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Eliciting cues to deception and truth: What matters are the questions asked

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ABSTRACT

In this paper we argue that there is little need for more of the traditional deception detection research in which observers assess short video clips in which there are few (if any) cues to deception and truth. We argue that a change in direction is needed and that researchers should focus on the questions the interviewer needs to ask in order to elicit and enhance cues to deception. We discuss three strands of research into this new 'interviewing to detect deception' approach. We encourage practitioners to use the proposed techniques and encourage other researchers to join us in conducting more research in this area. We offer some guidelines for what researchers need to keep in mind when carrying out research in this new paradigm.

1. The challenge

A turning point in our thinking about lie detection came in 2003. In that year, Bella DePaulo and her colleagues published a meta-analysis of deception research that demonstrated that nonverbal and verbal cues to deception are typically faint and unreliable. It made us realise that a new direction in deception research was required aimed at eliciting and enhancing cues to deceit. We will argue that interviewers play a vital role in achieving this. Hereby we distinguish ourselves from other researchers who ignore the role of the interviewer and instead are trying to find exceptional lie-catchers ('wizards'), train people to focus on specific cues, or believe that cues to deceit are more pronounced under certain circumstances (e.g., high-stakes). We also distance ourselves from the use of popular but theoretically unsound gadgets. Many of them are easy to apply and therefore attractive to practitioners. However, they do not work in the way that they are intended and can have a profound negative effect on investigations.

Also in 2003, the US National Research Council (NRC) published their report in which they concluded that there is no satisfactorily theoretical explanation as to why psychological states such as fear or anxiety would necessarily be stronger in liars than in truth tellers. It made us realise that anxiety-based interview protocols, based on the premise that liars are more anxious than truth tellers, are inadequate to distinguish truth tellers from liars. Such tools were dominant in lie detection in 2003 and, in fact, still are. We have, however, changed direction and have developed alternative protocols based on imposing cognitive load, asking unanticipated questions, and using evidence in a strategic manner. Most importantly, we have demonstrated that such protocols work, and, although they still need to be refined, we believe that several of them can now be applied by practitioners in the field. We invite other researchers also to change direction and to conduct 'interviewing to detect deception' research, and we finish this article with some guidelines on how to conduct such research.

2. The dominant view: faint and unreliable cues, poor lie detection, poor explanations, and poor research paradigms

DePaulo et al.'s (2003) meta-analysis included 50 verbal and nonverbal cues that were examined in five or more deception studies. Of these 50 cues, 14 (28%) showed a significant relationship with deception. The average effect size of these 14 significant cues was $d = .25$. In Cohen's (1988, 1992) widely cited discussions of effect sizes he stated that d-values around .20 represent a small effect and argued that a small effect is a barely perceptible but real difference. He gave as an example the difference in height between 15- and 16-year-old girls (Cohen, 1988; Rice & Harris, 2005). Given that most verbal and nonverbal cues do not appear to be related to deception at all and that those that are only show a weak relationship with deception, we conclude that cues to deception are faint and unreliable. DePaulo et al.'s (2003) meta-analysis about verbal and nonverbal cues to deception was followed by Bond and DePaulo's (2006) meta-analysis about people's ability to detect truth and lies. This second meta-analysis, including almost 25,000 observers, revealed an average accuracy rate of 54% in correctly classifying truth tellers and liars, which is low given that 50% could be expected by just flipping a coin. To us, the outcome of

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the second meta-analysis followed logically from the first. If cues to deceit are faint and unreliable, people will be poor at detecting deceit because there are no diagnostic cues to rely upon. Yet, many researchers continue searching for things that may not be there and are unlikely to be found, such as examining whether some people are better than others at lie detection (O'Sullivan, 2005, 2007, 2008; O'Sullivan & Ekman, 2004), whether people become better lie detectors if they are taught to pay attention to some specific cues (Bull, 2004; Driskell, 2011; Frank & Feeley, 2003; Vrij, 2008), and whether lie detection is easier in high-stakes situations than in low-stakes situations (O'Sullivan, Frank, Hurley, & Tiwana, 2009). Unsurprisingly, they do not have empirical data on their side.

