

Lie Detection Accuracy—the Role of Age and the Use of Emotions as a Reliable Cue

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Abstract Literature surrounding the accuracy of deception detection has produced inconsistent findings, and the majority of investigations have been based upon low-stakes lies. Although recent research has suggested that high-stakes situations may produce reliable cues to deception, it remains unclear whether knowledge of these cues actually improves the detection of lies. In an online experiment, we assessed participant's ability to detect lies in 22 public appeals for help with missing or murdered relatives ($N = 196$). Participants were randomly allocated to either the cue condition (presented with previously identified cues to deception) or no cue condition (instructed to make judgement on instinct), before being presented with the video footage. Participants were asked to indicate whether the appellant is lying or telling the truth, how confident they are in their judgement and if they were familiar with the case. At the end of the experiment, participants wrote qualitative responses on the cues that they used during lie detection. Although cue knowledge and confidence did not significantly predict accuracy scores, there was a positive relationship between accuracy and age. Participants who used emotion-based cues were significantly better at detecting deception. The findings are discussed with reference to the existence of reliable cues.

Keywords Lie detection accuracy · Cue condition · Confidence · Age · Emotions · High-stakes lies

Introduction

Through recent research on high-stakes lies, certain cues have emerged that appear to be significantly more prevalent in deceptive rather than honest communications, and some of these cues differ remarkably between high-stakes and low-stakes settings. For example, gaze aversion and head movements have been identified as cues in high-stakes televised appeals (Wright Whelan et al. 2014), whereas in low-stakes laboratory studies, these cues are not reliable (DePaulo et al. 2003). It is possible that when the stakes are high (e.g. risking prosecution for a murder), the behaviour of liars is significantly different to low-stakes lie situations. This could be due to a large number of moderator variables (Sporer and Schwandt 2007), including preparation, differences in emotional processes, interviewing techniques and motivation. Despite earlier research suggesting that people perform at chance levels when detecting lies (Bond and DePaulo 2006), more recent research on high-stakes lies generally supports the proposition that people are able to achieve above chance accuracy at deception detection (e.g. Lyons et al. 2013). Such findings imply that there are reliable cues to deception, potentially typical to high-stakes lies, which some individuals can utilise in their judgement.

Besides gaze aversion and head shaking (Wright Whelan et al. 2014), other cues to high-stakes lies have been identified in recent studies. Lack of emotional authenticity (ten Brinke and Porter 2012; Wright Whelan et al. 2015a), blink rate (ten Brinke and Porter 2012), speech errors (Porter and ten Brinke 2010) and a number of verbal cues (McQuaid et al. 2015) have all been found to discriminate between liars and truth tellers. However, it is unclear whether these cues can be used in achieving accuracy in lie detection, as the motivation to be believed can make individuals look deceptive even when they are being truthful (Bond and DePaulo 2006).

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There has been very little research investigating whether asking people to consciously focus on certain cues (e.g. Wright Whelan et al. 2014, 2015a) improves their confidence and accuracy when detecting high-stakes lies. One exception is a study by Shaw et al. (2013), who found a significant increase in accuracy after a full-day training workshop. There are however several studies in which participants have been informed of cues before making judgements regarding low-stakes lies (e.g. Kassin and Fong 1999). Recent meta-analyses have suggested that all forms of deception detection training, including the informing of indicative cues, have a small or medium positive effect on deception detection accuracy (Driskell 2012; Hauch et al. 2016). Therefore, it would be expected that informing participants about cues to high-stakes lies would improve their ability to detect a lie.

It is possible that many studies have found only a small effect from training because intuitive processing may play an important part in deception detection (Albrechtsen et al. 2009; ten Brinke et al. 2014). According to Hartwig and Bond (2011), intuitive judgements of deception are more accurate than an explicit knowledge of valid cues, and the major limitation for accuracy is the weakness of the cues, rather than reliance on incorrect indicators. However, this could be due to the nature of the studies, as most research has been conducted as laboratory experiments where the liars have little to lose if they get caught (Hartwig and Bond 2011). If there are indeed valid cues that may be typical only to high-stakes situations, it is possible that when people are instructed to focus on these cues, their accuracy increases, together with confidence in their judgements. Previous research has found discrepancies between confidence and accuracy (DePaulo et al. 1997), but this could be an artefact of the laboratory experiments with low-stakes lie stimuli. More recent research using high-stakes situations has found a positive relationship between confidence and accuracy of judgements (Honts et al. 2014; Wright Whelan et al. 2015b). Thus, it may be that when people are focusing on lies that have real-life implications, they are somewhat consciously aware of their own accuracy.

