

Chapter 7

Does Testimonial Inconsistency Indicate Memory Inaccuracy and Deception? Beliefs, Empirical Research, and Theory

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Introduction

When eyewitnesses and criminal suspects change their sworn testimony, their credibility is challenged, either because inconsistent testimony is a sign that people have poor memories or because they are deceptive and “can’t keep their story straight.” As reviewed below, inconsistency is the most often cited reason for discrediting others (e.g., Brewer, Potter, Fisher, Bond, & Luszcz, 1999; Granhag & Strömwall, 2000; Strömwall, Granhag, & Jonsson, 2003) and is often the attack point for impeaching witnesses in the courtroom. But is it justifiable? In support of this approach, research on memory warns us that changes in recollection may be the product of contamination from sources such as misleading questions, which could distort memory (Loftus, 1975; see Yarbrough, Hervé, & Harms, this volume). However, one can imagine just the opposite pattern: in an effort to sound truthful, good liars often simply repeat whatever they said earlier and, so, they may be more, not less, consistent than truth-tellers (Vrij, Granhag, & Mann, 2010). Perhaps the true meaning of inconsistency is not so obvious.

This chapter examines the role of inconsistency in memory and deception from a variety of perspectives. After showing that both experts and novices regularly use inconsistency to infer people’s mental state—either a faulty memory or deception—we examine the scientific evidence itself: in fact, is inconsistency a valid predictor of inaccurate recollection or deception? Finally, we speculate about the psychological processes that underlie inconsistency and present a tentative framework to understand the phenomenon of inconsistency.

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Inconsistency as a Predictor of Memory Inaccuracy

Inconsistency in the Legal Framework

Research examining the question of inconsistency as a predictor of memory accuracy has been conducted using survey and experimental methodology. Brewer and Burke (2002), Brewer and Hupfeld (2004), and Brewer et al. (1999) have surveyed lay people, police, attorneys, and judges, asking them to indicate how predictive of memory inaccuracy are various eyewitness behaviors, including: (a) inconsistency with previous statements, (b) too little confidence in testimony, (c) testimony not in chronological order, and (d) exaggeration of circumstances (see also Leippe, Manion, & Romanczyk, 1992). Invariably, the most predictive measure of perceived eyewitness inaccuracy was inconsistent testimony. In parallel with this survey research, others have conducted experimental research to see whether mock jurors assigned differential credibility to experimental witnesses who provided consistent versus inconsistent testimony (Berman & Cutler, 1996; Lindsay, Lim, Marando, & Cully, 1986). In these studies, participants observed or read transcripts of a simulated trial in which some witnesses responded consistently across testimony and other witnesses contradicted their earlier statements. Participants then rendered several decisions to reflect their credibility in the witnesses. The typical finding, which mirrors the survey research, is that participants judged inconsistent witnesses to be less credible than consistent witnesses.

Dependence on consistency of eyewitness reporting has made its way into law school training and the courtroom itself. Books written by expert litigators encourage attorneys to monitor, or even create, inconsistencies in (their opponents') eyewitnesses' testimonies for the purpose of impeaching them. Glissan (1991) recommends: "A true inconsistency can effectively destroy a witness, and sometimes a whole case ... If you find a true inconsistency, or if you can manufacture one, then use the deposition of previous evidence to sheet it home" (p. 108). Finally, the law itself, in the form of judicial instructions, directs jurors to attend to inconsistencies within witness statements. A standard (U.S.) federal instruction on witness credibility directs jurors to attend to whether "the witness testified inconsistently while on the witness stand, or if the witness said or did something, or failed to say or do something, at any other time that is inconsistent with what the witness said while testifying" (Committee on Pattern Jury Instructions of the District Judges Association, 2005). In short, just about everyone involved in a legal investigation (e.g., police, defense and prosecuting attorneys, judges) believes that inconsistent testimony is a sign of inaccurate recollection (see Connolly & Price, this volume).

We can understand why attorneys would argue that eyewitnesses who testify inconsistently should be impeached. If attorneys take as their goal to convince the judge or jury that their side of the argument is correct and, if the judge or jury believes that inconsistent testimony is an indicator of having a weak memory, then, not surprisingly, attorneys will play into that belief and highlight those instances in which the opposing eyewitness provided inconsistent testimony. From the scientific

perspective, however, we are not so concerned about convincing others but whether *in fact* inconsistent testimony is a valid predictor of an eyewitness' inaccurate memory. Is it the case, as most people seem to believe, that inconsistent eyewitnesses are much less accurate than consistent eyewitnesses?

Scientific Research on Inconsistency

Prior to 1970, there were relatively few studies about the (in)consistency of memory with repeated testing (for reviews, see Erdelyi, 1996; Payne, 1987). Most theories of memory were concerned with recollection at the (one) time of testing, and the science of memory had little to say about how memory for individual items might change over repeated testing. More recently, researchers have become interested in the (in)stability of recollection. Much of this research emanates from the field of autobiographical memory, where researchers have sometimes tested people repeatedly for earlier real-life experiences (see Connolly & Price, this volume). These studies generally show that, although many of our repeated recollections are stable, there are some instances of change, either in the form of (a) direct contradictions of earlier claims, (b) new recollections that did not appear on earlier tests, or (c) old recollections dropping out from later reports. This occurs for conventional autobiographical experiences and also for highly arousing or flashbulb memories (see Paz-Alonso, Ogle, & Goodman, this volume). One historically noteworthy finding was reported by Wagenaar and Groeneweg (1990) who compared Holocaust survivors' memories of their imprisonment experience when tested initially in the mid-1940s and again in the mid-1980s. In general, most recollections, and especially of central events and actions, were reported consistently over time, although some details—typically non-central, context-defining elements (e.g., dates and specific locations of objects)—were reported inconsistently. A related study was reported by Fisher, Falkner, Trevisan, and McCauley (2000), who described people's recollections of typical activities (e.g., visiting friends, playing sports, doing laundry). People were tested initially in 1960, as part of an epidemiological survey, and again in 1995 as part of a psychological study of long-term recall. In general, people provided similar answers about their activities across the 35-year interval (e.g., whether they engaged in the activity or not), although there were some inconsistencies about frequency (e.g., whether they did the activity once per week or less often). Finally, a few studies have examined flashbulb-memory kinds of experience (e.g., political assassinations, terrorist activities) and, again, central experiences (e.g., whether the World Trade Center was destroyed, or whether President Kennedy was assassinated) are reported consistently, whereas peripheral details of the learning experience (e.g., in which location or from which source one learned about the experience) are sometimes reported inconsistently (e.g., Pezdek, 2003).

