesses as a function of different presentation modes and the witness' actual veracity. Specifically, the study had three major aims. The first aim was to investigate if the observers' perception of the witnesses would be affected by the witness' actual veracity status (deceptive vs. truthful). It was predicted, in line with DePaulo and colleagues (2003), that the observers would perceive the truth-telling witnesses in more positive terms (i.e., as being more positive, pleasant, confident and forthcoming, and their statements as more plausible, detailed and convincing) compared to lying witnesses. The second aim was to investigate the observers' perception and veracity assessments as a function of the presentation mode. It was predicted, in line with previous research (Buller et al., 1991; Feeley & deTurck, 1997; Granhag & Strömwall, 2001a), that both live and video observers would exhibit a truth bias and that this truth bias would be more pronounced for live observers

than for video observers (Granhag & Strömwall, 2001a). In line with the findings on live observers' more pronounced truth bias, we predicted that the live observers would rate the witnesses in more positive terms.

The third aim was to investigate if the observers' subjective memory (i.e., the observers' own beliefs on how well they remembered the witness' statement) and objective memory (i.e., the observers' actual memory of the witness' statement), would be affected by the witness' actual veracity. On the basis of the presumed differences in quality between truthful and deceptive statements that is, that truthful statements have a higher degree of logical structure and make more sense than deceptive statements (DePaulo et al., 2003), we predicted that truthful statements would be more accurately remembered than deceptive statements.

Method

Study I was an experiment divided in three phases. In the first phase, twelve undergraduate students witnessed a staged accident in a parking lot. In the second phase, which took place after three weeks, the twelve witnesses were asked to testify about the accident. Six of them were asked to tell the truth about the accident, whereas the remaining six were asked to lie (i.e., alter the cause of the accident). Mock jurors ($N = 122$) viewed the witnesses' testimony either live (in the second phase) or on video (in phase 3). Subsequently, they were asked to (a) rate their perception of the witnesses' statement and appearance, (b) assess the witness' veracity, (c) rate their own memory of the witness' statement (i.e., their subjective memory), and (d) make a word for word written recall of the witness' statement (in order to assess their objective memory performance).

Results

Live observers rated the witnesses' appearance in a more positive way (i.e., as more eloquent and pleasant), and perceived them as being more honest, than did video observers. However, the live observers did not rate the witnesses' statements as such more positively than did the video observers. Hence, our result was partly in line with previous research showing that live observers tend to evaluate the target with greater leniency than do video observers (e.g., Buller et al., 1991; Granhag & Strömwall, 2001a; Feeley & deTurck, 1997). We found that observers watching truth tellers perceived their statements (but not their appearance) more positively than those watching liars. The observers' overall deception detection accuracy was not better than the level of chance, regardless of the presentation mode. Our analysis showed that the accuracy rate for live observers was 49.2% and for video observers 50.8%. This result is even lower than the overall hit rate of 54% found in previous deception detection studies (Bond & DePaulo, 2006). Both

live and video observers stated ‘*this statement is deceptive*’ more often than ‘*this statement is truthful*’, and consequently a slight lie bias was detected. The observers rated deceptive witnesses as having to think harder than truth-telling witnesses, which is congruent with findings from previous research (Vrij et al., 2001). Additionally, the observers reported having used verbal cues to deception to a greater extent than nonverbal cues, and live observers reported having used more verbal cues than video observers. Moreover, live observers believed that they had a better memory of the witnesses’ statement than did video observers. However, the analysis showed no differences between live and video observers’ objective memory performance. In line with our prediction, we found that the observers who had watched truthful statements showed a significantly better memory performance than did the observers who had watched deceptive statements.

Conclusions

Although live and video observers watched the very same witnesses (interviews) we found that their perception of the witnesses differed. Specifically, the live observers perceived the witnesses in more positive terms than did the video observers. In addition, the results extend previous knowledge by showing that observers who had watched truthful statements showed a superior memory performance (compared to those who had watched deceptive statements). It was concluded that the presentation mode is an important part of the message and therefore a factor for policy makers to consider when considering updating court procedures.

