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NEW APPROACHES IN DECEPTION DETECTION II. ACTIVE INTERVIEWING STRATEGIES AND CONTEXTUAL INFORMATION

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La evidencia meta-analítica muestra que los indicadores conductuales de la mentira son escasos, poco diagnósticos y cambiantes. Esto ha propiciado un cambio de orientación en la investigación sobre detección de mentiras: ya no se trata de escudriñar atenta pero pasivamente al emisor de la comunicación en busca de indicadores conductuales reveladores de mentira; por el contrario, es necesario (a) adoptar un rol activo, empleando modalidades de entrevista diseñadas específicamente para detectar mentiras, o (b) atender a indicios contextuales (en lugar de conductuales) del engaño. En un artículo anterior (Masip y Herrero, 2015a) revisamos los antecedentes de este cambio de orientación, así como el trasfondo teórico de las nuevas aproximaciones. Aquí describimos estrategias concretas de entrevista para detectar mentiras, así como la (aún escasa) investigación sobre indicios contextuales del engaño. Con ello, esperamos ofrecer al lector una panorámica detallada de los desarrollos recientes en esta parcela concreta de la Psicología Jurídica.
Palabras Clave: *Detección de mentiras, Entrevista, Carga cognitiva, TRI-Con, Técnica SUE, Claves contextuales.*

Meta-analytical evidence shows that behavioural indicators of deception are scant, poorly diagnostic and inconsistent. This has yielded a shift in deception detection research. Rather than passively scrutinising the communication sender to find tell-tale behavioural indicators of deception, the deception judge needs to (a) adopt an active role by using interviewing techniques specifically designed to detect deception, or (b) focus on contextual (rather than behavioural) deception cues. In the previous paper (Masip & Herrero, 2015a), we reviewed the antecedents of this change in focus, as well as the theoretical grounding of the new approaches. Here we describe specific interviewing strategies for detecting deception, as well as the (still scant) research on contextual deception indicia. In doing this, we hope to offer the reader a detailed perspective on the recent developments in this specific area of psychology and law.
Key Words: Detection of deception, Interview, Cognitive load, TRI-Con, SUE Technique, Content in context.

In the first part of this essay (Masip & Herrero, 2015a) we explained that, historically, research into deception detection has been based on the premise that people show certain revealing behavioural indicators when deceiving. These indicators were assumed to appear automatically and to be difficult to control. However, recent meta-analytical research has shown that this assumption is incorrect: the behavioural indicators of deception are scant, poorly diagnostic and changing. Consequently, the accuracy rates of individuals in judging the veracity of others are low and the increase due to training programs is limited (see Masip & Herrero, 2015a).

This finding has caused a shift in deception detection research, which has forked into two different approaches: (a) the design of active interviewing techniques aimed at generating and/or maximising behavioural differences between truth-tellers and liars, and (b) the recognition of the importance of contextual information in judging veracity. The purpose of this article is to describe these two approaches.

THE ACTIVE INTERVIEWER

The first approach is based on the idea that if the behavioural differences between truths and lies are non-existent or trivial, then something must be done in order to generate them or increase them. This approach differs from the traditional view in that here the deceiver is not inevitably expected to show indicators of deception; on the contrary, in order for these indicators to manifest the

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interviewer must take an active role, strategically managing the interaction.

This approach needs to be based on solid and consistent theoretical models. As we discussed in the first part of this essay (Masip & Herrero, 2015a), these models can be grounded on cognitive psychology. There is evidence that deceiving requires more mental effort than telling the truth, which has led to the development of (a) cognitive models of the production of lies and (b) active interviewing strategies with a cognitive basis.

In the previous article (Masip & Herrero, 2015a), we briefly described one of these models: the *Activation-Decision-Construction Model* (ADCM) by Walczyk, Roper, Seemann and Humphrey (2003), recently reformulated as *Activation-Decision-Construction-Action Theory* (ADCAT; Walczyk, Harris, Duck & Mulay, 2014). The ADCM has provided the basis for the development of an active interviewing modality to detect deception, known as TRI-Con (*Time Restricted Integrity-Confirmation;* Walczyk et al. 2005, 2012; Walczyk, Mahoney, Doverspike & Griffith-Ross, 2009). In the next subsection, we describe TRI-Con, as well as another type of interview also based on cognitive load. TRI-Con will be easier to understand if the reader has read the first part of this essay (Masip & Herrero, 2015a) or is familiar with ADCAT. After that, we will describe some other active interviewing modalities grounded on other principles.

Interview Procedures to Detect Deception Based on Cognitive Load

TRI-Con

The essential features of TRI-Con are as follows:

a) At the beginning of the interview some *general questions* are asked that invite the interviewee to answer truthfully. These questions are not related to the matter under investigation and refer to issues such as who is the president of the country, what is the gender or the year of birth of the interviewee (see top half of Table 1). The inclusion of these questions allows interviewees to become familiar with the procedure. It also allows the interviewer to establish the interviewees' baseline levels in the dependent variables when telling the truth. However, the *measures relating to these questions* (e.g., response times) *are not included in the analysis* because these questions do not refer to the issue being investigated and there would be no reason to lie when answering them.

b) Next *the interviewee is warned,* being told, for example: "The following 10 questions are about your activities on the afternoon of the crime". The aim of this is to activate the truth in the memory in order to make the task easier for the truth-teller (the truth will be activated and will be easier to transmit) and more difficult for the liar (the more activated the truth, the more effort that will be required to inhibit it).

c) In spite of this general warning, *the specific questions are not revealed until the last moment.* This is to prevent the deceiver from mentally preparing his response[1]—in which case the cognitive effort that he

TABLE 1
TRI-CON: POSSIBLE GENERAL QUESTIONS AND QUESTIONS REFERRING TO THE CRIME FOR WITNESSES TO A THEFT IN A CONVENIENCE STORE

General Questions *

(The pairs of questions for evaluating inconsistencies are: 2-16, 3-15, 5-10, 7-17)

1. What was former President Aznar's first name?
2. Is Columbus Day celebrated in August?
3. Is it possible for a person to be burned when operating an oven?
4. What are your surnames?
5. What is your age?
6. What is your biological mother's first name?
7. In which city is the Palace of Moncloa located?
8. You finished high school in which year?
9. What is your gender?
10. Were you born before 1980?
11. Are you an immigrant?
12. Are you a first year student?
13. Is the current President of the Government called Alfonso?
14. Are you a student?
15. Can an oven get hot?
16. On what day does Spain celebrate Columbus Day?
17. Is Barcelona the location of the Palace of Moncloa?
18. What is the name of the city of the Aragón autonomous community capital?