The search for outstanding lie detectors has resulted in only 29 identified so-called 'wizards', out of 12,000 tested (O'Sullivan & Ekman, 2004). Using statistical arguments, it has been suggested that this small number of wizards may have emerged just by chance (Bond & Uysal, 2007; Bond & DePaulo, 2008). More important is whether wizards use clearly identifiable strategies. If so, it would mean that others could learn from them. None of the Ekman group have published detailed data about the strategies used by their wizards to date, but Bond has (Bond, 2009). In his wizard project, Bond started with 234 lie detectors and identified two wizards. Via eye tracking equipment he determined the locations they both looked at when making their veracity decisions. The two experts used different strategies: one wizard looked more at the face area, whereas the other looked more at the arm/torso area. In summary, if wizards exist, it is unclear what it is that makes them wizards.

A review of 22 studies examining the effect of training people to pay attention to specific cues showed that such training on average resulted in a minimal increment (4.26%) in lie detection accuracy (Vrij, 2008), underlining the limitations of this approach. In his review of the literature regarding training to detect deception Driskell (2011) draws a more positive picture. He observed a medium positive effect ($d = .50$) of training and concluded that it is an effective means to enhance detection accuracy. Although we agree that training can enhance accuracy, we believe that Driskell is too optimistic. After all, Bond and DePaulo (2006) have shown that untrained judges perform only just above the level of chance and a medium increase on that level is not overly impressive. In addition, the training content remains unclear. Driskell (2011) correctly observes that the cues that are used in the training should in fact be reliable indicators of deception. And that is the problem: such cues are at best faint.

We do not deny that high-stakes may affect a liar's behaviour. However, in alignment with the NRC argument, there is good reason to assume that high-stakes will affect truth teller's behaviour in a similar way, and therefore no clear differences between liars and truth tellers will emerge even in high-stake situations. In their article arguing that stakes matter, O'Sullivan, Frank, Hurley, and Tiwana (2009) compared the lie detection performance in 13 'high-stakes' studies with the lie detection performance in 18 'low-stakes' studies. The average accuracy rate in the high-stakes studies (67.15%) was significantly higher than that in the low-stakes studies (55.17%). However, we question the selection of high-stakes studies on which this 67.15% accuracy rate was based. Included in this sample was O'Sullivan's (2008) lie detection experiment which achieved an 88% accuracy rate, the highest accuracy rate reported in the paper. However, this accuracy rate was obtained by a selected group of 18 'police experts' and no further information about the lie detection experiment was given in O'Sullivan (2008). This is not surprising as the article was a commentary, not an empirical article. In other words, the experiment that produced the 88% accuracy rate was not peer-reviewed, and was the only non-peer reviewed article included in O'Sullivan et al.'s (2009) sample of low and high-stakes studies. In addition, the sample of high-stakes studies further included four lie detection experiments—with accuracy rates ranging from 65% to 72%—from one group of researchers who used the same stimulus material in each experiment (Mann & Vrij, 2006; Mann, Vrij, & Bull, 2004; Mann, Vrij, & Bull, 2006; Vrij, Mann, Robbins, & Robinson, 2006). Although it becomes evident in the four articles that the same stimulus material was used, O'Sullivan et al. (2009) do not mention this. If we exclude O'Sullivan's (2008) 88% accuracy rate and treat the accuracy rates in the four experiments that used the same stimulus material as one score (68%), the accuracy rate in high-stakes studies is a modest 64%.

Low accuracy rates may be less problematic if observers are aware of the mistakes they make. Examining confidence in making veracity judgements is therefore important. In many lie detection studies, in addition to observers' accuracy, observers' confidence in the veracity judgement they make is also examined. A meta-analysis of that literature showed that a relationship between confidence and accuracy typically does not exist and that confidence does not predict accuracy (DePaulo, Charlton, Cooper, Lindsay, & Muhlenbruck, 1997). Studies where professional lie catchers' and laypersons' confidence and accuracy levels were compared show an interesting trend: professional lie catchers were more confident in their veracity judgements than laypersons, but were no more accurate (DePaulo & Pfeifer, 1986; Garrido, Masip, & Herrero, 2004; Kassin, Meissner, & Norwick, 2005; Meissner & Kassin, 2004). The tendency to be overconfident is not unique to police officers or lie detection, but common amongst many groups of professionals in carrying out various tasks (Allwood & Granhag, 1999).

Accepting DePaulo et al.'s conclusion that cues to deceit are faint and unreliable implies that the only way to improve lie detection is by eliciting and enhancing such cues. We argue that interviewers can achieve this by using appropriate, theoretically sound interview techniques that exploit liars' and truth tellers' different psychological states. We have developed such interview techniques and they take into account that lying is often mentally more taxing than truth telling, exploit the fact that liars prepare themselves for interviews, and take into account the different strategies truth tellers and liars use during interrogations. We have demonstrated that our techniques work. We can see another benefit of our research into 'interviewing to detect deception': it reflects real life better than traditional deception research. In real life people do ask target persons questions, so why not examine which questions should be asked? And in real life people often have background information about a target person (Park, Levine, McCornack, Morrisson, & Ferrara, 2002), so why not examine how to strategically use that information?