Given the acknowledged need to examine forensic populations and high-stakes lies (Porter and ten Brinke, 2010), the present study used video footage of real-life missing person appeals, to investigate the relative contribution of cue knowledge and confidence as predictors of deception detection accuracy. Further, we wanted to control for participant's age, as previous studies have found that age may be a negative predictor of lie detection ability (Sweeney and Ceci 2014). We predicted that participants who were given the previously identified reliable cues (Wright Whelan et al. 2014, 2015a) would have an increased ability to detect lies, in comparison to participants who were relying on intuition. Further, we expected that participants who were given the cues would be significantly more confident than participants who were making the judgements based on their intuition. Due to scarcity

and inconsistency of findings regarding which behavioural cues are indicative of deception, we also asked participants to report the cues that they thought to be important when making the judgement.

Methods

Participants

An online experiment, titled “lie detection accuracy”, was advertised at a university in North-West England to students who were able to participate in exchange for course credits. In addition, the experiment was advertised to the community via the first author's social networks, and on psychology research participant websites. Participants were recruited through opportunity sampling and all participation was voluntary. After removing participants who indicated they were familiar with one or more of the cases ($n = 72$), the final sample consisted of 196 volunteers (males = 54; students = 178), aged between 16 and 67 years ($M = 21.39$, $SD = 7.72$). Participants were randomly allocated to either the cue condition ($N = 101$; males = 31; students = 90) or the no cue condition ($N = 95$; males = 23; students = 88).

Materials

Video footage of 22 real-life high-stakes emotional television appeals was selected for inclusion in the survey. These appeals were based on real broadcasts from major television channels in the UK, USA and Australia. In each appeal, a person pleaded for information surrounding the disappearance or murder of an individual. Appeals were not considered for inclusion if they were recent or high profile in the UK or if the case had not been solved. In half of the cases (11 video clips), the person making the appeal was honest; he or she was not involved in the death or disappearance of the individual. However, in the other half (11 video clips), the person making the appeal was involved in the death or disappearance and was therefore deceptive in the clip. In all these cases, the appellant was convicted in a criminal court for their involvement, and in the cases classified as honest, another person was convicted of the death or the missing individual was found. Appellers were only classified as either deceptive or honest if there was overwhelming evidence to support the conclusion of the case (criteria set out by Vrij and Mann 2001; ten Brinke and Porter 2012). Each appeal was reviewed and clips were cut appropriately; videos had duration between 8 and 38 s.

Procedure

After being presented with an online information sheet, online consent and demographic information, participants were

randomly allocated to one of two conditions. All of the participants were given the following instructions: “You will be shown a series of video clips of people talking about missing or murdered individuals. In some of the clips, the person who is interviewed has been personally involved with the disappearance or murder, therefore is lying. In the other clips, the person being interviewed is being truthful. Please watch the clips carefully, and try to judge whether the person is telling the truth, or whether they are lying”. In the “no cue” condition, these instructions were followed by the statement “Try to use your instinct when making your judgement”. In the “cue” condition, participants were told that “Previous studies have found that when people are telling lies in high-stakes situations (i.e., missing persons appeals), they often (although not always) (1) avert their gaze, and don’t look directly into the camera (2) Shake their head and (3) fake their emotions, including having tears that are forced rather than natural”.