Crime Questions

(The pairs of questions for evaluating inconsistencies are: 19-23, 19-24, 20-23, 20-25)

19. What was the criminal act?
20. Was the perpetrator a man?
21. Was the perpetrator European?
22. Was the clerk behind the counter a foreigner?
23. How did the perpetrator try to conceal the criminal act?
24. Where did the criminal act take place?
25. What did the perpetrator and the clerk talk about?
26. Was the perpetrator wearing a hat?
27. Was the perpetrator wearing running shoes?

Note. Adapted from Walczyk *et al.* (2012).
* The measures relating to the general questions are not included in the analyses because these questions do not refer to the issue under investigation and are normally answered truthfully.

[1] *Translator's note*: From here onwards in the text, male and female pronouns will be used alternatively to avoid the use of 'he/she' and 'his/her'.

would have to make subsequently would be less, which would reduce his detectability.

d) Similarly, the questions are grammatically constructed in such a way that *it is not known very well what the question refers to until the last words are heard*. Again, this is done so that the deceiver will not think about her answer in advance while the question is being asked.

e) *The questions should be of the type that can be answered with just one or two words*; they should not be open-ended questions requiring lengthy speech. This enables cognitive load to be measured with greater accuracy.

f) *Related questions* are asked that, indirectly, inquire about the same thing, thus facilitating the detection of inconsistencies.

g) Again in order to accurately measure cognitive load, *the interviewee is instructed to respond as quickly as possible*. To ensure this happens, the interviewee is told that otherwise she will look deceptive.

A possible set of TRI-Con questions is presented in Table 1. These questions were adapted from those used for Video 2 in Walczyk et al.'s (2012) experiment.

Walczyk's team investigated the effectiveness of this type of interview in detecting deception. For the purposes of illustration, we summarise their 2012 study here. In this study there were three veracity conditions: Truthful (T) Rehearsed Lies (RL) and Unrehearsed Lies (UL). Each of the 145 participants was assigned to one of these conditions.

At the beginning of the study, all of the participants were asked 18 general questions similar to those in the top part of Table 1; they were asked to answer truthfully. Then they watched a video (Video 1) of a security camera showing a crime. Those participants assigned to the RL condition were given a list of the questions to be asked, as well as 5 minutes to prepare their answers. The other participants were interviewed immediately. The interview consisted of ten questions (similar to those in the bottom part of Table 1) concerning the events shown in the video. The truthful participants had to tell the truth, while the deceivers in both groups had to lie, exculpating the offender (they were asked to assume that the offender was a friend whom they wanted to protect). Then, all participants were shown another video (Video 2) of another security camera with another crime. The subsequent procedure was similar to that followed for Video 1.

Four dependent variables related to the cognitive load were examined:

a) *Response time* (RT). This was measured by connecting a microphone to a computer that measured the response latency in milliseconds.

b) *Inconsistencies across related questions*. To measure this variable, audio responses were recorded and then transcribed.

c) *Pupil dilation*. This is an indicator of cognitive load. It was measured, just like the next dependent variable, with an eye tracker.

d) *Eye movements*. In responding to cognitively complex questions, people usually stare at one point to avoid distractions while thinking about the response (Glenberg, Schroeder & Robertson, 1998).

It was expected that truth-tellers would present shorter response times, fewer inconsistencies, less pupil dilation and more eye movements than unrehearsed liars. Values for rehearsed liars were expected to be in between those for truth-tellers and those for ULs (with the exception of RT, which was expected to be lower among RLs than among truth-tellers).

Generally, the results supported the hypotheses and the effectiveness of TRI-Con (see however the original study by Walczyk et al., 2012, as there are many nuances). Specifically, reaction times were shorter for Ts and RLs than for ULs, inconsistencies were more numerous when lying than when telling the truth, and more eye movements were made in telling the truth than in telling RLs. However, no significant differences emerged for pupil dilation. Two separate discriminant analyses were run with the scores of all measures except pupil dilation. Classification rates were 67% for Video 1 and 69% for Video 2; these accuracy rates are substantially higher than the 33% classification rate expected by chance.

In short, TRI-Con looks like a promising procedure for differentiating between truths and lies on the basis of behavioural indicators of cognitive load such as response time, inconsistencies and eye movements. It requires an "active position" on the part of the interviewer, who must follow certain guidelines in order to maximise the behavioural differences between truth-tellers and liars. In addition, it is based on a detailed cognitive theory of verbal deception, Walczyk at al.'s ADCM (Walczyk *et al.*, 2003, 2005, 2009, 2012).

Induced Cognitive Load

The reasoning behind this approach is simple and ingenious at the same time. Lying is cognitively more complex than telling the truth. Now imagine that, during the

interview, we do something to increase the interviewee's cognitive load artificially (induced cognitive load). If the interviewee is telling the truth, this increase in cognitive load will make the task more difficult, but probably not enough to cause major disruptions in his behaviour. However, if the interviewee is lying, this induced cognitive load adds to the cognitive load of the activity of lying itself. As a result, it is possible that the liar's behaviour will show observable signs of cognitive overload.

We owe this reasoning to the psychologist Aldert Vrij and his colleagues (Vrij et al, 2008; Vrij, Leal, Mann & Fisher, 2012; see also Vrij & Granhag, 2012, and Vrij, Granhag & Porter, 2010), who have conducted some studies to test it. Perhaps the best known study is the one conducted by Vrij et al. (2008), in which they interviewed 40 participants who were guilty of a mock crime (theft of a note from a wallet) but denied involvement, as well as 40 innocent individuals who told the truth in denying their involvement and describing their activities. Half of the guilty suspects and half of the innocent suspects had to describe what happened in chronological order, while the other halves had to do so in reverse order—i.e., starting with what happened at the end and finishing with what happened at the start. The reason is that telling a story in reverse order requires more cognitive effort, thus increasing the speaker's cognitive load. The interviews were video-recorded and analysed. It was found that, of the nine indicators examined, only one (hand and finger movements) discriminated significantly between truth-tellers and liars in the normal order condition (truth-tellers made more movements than liars). In contrast, eight indicators discriminated in the reverse order condition: quantity of auditory details (more in telling the truth: T), contextual embedding [2] (T), speech hesitations (more in deceiving: D), speech rate (T), leg/foot movements (D), cognitive operations[3] (D), speech errors (D) and eye blinks (D). While these results seem to support the usefulness of this approach, some of the effects are surprising. Specifically, if the differences in the reverse order condition are due to cognitive overload, then we would expect fewer (not more) leg/foot movements and eye blinks when deceiving than when telling the truth. It is not clear, therefore, whether the effects are exclusively due to cognitive overload. In any case, Vrij et al. (2008) showed a subset of the video-taped interviews to 55 British police officers who had to judge whether each suspect was lying or telling the truth. The accuracy rate was 58% in the reverse order condition (56% for truths and 60% for lies) and 46% in the chronological order condition (50% for truths and 42% for lies). The differences were significant overall and for lies, but not for truths. These officers also assessed the extent to which the suspects appeared to make a mental effort and looked nervous. In the reverse order condition, the scores on these variables were significantly higher for liars than for truth-tellers. This was not so in the chronological order condition. More recently, Vrij et al. (2012) conducted a similar study with a repeated measures design, participants from a different population, with a paradigm in which asking participants to tell the story in reverse order did not seem odd, and examining other behavioural indicators. The results gave only partial support to the hypothesis.