These naturalistic studies of autobiographical memory show some instances of inconsistency—which some may consider surprising, given the importance of these

events. However, because they are naturalistic events and not experimenter-created, we do not know whether the recollections are historically accurate (e.g., whether the Holocaust inmate was actually beaten at one prison camp or another; whether the participant heard about Kennedy's assassination from a friend or from a teacher). In order to determine if inconsistency is predictive of accuracy, we must turn to laboratory studies, where we know exactly what occurred, and hence we can measure accuracy in addition to consistency.

Experimental Testing

We describe here a series of laboratory experiments that converge on the relation between consistency and accuracy of eyewitness recall. Each of the experiments followed the same general plan. Experimental witnesses (e.g., usually college students) either watched a videotape of a simulated crime (i.e., robbery or homicide) or observed a live, innocuous event or a staged confrontation between two people. The witnesses were then interviewed twice to assess their memories of the observed event. The first interview occurred shortly after observing the event (i.e., within 30 min), and the second interview occurred after a delay of up to 2 weeks. The interviewers' questions were either open-ended (e.g., Describe the robber) or closed: cued recall (e.g., what color was the robber's hair?), multiple choice (e.g., what color was the robber's hair: blond, black, or brown?), or true/false (e.g., the robber's hair was brown: true or false?). The witnesses were sometimes encouraged to be very certain before volunteering an answer, sometimes encouraged to guess, and sometimes not provided any explicit instructions about certainty.

We compared each witness' statements across the two interviews and categorized them as one of four types: consistent (i.e., same answer at Time 1 and Time 2, e.g., *robber was clean shaven* at Time 1, and *robber was clean shaven* at Time 2), contradiction (i.e., contradictory answers at Time 1 [*clean shaven*] and Time 2 [*bearded*]), reminiscent (i.e., no answer at Time 1, but witness provided an answer at Time 2 [*clean shaven*]), and forgotten (i.e., witness provided an answer at Time 1 [*clean shaven*] but no answer at Time 2). We then calculated the accuracy of each of the four response categories in addition to the accuracy of the entire testimony. Accuracy was calculated separately at Time 1 and Time 2 by dividing the number of correct statements by the total number of statements reported. For instance, if at Time 1, a witness made eight correct statements (i.e., out of ten total statements), then his or her accuracy rate at Time 1 was 0.8 (8/10).

Two corollaries of the common belief that inconsistent recall is predictive of memory inaccuracy are examined here. First, individual statements that are reported inconsistently should be less accurate than those reported consistently. Second, witnesses who make more inconsistent statements should be generally less accurate than witnesses who make fewer inconsistent statements.

Inaccuracy of Inconsistent Statements

In all of our experiments, the accuracy rate of contradictory statements was low (Brock, Fisher, & Cutler, 1999; Fisher & Patterson, 2004; Gilbert & Fisher, 2006). For instance, in Gilbert and Fisher, the accuracy rate of contradictory statements was 0.49 (i.e., averaged across Time 1 and Time 2); by comparison, the accuracy rate of consistent answers was 0.95. At some level, this should be obvious, since, if a witness gives contradictory answers (e.g., clean shaven & bearded) then at least one of those answers must be wrong—which sets the upper level of accuracy at 0.50. By contrast, if people's recollections are generally accurate, then consistent statements, which constitute the bulk of most reports, will be very accurate. Experimental testing, therefore, supports the common belief that contradictory statements are relatively inaccurate.

What about other forms of inconsistent recollections, forgotten, and reminiscent items? In Gilbert and Fisher (2006), forgotten and reminiscent items were recalled almost as accurately (i.e., 0.93 and 0.87, respectively) as consistent items (i.e., 0.95; see La Rooy, Pipe, & Murray, 2005 for comparable findings with child witnesses, although note some studies in which reminiscent answers were less accurate: see Brock, Fisher, & Cutler, 1999; La Rooy, Lamb, & Pipe, 2008). The high accuracy of reminiscent items is particularly interesting, as it violates the commonly held belief that memory gets worse with the passage of time—and hence is often challenged in the courtroom (see Hervé, Cooper, & Yuille, this volume). If nothing else, these results suggest that we need to distinguish between different kinds of inconsistency. Only contradictory statements are grossly less accurate than consistent recollections. Forgotten and reminiscent statements, although somewhat less accurate than consistent statements, may be generally accurate.