The idea that interview styles are crucial in eliciting reliable cues to deceit has been acknowledged in physiological ('polygraph') lie detection literature for decades. Broadly speaking, two different types of polygraph tests exist, and they are discussed in detail in Kleiner's (2002) edited book. The underlying assumption in the first approach is that guilty examinees show heightened levels of arousal during key elements of the polygraph test because they are anxious that their deceit will be detected. Examples of this approach are the Control/Comparison Question Test and the Directed Lie Test. In such tests relevant and comparison questions are asked. Relevant questions are specifically about the crime under investigation (e.g., "Did you murder Julie Appletoddler?"). Comparison questions deal with acts that are related to the crime under investigation, but do not refer to the crime in question. They are always general in nature, deliberately vague, and cover long periods of time in the history of the examinee. The examiner formulates a comparison question for which in the examiner's view a "No" answer would be deceptive. In a murder inquiry a comparison question could be 'During the first 25 years of your life, did you ever physically hurt someone?' where the examiner believes that the examinee did indeed hurt someone before age 26. Under normal

circumstances, some examinees might admit to this wrongdoing. However, during a polygraph examination they are unlikely to do this because the examiner will make the examinee believe that admitting to this would demonstrate that he or she is the type of person who would commit the crime in question and so will be considered guilty. Comparison questions are thought to result in stronger physiological responses than the relevant questions in the *innocent examinee*. Since the examiner puts so much emphasis on the comparison questions to which the innocent examinee will be deceptive, and because the innocent examinee knows he or she is answering truthfully to the relevant questions, the innocent examinee will become more anxious about his/her answers to the comparison questions than his/her answers to the relevant questions. However, the same comparison questions are expected to elicit weaker physiological responses than the relevant questions in the *guilty examinee*. A guilty suspect responds deceptively to both types of question, which in principle should lead to similar physiological responses to both types of question. However, relevant questions represent the most immediate and serious threat to the guilty examinee, which will make him/her more concerned about his/her lies to the relevant questions than to the probable lie questions.

The underlying assumption in the second polygraph approach is that guilty examinees will show orienting reflexes when confronted with crucial details of a crime (i.e., signs of recognition of the details). Orienting reflexes result in physiological responses measured by the polygraph, such as an increase in electrodermal activity (Nakayama, 2002), and a decline in heart rate (Verschuere, Crombez, de Clercq, & Koster, 2005). Such a polygraph test is called a Concealed Information Test and has the format of a multiple choice test. Thus, in the Julie Appletoddler murder case, the examinee could be asked 'Julie has been found murdered. How was she killed? Was she drowned? Was she hit on the head with something? Was she shot? Was she beaten to death? Was she stabbed? Was she strangled? If the guilty examinee recognises the correct answer, an orienting reflex will occur. The innocent examinee, who does not know how Julie was killed, should show no orienting reflex during the test.

Anxiety-based polygraph tests are used more frequently in real life than Concealed Information Tests, which are, in fact, used infrequently. One reason why Concealed Information Tests are less popular amongst practitioners is that they can be used only if the examiner knows specific details about the crime. In addition, for the Concealed Information Test to work, guilty examinees should know the correct alternatives in the test and innocent examinees should not know them. In contrast, anxiety-based polygraph tests can be employed in every investigation. The debate between the two polygraph camps is lively and heated and spans many decades. See Grubin (2008) and Ben-Shakhar (2008) for a recent example of a lively exchange about the use of anxiety-based polygraph tests with sex offenders.