However, the idea that inducing cognitive load facilitates the differentiation between truths and lies has permeated the field. Several researchers have explored alternative manipulations of cognitive load, other than reverse order, such as depleting the participant's cognitive resources before the interview (Blandón-Gitlin, Echon & Pineda, 2013), requiring participants to speak in a second language that they do not know well (Evans, Michael, Meissner & Brandon, 2013, Experiment 2) or asking participants to stare into the eyes of the interviewer (Vrij, Mann, Leal & Fisher, 2010). The results have generally been promising.

Other New Interview Procedures for Detecting Deception

In the previous section we described two new interview procedures for detecting deception. Both procedures propose that the detector must adopt an active role in order to magnify the behavioural differences between

[2] *Contextual embedding* is a verbal credibility criterion of the procedure known as Criteria-based Content Analysis (CBCA; Steller & Köhnken, 1989/1994). It is based on the notion that real events are immersed in a specific space-time reality, so they will be inextricably linked to other events, habitual behaviour patterns, etc. (see, e.g., Garrido & Masip, 2001).

[3] Under the *reality monitoring* framework (Johnson & Raye, 1981), *cognitive operations* are inferences or assumptions; for example: "I must have dreamed this because I know I've never been to Australia" (Sporer, 2004, p. 64). They would indicate that the event evoked in memory or narrated never happened, but has been imagined instead (i.e., it has an *internal origin*; Johnson & Raye, 1981; Masip & Garrido, 2003; Masip, Sporer, Garrido & Herrero, 2005; Sporer, 2004).

truth-tellers and liars, are based on the idea that deceiving involves more mental effort than telling the truth, and are being tested empirically. In this section we describe some additional new procedures which are similar in nature but are not based on the idea that lying is cognitively more complex.

The SUE (Strategic Use of Evidence) Technique

The SUE Technique was designed in Sweden by Pär-Anders Granhag, Leif Strömwall and Maria Hartwig, during Hartwig's doctoral research. The SUE acronym refers to the Strategic Use of Evidence, because this is what is done during an interview using the SUE Technique: the available evidence is handled strategically (Granhag & Hartwig, 2008; Granhag & Strömwall, 2008; Granhag, Strömwall & Hartwig, 2007; Hartwig, Granhag & Luke, 2014).

Research on the measures that guilty and innocent individuals take during an interview in order to seem convincing (see Masip & Herrero, 2013, for a brief review and an empirical study on the subject) shows that the tendency to prepare a strategy before the interview is greater among guilty individuals than among innocent individuals. In addition, guilty people avoid mentioning any incriminating information and deny it if they are confronted with it. According to Granhag et al. (2007), this is only a particular form of the general human tendency to avoid aversive stimulation and escape from it if it occurs. In contrast, innocent people do not tend toward avoidance and escape, but are instead willing to provide information to help the investigator. Because of (a) the illusion of transparency (the tendency for people to overestimate the extent to which others may notice their internal states; Gilovich, Savitsky & Medvec, 1998), (b) the course of knowledge effect (people's tendency to attribute to others knowledge of information that is privy to themselves; Camerer, Loewenstein & Weber, 1989) and (c) the belief in a just world (the belief that everyone gets what they deserve in life; Lerner, 1980), innocent suspects tend to think that the truth will come out, that, consequently, there is no need to plan their statement in order to seem innocent and that the best strategy is to tell the truth (e.g., Masip & Herrero, 2013). The SUE interview exploits these differences between innocent and guilty people (Granhag & Hartwig, 2008; Granhag & Strömwall, 2008; Granhag *et al.*, 2007).

Some police manuals recommend that suspects must be told of the available evidence against them at the beginning of the interview with the aim that they will be scared and confess (e.g., Inbau, Reid, Buckley & Jayne, 2004; Yeschke, 1997). However, if the suspect is informed of the evidence against him, he can make up a story that is consistent with the evidence but that exonerates him. For example, if we tell the suspect that his fingerprints were found in the apartment of a homicide victim, he may say that, indeed, he knew the victim and visited her at home, but did not harm her. However if he is guilty and thinks he did not leave any tell-tale fingerprint, he may deny knowing the victim and having been at her place. As we found his fingerprints in the victim's apartment, we know he is lying and this points to his guilt.

In essence, then, the SUE Technique requires the interviewer to strategically use the evidence, not telling the suspect about any incriminating evidence until the end of the interview. Based on the abovementioned explanations of the differences between guilty and innocent individuals, the former will not admit to anything that might point to their guilt, so (a) they will not spontaneously mention any incriminating information and (b) their story will contradict the evidence. This will not be the case among innocent suspects, who tend to be more forthcoming and will (a) spontaneously report information that may put them in a compromising position, and (b) tell a story that will fit with the available evidence. The SUE Technique proposes that the consistency between the available evidence and the story that the suspect tells is an indicator of truthfulness.

According to Granhag *et al.* (2007), the phases of an interview using the SUE Technique are:

a) *Planning*. The interviewer examines the case documents to find potentially incriminating information, especially any information that the suspect is unlikely to know the interviewer possesses. It is important to emphasise here that the SUE Technique can be used in cases where there is some incriminating evidence, but not enough to take the suspect to court.

b) *Free recall*. After informing the interviewee of the offence that she is suspected of committing (but without revealing any information about the available evidence), the interviewer asks her to describe what she was doing, where, with whom, etc. during the time the crime was committed.

c) *Questioning*. After the free report, the interviewer asks specific questions. Some of these questions refer to

potentially incriminating information (the interviewer already knows the correct answers).

d) *Securing and commitment*. The interviewer repeats back to the suspect everything that the suspect has told him, to allow the suspect to correct him if there is something wrong. This also has the aim of ensuring that the suspect commits to her declaration.

e) *Matching the statement and the incriminating evidence*. If there are obvious inconsistencies between the suspect's statement and the available evidence, the suspect is asked to explain them.