Inconsistent Versus Consistent Witnesses

Although contradictory statements were considerably less accurate than consistent statements, inconsistency's ability to predict accuracy changed when the same data set was analyzed at the level of the individual witness. That is, *witnesses* who made many contradictory statements were not much less accurate than witnesses who made no or only a few contradictory statements. To examine the role of inconsistency at the witness level, we scored each witness in terms of the consistency of his/her recall (i.e., the proportion of all statements that were contradictory) and the accuracy of his/her recall (i.e., the proportion of all statements that were accurate). Across the various conditions of the experiments, the correlations between inconsistency and accuracy were relatively low (i.e., the Pearson correlation coefficients were generally between 0.00 and 0.35; Brewer et al., 1999; Fisher & Cutler, 1995; Fisher & Patterson, 2004; Gilbert & Fisher, 2006). Inconsistent witnesses were almost as accurate as consistent witnesses. Furthermore, this pattern held whether the inconsistencies occurred on material or peripheral aspects of the crime (Carbone & Fisher, 2011).

There is an apparent conundrum here: contradictory statements are much less accurate than consistent statements, yet witnesses who make many contradictory statements are almost as accurate as witnesses who make none or a few contradictory statements. We believe that this conundrum can be explained by the idea that the various components of a complex event (e.g., a crime) are processed nearly independently of one another. That is, accuracy of memory for one component of a complex event tells us very little about accuracy of memory for other components of the event (see Hervé et al., this volume). Thus, if a specific statement (e.g., facial hair) is believed to be inaccurate, because the witness contradicted her/himself, this tells us very little or nothing about the accuracy of the remainder of the testimony (e.g., description of gun). To test this idea, we conducted several experiments in which witnesses attempted to describe the various components of complex events. We then measured the relationships between accuracy levels for each of these various components. For example, Brewer et al. (1999) classified the recall of witnesses to a bank robbery into five different dimensions—offender description, offender actions, bystander description, bystander actions, and objects—and found no meaningful relationships between accuracy on one dimension and that on any other. Other studies have replicated this finding (e.g., Fisher et al., 2000; Mitchell, Haw, & Fisher, 2003). It is not surprising, therefore, that inaccurate recollection for a few, isolated parts of a crime (e.g., as inferred by contradictory statements) cannot predict the accuracy of the witness's overall testimony. That is, inconsistency of recollection informs us about the *specific statement* that is reported inconsistently, but it tells us little or nothing about the accuracy of the *rest of the witness's testimony*.

We believe that this pattern, of the independence across elements of a complex event, is critical as it exposes the weakness of a common courtroom tactic. Specifically, attorneys will often demonstrate that one specific statement with an eyewitness's testimony is incorrect, either because the statement is inconsistent with an earlier statement or because other, reliable evidence contradicts the eyewitness's statement (e.g., the eyewitness claims that she heard two gunshots, but the police found four bullet casings.). After demonstrating that the eyewitness was wrong about one element, the attorney then generalizes to the entire testimony, based on the assumption that memory for one element of the case is indicative of memory for all other elements of the case. Instead, our data show that extrapolating across elements is unfounded, and that the safer argument is to challenge only those specific statements that are inconsistent or otherwise shown to be incorrect.

A Framework for Understanding Inconsistency

The previous section reflected a purely empirical approach, but was not informed very well by cognitive theory. In order to make progress in understanding why inconsistency is or is not predictive of accuracy, we must first gain a better understanding of the psychological processes underlying the phenomenon of

inconsistency itself. Therefore, an initial framework around which to understand inconsistency is presented here. This is not so much a formal theory as a general framework for thinking about the phenomenon of inconsistency.

The unifying principle within our framework is that *something* must change from the earlier test (T1) to the later retest (T2) to account for inconsistent recollection. Specifically, what changes from T1 to T2? We offer various candidates about what might change from T1 to T2, and then we leave it to the reader to develop these ideas more thoroughly. The candidates for change are the three components of memory (e.g., following Tulving, 1983): the *mental representation* of the event to be remembered (i.e., the “memory trace”), the *retrieval* processes that activate the mental representation, and *metacognition* (i.e., monitoring and controlling one’s memory). We assume that (a) recollection is the product of activating or retrieving a memory of the to-be-recalled event or related knowledge, and (b) this product is monitored for confidence, so that a response is produced only if the assessed confidence level is above some criterion (Koriat & Goldsmith, 1996).

Underlying Mental Representation

The underlying mental representation may change over time, because (a) the eyewitness is exposed to some new information between T1 and T2 (e.g., either via communicating with other eyewitnesses, exposure to the media, or interviewers providing information via leading questions, [e.g., Gabbert, Memon, & Allen, 2003; Loftus, 1975]; see Yarbrough et al., this volume), or (b) there are systematic or random changes in the relative accessibility of events from T1 to T2, so that events that were relatively accessible at T1 may be less accessible at T2 (e.g., the different forgetting rates of gist and verbatim information; Brainerd & Reyna, 1993), or (c) the various events are rehearsed unequally, so that frequently rehearsed events become more accessible and infrequently rehearsed events become less accessible (see Hervé et al., this volume).

Retrieval Processes

The retrieval processes applied to the underlying mental representations may change over time. One kind of change may be global (e.g., shifting from reproductive to reconstructive recall). Reproductive recall refers to searching for the mental record of the specific to-be-remembered event (e.g., what I ate for breakfast this morning); reconstructive recall refers to constructing a memory from a schema or related set of knowledge (e.g., using my knowledge of what I usually eat for breakfast to calculate or construct what I probably ate for breakfast today; see discussion of script memories by Connolly & Price, this volume; Hervé et al., this volume; Paz-Alonso et al., this volume; Ogle, & Goodman, this volume). A second kind of change may reflect the specific retrieval cues available at T1 and T2. These changes may be

brought about by changes in the wording of specific questions asked at T1 and T2, or even in the general style of interviewing as, for example, greater reliance on broad open-ended questions or on narrow, closed questions (see Yarbrough et al., this volume).