The National Research Council (2003) reviewed the utility and usefulness of polygraph tests for pre-employment and employment screening for (American) federal agencies. In these contexts anxiety-based polygraph tests dominate. The NRC report makes clear that lie detection techniques based on the assumption that liars are more afraid or anxious than truth tellers are problematic as they are not based on sound theory. Anxiety-based lie detection tests also dominate nonverbal lie detection. The Behavior Analysis Interview (Inbau, Reid, Buckley, & Jayne, 2001) is based on this premise (Vrij, 2008; Vrij, Mann, & Fisher, 2006a), as are Ekman's micro-expressions approach (Ekman, 1985/2001), and gadgets such as voice stress analysers (http://www.tdtvsa.com/). Inbau et al. (2001, p. 173) describe the core of the Behavior Analysis Interview (BAI) as "the asking of behaviour-provoking questions that are specifically designed to evoke behavioural responses". The BAI protocol, as described in the Inbau et al. manual, consists of 15 questions to which it is thought that liars and truth tellers will display different nonverbal responses. It is proposed that liars feel less comfortable than truth tellers in an investigative interview, resulting in behaviours such as legs crossing, shifting about in a chair, grooming behaviours and a lack of eye contact. The BAI protocol is used in a pre-interrogation setting to shed light on the possible guilt or innocence of the suspect. Based on the suspect's responses during the BAI, investigators determine the worthiness of further interrogating a suspect. BAI is taught to hundred of thousands of law enforcement personnel in the US (Vrij, 2008), but in the only experimental examination of BAI to date, the responses that are assumed to be typical for liars did not emerge (Vrij, Mann, & Fisher, 2006b).

Ekman has long argued that deceptive emotional information is betrayed (leaked) by *microexpressions*, fleeting but complete facial expressions that are thought to reveal the felt emotion during emotional concealment and are suppressed within 1/5th to 1/25th of a second (Ekman, 1985/2001). This idea has enjoyed increasing popularity in the media (Henig, 2006) and scientific community (Schubert, 2006), and is used in the popular TV crime series *Lie to Me*, despite being backed by little empirical research. Porter and ten Brinke (2008) conducted the first thorough investigation of facial expressions associated with genuine and deceptive emotions. The micro-expressions occurred infrequently and were not just shown by liars.

Voice Stress Analysers (VSA) use microphones attached to computers to detect and display voice indices such as intensity, frequency, pitch, harmonics or micro tremors. We understand that they are sometimes used by insurance companies and they were also used by the UK Government. There is no evidence that they actually work (Gamer, Rill, Vossel, & Gödert, 2006). In other words, the theoretical and empirical support for anxiety-based protocols when examining nonverbal responses, such as BAI, microexpressions and VSA, is weak or non-existing.

3. The solution: theoretically sound techniques that elicit and enhance cues to deception

In recent years, alternatives to anxiety-based protocols have been introduced in the deception literature, based on imposing cognitive load, asking unanticipated questions and using evidence in a strategic manner. We will discuss these approaches briefly and provide evidence that they work.

3.1. Lying and cognitive load

There is overwhelming evidence that lying is cognitively more difficult than telling the truth (Vrij, Fisher, Mann, & Leal, 2006), and empirical support comes from various sources. First, in a (rare) examination of high-stake police interviews with real-life suspects, lies were accompanied by increased pauses, decreased blinking, and, for males, decreased hand and finger movements, all of which are signs of cognitive load (and only increased pauses is also a sign of arousal; Mann, Vrij, & Bull, 2002). Second, police officers who saw videotapes of suspect interviews reported that the suspects were thinking harder when they lied than when they told the truth (Mann & Vrij, 2006) (but less tense when they lied than when they told the truth). Third, participants in mock-suspect experiments directly assessed their own cognitive load during interviews and reported that lying is more cognitively demanding than truth telling (see Vrij, 2008, for a review of this research). Fourth, participants who kept diaries for a week reported that lying was more cognitively demanding than truth telling (Vrij, Ennis, Farman, & Mann, 2010). Fifth, fMRI research has demonstrated that deceiving

is associated with activating executive 'higher' brain centres such as the prefrontal cortex (see Gamer, 2011, for a review).

Investigators can exploit the differences in cognitive load that liars and truth tellers experience. If lying requires more cognitive resources than truth telling, liars will have fewer cognitive resources left over. If cognitive demand is further raised, which could be achieved by making additional requests, liars may not be as good as truth tellers in coping with these additional requests.

One way to raise cognitive load is by asking interviewees to tell their stories in reverse order. This increases cognitive load because (a) it runs counter to the natural forward-order coding of sequentially occurring events, and (b) it disrupts reconstructing events from a schema (Gilbert & Fisher, 2006). Another way to increase cognitive load is by instructing interviewees to maintain eye contact with the interviewer. When people have to concentrate on telling their stories—likely when they are asked to recall what has happened—they are inclined to look away from their conversation partner (typically to a motionless point), because maintaining eye contact is distracting (Doherty-Sneddon & Phelps, 2005). In two experiments, half of the liars and truth tellers were requested either to recall their stories in reverse order (Vrij et al., 2008) or to maintain eye contact with the interviewer (Vrij, Mann, Leal, & Fisher, 2010), whereas no instruction was given to the other half of the participants. More cues to deceit emerged in the reverse-order and maintaining-eye-contact conditions than in the control conditions. Observers who watched these videotaped interviews could distinguish between truths and lies better in the reverse-order condition and maintaining-eye-contact conditions than in the control conditions. For example, in the reverse-order experiment, 42% of the lies were correctly classified in the control condition, well below that typically found in verbal and nonverbal lie-detection research, suggesting that the lie-detection task was particularly difficult. Yet, in the experimental condition, 60% of the lies were correctly classified, which is more than typically found in this type of lie detection research.