Hartwig, Granhag, Strömwall and Vrij (2005) conducted a study in which 33 participants committed a mock crime and 25 participants did not. However, the same potentially incriminating evidence was available for all of the suspects, innocent or guilty: two witnesses and fingerprints. The suspects were interviewed and had to deny their involvement. Half of the suspects were subjected to a form of interview in which the incriminating evidence was disclosed at the beginning of the interview. The other half were interviewed using a mode of interview in which the evidence was not revealed until the end. The interviews were video recorded and shown to a sample of 116 observers who judged their veracity. For the first interviewing modality, accuracy was 43% (46% for truths and 41% for lies); for the second modality, accuracy was 62% (54% for truths and 68% for lies). The differences between the two interview modalities were significant for overall accuracy and for accuracy in judging lies. In addition, it was found that, when the evidence was revealed at the beginning of the interview: (a) during the free recall phase, innocent and guilty participants did not differ in terms of their tendency to mention the potentially incriminating information, and (b) during the questioning phase, there was no difference between innocent and guilty participants in terms of inconsistencies between the story and the evidence. However, when the evidence was revealed at the end: (a) during the free recall phase, guilty participants tended to mention the potentially incriminating information less often than innocent participants, and (b) during the questioning phase, guilty suspects showed more inconsistencies than innocent suspects.

Shortly afterwards, the same research team conducted an interesting study in which 41 police recruits were trained to use the SUE Technique and compared with 41 untrained recruits (Hartwig, Granhag, Strömwall & Kronkvist, 2006). Each police officer interviewed one of 82 suspects who had committed (n = 41) or not committed (n = 41) a crime similar to the one in the previous study by Hartwig et al. (2005). The results showed that (a) during the free recall phase, guilty suspects avoided mentioning the incriminating information more often than innocent suspects; (b) guilty suspects showed more inconsistencies with the evidence than innocent suspects, and this difference was greater with trained interviewers than with untrained interviewers; (c) among trained interviewers, the presence of inconsistencies resulted in more deception judgments; this relationship was not significant among untrained interviewers; and (d) trained interviewers had an overall accuracy rate of 85% (both for truths and lies), noticeably higher than the 56% accuracy rate (57% for truths, and 55% for lies) of untrained interviewers.

Later studies have replicated some of these findings (e.g., Jordan, Hartwig, Wallace, Dawson & Xhihani, 2012), have led the SUE Technique into new territories, such as the child witness area (Clemens et al., 2010) or the study of deception about future intentions rather than past events (Clemens, Granhag & Strömwall, 2011), and have refined the procedure (Granhag, Strömwall, Willén & Hartwig, 2013). A meta-analysis of the relevant research found that indeed the tendency of suspects to provide information that contradicts the evidence is greater when the interviewer does not reveal the evidence at the beginning of the interview than when she does reveal it (Hartwig *et al.*, 2014).

Recently there has been some controversy over whether it is better to disclose the information at the end of the interview or to reveal it gradually throughout the interview (see Dando & Bull, 2011; Dando, Bull, Ormerod & Sandham, 2015; Sorochinski et al, 2014). Presenting these aspects would exceed the limited objectives of this essay, so we suggest the interested reader consult the studies cited.

Unexpected questions

Another recent strategy for identifying deceivers is to ask unexpected questions. Vrij et al. (2009) investigated its usefulness in solving crimes committed together by two or more people. Imagine there are two suspects of a crime—e.g., a homeless person has been beaten up in a park at night. Imagine also that they are innocent; they went to the cinema together that night. We interview them separately about what happened. As they are innocent,

they simply tell the truth and their stories coincide. Now imagine that they are guilty. In order to make their stories match, they agree on what to say. However, they will agree only with regard to the questions they can anticipate (what time they met, what cinema they went to, what movie they saw, what time it started and finished, and similar questions). But if the interviewer asks questions that they were not expecting (how many people were ahead of them in line, what they talked about as they waited, who sat on the right and who sat on the left, which side of the room they were closer to, whether either of them went to the bathroom and when, etc.), they are likely to give different answers. In short, innocent suspects are expected to give consistent answers to both expected and unexpected questions, whereas guilty suspects are expected to give consistent answers to expected questions but inconsistent answers to unexpected ones.

Vrij et al. (2009) conducted a study in which 40 participants committed a mock theft (in pairs) and 40 went for lunch to a restaurant (in pairs). Then they were all told that the theft had occurred and that they would be interviewed as suspects. They had to convince the interviewer of their innocence, saying that they were having lunch in a restaurant at the time of the theft. Each pair of suspects was left alone for 10 minutes; afterwards they were separated and each suspect was asked (a) to draw a sketch of the restaurant layout indicating six specific features (e.g., where he or she sat, the location of the bathroom door, etc.); (b) six questions that were easy to anticipate; and (c) several unexpected questions about spatial and temporal information. The correspondence (consistency) between the answers of each pair of suspects was measured, as well as the consistency between their drawings. It was found that, for expected questions, the degree of consistency was the same for innocent and guilty individuals. However, for spatial and temporal questions and for drawings, consistency was significantly greater among innocent (truthful) than among guilty (untruthful) pairs of suspects. Discriminant analyses yielded discrimination rates of 60% for innocent suspects and 80% for guilty suspects when consistency in answering spatial questions was entered as the predictor; 60% for innocent suspects and 55% for guilty suspects when consistency in responding to temporal questions was entered as the predictor; and 80% for innocent suspects and 75% for guilty suspects when consistency in the drawings was entered as the predictor.

Drawings

Recently, additional studies have been published exploring the usefulness of drawings. Leins, Fisher, Vrij, Leal and Mann (2011) described two experiments in which, first, the participants performed (truth-tellers) or did not perform (liars) certain actions. Then they had to answer spatial questions and had to draw a map of the place. In both experiments, the consistency between the drawing and the verbal description was higher among truth-tellers than among liars. Discriminant analyses were conducted introducing the drawing-verbal description consistency scores. In Experiment 1, classification rates were 80% for truths and 70% for lies; in Experiment 2, the rates were 100% for truths and 77% for lies.