Metacognition

Eyewitnesses' thoughts about their own recollections or the goal of the interview may change over time. For instance, an eyewitness might adopt a more lenient output criterion at T1 and a more stringent output criterion at T2, or vice versa. These changes may manifest themselves with fewer or more "I don't know" responses, which may, in turn, alter the relative frequency of omission and commission errors (Evans, 2011). Such changes might reflect different interview contexts (e.g., police station vs. courtroom) or different instructions by the interviewers (e.g., to be complete or to be certain). Given these various candidates for the elements or processes that may change between T1 and T2, what are the implications for whether inconsistencies are predictive of accuracy? We organize these predictions along the three areas of change: underlying representation, retrieval processes, and metacognition.

Analysis by Components

If the underlying representation has changed because the eyewitness is exposed to new facts, then T2 recollection accuracy will depend on the validity of these new facts. They may be correct (e.g., if acquired from another, unbiased eyewitness who had a good view of the critical event) or incorrect (e.g., if acquired from a biased source, for instance, the opposing party's attorney or an investigator whose goal may be to introduce an error into the eyewitness' recollection). Although this approach is sound theoretically, in most realistic situations, it will be difficult to know who or what was the source of the newly exposed facts. Eyewitnesses may be exposed to many new sources and, given people's limitations to monitor the source of their knowledge (Johnson, Hashtroudi, & Lindsay, 1993), the validity of the newly exposed information is likely not to be known.

If the underlying representation changes because of differential forgetting or rehearsing, then T2 accuracy will depend on whether correct items are less or more likely to be forgotten or rehearsed than incorrect items. We cannot think of any a priori reason why incorrect recollections might be more likely to be rehearsed than correct recollections.

If the retrieval process, which is likely to be driven by the interviewer's question, has changed from T1 to T2, then it is important to know the specific questions that were posed to the eyewitness at T1 and T2. In general, open-ended questions yield more accurate recollections than closed questions (Fisher & Patterson, 2004). The difficulty in most investigations will be to know what questions were asked.

Interviewers (and eyewitnesses) are unlikely to remember the exact form of their own questions (Warren & Woodall, 1999). Tape recordings and videotapes should, therefore, contribute substantially to inferring the nature of the question posed and, hence, the likelihood of new recollections being correct (see Yarbrough et al., this volume).

Eyewitnesses' metacognitive processes, whether they use a lenient or stringent output criterion, may vary over time, perhaps influenced by interviewers encouraging or discouraging them to guess. Again, an audio or video record of the interview will be helpful to know whether interviewers encouraged eyewitnesses to be certain (high accuracy) or to guess (low accuracy) when responding.

In overview, whether inconsistent testimony is an indicator of memory inaccuracy depends theoretically on (a) which of the various psychological processes are responsible for the inconsistency, and (b) how the engaged psychological processes are related to recall accuracy. Furthermore, we should distinguish between different forms of inconsistency: direct contradictions, adding new information in a later interview (i.e., reminiscence), or forgetting earlier stated information. Presumably other factors are also involved. Put simply, the matter is not as simple as many believe.

Inconsistency as a Predictor of Deception

We turn now to the second area within the law in which inconsistent reporting leads observers to draw inferences about the respondent, viz., whether he/she is lying. Again, we ask (a) whether people use inconsistency to infer deception, and (b) in fact, how valid is inconsistency as a predictor of deception?

Beliefs About Inconsistency

Parallel to the research showing that inconsistency influences observers' beliefs about eyewitness memory, research also shows that inconsistency influences observers' beliefs about eyewitnesses' veracity. This follows from both informal and formal surveys and from controlled laboratory experiments. A casual search through the Internet shows that many investigators and training agencies believe that inconsistency within a suspect's interview is a reliable cue to deception. The same belief is found in more formal print (e.g., interrogations manuals; Shuy, 1998; Zulawski & Wicklander, 1993). A survey of police officers about their experiences conducting sexual assault investigations found that inconsistency of reporting was the most commonly mentioned cue to detect deception (Greuel, 1992, as reported by Strömwall & Granhag, 2003). Similarly, Strömwall and Granhag asked experienced police officers, prosecutors, and judges to indicate their beliefs about signs of deception.

Eighty-two percent of the police officers, 72 % of the prosecutors, and 74 % of the judges indicated that truth-tellers' stories will be more consistent than liars' stories. In short, most people, irrespective of their professional experience, believe that inconsistency is an indicator of deception.

In addition to these surveys, Granhag, Strömwall, and their colleagues conducted several controlled laboratory studies to examine how observers relied on their beliefs about inconsistency (i.e., the consistency heuristic) to decide whether suspects were being deceptive (e.g., Granhag & Strömwall, 2000). In one study, Granhag and Strömwall (2001) showed a simulated crime to 24 witnesses and then interviewed each laboratory witness three times (i.e., after 3 hours, 4 days, and 11 days). Half of the witnesses were instructed to be truthful when describing the "crime" and half of the witnesses were asked to lie such that the victim was the perpetrator. These interviews were videotaped and shown to 144 observers who were asked to determine which of the witnesses were truthful and which were deceptive, and to justify their judgments. The most commonly reported justification of the deception judgments was inconsistency of the witness's story across repeated tellings. The same findings were observed when adults judged the veracity of children who had been interviewed twice (Strömwall & Granhag, 2005).