An alternative way of imposing cognitive load on liars is to ensure that in a given interview setting truth tellers will provide more information. Talkative truth tellers raise the standard for liars, who also need to become more talkative to match truth tellers. Liars may find it too cognitively difficult to add as many details as truth tellers, or if they do add a sufficient amount of detail the additional information may be of lesser quality or may sound less plausible. We recently successfully tested two ways of increasing the amount of detail truth tellers generate. In one experiment two interviewers were used (Mann et al., submitted for publication). The second interviewer was silent but showed different demeanours during the interview. In one condition he was supportive throughout (e.g., nodding his head and smiling); in a second condition he was neutral and in a third condition he was suspicious (e.g., frowning). Being supportive during an interview facilitates talking and encourages cooperative witnesses (e.g., truth tellers) to talk (Bull, 2010; Fisher, 2010; Memon, Meissner, & Fraser, 2010). Indeed, truth tellers provided most detail in the supportive condition and only in that condition did they provide significantly more detail than liars (Mann et al., submitted for publication). In a second experiment, half of the participants were primed and were asked before being interviewed to listen to an audiotape in which someone gave a detailed account of an event unrelated to the participant's interview. Participants were informed that the purpose of the priming audiotape was to give them an idea of what a detailed account actually entails. The underlying assumption of the audiotape was that if participants hear a model of a detailed answer, they are more likely to provide a more detailed answer themselves. Interviewees' expectations about how much detail is expected from them could be inadequate. If conversation partners do not know each other well, which is the case in most formal interview settings, they tend to give short answers (Fisher, 2010; Fisher, Bull, & Milne, 2011). Perhaps interviewers can alter the participants' expectations about how much detail is required by providing them with a model answer. Indeed, although truth tellers and liars did not differ from each other in the non-primed condition, they did so in the primed condition, and primed truth tellers gave more detailed answers that also sounded more plausible (Leal, Vrij, Warmelink, & Fisher, 2012).

In sum, imposing cognitive load can be achieved in two different ways. First, by using interventions that increase the difficulty to recall information (reverse order and maintaining eye contact), and, second, by using interventions that makes examinees more talkative.

3.2. Planning the lie

A consistent finding in deception research is that liars prepare themselves when anticipating an interview (Hartwig, Granhag, & Strömwall, 2007). This strategy makes sense. Planning makes lying easier, and planned lies typically contain fewer cues to deceit than do spontaneous lies (DePaulo et al., 2003). However, the positive effects of planning will only emerge if liars correctly anticipate which questions will be asked. Investigators can exploit this limitation by asking questions that liars do not anticipate. Though liars can refuse to answer unanticipated questions, such "I don't know" or "I can't remember" responses will create suspicion and should therefore be avoided if the questions are about central (but unanticipated) aspects of the target event. To test the unanticipated-questions technique, pairs of liars and truth tellers were interviewed individually about an alleged visit to a restaurant (Vrij et al., 2009). The conventional opening questions (e.g., "What did you do in the restaurant?") were anticipated, whereas the request to sketch the layout of the restaurant was not. (Anticipation was established with the interviewees after the interview.) Based on the overlap (similarity) in the two pair members' drawings, 80% of the liars and truth tellers were classified correctly (the drawings were less alike for the pairs of liars than pairs of truth tellers), whereas on the basis of the conventional questions the pairs were not classified above chance level. A difference in overlap between anticipated and unanticipated questions further indicated deceit. Pairs of truth tellers showed the same amount of overlap in their answers to the anticipated and unanticipated questions whereas liars did not. They showed significantly more overlap in their answers to the anticipated questions than in their answers to the unanticipated questions.