More recently, Leins, Fisher and Vrij (2012) replicated the effect and showed that it is due to differences in the "cognitive flexibility" of truth-tellers and liars. This explanation upholds that, as truth-tellers have actually encoded the information of the event, they have in their memory many details of different perceptual qualities, including spatial, contextual, and sensory aspects of the event (Johnson & Raye, 1981; Masip & Garrido, 2003; Masip, Sporer, Garrido & Herrero, 2005; Sporer, 2004). Consequently, they have no difficulty in finding the relevant information irrespective of the mode (verbal or pictorial) in which it has to be transmitted, thus displaying great "cognitive flexibility". By contrast, the liars' imagined events have not been experienced perceptually. As a result, the liars' memory trace will lack spatial, contextual and sensory details (Johnson & Raye, 1981; Masip & Garrido, 2003; Masip et al., 2005; Sporer, 2004). Because of this, changing from one modality to another (drawing to verbal or verbal to drawing) is going to be more difficult for liars than for truth-tellers, particularly with regard to perceptual details.

Finally, in another study by Vrij, Mann, Leal and Fisher (2012), the participants had to draw and describe their workplace. Relative to the liars' *drawings*, the truth-tellers' drawings contained more details, were more plausible, showed more people, and the people were sketched with greater detail. However, the *verbal description* of truth-tellers was very similar to that of liars in terms of degree of detail and plausibility of the account. Only the number of people mentioned discriminated significantly: truth-tellers named more people than liars. According to Vrij et al. (2012), the differences in the drawing condition may simply reflect that liars did not expect having to draw and

thus were not prepared for it. Alternatively, it is possible that, not having a real perceptual image in their memory, the liars had not thought about the location of spatial objects, so they excluded certain elements of the drawing or placed them in implausible locations, producing less plausible drawings (Vrij et al., 2012). The authors also argue that liars (in both conditions) may tend to draw or mention fewer people than truth-tellers, or may depict people in less detail than truth-tellers, because they may fear they will be asked additional questions about these people. It may also be that as they are specifically asked about the place, they focus only on the place and its static characteristics, not on the people that are there (Vrij *et al.*, 2012).

CONTEXTUAL OR SITUATIONAL INDICATORS OF DECEPTION

We have noted in the introduction that the perspective that deception is spontaneously reflected in the communication sender's behaviour has been abandoned, being replaced by two new orientations: (a) one that states that, for behavioural differences to appear, the detector must actively do something, and (b) one that does not seek behavioural but rather contextual or situational indicators of deception. We have described the first of these two approaches in the preceding pages. In the remainder of this article, we will focus on the second approach.

Research on deception detection has explored almost exclusively potential psychophysiological, verbal and nonverbal correlates of deception. This emphasis seems to stem from the general human tendency, mentioned at the beginning of this essay (Masip & Herrero, 2015a), to consider that deceivers are betrayed by their behaviour. At the end of the day, scientists are just as human as anyone else, and it is therefore logical for them to start their research with clearly human frames of reference in mind. The strong magnetism of behaviour as a possible deception indicator was revealed in a series of experiments by Bond, Howard, Hutchison and Masip (2013). First, the researchers developed an incentive that was perfectly diagnostic of veracity. How? They gave people the choice to either lie or tell the truth, but one group was told that it would be better for the investigator if they lied. Conversely, the other group was told that it would be better for the investigator if they told the truth. Those choosing to act in accordance with the convenience of the researcher would be allowed to leave immediately after giving their statement, but those choosing to do the opposite would have to stare at an analogue clock positioned on their lap for 15 minutes, without looking away for even a second. These instructions were videotaped. One-hundred percent of the people that were induced to lie lied, and 100% of the people that were induced to tell the truth told the truth. Consequently, the instructions were a perfectly diagnostic indicator of deception.

Later on (Experiment 3), a sample of observers were shown *only the instructions* (with the clock incentive) given to each speaker, another similar sample were shown *only the visible behaviour* (without audio) of each speaker while lying or telling the truth, and a third sample were shown *both elements*: the instructions given to each speaker followed by the speaker's visible behaviour. The observers had to assess the veracity of each speaker. Participants in the instructions-only condition reached an accuracy rate of 97%, confirming that these instructions were an excellent indication of deception. In the visible-behaviour-only condition, an accuracy rate of 51% was reached, which was equivalent to chance level: the visible indicators had no diagnostic value at all to detect deception. What did the participants do in the third condition? Did they completely dismiss the irrelevant behavioural cues to focus solely on the highly diagnostic instructions? The answer is no: this group had significantly lower accuracy (76%) than those who saw only the instructions; this demonstrates that the behavioural information displayed by the sender was taken into account. In conclusion, even when people have access to an almost perfect contextual indicator of veracity, they do not focus solely on that indicator. Instead, they feel attracted by the [poorly diagnostic] nonverbal behaviour of the sender and use these behavioural cues as a basis for their veracity judgments. This limits their accuracy rates.

However, as discussed below, the observers would do better if they focused on contextual cues—because these are useful in detecting lies in the real world. Given the fact that research has explored almost exclusively behavioural correlates of lying, Park, Levine, McCornack, Morrison and Ferrara (2002) wondered whether in the real world, away from psychology and communication laboratories, deception is actually detected from behavioural cues. In an ingenious and thought-provoking study, they asked 202 participants to recall a lie that they had discovered in

the past and to indicate how they had detected it. The results showed that, in real life, lies are only rarely detected from behavioural indicators. In fact, the indicia mentioned most often were third party information, confessions, and physical evidence. Park et al.'s position is that detection rates derived from laboratory studies cannot be extrapolated to the real world, since the most useful information for detecting lies outside the laboratory is absent in scientific experiments, during which the detectors only have access to fallible verbal and nonverbal behaviours.[4] Note that the fact that Park et al.'s participants did not mention behavioural indicators does not mean that they did not use them, only that they did not allow participants to identify the lies.

Recently, the present authors have conducted a study similar to Park et al.'s (2002) but somewhat more ambitious (Masip & Herrero, 2015b). First we asked both a sample of local police officers and a sample of community members how they believed that lies can be detected (Questionnaire 1: Beliefs). Then, after collecting their answers, we did the same as Park et al.: we asked all participants to recall a lie and report how they had detected it (Questionnaire 2: Revealing information). The officers had to do this second task twice, first focusing on a lie they had discovered in their professional police work and then focusing on a lie they had discovered in their personal life. The results show that, in line with Park et al.'s findings, participants in both samples mentioned significantly more contextual than behavioural information in answering Questionnaire 2. However, the answers to the first questionnaire showed the opposite pattern: significantly more behavioural than contextual cues were mentioned. This shows that, despite people's experience that real-life lies are detected from contextual indicators, they remain attached to their belief that the sender's behaviour is a source of valuable information to determine whether the sender is lying. There was little difference between police officers and non-officers, which shows that the greater experience that officers undoubtedly have with lies and deceivers does not correct their tendency to overestimate the usefulness of behavioural information. No differences were found within the officers' group between professional and personal contexts.