Strömwall et al. (2003) extended the earlier study to examine consistency in a novel fashion (i.e., consistency across two respondents) in addition to the earlier tested measure (i.e., consistency within one respondent on repeated interviews). In this innovative study, 10 pairs of people ate lunch at a restaurant and then returned to the laboratory to describe truthfully their lunch-time activities. Another matched group of 10 pairs of people did not go to lunch at the restaurant, but were asked to fabricate a lie that they had gone to lunch. All 40 people (i.e., 10 pairs of truth-tellers and 10 pairs of liars) were then interviewed about their truthful or fabricated lunch-time experiences. Videotape recordings of these interviews were then shown to 120 observers who decided which respondents were truthful and which were deceptive. The results show that observers depended on consistency both across respondents and, also, within each respondent, across time.

In short, lay people and experts within the fields of law enforcement and security strongly believe that inconsistent reporting, both across and within respondents, is grounds for doubting the veracity of the respondent.

Scientific Evidence Relating Consistency and Deception

As was the case with inconsistency as an indicator of poor memory, relatively little research has been conducted to examine whether inconsistency, in fact, is predictive of deception. This is odd, given that observers rely on inconsistency more than any other cue when multiple statements are available (Strömwall et al., 2003). We suspect that there is a paucity of research examining inconsistency as a predictor of deception and poor memory because such research is resource-demanding: the researcher must interview each respondent twice, compare the responses given at

the two or more interviews, and then calculate the observed relationship between inconsistency and deception. Nevertheless, there are enough studies now, mainly from the labs of two teams of researchers (i.e., Granhag & Strömwall; Vrij & Fisher), that we can establish some general patterns.

Most of the laboratory studies examining the empirical relation between consistency and deception follow the same general procedure. Truth-telling participants (e.g., typically college students) are instructed to go to a specified location and engage in an activity (e.g., go to a restaurant and eat; go to a laboratory room and perform a specific task), whereas liars do not go to the specified location and do not participate in the activity. Liars typically spend a comparable amount of time thinking about such an activity. Truth-tellers and liars are then interviewed shortly thereafter by someone who is blind to the respondents' experimental condition. Truth-tellers are instructed to describe the event they participated in; liars are instructed to try to convince the interviewer that they actually participated in the event. After an interval of time following this first interview (i.e., Int-1), which might range from a few minutes to several days, the participants are interviewed a second time (i.e., Int-2) about the same event. The participants' responses on the two interviews are then compared and scored for consistency to determine whether the consistency score differs for liars and truth-tellers, as would be predicted by the consistency heuristic. In some variants of this procedure, the participants do the activities in pairs and both participants are interviewed (i.e., individually), so that consistency may be measured by comparing one member of the pair's responses to those of the other pair member.

Two distinct patterns emerge from these studies: in those studies conducted by Granhag and Strömwall, liars generated equivalent amounts or slightly fewer inconsistencies than did truth-tellers, whereas, in those studies conducted by Vrij and Fisher, liars produced more inconsistencies than did truth-tellers. We believe that the critical differences between the two sets of studies reflect (a) the participants' preparations for the interview, (b) the questions that the interviewers posed at the interview, and (c) the similarity of the questions at Int-1 and Int-2. In the Granhag/Strömwall studies, (a) the liars were given time to rehearse their stories prior to the interview whereas the truth-tellers did not have time to rehearse, (b) the interviewers asked the participants to describe in general what happened during the target activity (e.g., What did you do when you went to the restaurant?), and (c) the same questions were usually asked at Int-1 and Int-2. By comparison, in the Vrij/Fisher studies, (a) both the liars and the truth-tellers had time to prepare for the interview, (b) the questions asked about non-central aspects of the activity (e.g., Where was the waiter standing relative to your companion?), and (c) different questions were asked at Int-1 and Int-2. Why should it matter if (a) the participants have time to prepare for the interview, (b) the interviewer asks about the core activity or about a non-central detail, and (c) the questions asked at Int-1 and Int-2 are the same or different? We believe that two simple factors can account for the results: liars and truth-tellers (a) prepare differently and (b) use different retrieval strategies for the interview. These differences are expanded upon below, as they are critical to understanding the diverse patterns of results.

Differential Preparation

In preparation for the interview, liars are more likely than truth-tellers to rehearse their answers. As a result of this pre-interview rehearsal, liars are prepared to describe their (fabricated) story; however, they are prepared to narrate a response only to the questions that they anticipated, which is likely to be about the central activity. By contrast, truth-tellers do not prepare thoroughly for their interview, because they have less reason to think that the investigator will disbelieve them (Hartwig, Granhag, & Strömwall, 2007). Instead, truth-tellers rely on their being able to recall the critical event, which they can retrieve on command, to convince the interviewer of their veracity. We examine this explanation by (a) showing that liars do rehearse more than truth-tellers in preparing for the interview, and (b) exploring the implications of this differential rehearsal.

In a recent study in our lab, truthful participants were asked to go to the campus bookstore and engage in specific tasks, and then later to describe their activities (Cahill, Fisher, & Rivard, 2011). Liars did not go to the bookstore, but were asked to convince an interviewer that, in fact, they had gone to the bookstore. Prior to participating in the interview, the liars and truth-tellers were given 5 min to sit in a waiting room that was filled with a book of cartoons. The liars and truth-tellers were told that they could rehearse in preparation for the interview or they could read through the book of cartoons (and rate the cartoons for humor) or do whatever they wished prior to the interview. We assumed that, if the participants were preoccupied with rehearsing their fabricated story, they would not be enticed to look at the cartoons, whereas if they were not concerned about being believed, they would not bother rehearsing and would look at the cartoons. In support of the differential preparation hypothesis, liars read (rated) fewer cartoons than did the truth-tellers. Liars, compared to truth-tellers, were also more likely to tell the experimenter that they rehearsed in preparation for the interview.