Study II

In most previous studies on children and presentation mode the aim has been to investigate if children testifying live experience this differently than children testifying via CCTV (or via videotaped interviews). That is, two separate groups of children are compared. In contrast, the focus of Study II was to investigate if the observers’ perception of child witnesses (and not the child witnesses’ experience) would be affected by the presentation mode used. In short, we used the same set of child witnesses in the live and video condition. Moreover, as there are relatively few studies on adults’ ability to distinguish between children’s lies and truths, we included both lying and truth-telling children. In sum, Study II set out to investigate observers’ perception, assessments and memory of truth-telling and lying children’s live and videotaped statements.

The first major aim was to investigate if the presentation mode (live vs. video), and the children's veracity (lying vs. truth-telling), affected the observers' perception. In line with the vividness effect (Nisbett & Ross, 1980) and previous empirical findings (e.g., Goodman et al, 1998), it was predicted that live observers would rate the children's statement and appearance in more positive terms than would video observers. Moreover, in line with the findings in the meta-analysis by DePaulo and colleagues (2003), it was predicted that the truth-telling children's statements and appearance would be perceived more positively compared to the lying children's. In addition, it was predicted that truth-telling children would be perceived as having to think less hard than lying children (Vrij et al., 2001).

The second aim was to investigate the observers' veracity assessments as a function of the presentation mode. In line with previous research (Chahal & Cassidy, 1995; Strömwall & Granhag, 2005; Westcott, Davies & Clifford, 1991), it was predicted that both live and video observers would exhibit a truth bias. Furthermore, it was predicted that the truth bias would be more pronounced for live observers than for video observers (Granhag & Strömwall, 2001a).

The third aim was to investigate if the observers' subjective and objective memory would be affected by (a) presentation mode and (b) the witness' truth status. In line with basic memory principles (Baddeley, 1999) and the findings in Study I, it was predicted that the observers watching a truthful witness would show a better memory performance than observers watching a deceptive witness. On theoretical grounds (Nisbett & Ross, 1980), it was predicted that the live observers, due to the immediacy of the witness, would have a better memory of the children's statements than would the video observers.

Method

The study was a three phase experiment. In the first phase, fourteen children (10-11 year olds) either experienced an event (in which the children interacted with a stranger) or learned about the event by hearsay. In the second phase, after two weeks, all the children were asked to testify as if they had experienced the event. Undergraduate students ($N = 136$) acted as mock jurors, and viewed the children's testimonies either live ($n = 68$) in the second phase, or on video ($n = 68$) in the third phase. The mock jurors then rated their perception of the children's statement and appearance, assessed the children's veracity and rated their subjective memory of the children's statement. In addition, a memory test was carried out in order to examine the observers' objective memory of the children's statement.

Results

In line with our prediction, the live observers had a more positive attitude towards the children's statement than had the video observers. Specifically, live observers rated the children's statements as being more convincing. We found that the truth-telling children's statements and appearance were perceived in more positive terms than were the lying children's statement and appearance. The overall deception detection accuracy was 59.6%, which was significantly different from the level of chance. Live observers (but not video observers) were better than chance in assessing veracity (63.2% vs. 55.9%). The observers were better than chance at assessing deceptive statements (66%), but not at assessing truthful statements (53%). Moreover, the observers rated the lying children as having to think harder than the truth-telling children. Our analysis of the self-reported cues to deception showed that both live and video observers reported more verbal than nonverbal cues, and that the live observers did so to an even greater extent than the video observers. In terms of subjective memory, live observers believed that they had a better memory of the children's statements than did video observers. The objective memory test showed that the live observers' optimism was warranted as they showed a significantly better memory performance than video observers. In contrast to our prediction the observers who watched truth-telling children and those who watched lying children had equally correct memory reports.

Conclusions

The results expand previous research on presentation mode, by showing that the presentation mode influenced how children are perceived, assessed and remembered. Notably, the live observers perceived the children's statements as being more convincing than did the video observers. This positive attitude towards child witnesses could play an important role in real-life cases. For this reason, it was concluded that the psychological effects of presentation mode is an important aspect to consider when reforming courtroom procedures.