The data from Masip and Herrero (2015b) suggests that awareness should be raised among police officers (and other professionals, such as insurance agency inspectors, auditors, judges, etc.) of the discrepancy between their beliefs (behavioural cues) and revealing information (contextual information). If a professional believes that deception is revealed spontaneously in the behaviour, when required to assess the veracity he will attend more strongly to behavioural indicators than to contextual information. This will compromise the accuracy of his judgment. If he were aware that contextual information is more revealing, then perhaps he would focus consciously on that information rather than on fallible behavioural cues.

Blair and colleagues (Blair, Levine, Reimer & McCluskey, 2012; Blair, Levine & Shaw, 2010) defend contextual cues as indicators of deception, and categorise such cues into the following types: (a) *contradictions* between the information provided by the speaker and information that may be available to the detector; (b) *normative information*, i.e., knowledge of the person's habitual activities, physical laws, what people generally do in that situation, etc.; a declaration that deviates from the norm will arouse suspicion; and (c) *idiosyncratic information*, which cannot be included in either of the above categories but is nonetheless revealing: Blair et al. (2010, 2012) give the example of a company from which money disappears regularly except when a particular employee is on vacation, the problem reappearing when the employee returns. Blair et al. (2010) demonstrated empirically the utility of contextual information in assessing veracity: in a set of eight experiments, mean accuracy when only behaviour was shown (without context) to the observers was 57% (63% for truths and 52% for lies), which is typical of laboratory research in this area. But when participants were provided with information on the context, accuracy increased significantly to 75% (74% for truths and 75% for lies). In short, studies focused on lies discovered in real life (Masip & Herrero, 2015b; Park et al., 2002) and the laboratory

[4] A provocative implication of these findings is that the conclusion –derived from laboratory studies– that people are incapable of discriminating between truths and lies may be erroneous. Park et al. (2002) detected two other differences between what is normally done in the laboratory and what happens in real life: (a) in the laboratory, observers must detect lies immediately, whereas in the real world lies are detected only weeks or months after they were told, and (b) in the laboratory, normally participants have to judge the veracity of strangers, whereas in the real world the detector often knows the deceiver personally. All of this can influence accuracy rates.

experiments by Blair et al. (2010) converge in showing that context permits higher accuracy rates than behavioural cues.[5]

In a more recent paper, Blair et al. (2012) describe three types of deception cues. It is obvious that Blair et al.'s "contextual" approach is not so different from the strategic interviewing approach to maximise the differences between liars and truth-tellers:

a) *Demeanour*. Blair et al. (2012) recognise that demeanour is not useful to detect lies; however, they recommend "to ask questions that are not difficult or threatening to an honest person, but that prove challenging to the liar" (p. 735). Although they then make an unfortunate proposal in line with the BAI, it is clear that the general notion is in tune with the idea of an active interviewer whose actions increase the behavioural differences between liars and truth-tellers.

b) *Coherence*. Coherence is the consistency between different statements by the same sender (intra-individual coherence) or between statements from different senders (interpersonal coherence). As Blair et al. note (2012), intra-individual coherence has not always proven to be a valid indicator of the veracity (e.g., Granhag & Strömwall., 2002; but see Street & Masip, 2015); however, DePaulo et al.'s (2003) meta-analysis shows that "discrepancies/ambivalences" are indicators of deception. (It is important to note, however, that discrepancies/ambivalences are more comprehensive than verbal inconsistency, as they also include discrepancies between communication channels). Furthermore, with a specific strategic interviewing modality still under development, intra-individual coherence can become a valid indicator of veracity (Masip, Blandón-Gitlin, Herrero, Ibabe & Martínez, 2015). Concerning interpersonal coherence, it can be exploited, as indicated by Blair et al., by using unexpected questions, as Vrij et al. (2009) did in the study described above.

c) *Correspondence*. Correspondence is the agreement between the speaker's utterances and the detector's knowledge. Specific strategies designed to maximise its usefulness should be employed; the SUE technique is an excellent example of such a strategy (Blair et al., 2012).

In short, then, there is evidence showing that despite people's preference for behavioural cues as indicators of deception, contextual information is more revealing of veracity. Some of the contextual indicators that have been proposed can be exploited by the interviewer by using active strategies to increase the differences between truth-tellers and liars. Consequently, the two approaches described in this paper are closely related.

CONCLUSIONS

Despite the popular belief that deception is revealed spontaneously in the behaviour of the sender, research accumulated over several decades shows that this is not the case. In view of this finding, deception scientists have changed the orientation of their research. Specifically, they have begun to explore techniques to be used by the interviewer to generate observable differences between truth-tellers and liars. These techniques must be based on solid psychological theories and be supported by empirical research. With this in mind, different interviewing approaches are being developed, such as TRI-Con, inducing cognitive load, the SUE Technique, asking unexpected questions or using drawings. The lie detector should also seek contextual rather than behavioural indicators, looking for physical evidence against which to check the sender's statements, asking third parties, and considering whether the story strays from the norm (the laws of nature, and the habitual behaviour of people in general or of that particular sender). In a ground-breaking recent study, Ormerod and Dando (2015) have combined these two new approaches (active interviewing and contextual cues) in a brief interviewing technique designed to be used with passengers at airports. The results are very encouraging.

However, it is important to note here that these protocols are still under development. Although they provide an

[5] Reinhard, Sporer, Scharmach and Marksteiner (2011) found that if people are familiar with the situation to which the communication refers they will achieve higher accuracy levels in judging veracity than if they are not. This may seem consistent with the notion that lies can be detected from contextual cues: in familiar situations, the receivers can assess the plausibility of the verbal content by comparing it with their knowledge of the situation (Stiff et al., 1989). However, Reinhard, Scharmach and Sporer (2012) showed that *perceived* (and not necessarily real) familiarity is enough for this effect to occur. This implies that the mechanism underlying the situational familiarity effect is not the use of correct contextual information—although, of course, it does not question the notion that contextual information may be helpful in assessing veracity.

improvement over the alternative methods, in most studies error rates (truth-tellers judged as liars and liars judged as truth-tellers) are still high. Consequently, it is not advisable to make certain decisions (such as convicting a defendant or dismissing a worker) based exclusively on these protocols. Furthermore, research is still very scant. Few studies have examined each of the new interview modalities, and often all of the studies examining a specific protocol have been carried out by only one research team (e.g., only Walczyk and his group have examined TRI-Con, only Vrij, Fisher and Leins's group has explored the effectiveness of drawings, etc.). Other researchers must independently verify the effectiveness and limitations of each procedure. Until then, the widespread use of the new protocols is not recommended (see Blandón-Gitlin, Fenn, Masip & Yoo, 2014).