All other content of the survey was the same for participants in both conditions, including the video footage of the appeals (11 truthful and 11 deceptive) in a randomised order for lies and truths. After viewing each clip, participants were asked to indicate whether the person appealing was lying or telling the truth, then rate how confident they were with this answer using a six-point Likert scale (ranging from “not confident at all” to “extremely confident”). Participants were also asked whether they were familiar with each case featuring in the footage. At the end of the survey, participants were asked to qualitatively report what behaviours they focused on when judging the clips before being thanked and presented with a full debrief.

Data Analysis

To estimate deception detection accuracy, signal detection theory (Higham et al. 2009; Macmillan and Creelman 2005) was used to calculate a hit rate and a false alarm rate for each participant. The hit rate expressed the probability of correctly identifying a liar, whereas the false alarm rate was the probability of a non-liar being wrongly identified as a liar. The Snodgrass and Corwin (1988) correction was applied to these rates to compute a non-bias measure of lie detection accuracy (d) to be used in the analysis.

Qualitative responses in which participants detailed the behaviours they focused upon when detecting lies were initially analysed using the inductive thematic analysis procedure (Braun and Clarke 2006). Responses were carefully and thoroughly read to search for patterns, and then, each unit of text was grouped into categories. Codes for each category were created and the entire content of the data set was coded. The analysis identified six key factors taken into account when detecting deception: emotion, body language, the spoken account, head movement, eye movement and the participant’s personal instinct.

Results

Descriptive statistics and differences between the cue conditions for accuracy (d), confidence and age are reported in Table 1. An independent samples t test revealed no significant difference between the cue condition and the no cue condition for deception detection accuracy (d) or confidence ratings. However, despite random allocation, results show that age significantly differed between the cue conditions.

A simultaneous linear regression analysis was conducted to analyse the effect of cue condition, confidence and age on deception detection accuracy (d). Age emerged as the only significant predictor ($b = 0.14$, $t = 1.94$, $p = 0.05$), indicating that as age increased, accuracy increased also. None of the other predictors were significant ($p > 0.34$).

For the qualitative responses, descriptive statistics and differences in accuracy scores (d) between participants reporting use and participants not reporting use for each cue type are reported in Table 2. An independent samples t test was carried out on each cue type to compare deception detection accuracy (d) between those using the cue and those not using the cue. Participants who reported using emotion-based cues were significantly better at detecting deception (d) than participants who did not report using emotion-based cues; however, no significant differences were found for any other cue type (see Table 2). In order to check whether participants’ accuracy was based on the utilisation of emotion cues after being instructed to do so in the cue condition, we conducted a 2 (emotion cues used/not used) \times 2 (cue condition/no cue condition) between participants’ ANOVA, where the d prime was entered as the dependent variable. The interaction between the cue condition and the cue utilisation was not significant ($F(1192) = 0.14$, $p = 0.72$), indicating that knowing that emotion cues may be relevant to accuracy did not lead to a higher accuracy via self-reported utilisation of these cues.

Discussion

The present study contributes to the growing body of research examining deception detection in real-life and high-stakes situations and may have implications for the understanding of lie detection in a forensic context. In particular, the findings raise questions about the use of behavioural cues to determine whether an individual is lying or telling the truth. There were no differences in deception detection accuracy between the participants informed of cues to deception and the participants who were told to make judgements based on instinct. Further, we found that confidence in deception detection did not relate to accuracy, in line with DePaulo et al. (1997), but contrary to findings reported by Wright Whelan et al. (2015b). A positive relationship was found between age and deception detection accuracy, which contradicts research by Sweeney and Ceci

Table 1 Descriptive statistics and *t* tests for accuracy (*d*), confidence and age by the cue condition

	Mean (\pm SD)			<i>t</i>
	Overall	Cue	No cue	
Accuracy (<i>d</i>)	0.35 (0.55)	0.35 (0.54)	0.34 (0.56)	0.07
Confidence	4.04 (0.78)	4.04 (0.78)	4.03 (0.78)	0.14
Age	21.39 (7.72)	22.42 (9.73)	20.29 (4.55)	1.97**
<i>N</i>	196	101	95	

p* < .05; *p* < .01

(2014) that found the older the individual, the worse the ability to detect lies. Furthermore, overall reported cue usage was not associated with deception detection accuracy; however, participants who used emotion-based cues were better at deception detection than participants that did not.