Study III

Study III investigated observers' perception and veracity assessment of children's testimonies as a function of three different presentation modes; live, two-way CCTV and video. Previous studies on adults' perception and assessments of veracity have contrasted either (a) one-way CCTV and live children's testimonies (e.g., Goodman et al., 1998; Tobey et al., 1995), or (b) video recorded and live

children's testimonies (e.g., Goodman et al., 2006). In Study III we included two out-of-court presentation modes; two-way CCTV and video. The rationale for this was that two-way CCTV is employed in courts in several countries, but that there is no experimental research on the psychological effects of this technology. In addition, previous research (e.g., Davies & Noon, 1991) has suggested that the rationale behind jurors' more negative attitude toward children's CCTV (and video recorded statements) is that these statements do not have the same emotional impact and immediacy as live statements. Thus, in Study III two out-of-court presentation modes were included to investigate if two-way CCTV would increase the immediacy and the emotional impact compared to videotaped testimonies.

The first aim of the study was to investigate the observers' perception as a function of the different presentation modes. In line with the vividness effect (Nisbett & Ross, 1980), and previous empirical findings (e.g., Goodman et al., 1998; Tobey et al., 1995), it was predicted that the children seen live would be perceived in more positive terms than the children seen via two-way CCTV and via videotapes. In turn, it was predicted that the children seen via two-way CCTV would be perceived in more positive terms than the video recorded children.

The second aim was to investigate the observers' perception and veracity assessments as a function of the children's veracity. In line with previous findings (Chahal & Cassidy, 1995; Strömwall & Granhag, 2005; Westcott, Davies, & Clifford, 1991), it was predicted that the overall deception detection accuracy would be at chance level, but that the observers would be able to discriminate between truthful and deceptive children on dimensions other than explicit veracity (DePaulo & Morris, 2004). Specifically, and in line with the findings in Study I and Study II, it was predicted that the observers would perceive the truth-telling (vs. lying) children's statements as more plausible, detailed and convincing, and that lying (vs. truth-telling) children would be perceived as having to think harder.

The third aim of Study III was to investigate to what extent the children's own experiences of nervousness and difficulties would be affected by the different presentation modes examined. In order to be able to address this issue, three separate groups of children were included; one appearing live, one via two-way CCTV and a third group appearing on video. In line with previous findings (Goodman et al., 1998; Tobey et al., 1995), we predicted that the children testifying live would be more nervous and that they would find the interview to be more difficult than the children in the two-way CCTV and video conditions.

Method

Study III was (structurally similar to Study I and II) an experiment divided in three phases. In the first phase, 108 children (10-11 year olds) participated, and half the sample experienced a real event (an interaction with a stranger), and the other half imagined the same event. In the second phase, three weeks later, all the children testified about the event as having experienced it. Adult mock jurors ($N = 240$) watched the children's testimonies live ($n = 80$) or via two-way CCTV ($n = 80$) in phase two, or via pre-recorded video ($n = 80$) in phase three. The mock jurors rated their perception of the children's statement and appearance, and assessed the children's veracity. In addition, the children were, after being interviewed, asked to what extent they had experienced discomfort (nervousness or difficulties) during the interview.

Results

The results showed, in line with the prediction, that live observers perceived the children in more positive terms than did the two-way CCTV and video observers. Furthermore, the two-way CCTV observers perceived the children in more positive terms than did the video observers. In brief, the more proximal the presentation mode, the more positive the observers' perception. The observers' overall deception detection accuracy was significantly, but not impressively, better than the level of chance (58.3%). Video observers (but not live and two-way CCTV observers) were better than chance in assessing veracity. Furthermore, and in line with the prediction, observers were able to discriminate between truthful and deceptive statements on dimensions other than explicit veracity. Specifically, the observers perceived the truth-telling (vs. lying) children as being more involved, straightforward and natural.

Moreover, fewer children who testified on video stated that they were nervous, compared to the groups of children who testified live or via two-way CCTV. In a similar vein, the children in the live condition reported that they found the interview to be more difficult than did the children in the two-way CCTV and video conditions. This finding suggests that the more proximal the presentation mode, the harder the interview for the children.