Comparing the answers to anticipated and unanticipated questions can also be used to detect deceit in individual liars, as two recent experiments demonstrated. In the first experiment truth tellers and liars were interviewed about their alleged activities in a room (Lancaster, Vrij, Hope, & Waller, submitted for publication). Expected questions (e.g., 'Tell me in as much detail as you can what you did in the room') were followed by unexpected spatial and temporal questions. In the second experiment truth tellers and liars were interviewed about their alleged forthcoming trip (Warmelink, Vrij, Mann, Jundi, & Granhag, submitted for publication). Expected questions about the purpose of the trip (e.g., "What is the main purpose of your trip?"), were followed by unexpected questions about transport (e.g., "How are you going to travel to your destination?"), planning ("What part of the trip was easiest to plan?"), and the core event ("Keep in mind an image of the most important thing you are going to do at this trip. Please describe this mental image in detail?"). Liars are likely to have prepared answers to the expected questions and may therefore be able to answer them in considerable detail. Liars will not have prepared answers for the unexpected questions and may therefore struggle to generate detailed answers to them. Indeed, in both experiments, compared to truth tellers, liars gave significantly more detail to the expected questions and

significantly less detail to the unexpected questions. This resulted in a larger decline in detail between anticipated and unanticipated answers in liars than in truth tellers. (For a similar finding, see Sooniste, Granhag, Knieps & Vrij, submitted for publication.)

3.3. The Strategic Use of Evidence (SUE) technique

It is reasonable to assume that liars (guilty suspects) and truth tellers (innocent suspects) enter interviews with different counter-interrogation strategies (Granhag & Hartwig, 2008). An increased knowledge about these counter-interrogation strategies will help to predict suspects' responses, and this in turn, can form the basis for developing and refining interviewing techniques to discriminate between truthful and deceptive statements. However, the scientific literature on suspects' counter-interrogation strategies is still scarce (Granhag & Vrij, 2010).

The empirical research conducted so far showed that liars are inclined to use avoidance strategies (e.g., in free recall avoiding mentioning where they were at a certain time) or denial strategies (e.g., denying having been at a certain place at a certain time when asked directly) (Hartwig et al., 2007). In contrast, truth tellers are generally more forthcoming and "tell the truth like it happened" (e.g., Hartwig, Granhag & Strömwall, 2007; Kassin, 2005).

When investigators possess critical and possibly incriminating background information (evidence) in a case, they can exploit these differential truth tellers' and liars' strategies by introducing the available evidence during the interview in a strategic manner (the Strategic Use of Evidence technique, SUE). When questions about the evidence are asked, it is thought that guilty suspects use more avoidance strategies, whereas innocent suspects use more forthcoming strategies (Granhag & Hartwig, 2008). The result is that innocent suspects' accounts will be more consistent with the available evidence than guilty suspects' accounts. The SUE-technique has a strategic and a tactical level (Granhag & Vrij, 2010). The strategic level is abstract, and contains the case-independent general principles underlying the SUE-technique (guilty suspects are avoidant and innocent suspects are forthcoming) (Granhag & Hartwig, 2008). The tactical level is concrete, and contains specific tactics which are case-dependent. In principle, there are three groups of SUE-tactics: (i) evidence tactics, (ii) question tactics and (iii) disclosure tactics. The evidence tactics are used primarily to assess the evidence in the planning phase; the question tactics are used systematically to exhaust the alternative explanations that a suspect may have to account for the evidence; and the disclosure tactics are used to maximise the diagnostic value of the evidence. The SUE-technique has been found to be successful in eliciting cues to deception for lying adults (Hartwig et al., 2011) and lying children (Clemens et al., 2010), for lying single suspects (Hartwig, Granhag, Strömwall, & Vrij, 2005) and lying multiple suspects (Rangmar, Granhag, & Strömwall, in preparation), and for suspects lying about their past actions (Hartwig et al., 2005) and lying about their intentions (Clemens, Granhag & Strömwall, 2011). In a study by Hartwig, Granhag, Strömwall and Kronkvist (2006) police trainees at an academy in Sweden were taught to use some basic elements of the SUE-technique. The results showed that participants who had received training in the technique clearly outperformed their untrained colleagues: 85% vs. 56% deception detection performance.