As a result of liars rehearsing their stories more than truth-tellers, liars are better prepared than truth-tellers to tell their story during the interview—but only if the interviewer asks them questions that are compatible with how they rehearsed. Prompts such as “tell me what happened [at the critical time period],”—the types of prompts/questions used by Granhag and Strömwall—are likely to be compatible with the liars’ rehearsal and, hence, are answered easily by the liars. Asking the same question on a later interview again allows liars to rely on their rehearsed story a second time and, not surprisingly, to generate the same stories on both occasions. Given that Granhag and Strömwall asked their participants questions that they could easily anticipate and likely rehearsed, it is not surprising that Granhag and Strömwall found that liars were as or more consistent than truth-tellers.

In a slightly different version of this study, Granhag, Strömwall, and Jonsson (2003) tested participants in pairs, as if two people had committed a crime together and were being interviewed (i.e., individually) about their earlier activity. Again, Granhag and colleagues gave the pairs of liars time (i.e., 30 min) to prepare for the

interview. Given the time to prepare, liars were able to provide similar stories when asked the same easily anticipated questions/prompts: “tell me what happened [at the critical time period].” Once again, when liars can anticipate the interview question, they can rehearse before the interview and, as a result, their responses will match one another’s and they will be consistent across time.

In comparison to the Granhag/Strömwall studies, where the interviewer asked easily anticipated questions, the studies conducted by Vrij, Fisher, and their colleagues posed questions that were not easily anticipated. For example, in Vrij et al. (2009), pairs of truth-telling participants went to and ate at a restaurant, whereas pairs of liars did not go to the restaurant but attempted to convince the interviewer that they did. They were then interviewed (i.e., individually), but the questions were difficult to anticipate, because they were specific and addressed non-central aspects of the activity (e.g., in relation to the front door and where you sat, where were the closest diners?). Not surprisingly, given the lack of opportunity to prepare answers to these questions, liars often contradicted one another as compared to truth-tellers, whose responses tended to corroborate one another. In a related set of studies, Leins, Fisher, Vrij, and Mann (2011) asked truth-telling participants to go to a designated room and engage in a set of activities (e.g., turn on the radio, untie the shoes). The participants were then interviewed twice with questions that they did not anticipate (e.g., where was the radio relative to the location of the shoes?). After answering such questions, the participants were then asked to draw a sketch of the room, placing within the sketch the various objects that they had named. Again, such a request was not anticipated, as confirmed by a post-experimental debriefing of the participants. The results replicated Vrij et al.’s earlier finding: when participants cannot anticipate the interview questions, liars contradict themselves more than truth-tellers. In summary, whether liars are less consistent than truth-tellers, as most people believe, or are equally or more consistent than truth-tellers, depends in part on whether they can anticipate the interviewer’s questions (see Colwell, Hiscock-Anisman, & Fede, this volume).

Different Retrieval Strategies

Granhag and Strömwall (1999) postulated that liars adopt a different answering strategy than truth-tellers, because liars are more concerned that others will find out that they are lying. Hence, if liars believe that inconsistency is characteristic of lying, they will try to answer consistently across interviews. If they are successful in providing the same answer on both interviews, they may fool the investigator into thinking they are truthful, which ultimately is the goal of lying. In attempting to answer consistently, liars may, therefore, use the strategy of remembering what they said at the first interview and then repeating the same answer on the second interview (Granhag & Strömwall, 1999). By comparison, truth-tellers are likely to assume that, if they simply describe their truthful experience, the truth will “shine through” and they will be believed (Hartwig et al., 2007). Truth-tellers should, therefore, adopt the strategy of simply retrieving from memory their original experience

and reconstructing it each time they are asked. The difference between the repeat (liars) and reconstruct (truth-tellers) strategies should be observable by focusing on the similarity of the questions at Int-1 and Int-2. Liars should find it easier to implement the response-repetition strategy if the questions at Int-2 are similar to those at Int-1. By comparison, truth-tellers, who always try to recall the original experience, should be relatively uninfluenced by the similarity of the questions across the two interviews. We should, therefore, predict that liars will be more influenced than truth-tellers by the similarity of the questions from Int-1 to Int-2. Specifically, liars should respond less consistently as the questions change from Int-1 to Int-2, whereas truth-tellers' consistency should not be influenced by the similarity of questions from Int-1 to Int-2.

Leins, Fisher, and Vrij (2012) examined this question-similarity hypothesis by asking liars and truth-tellers either the same questions or different questions on two interviews. In their study, the participants were interviewed twice. Half were required to use the same mode of responding on the two interviews (i.e., recall verbally at both Int-1 and Int-2, or draw a sketch at both Int-1 and Int-2) and half were required to use a different mode of responding on the two interviews (i.e., recall verbally at Int-1 but draw a sketch at Int-2, or vice versa). The experimenter then scored the two interviews to see if the participants responded consistently or not. For example, if the participant indicated that the shoes were to the left of the radio on both interviews, this response was scored as consistent; but, if the participant indicated that the shoes were to the left of the radio on Int-1, but to the right of the radio on Int-2, this was scored as an inconsistent response. The results supported our hypothesis: truth-tellers' responses were highly consistent whether they answered in the same mode on both interviews (i.e., verbal/verbal or sketch/sketch) or in different modes (i.e., verbal/sketch or sketch/verbal), whereas liars were much more consistent if the modes of responding were the same than if they differed.