Conclusions

The results adds to the theoretical groundwork of the vividness effect by showing that the more proximal the presentation mode, the more positive the observers' evaluation of a child witness. Furthermore, both live and two-way CCTV statements seemed to be more emotionally involving than the videotaped statements; and this indicates that the temporal proximity to the witness provides an important

contribution to the vividness effect. However, the results in Study III leave us with the following dilemma: (a) Fewer children of those who testified via video reported that they were nervous, and they found the interview to be less difficult, but (b) the observers who watched those videotaped children perceived them in more negative terms. This dilemma, also identified in previous research (e.g., Goodman et al., 1998), emphasizes the importance of balancing the positive effects of legal representatives' proximity to the child (i.e., increased credibility) and the negative effects on the child's wellbeing (i.e., increased stress).

Study IV

In Study IV we set out to investigate how adults' perception and assessments of children's videotaped statements is affected by variations of (a) the camera shot (i.e., the distance between the camera and the child), and (b) the camera focus (i.e., focus on the child vs. focus on both the child and the interviewer). In addition, since previous research (including Study II and Study III in the current thesis) has shown that observers are able to distinguish between lying and truth-telling children when asked to rate aspects other than explicit veracity, we decided to further examine this issue. Thus, Study IV had three major aims. The first was to investigate to what extent the observers' perception would be affected by different camera shots (close-up shot vs. medium shot vs. long shot). In line with Millerson (1979) we predicted that the observers in the 'close-up shot' condition would perceive the children as having to think harder than the observers in the 'medium shot' and 'long shot' conditions. The rationale behind this hypothesis was that the observers in the 'close-up shot' condition were assumed to pick up more signs of cognitive load such as tenseness and decreased blinking (Vrij et al., 2006). In the same vein, it was predicted that the observers in the 'long shot' condition would perceive the children as more relaxed, natural and pleasant than the observers in the 'medium shot' and 'close-up shot' conditions.

The second aim was to investigate observers' perception and assessments as a function of camera focus (i.e., focus on the child alone or focus on both the child and the interviewer). In line with previous research (Lassiter et al., 2001) and the illusory causation phenomenon (MacArthur, 1980), it was predicted that the observers in the 'child only' condition (vs. 'child and interviewer' condition) would perceive the children in more positive terms.

The third aim was to investigate the observers' perception and assessment of truth-telling and lying children. We predicted that observers would perceive the truth-telling children as being more pleasant, relaxed and natural (DePaulo et al.,

2003). Furthermore, and in line with the findings of Study II, we predicted that the truthful statements would be perceived as more plausible, detailed and convincing, and liars as having to think harder.

Method

The study was a three phase experiment. In the first phase, 14 children (8-9 year olds) either experienced an event (in which the children interacted with a stranger) or learned about the event through hearsay. The children were interviewed two weeks later, in the second phase, and all the children were asked to testify as having experienced the event. When interviewed, the truth-telling and lying children were videotaped simultaneously by four cameras, each taking a different visual perspective; (a) close-up shot/child only, (b) medium shot/child only, (c) medium shot/child and interviewer, and (d) long shot/child and interviewer. In the third phase, mock jurors ($N = 256$) watched the videotaped testimonies and rated their perception of the children's statement and appearance, and assessed the children's veracity.

Results

In terms of camera shot we found, in line with our prediction, that the children seen in long shot were perceived in more positive terms (more natural and relaxed), and that the children seen in close-up were perceived as having to think harder. In addition, we found partial support for our prediction concerning camera focus in that the observers who saw a videotaped version showing both the child and the interviewer perceived the child's statements as less reliable than did those observers who saw the child only. The observers' ability to discriminate between the children's truthful and deceptive statements was poor (their overall accuracy rate was 46.9%). In contrast to our prediction, the observers were unable to discriminate between the children's truthful and deceptive statements by using indirect methods.