REFERENCES

Blair, J. P., Levine, T. R., Reimer, T. O. & McCluskey, J. D. (2012). The gap between reality and research. Another look at detecting deception in field settings. *Policing: An International Journal of Police Strategies & Management, 35*, 723-740.

Blair, J. P., Levine, T. R. & Shaw, A. S. (2010). Content in context improves deception detection accuracy. *Human Communication Research, 36*, 423-442.

Blandón-Gitlin, I., Echon, R. & Pineda, C. (2013, June). *Detecting deception: The benefit of depleting executive control in liars*. Communication presented at the 10th edition of the congress of the Society for Applied Research in Memory and Cognition (SARMAC), Rotterdam, Holland.

Blandón-Gitlin, I., Fenn, E., Masip, J. & Yoo, A. (2014). Cognitive-load approaches to detect deception: Searching for cognitive mechanisms. *Trends in Cognitive Sciences, 18,* 441-444.

Bond, C. F., Jr., Howard, A. R., Hutchison, J. L. & Masip, J. (2013). Overlooking the obvious: Incentives to lie. *Basic and Applied Social Psychology, 35*, 212-221.

Camerer, C., Loewenstein, G. & Weber, M. (1989). The course of knowledge in economic settings: An experimental analysis. *Journal of Political Economy, 97*, 1232-1254.

Clemens, F., Granhag, P. A. & Strömwall, L. A. (2011). Eliciting cues to false intent. A new application of strategic interviewing. *Law and Human Behavior, 35*, 512-522.

Clemens, F., Granhag, P. A., Strömwall, L. A., Vrij, A., Landström, S., Roos af Hjelmsäter, E. & Hartwig, M. (2010). Skulking around the dinosaur: Eliciting cues to children's deception via strategic disclosure of evidence. *Applied Cognitive Psychology, 24*, 925-940.

Dando, C. J. & Bull, R. (2011). Maximising opportunities to detect verbal deception: Training police officers to interview tactically. *Journal of Investigative Psychology and Offender Profiling, 8*, 189-202.

Dando, C. J., Bull, R., Ormerod, T. C. & Sandham, A. L. (2015). Helping to sort the liars from the truth tellers: The gradual revelation of information during investigative interviews. *Legal and Criminological Psychology, 20*, 114-128.

DePaulo, B. M., Lindsay, J. J., Malone, B. E., Muhlenbruck, L., Charlton, K. & Cooper, H. (2003). Cues to deception. *Psychological Bulletin, 129*, 74-118.

Evans, J. R., Michael, S. W., Meissner, C. A. & Brandon, S. E. (2013). Validating a new assessment method for deception detection: Introducing a Psychologically Based Credibility Assessment Tool. *Journal of Applied Research in Memory and Cognition, 2*, 33-41.

Garrido, E. & Masip, J. (2001). La evaluación psicológica en los supuestos de abusos sexuales [Psychological assessment in cases of sexual abuse]. In F. Jiménez (Ed.), *Evaluación psicológica forense 1: Fuentes de información, abusos sexuales, testimonio, peligrosidad y reincidencia* (pp. 25-140). Salamanca: Amarú.

Gilovich, T., Savitsky, K. & Medvec, V. H. (1998). The illusion of transparency: Biased assessments of others' ability to read one's emotional states. *Journal of Personality and Social Psychology, 75*, 332-46.

Glenberg, A. M., Schroeder, J. L. & Robertson, D. A. (1998). Averting the gaze disengages the environment and facilitates remembering. *Memory & Cognition, 26*, 651-658.

Granhag, P. A. & Hartwig, M. (2008). A new theoretical perspective on deception detection: On the psychology of instrumental mind-reading. *Psychology, Crime & Law, 14*, 189-200.

Granhag, P. A. & Strömwall, L. A. (2002). Repeated interrogations: Verbal and non-verbal cues to deception. *Applied Cognitive Psychology, 16*, 243-257.

Granhag, P. A. & Strömwall, L. A. (2008). Detection of deception: Use of evidence in. In B. L. Cutler (Ed.), *Encyclopedia of psychology and law* (pp. 204-206). Thousand Oaks, CA: Sage.

Granhag, P. A., Strömwall, L. & Hartwig, M. (2007). The SUE-technique: The way to interview to detect deception. *Forensic Update, 88*, 25-29.

Granhag, P. A., Strömwall, L. A., Willén, R. & Hartwig, M. (2013). Eliciting cues to deception by tactical disclosure of evidence: The first test of the Evidence Framing Matrix. Legal and Criminological Psychology, 18, 341-355.

Hartwig, M., Granhag, P. A. & Luke, T. (2014). Strategic use of evidence during investigative interviews: The state of the science. In D. C. Raskin, C. R. Honts & J. C. Kircher (Eds). *Credibility assessment: Scientific research and applications* (pp. 1-36). San Diego, CA: Academic Press.

Hartwig, M., Granhag, P. A., Strömwall, L. A. & Kronkvist, O. (2006). Strategic use of evidence during police interviews: When training to detect deception works. *Law and Human Behavior, 30*, 603-619.

Hartwig, M., Granhag, P. A., Strömwall, L. A. & Vrij, A. (2005). Detecting deception via strategic disclosure of evidence. *Law and Human Behavior, 29*, 469-484.

Inbau, F. E., Reid, J. E., Buckley, J. P. & Jayne, B. C. (2004). *Criminal interrogation and confessions* (4ª ed.) Sudbury, MA: Jones and Bartlett Publishers.

Johnson, M. K. & Raye, C. L. (1981). Reality monitoring. *Psychological Review, 88*, 67-85.

Jordan, S., Hartwig, M., Wallace, B., Dawson, E. & Xhihani, A. (2012). Early versus late disclosure of evidence: Effects on verbal cues to deception, confessions, and lie catchers' accuracy. *Journal of Investigative Psychology and Offender Profiling, 9*, 1-12.

Leins, D., Fisher, R. & 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., Leal, S. & Mann, S. (2011). Using sketch drawing to induce inconsistency in liars. *Legal and Criminological Psychology, 16*, 253-265.