Granhag (2010b) introduced the so-called Evidence Framing Matrix which is an example of a disclosure tactic within the SUE-framework. This matrix suggests that when one piece of evidence is disclosed, two dimensions are particularly helpful in illuminating the different framing alternatives that exist. The first dimension is the *strength of the source* of the evidence, which can vary from weak to strong. The second dimension is the *degree of precision* of the evidence, which can vary from low to high. The source and specificity dimensions can be related orthogonally, resulting in a matrix explicating the different alternatives regarding how a singular piece of evidence can be framed at the point of disclosure. Recent research by Granhag, Strömwall, Willén, and Hartwig (in press) showed that using this matrix to reveal the evidence in a stepwise manner moving from the most indirect form of framing (weak source/low specificity, e.g., 'We have information telling us that you recently visited the central station') to the most direct form of framing (strong source/high specificity, e.g., 'We have CCTV footage showing that you collected a package from a deposit box at the central station, ground floor level, on the 24th of August at 7.30 pm') elicited more and stronger cues to deception than using the most direct form of framing only. Put differently, it was found that both *when* and *how* the evidence was disclosed moderated the effectiveness of disclosure. With respect to *when*, it was most effective to disclose the evidence late rather than early in the interview, and with respect to *how*, it was most effective when the evidence became progressively stronger and more precise.

3.4. Refinements

We acknowledge that all our approaches need refining. For example, there will be individual differences in how much cognitive load additional requests impose on interviewees, and these differences may be difficult to measure for interviewers. In addition, more work is required about how to define and operationalise an 'unanticipated question'. For the SUE-technique, the strategic level is well documented, but some aspects of the more specific tactical level are still rather underdeveloped. Finally, we obtained the effects in controlled experiments and some of these effects were rather small. Whether they still emerge in real life settings is an empirical question. In other words, we do not claim to have all the answers, but we are convinced that we are heading in the right direction.

3.5. Anxiety versus cognitive load

We introduced the cognitive load lie detection approach as an alternative to the anxiety approach. We do not suggest that cognitive load and anxiety are mutually exclusive. On the contrary, they can occur simultaneously and cognitive load lie detection techniques may well result in increased anxiety. A key difference between the two techniques is that with anxiety based techniques anxiety cues are central. The aim of those techniques is to provoke anxiety cues and when they arise they are interpreted and perceived as signs to deceit. In contrast, in the cognitive approach anxiety cues are a side effect, and when they arise they are considered to be irrelevant and too unreliable to be relied upon. They are therefore ignored.

3.6. Information-gathering versus accusatory interview approaches

Analyses of audiotaped police—suspect interview in England and Wales identified two interview styles used by the police: an information-gathering style in which suspects are invited to give their account through a series of open-ended questions (e.g., 'Tell me in as much detail as possible what you did last night'), and an accusatory style in which interviewers confront suspects with accusations (e.g., "Your reactions make me think that you are hiding something from me"). The police often use a combination of the two approaches. They typically start with an information-gathering approach but if the suspect continues to deny involvement in the crime they tend to switch to an accusatory approach (Moston & Engelberg, 1993). The cognitive load approach solely uses information-gathering questions. Experimental and

field research has revealed numerous advantages of such questions. First, they are more cognitively demanding for liars (Vrij et al., 2006b) as they encourage liars to provide a considerable amount of detail and more than they have prepared when the correct questions are asked. In contrast, accusatory questions lead to short denials (e.g., 'I am not lying', 'I did not do it') that do not require fabricating much detail. Second, information-gathering interviews result in more nonverbal cues to deceit (Vrij, 2006). Accusing somebody in itself can lead to strong nonverbal reactions in both liars and truth tellers. Someone may even argue that there is hardly anything that produces more anxiety than having to address false allegations. The nonverbal reactions are often similar in truth tellers and liars (Bond & Fahey, 1987; Ofshe & Leo, 1997). Information-gathering questions per se do not evoke specific nonverbal reactions. Nonverbal differences between truth tellers and liars, which are subtle by nature, are therefore most likely to occur in response to information-gathering questions. Third, information-gathering interviews result in more verbal cues to deceit (Vrij, Mann, Kirsten, & Fisher, 2007), mainly because they provide more opportunities for verbal cues to occur. That is, information-gathering interviews result in longer responses than accusatory interviews and words are the carriers of verbal cues to deceit. Fourth, and related to the third point, interviewees provide more information in information-gathering interviews than in accusatory interviews. Eliciting information is at the core of investigative interviewing (Fisher, 2010; Fisher, Bull, & Milne, 2011). Fifth, a meta-analysis of experimental research revealed that information-gathering approaches increased the likelihood of true confessions and decreased the likelihood of false confessions. In contrast, accusatory interviews increased the likelihood of both true and false confessions (Meissner, Redlich, Bhatt, & Brandon, 2011). The same meta-analysis also evaluated field studies (both information-gathering interviews and accusatory interviews led to more confessions), but the veracity of confessions could not be determined in these field studies.