Conclusions

The findings show that the camera shot influence the observers' perception of children's appearance. Specifically, the observers who saw the close-up shot showed a more skeptical attitude towards the children. Although this skepticism did not translate into any significant difference with respect to the more global veracity assessments made, it could still play an important role in real-life cases as previous research has shown that jurors do pay attention to a child's appearance when assessing the veracity of his or her testimony (e.g., Golding, Fryman, Marsil, & Yozwiak, 2003).

General Discussion

To reiterate, the major aim of the present thesis was to investigate adult observers' perception and assessment of witnesses as a function of different presentation modes. In a series of studies, this issue was addressed from different forensically relevant perspectives. We commenced by investigating the effects of two presentation modes (live and video) on observers' perception of adult (Study I) and child (Study II) testimonies. Study III investigated the effects of three different presentation modes (live, CCTV, and video), and Study IV focused on the effects of variations in camera perspective.

Main Results and Legal Implications

In brief, the studies showed that the presentation mode, via which the witnesses were shown, affected the observers in terms of (a) their perception of the witnesses' statements and appearance, and (b) their memory of the witnesses' statements, but (c) not in terms of their ability to correctly assess veracity. In the following paragraphs these main findings will be outlined and the converging results of the studies will be identified. In addition, the legal implications of the findings will be discussed.

Perception of the Witnesses' Statement and Appearance

Three studies investigated and found that varying the presentation mode resulted in differences with respect to the observers' perception of the eyewitnesses' testimonies. Specifically, in Study I it was found that the live observers perceived the adult witnesses' appearance more favorably than did the video observers. In Study II it was found that the live observers perceived the children's statement in more positive terms than did the video observers. Study III showed that live observers perceived the children's statements and appearance in more positive terms than did the two-way CCTV and video observers. Furthermore, the two-way CCTV observers perceived the children's appearance in more positive terms than did the video observers. Thus, the present thesis lends strong support to the idea that 'presentation mode matters'. The combined evidence adds to previous re-

search showing that live observers tend to be more positive in their evaluation of witnesses than CCTV and video observers (e.g., Goodman et al., 1998).

A closer inspection reveals that the findings of Study I and Study II are somewhat inconsistent, as the presentation mode affected the perception of the appearance (but not statement) in Study I, and perception of the statement (but not appearance) in Study II. At an early stage we speculated that this could be due to the witnesses in Study I being adults, whereas the witnesses in Study II were children. The rationale for this speculation was that previous research shows that adults tend to pay more attention to children's statements than their appearance when assessing veracity (e.g., Strömwall & Granhag, 2005), and that this 'imbalance' seems to be less pronounced when the targets are adults. However, Study III showed that the presentation mode affected the observers' perception of both the children's statement and the children's appearance. Hence, this particular finding questions the initial speculation and shows that the perception of senders' statement is not easily separated from the perception of senders' appearance (and vice versa).

Moreover, the results of Study I, II and III support the vividness effect (Nisbett & Ross, 1980). In brief, in all the studies it was found that the more proximal the presentation mode, the more positive the observers' perception of the witness. Also, Study III adds to the theoretical groundwork of the vividness effect by showing that temporal proximity is a significant contributor to the vividness effect. Specifically, the study showed that the children who testified via the two temporally proximate presentation modes (i.e., live and two-way CCTV) were perceived in more positive terms, compared to the children who testified via the temporally more distal presentation mode (i.e., video). Put differently, the observers were positively affected by the fact that the witness was giving his (or her) testimony "right now" (i.e., temporal proximity).

In many criminal cases judges and jurors have to rely heavily on eyewitness testimony in order to reach a verdict. Hence, it is important to acknowledge that witnesses can be perceived in more negative terms due to the fact that they have appeared out of court (vs. in court). Specifically, this thesis show that out-of court witnesses are perceived as telling less convincing stories, being less honest, confident, natural, and forthcoming etcetera.