In overview, whether liars in experimental studies are more inconsistent than truth-tellers seems to depend heavily on the nature of the interviewer's questions. If interviewers ask questions that liars can anticipate and, therefore, prepare for, then liars will answer consistently, because liars have rehearsed their answer. Similarly, if interviewers ask the same questions on succeeding interviews, liars will also respond consistently, but for a different reason: they will be able to recall their answers from the earlier interview. Two important principles follow from these conclusions: first, when interviewing suspects, or others who might be motivated to lie, investigators should (a) anticipate how deceptive respondents prepare for the interview and then ask questions that are unexpected, and (b) avoid asking the same questions on consecutive interviews. Second, and more in keeping with the theme of this chapter, no simple rule can be applied universally to categorize people as liars or truth-tellers based on the consistency of their responses (see ten Brinke & Porter, this volume). Rather, we need to understand the cognitive and social processes that account for consistent and inconsistent recollections, and how these processes may differ for liars and truth-tellers.

Summary and Practical Implications

We have noted several findings in this chapter, including: (a) some forms of inconsistency (i.e., contradictions) are much more indicative of memory inaccuracy than other forms (e.g., forgetting and reminiscence), (b) inconsistency is more predictive of memory inaccuracy at the level of the individual statement than at the level of the witness's entire testimony, and (c) liars are more inconsistent than truth-tellers, but only when the questions are unanticipated. These findings not only advance our theoretical understanding, but they also have practical implications for investigators and the legal system. A few implications are as follows. First, witnesses who testify in court and reveal information they had not described in an earlier deposition should not reflexively be badgered about their "newly found" information (e.g., as if they had been fed the new facts by someone else), as such reminiscences are common and often accurate. Second, if eyewitnesses contradict themselves when reporting some facts, interviewers should continue to probe these eyewitnesses for additional information, as the contradictions (i.e., low accuracy items) may not be predictive of the eyewitness's ability to remember other facts. Third, before interviewing a suspect, interviewers should try to think as if they were the suspect, duplicating how the suspect might prepare for the interview, and then ask questions that the suspect probably did not anticipate. We leave it to the reader to derive other practical implications.

Conclusion

Despite people's reliance on inconsistency as a means to infer the inaccuracy or deception of others' reports, controlled laboratory tests show that inconsistency is not as predictive as we might expect. Rather, the behavioral patterns appear to reflect complex underlying cognitive and social processes. We can take two approaches in response to these findings. One approach is to abandon relying on inconsistency to assess memory and deception. That approach seems to have limited utility since, (a) under some conditions, inconsistency is predictive of inaccuracy and deception, and (b) we need to rely on some indicators to assess others' reports, and it is not obvious what behaviors we would substitute for inconsistency (see Vrij & Granhag, 2012, for an assessment of some of these alternatives). A second approach is to understand better the nature of inconsistency so that we are more sensitive to its subtlety, why it is a good indicator of memory inaccuracy and deception sometimes but not at other times. That approach seems to have more promise. We have tried here to hint at some of the cognitive and social processes that underlie inconsistency. We trust that other researchers will advance our knowledge beyond the elementary notions presented here.

References

- Berman, G. L., & Cutler, B. L. (1996). Effects of inconsistencies in eyewitness testimony on mock-juror decision making. *Journal of Applied Psychology, 81*, 170–177.
- Brainerd, C. J., & Reyna, V. F. (1993). Memory independence and memory interference in cognitive development. *Psychological Review, 100*, 42–67.
- Brewer, N., & Burke, A. (2002). Effects of testimonial inconsistencies and eyewitness confidence on mock-juror judgments. *Law and Human Behavior, 26*, 353–364.
- Brewer, N., & Hupfeld, R. M. (2004). Effects of testimonial inconsistencies and witness group identity on mock-juror judgments. *Journal of Applied Social Psychology, 34*, 493–513.
- Brewer, N., Potter, R., Fisher, R. P., Bond, N., & Luszcz, M. A. (1999). Beliefs and data on the relationship between consistency and accuracy of eyewitness testimony. *Applied Cognitive Psychology, 13*, 297–313.
- Brock, P., Fisher, R. P., & Cutler, B. L. (1999). Examining the cognitive interview in a double-test paradigm. *Psychology, Crime & Law, 5*, 29–45.
- Cahill, B.S., Fisher, R.P., & Rivard, J.J. (2011). *Catching liars with cartoons*. Paper presented at the meeting of the American Psychology-Law Society, Miami, Florida.
- Carbone, J. & Fisher, R.P. (2011). *Inconsistency on the witness stand*. Paper presented at the meeting of the American Psychology-Law Society, Miami, Florida.
- Committee on Pattern Jury Instructions of the District Judges Association (2005). *Sixth circuit criminal pattern jury instructions*.
- Erdelyi, M. H. (1996). *The recovery of unconscious memories: Hypermnnesia and reminiscence*. Chicago: University of Chicago Press.
- Evans, J. R. (2011). Eyewitness memory: Balancing the accuracy, precision, and quantity of information. *Applied Cognitive Psychology, 25*, 501–508.
- Fisher, R. P., & Cutler, B. L. (1995). The relation between consistency and accuracy of eyewitness testimony. In G. Davies, S. Lloyd-Bostock, M. McMurrin, & C. Wilson (Eds.), *Law and criminal justice: International developments in research and practice*. Berlin: De Gruyter.
- Fisher, R. P., Falkner, K. L., Trevisan, M., & McCauley, M. R. (2000). Adapting the Cognitive Interview to enhance long term (35 years) recall of physical activities. *Journal of Applied Psychology, 85*, 180–189.
- Fisher, R.P. & Patterson, T. (2004). *The relationship between consistency and accuracy of eyewitness memory*. Paper presented at 45th Annual Meeting of the Psychonomic Society, Minneapolis, Minnesota.
- Gabbert, F., Memon, A., & Allen, K. (2003). Memory conformity: Can eyewitnesses influence each other's memories for an event? *Applied Cognitive Psychology, 17*, 533–543.
- Gilbert, J. A. E., & Fisher, R. P. (2006). The effects of varied retrieval cues on reminiscence in eyewitness memory. *Applied Cognitive Psychology, 20*, 723–739.
- Glissan, J. L. (1991). *Cross-examination: Practice and procedure*. Sydney: Butterworths.
- Granhag, P. A., & Strömwall, L. A. (1999). Repeated interrogations: Stretching the deception detection paradigm. *Expert Evidence, 7*, 163–174.
- Granhag, P. A., & Strömwall, L. A. (2000). Deception detection: Examining the consistency heuristic. In C. M. Breur, M. M. Kommer, J. F. Nijboer, & J. M. Reintjes (Eds.), *New trends in criminal investigation and evidence* (Vol. 2, pp. 309–321). Antwerpen: Intersentia.
- Granhag, P. A., & Strömwall, L. A. (2001). Deception detection based on repeated interrogations. *Legal and Criminological Psychology, 6*, 85–101.
- Granhag, P. A., Strömwall, L. A., & Jonsson, A.-C. (2003). Partners in crime: How liars in collusion betray themselves. *Journal of Applied Social Psychology, 33*, 848–868.
- Hartwig, M., Granhag, P. A., & Strömwall, L. (2007). Guilty and innocent suspects' strategies during police interrogations. *Psychology, Crime and Law, 13*, 213–227.
- Johnson, M. K., Hashtroudi, S., & Lindsay, D. S. (1993). Source monitoring. *Psychological Bulletin, 114*, 3–28.