Although the study relied upon prior research that has identified cues to deception (Wright Whelan et al. 2014, 2015a), what constitutes these cues remains highly disputed within the literature, and therefore, it is plausible that they may not indicate deception. Due to varying sound quality and speech content of the clips, we were unable to ask participants to focus on verbal cues that have previously been linked to deception. Research has identified speech rates and vagueness (Porter and ten Brinke 2010), as well as word usage (McQuaid et al. 2015) as potential indicators. Additionally, in an attempt to create a feasible task for untrained participants, only a limited number of cues identified in the literature were used in the study. It is possible that successful lie detection relies on multiple cues using verbal and non-verbal channels and that our participants were not successful in the cue condition because they were only asked to focus on three non-verbal indicators. The limited length of clips (8–38 s) should also be considered, as it may be argued that this may not be enough footage to generate a cautious decision. Though there are clear experimental limitations, this was outweighed by the need to

replicate high-stakes environments, which is unlikely to be possible in a laboratory setting.

Our results suggested neither confidence nor accuracy was related to using intuition or cues when judging the veracity of the appeals. It is possible that despite receiving instructions to use previously identified cues, participants in the cue condition also had the contribution of intuitions inaccessible to the conscious mind (Hartwig and Bond 2011). Equally, participants in the no cue condition may have held stereotypical beliefs regarding which cues were indicative of deception and therefore utilised similar cues to those provided in the cue condition, when making judgements regarding deception. This may explain why no difference in accuracy was found between the two cue conditions. Interestingly, qualitative responses in our study indicated that individuals who used emotions as a cue performed better, but this was not dependent on the experimental condition they were in. Faked sadness and leaking of happiness have been identified as cues in high-stakes lies (ten Brinke and Porter 2012). In our study, individuals who noted faked emotions as an important cue also reached higher accuracy, suggesting that people who are good at detecting lies may intuitively concentrate on the veracity of emotions. Therefore, as highlighted by Wright Whelan et al. (2015a), emotional authenticity may be beneficial to those needing to discriminate between truth and lies, for example in a forensic setting.

Contrary to Sweeney and Ceci (2014), we found that deception detection accuracy increased with age. One possible explanation for this result is linked to previous findings which indicate that in children, older subjects show a more cynical judgement bias (DePaulo et al. 1982). As people get older, there appears to be an increased awareness surrounding the notion that people's overt expressions do not always resemble internal feelings. Additionally, with age comes more opportunity to encounter deception, which may explain why the ability to detect deception improved with age. This would suggest that experience improves deception detection, something that should be investigated more in future studies. Nevertheless, it should be noted that as a large proportion of the sample were students, only a few participants fell into the over 50 age bracket and no participants were aged 68 or above. Therefore, further research using a sample with a wider age range is required.

In conclusion, we provide the first evidence to suggest that instructing people to focus on previously identified non-verbal cues to high-stakes lies is not associated with accuracy or confidence in deception detection ability. However, irrespective of being instructed to use intuition or cues, people who qualitatively reported that emotions are an important in lie detection performed better than people who did not mention emotions. It is possible that the ingredient of a good lie detector is the ability to identify truthful and feigned emotions. This may be something that is based on intuition, as even accurate

Table 2 Descriptive statistics and *t* tests for accuracy (*d*) by self-reported usage of cue type

	Mean (\pm SD)		<i>t</i>
	Cues used	Cues not used	
Emotion	0.43 (0.55)	0.24 (0.55)	2.35*
Body language	0.38 (0.59)	0.32 (0.53)	0.68
Spoken account	0.34 (0.56)	0.35 (0.54)	−0.17
Head movement	0.35 (0.49)	0.35 (0.56)	0.06
Eye movement	0.35 (0.60)	0.33 (0.48)	0.25
Instinct	0.12 (0.51)	0.35 (0.55)	−0.81

p* < .05; *p* < .01

individuals were bad at monitoring their responses. The ability to identify crocodile tears may not be a skill that can be taught, although this remains to be investigated in future studies.

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