Moreover, in Study IV we predicted and found that the observers' perception of the children's videotaped statements was affected by variations in camera perspective. In brief, variations of the camera shot (i.e., the distance between the child and the camera) influenced the observers' perception more than variations of the camera focus (i.e., focus on the child vs. focus on both the child and the interviewer). Specifically, longer shots created a more favorable impression than

did medium and close-up shots. This finding may play an important role in real-life cases since most Swedish children who are asked to testify in criminal cases are videotaped. Also, hitherto in Sweden there are no specific governmental guidelines about what camera shot to employ when video taping children. Thus, there can be vast variations in camera shot from one video recording to the next, which could lead to one child being viewed more critically than another due to the camera shot used.

In sum, the studies showed that observers' perception of testimonies varies between different presentation modes (Study I, II and III), but also that observers' perception varies within a specific presentation mode (Study IV).

Assessments of the Witnesses' Veracity

The observers overall deception detection accuracy was modest in all four studies, ranging from 46.9% to 59.6%. This supports previous research, showing that peoples' ability to detect other adults' (Bond & DePaulo, 2006) and children's lies (Vrij, 2002) is indeed very modest. On a general level, the present thesis failed to show that deception detection accuracy is moderated by the type of presentation mode. On a more detailed level, Study II showed that the live observers (vs. video observers) obtained an accuracy score that differed significantly from the level of chance, whereas Study III showed that video observers (vs. live observers) obtained an accuracy rate significantly higher than the level of chance. The result on this more detailed level is inconsistent, but not something to be daunted by. Instead, the most important results with respect to this issue are the consistent findings that the observers' ability to assess the witnesses' veracity was (a) not moderated by the presentation mode used, and (b) poor regardless of the presentation mode. Obviously, the former finding must be viewed in the light of the fact that previous research has identified very few variables that actually do moderate peoples' deception detection accuracy. For example, variables such as presumed expertise (e.g., Hartwig et al., 2004; Vrij, 2008) and the number of interviews shown to the lie-catchers (e.g. Granhag & Strömwall, 2001b) do not seem to enhance deception detection accuracy.

Moreover, Study IV showed that the observers were better at detecting deceptive statements than truthful statements. A similar result was found in Study II, where the observers watching deceptive statements were better than chance in assessing veracity. These findings can, at least partly, be explained by the observers' lie bias tendency. That is, overall the observers more often stated '*this statement is deceptive*' than '*this statement is truthful*'. Interestingly, a lie bias was also detected in Study I. Thus, two studies in this thesis showed a significant lie bias (Study I and Study IV) and one study showed a lie bias tendency (Study II). This

lie bias stands in contrast to previous research showing that people tend to judge statements as truthful rather than deceptive (e.g., Buller & Burgoon, 1996), and particularly so when assessing children's veracity (e.g., Strömwall & Granhag, 2005). The present lie bias could be due to the settings used in the studies. That is, as we tried to simulate courtroom procedures, we may have primed the observers to become more suspicious. Indeed, previous research has shown that when simulating real life investigative settings the observers are not as likely to show the commonly found truth bias (Hartwig et al., 2004).

Although the observers were poor at catching lies, three (of the four) studies showed support for the notion that peoples' lie detection ability may improve by rating the testimony on dimensions other than explicit veracity (DePaulo & Morris, 2004; Vrij et al., 2001). Study I, II and III showed, in line with Anderson and colleagues (2002), that truth tellers (vs. liars) were perceived more positively. In addition, Study I and II showed that lying (vs. truth-telling) witnesses were perceived as having to think harder. This particular result can be explained by lying being a cognitively more demanding task than telling the truth, and that the observers picked up signs of this increased cognitive load (e.g., Vrij et al., 2006). However, it should be noted that even though the observers may have been able to discriminate between truth tellers and liars on indirect measures, the research area on indirect lie detection (or 'implicit lie detection') still needs much more conceptual work. For example, the term 'implicit lie detection' is not very well defined, and is used to describe a host of different phenomena (for a fuller and critical account on this topic, see Granhag, 2006). Thus, it is an issue for future research to further examine how (if at all) indirect lie detection can be used in applied settings.