- Koriat, A., & Goldsmith, M. (1996). Monitoring and control processes in the strategic manipulation of memory accuracy. *Psychological Review*, *103*, 490–517.
- La Rooy, D., Lamb, M. E., & Pipe, M.-E. (2008). Repeated interviewing: A critical evaluation of the risks and potential benefits. In K. Kuehnle & M. Connell (Eds.), *Child sexual abuse: Research, evaluation, and testimony for the courts*. Hoboken: Wiley.
- La Rooy, D., Pipe, M.-E., & Murray, J. E. (2005). Reminiscence and hypermnesia in children's eyewitness memory. *Journal of Experimental Child Psychology*, *90*, 235–254.
- Leins, D., Fisher, R. P., & Vrij, A. (2012). Drawing on liars' lack of cognitive flexibility: detecting deception through varying report modes. *Applied Cognitive Psychology*, *26*, 601–607.
- Leins, D., Fisher, R. P., Vrij, A., & Mann, S. (2011). Using sketch-drawing to induce inconsistency in liars. *Legal and Criminological Psychology*, *16*, 253–265.
- Leippe, M. R., Manion, A. P., & Romanczyk, A. (1992). Eyewitness persuasion: How and how well do fact finders judge the accuracy of adults' and children's memory reports? *Journal of Personality and Social Psychology*, *63*, 181–197.
- Lindsay, R. C. L., Lim, R., Marando, L., & Cully, D. (1986). Mock-juror evaluations of eyewitness testimony: A test of metamemory hypotheses. *Journal of Applied Social Psychology*, *16*, 447–459.
- Loftus, E. (1975). Leading questions and the eyewitness report. *Cognitive Psychology*, *7*, 550–572.
- Mitchell, T., Haw, R., & Fisher, R. P. (2003). *Eyewitness accuracy: Can accuracy for one statement be predictive of more 'global' accuracy?* Paper presented at European Psych-Law Society, Edinburgh.
- Payne, D. (1987). Hypermnesia and reminiscence in recall: A historical and empirical review. *Psychological Bulletin*, *101*, 5–27.
- Pezdek, K. (2003). Event memory and autobiographical memory for the events of September 11, 2001. *Applied Cognitive Psychology*, *17*, 1033–1045.
- Shuy, R. (1998). *The language of confession, interrogation and deception*. Thousand Oaks: Sage Publications.
- Strömwall, L. A., & Granhag, P. A. (2003). How to detect deception? Arresting the beliefs of police officers, prosecutors and judges. *Psychology, Crime & Law*, *9*, 19–36.
- Strömwall, L. A., & Granhag, P. A. (2005). Children's repeated lies and truths: Effects on adult's judgments and Reality Monitoring scores. *Psychiatry, Psychology & Law*, *12*, 345–356.
- Strömwall, L. A., Granhag, P. A., & Jonsson, A.-C. (2003). Deception among pairs: "Let's say we had lunch and hope they will swallow it!". *Psychology, Crime & Law*, *9*, 109–124.
- Tulving, E. (1983). *Elements of episodic memory*. Oxford: Clarendon.
- Vrij, A., & Granhag, P.-A. (2012). Eliciting cues to deception and truth: What matters are the questions asked. *Journal of Applied Research in Memory and Cognition*, *1*, 110–117.
- Vrij, A., Leal, S., Granhag, P. A., Mann, S., Fisher, R. P., Hillman, J., & Sperry, K. (2009). Outsmarting the Liars: The benefit of asking unanticipated questions. *Law and Human Behavior*, *33*, 159–166.
- Wagenaar, W. A., & Groeneweg, J. (1990). The memory of concentration camp survivors. *Applied Cognitive Psychology*, *4*, 77–87.
- Warren, A. R., & Woodall, C. E. (1999). The reliability of hearsay testimony: How well do interviewers recall their interviews with children? *Psychology, Public Policy, and Law*, *5*, 355–371.
- Zulawski, D. E., & Wicklander, D. E. (1993). *Practical aspects of interview and interrogation*. New York: CRC Press.