Lerner, M. J. (1980). *The belief in a just world: A fundamental delusion*. New York: Plenum Press.

Masip, J., Blandón-Gitlin, I., Herrero, C., Ibabe, I. & Martínez, M. C. (2015, Marzo). *Interviewing to detect deception: Inconsistency in answering central and peripheral questions across repeated interviews as a deception cue*. Paper presented at the annual meeting of the American Psychology-Law Society, San Diego, California, United States.

Masip, J. & Garrido, E. (2003). La detección del engaño mediante la técnica del control de la realidad [The detection of deception by the technique of reality monitoring]. *Encuentros en Psicología Social, 1*(5), 113-121.

Masip, J. & Herrero, C. (2013). "What would you say if you were guilty?" Suspects' strategies during a hypothetical Behavior Analysis Interview concerning a serious crime. *Applied Cognitive Psychology, 27*, 60-70.

Masip, J. & Herrero, C. (2015a). New approaches in deception detection I. Background and theoretical framework. *Papeles del Psicólogo, 36*, 83-95.

Masip, J. & Herrero, C. (2015b). Police detection of deception: Beliefs about behavioral cues to deception are strong even though contextual evidence is more useful. *Journal of Communication, 65*, 125-145.

Masip, J., Sporer, S. L., Garrido, E. & Herrero, C. (2005). The detection of deception with the Reality Monitoring approach: A review of the empirical evidence. *Psychology, Crime & Law, 11*, 99-122.

Ormerod, T. C. & Dando, C. (2015). Finding a needle in a haystack: Toward a psychologically informed method for aviation security screening. *Journal of Experimental Psychology: General, 144*, 76-84.

Park, H. S., Levine, T. R., McCornack, S. A., Morrison, K. & Ferrara, S. (2002). How people really detect lies. *Communication Monographs, 69*, 144-157.

Reinhard, M.-A., Scharmach, M. & Sporer, S. L. (2012). Situational familiarity, efficacy expectations, and the process of credibility attribution. *Basic and Applied Social Psychology, 34,* 107-127.

Reinhard, M.-A., Sporer, S. L., Scharmach, M. & Marksteiner, T. (2011). Listening, not watching: Situational familiarity and the ability to detect deception. *Journal of Personality and Social Psychology, 101*, 467-484.

Sorochinski, M., Hartwig, M., Osborne, J., Wilkins, E., Marsh, J., Kazakov D. & Granhag, P. A. (2014). Interviewing to detect deception: When to disclose the evidence? *Journal of Police and Criminal Psychology, 29*, 87-94.

Sporer, S. L. (2004). Reality monitoring and the detection of deception. In P.-A. Granhag & L. A. Strömwall (Eds.), *The detection of deception in forensic contexts* (pp. 64-102). Cambridge, United Kingdom: Cambridge University Press.

Steller, M. & Köhnken, G. (1994). Análisis de

declaraciones basado en criterios [Criteria based content analysis declarations]. In D. C. Raskin (Ed.), *Métodos psicológicos en la investigación y pruebas criminales [Psychological methods in criminal investigation and evidence]* (pp. 189-211). Bilbao: Desclée de Brouwer. (Originally published in English in 1989 by Springer, New York).

Stiff, J. B., Miller, G. R., Sleight, C., Mongeau, P., Garlick, R. & Rogan, R. (1989). Explanations for visual cue primacy in judgments of honesty and deceit. *Journal of Personality and Social Psychology*, *56*, 555–564.

Street, C. N. H. & Masip, J. (2015). The source of the truth bias: Heuristic processing? *Scandinavian Journal of Psychology, 56*, 254-263.

Vrij, A. Publicado Granhag, P. A. (2012). Eliciting cues to deception and truth: What matters are the question asked. *Journal of Applied Research in Memory and Cognition, 1*, 110-117.

Vrij, A., Granhag, P. A. & Porter, S. (2010). Pitfalls and opportunities in nonverbal and verbal lie detection. *Psychological Science in the Public Interest*, *11*, 89-121.

Vrij, A., Leal, S., Granhag, P. A., Mann, S., Fisher, R., Hillman, J. & Sperry, K. (2009). Outsmarting the liars: The benefit of asking unanticipated questions. *Law and Human Behavior, 33*, 159-166.

Vrij, A., Leal, S., Mann, S. & Fisher, R. (2012). Imposing cognitive load to elicit cues to deceit: Inducing the reverse order technique naturally. *Psychology, Crime & Law*, *18*, *579-594*.

Vrij, A., Mann, S., Fisher, R., Leal, S., Milne, B. & Bull, R. (2008). Increasing cognitive load to facilitate lie detection: The benefit of recalling an event in reverse order. *Law and Human Behavior*, *32*, 253-265.

Vrij, A., Mann, S., Leal, S. & Fisher, R. (2010). 'Look into my eyes': can an instruction to maintain eye contact facilitate lie detection? *Psychology, Crime & Law*, *16*, 327-348.

Vrij, A., Mann, S., Leal, S. & Fisher, R. (2012). Is anyone there? Drawings as a tool to detect deceit in occupation interviews. *Psychology, Crime & Law, 18*, 377-388.

Walczyk, J. J., Harris, L. L., Duck, T. K. & Mulay, F. (2014). A social-cognitive framework for understanding serious lies: Activation-decision-construction-action theory. *New Ideas in Psychology, 34*, 22-36.

Walczyk, J. J., Griffith, D. A., Yates, R., Visconte, S. R., Simoneaux, B. & Harris, L. L. (2012). Lie detection by inducing cognitive load. Eye movements and other cues to the false answers of "witnesses" to crimes. *Criminal Justice and Behavior*, *39*, 887-909.

Walczyk, J. J., Mahoney, K. T., Doverspike, D. & Griffith-Ross, D. A. (2009). Cognitive lie detection: Response time and consistency of answers as cues to deception. *Journal of Business and Psychology*, *24*, 33-49.

Walczyk, J. J., Roper, K. S., Seemann, E. & Humphrey, A. M. (2003). Cognitive mechanisms underlying lying to questions: Response time as a cue to deception. *Applied Cognitive Psychology*, *17*, *755-774*.

Walczyk, J. J., Schwartz, J. P., Clifton, R., Adams, B., Wei, M. & Zha, P. (2005). Lying person to person about life events: A cognitive framework for lie detection. *Personnel Psychology*, *58*, 141-170.

Yeschke, C. L. (1997). *The art of investigative interviewing: A human approach to testimonial evidence*. Boston, MA: Butterworth-Heinemann.