In this context the association between observers' perception and assessment should also be acknowledged. If an observer perceives the witness in positive terms (e.g., pleasant and forthcoming), it might be that the observer assesses this witness as telling the truth. That is, the observer's perception of the witness predicts the subsequent veracity assessment. However, a different scenario is equally possible. The observer might (for one reason or other) decide very early that the witness is telling the truth, and thus perceive this witness in more positive terms. That is, the observer's veracity assessment predicts the subsequent perception of the witness. Hence, there is an association – but not a casual relation – between observers' perception and observers' veracity assessment.

Memory of the Witnesses' Statements

Both Study I and II showed that the live observers considered themselves to remember the witnesses' statements significantly better than did video observers. The live observers' optimism can be explained by the face-to-face proximity to the witnesses. The witnesses' statements had a stronger impact on live observers than on video observers; and the stronger the impact, the more positive the observers' evaluation of the witnesses, and the clearer their (subjective) memory. Our results support previous findings showing that proximal (vs. distal) information is perceived as more vivid, and therefore also as more memorable (Bell & Loftus, 1985). In addition, and also in line with the vividness effect, Study II showed that the live observers' optimistic belief was warranted as they were found to have a better memory of the children's statements than the video observers. Taylor and Thompson (1982) proposed that vivid information exerts no immediate effects on memory performance, but that vivid information over time will be better remembered than pallid information. However, the result of Study II suggests otherwise: The live observers evidenced a better memory performance and this after a very brief retention interval (10 minutes).

Moreover, the finding in Study I showing that observers watching truthful statements had a better memory than observers watching deceptive statements is congruent with previous research showing that truthful statements are more plausible and structured in a more logical and sensible way (DePaulo et al., 2003). However, Study II failed to replicate this particular finding.

Furthermore, in legal proceedings judges and jurors are highly dependent on their own memory of the evidence at hand as they are often faced with numerous pieces of evidence that they need to keep in mind and integrate. The present results showed that observers' subjective and objective memory for an eyewitness testimony varied due to different presentation modes. In brief, this may very well affect judges' and jurors' evaluation of the testimony. For example, regardless of whether all the evidence is evaluated and assessed before the case verdict is reached; one particular piece of evidence may be more clearly remembered. In turn, the more memorable piece of evidence may be considered more salient and have a greater impact on the case verdict than a less memorable piece of evidence.

Limitations

The current thesis aimed at mirroring a few important features of the courtroom proceedings. However, real-life court proceedings have several features not easily simulated in experimental settings. Hence, a number of possible limitations of the

present research need to be acknowledged. These limitations will be discussed in relation to the main findings. First, the finding that live observers perceive the witnesses more favorably than two-way CCTV and video observers must be contextualized. In brief, there is a host of different factors (other than presentation mode) that may influence an observer's perception and assessment of a witness. For example, factors such as the degree of details in the testimony (Bell & Loftus, 1986), the witness' emotional expressions (Kaufmann et al., 2003), the witness' ethnicity (Lindholm, 2008), and the fact finder's initial hypothesis about the case (Ask & Granhag, 2007), have all been shown to affect the perception and the assessment of a witness' statement.

Second, we found that the observers' overall deception detection accuracy rate was poor. Considering the fact that the observers had to base their veracity assessments on merely the witness' appearance and statement this is not very surprising. In many (but not all) real-life cases, there is a multitude of different sources of evidence (and information) that can be used in order to assess the reliability of a witness statement. For example, the specific statement given in court can be compared against (a) previously given statements (e.g., during the police interviews), (b) suspects' statements, (c) other witnesses' statements and (d) other forms of evidence (e.g., physical or medical). It is reasonable to assume that observers would be more accurate in assessing a witness' veracity, had they been provided with additional pieces of evidence. Furthermore, the actual interviews conducted in the studies are far from perfect in terms of mirroring real-life interviews. For example, the interviewer asked questions about the event, but did not put any pressure on the witness. In a real-life case, it is likely that a witness will be questioned in a more strategic manner in order to, for example, demonstrate different forms of inconsistencies. Hence, one could argue that had the witnesses been questioned more strategically, the observers' ability to correctly assess veracity would have been more impressive (for an in-depth discussion on the effects of strategic use of evidence, see Hartwig, 2005).