3.7. General recommendations for future deception detection research

We conclude this article by making general recommendations about future deception research. Hopefully this will result in more deception researchers choosing a more fruitful path in lie detection research. Some of the recommendations focus on issues that have not been discussed above.

- Deception researchers should stop producing more of the same, such as trying to find good lie detectors, teaching people to focus on cues that are not really diagnostic, or designing yet another gadget that is based on the anxiety assumption. Like we did in 2003, we encourage them to change direction, ideally by examining how to interview suspects in order to elicit and enhance cues to deception.
- Researcher should better mirror the situations in which practitioners assess veracity. In real life they do not passively watch video-clips. And in real life they often have background information about a case.
- Researchers should not just be outcome-oriented by focusing on deception detection accuracy only. Instead they should pay attention also to the processes that explain the outcome. For example, researchers could examine suspects' counter-interrogation strategies and use this knowledge to develop interrogation protocols that counteract those strategies. The SUE technique was developed based on knowledge of suspect counter-interrogation techniques, as is the unanticipated questions technique. We expect that further examination of suspects' interrogation strategies will lead to developing more, and more refined, interrogation techniques.
- Deception researchers should collaborate with experienced practitioners. Those practitioners should not set the research agenda, but their views are invaluable to identify relevant research questions and to conduct ecologically valid research.
- Researchers should pay more attention to the judicial dimension of their research. For deception research to really make a difference, researchers must provide criminal investigators with techniques that will help them to produce evidence that will stand up in court. It is not just about assessing whether a suspect is lying or telling the truth, it is also about maximising the value of the evidence so that prosecutors can present it 'beyond reasonable doubt', the standard of proof typically required in criminal courts. In essence, it is time to try filling the gap between traditional deception research and judicial decision making.
- Tools should be empirically tested thoroughly before taught to practitioners, and these tests should be published in high quality peer-reviewed journals. It is our impression that lie detection tools such as the Behavior Analysis Interview (BAI) (Inbau et al., 2001), Scientific Content Analysis (SCAN) developed by Sapir (1987/2000), and Ekman's micro-expressions approach (Ekman, 1985/2001) are widely taught to practitioners, and that Voice Stress Analysers (SVA) and other gadgets are aggressively sold to them. Yet, empirical evidence that such tools actually work is either weak or non-existing (Gamer et al., 2006; Nahari, Vrij, & Fisher, in press; Porter & ten Brinke, 2008; Vrij, 2008; Vrij, Granhag, & Porter, 2010; Vrij, Fisher, et al., 2006).
- Finally, we recommend new areas of deception research. Traditionally, psychology and law researchers focus on police interviews. This is an important research area, but there are other important settings that require attention. For example, during the last decades the acts and threats of terrorism have become more evident and deception research could play an important role in intelligence gathering (Brandon, 2011; Loftus, 2011). An important aim regarding terrorism is to *prevent* crimes from occurring, which makes it relevant to be able to discriminate between true and false stories about future activities (intentions). Intentions are also relevant in border crossings. We have started to examine lying about intentions (Clemens, Granhag, & Strömwall, 2011; Granhag, 2010a; Granhag & Knieps, 2011; Knieps, Granhag & Vrij, submitted for publication; Vrij, Granhag, Mann, & Leal, 2011; Vrij, Jundi, et al., in press; Vrij, Leal, Mann, & Granhag, 2011; Warmelink et al., 2011), but more research is required. In addition, terrorists typically work in networks, but deception research examining groups of truth tellers and groups of liars is still rare (for exceptions see, Driskell, Salas, & Driskell, in press; Granhag, Strömwall, & Jonsson, 2003; Meijer, Smulders, & Merckelbach, in press; Vrij et al., 2009; Vrij, Jundi, et al., in press; Vrij, Mann, Jundi, Hope, & Leal, in press). Finally, in some contexts, law enforcement, security and intelligence personnel may have good reason to extract information from suspects/sources without them being aware that they are under investigation, and/or without them being aware of the interviewer's information objectives. Hence, it is important to study undercover interviewing (Vrij, Mann, et al., in press) and the efficacy of different intelligence eliciting techniques (Granhag, Oleszkiewicz & Cancino Montecinos, submitted for publication). Researchers have only just started to examine these important areas.

In conclusion, it is about time to change direction in deception research. What is needed is research into theoretically sound methods that elicit and enhance cues to deception. This research should be carried out in consultation with practitioners, and should address the problems these practitioners actually face.

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