Which Lie Detection Tools are Ready for Use in the Criminal Justice System?☆

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We introduce 'arousal based' lie detection tools (the Behavior Analysis Interview, the Comparison Question polygraph Test, CQT) and 'cognition based' lie detection tools (imposing cognitive load, encouraging interviewees to say more, asking unexpected questions, Strategic Use of Evidence, Verifiability Approach and Concealed Information polygraph Test, CIT), and discuss whether they are ready for use in investigative interviews. We developed ten criteria on which to judge their suitability. The two arousal-based techniques (frequently used) fall short on numerous criteria. There are too many problems associated with the imposing cognitive load technique, but the other cognitive techniques are ready for use (encouraging interviewees to say more and Strategic Use of Evidence) or ready for use if they continue to receive support in empirical research (asking unexpected questions and Verifiability Approach). The CIT polygraph test cannot be included in a standard investigative interview but can be useful in addition to investigative interviewing.

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Research on lie detection has produced a shift in focus over the last years, away from measures frequently used in criminal investigations that seek to detect lies by monitoring anxiety or arousal (e.g., the Behavior Analysis Interview), the Comparison Question [polygraph] Test, CQT) and toward innovative measures that emphasize truth tellers' and liars' cognitively different psychological states (Vrij & Granhag, 2012). Such techniques take into account (a) that lying in interviews is often mentally more taxing than truth telling (e.g., imposing cognitive load), and (b) the different strategies truth tellers and liars use during interrogations (encouraging interviewees to say more, Strategic Use of Evidence and Verifiability Approach) and exploit the facts that (c) liars prepare themselves for interviews (e.g., asking unexpected questions), and (d) people orient toward familiar information (Concealed Information polygraph Test, CIT).

We briefly describe the techniques followed by a discussion whether they are ready for use in the criminal justice system, particularly in investigative interviews. For this purpose we developed ten criteria on which to judge their suitability and

discuss the extent to which each of these tests fits each of these criteria.[1]

Arousal-Based Lie Detection Tools

Behavior Analysis Interview (BAI)

The BAI consists of a set of standardized questions and is an integral part of the Reid Interrogation Technique. It is used to determine whether a suspect is likely to be guilty such that only suspects thought to be guilty will be submitted to the Reid Nine Steps of Interrogation. It is assumed that during the BAI liars feel more uncomfortable than truth tellers and display more nervous behaviors (e.g., crossing legs, shifting about in chairs, performing grooming behaviors, or looking away from the investigator) (Inbau, Reid, Buckley, & Jayne, 2013).

Comparison Question Test (CQT)

During a CQT examinees are attached to the polygraph and are asked relevant questions, e.g., 'Did you murder Joe Frisbie on March 12, 2016′? and comparison questions, e.g., 'Before 2015, did you ever physically injure someone who loved and trusted you?' Comparison questions are designed to provide the innocent suspect with an opportunity to become more concerned with the comparison questions than with the relevant questions. Examinees who react most strongly to the comparison questions are considered truthful and examinees who react most strongly to the relevant questions are considered deceptive (Raskin & Honts, 2002).

Cognitive-Based Lie Detection Tools

Imposing Cognitive Load

Lying in interview settings is typically more mentally taxing than truth telling (see fMRI research, e.g., Christ, Van Essen, Watson, Brubaker, & McDermott, 2009; Vrij & Ganis, 2014). Investigators can exploit truth tellers' and liars' different mental states by making the interview setting cognitively more difficult, for example by asking interviewees to engage in a concurrent, second, task when discussing the event. Liars, whose mental resources are more depleted, are less able than truth tellers

to cope with additional requests (e.g., Debey, Verschuere, & Crombez, 2012).

Asking Unexpected Questions

Liars typically prepare themselves for anticipated interviews by considering answers to questions they expect to be asked (e.g., Hartwig, Granhag, & Strömwall, 2007). The problem liars face is that they cannot know what will be asked. When investigators ask a mixture of anticipated and unanticipated questions, truth tellers answer these questions with similar ease, but liars find answering the unanticipated question more difficult than answering the anticipated questions (Lancaster, Vrij, Hope, & Waller, 2012).

Encouraging Interviewees to Say More

When prompted to expand on their original narrative, liars will provide less new information than truth tellers (Vrij, Hope, & Fisher, 2014). Liars do not add the same amount of information as truth tellers do in reaction to such prompts because they find it cognitively too difficult to add many plausible sounding details or may be reluctant to add more details out of fear that it will provide leads to investigators which can give their lies away (Leal, Vrij, Warmelink, & Fisher, 2015).

Strategic Use of Evidence (SUE)

During interviews truth tellers are generally forthcoming, whereas liars are inclined to be avoidant (e.g., in a free recall avoiding mentioning where they were at a certain time) or use denials (e.g., denying having been at a certain place at a certain time when asked directly) (Granhag & Hartwig, 2008). When investigators ask questions related to the evidence without making the interviewee aware that they possess this evidence, these different behaviors used by truth tellers and liars result in truthful suspects' accounts being more consistent with the available evidence than deceptive suspects' accounts (Hartwig, Granhag, & Luke, 2014).

Verifiability Approach

Liars prefer to provide many details because they are aware that accounts rich in detail are more likely to be believed. They also prefer to avoid mentioning too many details out of fear that investigators will check such details (Nahari, Vrij, & Fisher, 2012). A strategy that incorporates both goals is to provide details that cannot be verified. Liars use this strategy and typically report fewer details that can be checked than truth tellers (Nahari, Vrij, & Fisher, 2014).

Concealed Information Test (CIT)

A CIT polygraph test can be used when examinees deny knowledge of a specific crime. During the test examinees are given questions with multiple-choice answers (e.g., How did the murderer kill his victim: Did he (i) drown her; (ii) strangle her with a rope; (iii) stab her with a knife or (iv) shoot her with a gun?) A deceptive examinee will recognize the correct answer

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[1] Over the years Paul Ekman has argued that facial expressions of emotion betray liars (Ekman, 1985/2001). According to Ekman, aspects of facial communication are beyond control and can betray a deceiver's true emotion via micro-expressions (lasting 1/25 to 1/5 of a second) of that emotion. The method became known to the public through the fictional character Dr. Cal Lightman who successfully uses this method to catch liars in the American crime drama series *Lie to Me*. Ekman has claimed that his system of lie detection can be taught to anyone with an accuracy of more than 95% (*New York Times Magazine*, 5 February 2006; see also *Washington Post*, 29 October 2006 for a similar statement). However, Ekman has never published empirical data to back up this claim. That is, he has not published data showing that observers achieve this accuracy; neither has he published data showing that facial expressions of emotions are a diagnostic indicator of deceit. Regarding the latter, Porter and ten Brinke (2008) found that micro-expressions only occurred in 14 out of the 697 analyzed expressions, and that six of those 14 expressions were displayed by truth tellers. Since the analysis of micro-expressions is not an interview technique, it will not be discussed in this article.