Finally, the thesis shows that type of presentation mode influence the observers' perception and memory. Importantly, the thesis does not show that the influence of one particular presentation mode is too great, and therefore undue and prejudicial in a legal sense. To show such influence (if at all present) would require more in terms of experimental sophistication than showing enhanced influence (McAuliff, Nemeth, Bornstein, & Penrod, 2003). Thus, it is for future research to examine if, for example, enhanced influence may lead to biased verdicts and/or that legal representatives may give unduly little weight to videotaped testimonies.

Conclusions

The single most important message of this thesis is that ‘presentation mode matters’. All studies in the thesis showed that the presentation mode, via which the testimony was shown, affected the observers’ perception. Thus, we have reason to believe that the presentation modes used within legal proceedings do indeed affect judges’ and jurors’ evaluation of eyewitness evidence. In addition, all four studies showed that the observers’ ability to discriminate between truthful and deceptive statements was poor, regardless of the presentation mode. Hence, this thesis lends further support to previous research showing that when observers only have access to a witness statement, it is a very difficult task to assess the veracity of that statement (Vrij, 2008).

Beyond the two main findings, the thesis also lends support to the notion that indirect lie detection may improve observers’ deception detection accuracy. In addition, the thesis shows that presentation mode affects the observers’ subjective memory; live observers believed they had a better memory of the testimony than video observers.

The fact that the presentation mode affects observers’ perception and memory of eyewitnesses’ testimonies can have both immediate and latent legal effects. By *immediate effects* I refer to the fact that the presentation mode influences legal procedures in the present. Today, eyewitnesses can testify via various forms of presentation modes, and the message of this thesis is that different presentation modes influence legal decision makers differently. Proximal presentation modes (i.e., in-court testimonies) are perceived more favorably than are distal presentation modes (i.e., out-of-court testimonies). In short, it is reasonable to assume that the presentation mode affects legal proceedings on a more or less daily basis.

The *latent effects*, on the other hand, are dependent on the ongoing and future reforms within the legal system. In short, if such reformatory work is insensitive to the psycho-legal findings in the area, it might very well be that the subsequent reforms result in the effects of different presentation modes becoming exacerbated. For example, one aspect of the ongoing modernization of the Swedish court proceedings relates to the increased usage of new visual courtroom technology. On the basis of the present thesis, one could argue that every change in the legal proceedings affecting how frequently different presentation modes are used in court, must be carefully balanced in order to avoid one part being prejudiced. Yet another aspect of the new reform, that will be put into practice in November, 2008 (Prop. 2004/05:131), is that all hearings in the district courts will be videotaped and that these videotaped hearings will be used as evidence in the court of appeal. Thus, in the court of appeal, the physical presence of the parties involved

in the trial may be replaced by videotaped versions of their testimonies. This is obviously very efficient as the court of appeal does not have to summon all the witnesses once again. However, from a psychological viewpoint this reform is not unproblematic. To exemplify, if the court of appeal only views videotaped testimonies, they will be facing a different task than the district courts. That is, although the videotaped hearings presented in the court of appeal will show the “exact same thing” as was shown live in the district court, the hearings might be perceived differently. Specifically, the present thesis shows that the presentation mode does matter and may affect the evaluation of witnesses. Also, in the court of appeal, new witnesses might be called to testify, and the key-witnesses may be asked to testify again. If these witnesses testify live, their testimonies might have a greater impact on the legal decision makers than testimonies shown on videotapes.

The results in the thesis also raise the question of other new visual communication technologies that are used more frequently within the legal arena, such as computer animations, presentation software, evidence cameras, and digital photos. In essence, the present thesis makes clear that psycho-legal research has much to offer when it comes to informing the legal system about the effects of different forms of technologies used by the police and in court. If the outcome of such research is neglected, unwanted legal consequences might follow. If, on the other hand, such research is acknowledged, it might contribute to justice.

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Appendix

- I. Landström, S., Granhag, P.A., & Hartwig, M. (2005). Witnesses appearing live versus on video: Effects on observers' perception, veracity assessments and memory. *Applied Cognitive Psychology, 19*, 913-933.
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