



Video killed the radio star? The influence of presentation modality on detecting high-stakes, emotional lies

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Purpose. In many contexts in which high-stakes lies occur (such as security settings or the courtroom), observers must evaluate whether the stories they hear are credible. However, little research has evaluated the ability of observers to detect high-stakes lies, nor the influence of the manner in which the deception is presented on judgment accuracy. This study investigated whether the presentation modality of high-stakes lies influences both explicit and implicit deception detection accuracy.

Methods. Participants ($N = 231$) were randomly assigned to one of four presentation modalities: audiovisual, video-only, audio-only, or transcript-only and asked to evaluate the honesty of targets – half of whom were sincere and half deceptive killers – making a plea for the return of a missing relative both explicitly (direct lie/truth decision) and implicitly (via emotional reactions).

Results. Overall, explicit deception detection accuracy was slightly above chance ($M = 52.5\%$), and honest pleas were accurately identified at a higher rate than deceptive pleas. Although there were no differences in overall accuracy across modality, observers reading transcripts exhibited a truth bias, which resulted in them detecting truthful pleas at a higher rate than with the other groups. Although explicit accuracy was at the level of chance, implicit reactions indicated that observers were able to unconsciously discern liars from truth-tellers.

Conclusions. Despite the high-stakes nature of the lies presented here, they were difficult to detect. Lies presented via written language were missed at a higher rate when assessed using explicit but not implicit judgments.

Although deception is a pervasive social phenomenon, observers in psychological experiments are typically only able to detect lies at or slightly above the level of chance (e.g., Bond & DePaulo, 2006; Hartwig & Bond, 2011). To date, most studies examining the validity of deception detection have used low-stakes lies as stimuli. However, the results of such studies may not generalize to forensic contexts, such as interrogation settings or the courtroom, where lies, and their evaluation, can have grave consequences for all those involved (e.g., ten Brinke & Porter, 2012). While members of the judiciary and law enforcement appear confident in their ability to detect such lies (e.g., Porter & ten Brinke, 2009), research suggests that their performance may be similar to that of laypersons

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(e.g., Ekman & O'Sullivan, 1991; Vrij, Mann, Robbins, & Robinson, 2006). For example, one study examining the ability of the police to evaluate the veracity of high-stakes targets found that their performance was at the level of chance (Vrij & Mann, 2001).

Conversely, some work suggests that deception detection with high-stakes deceivers may be better than that documented in research with low-stakes deceivers. Mann, Vrij, and Bull (2004) had police officers attempt to differentiate truths and lies told by suspects during videotaped police interviews. In this case, accuracy rates for both truths and lies were around 65%, considerably higher than other studies with low- or no-stakes targets. Similarly, in a meta-analytic study of 31 groups of police officers in eight countries, O'Sullivan, Frank, Hurley, and Tiwana (2009) found that police officers detected high-stakes lies 67% of the time. As these high-stakes lies are more relevant to professional lie-catchers, and more ecologically valid, it is important to understand why individuals may be more accurate in making veracity decisions for lies of greater consequence. To this end, these studies addressed only the accuracy rates of observers assessing high-stakes deception, and did not investigate the cues that may have improved, or impaired, their ability to identify deception. As attempts to develop empirically-based training to identify high-stakes lies continues (e.g., Shaw, Porter, & ten Brinke, 2013), a better understanding of the cues that observers are using 'naturally' to make their decisions is critical and will inform the training of those given the important job of identifying high-stakes lies.

To understand the differences in accuracy in detecting low- versus high-stakes lies, it is necessary to elucidate the unique observable cues that liars display in high-stakes contexts. These liars 'leak' both verbal and non-verbal cues to their deceit (e.g., DePaulo *et al.*, 2003; Frank & Ekman, 1997). For example, in a study of a sample of missing person pleas, ten Brinke and Porter (2012) discovered that liars provided cues to emotional deception through insincere emotional expressions, brief instances of emotional leakage (e.g., smirking when attempting to appear sad), and used more hand illustrators than truth-tellers. Further, liars also implicated themselves through their language, using fewer words and more tentative words than those giving a genuine plea.

There are a number of possible explanations for the leakage of observable cues to high-stakes deception. For example, evidence of deception may be present due to increased cognitive load. In relation to lying, cognitive load is increased when a liar must tell a convincing lie while controlling their verbal and non-verbal behaviour (see Vrij, Fisher, Mann, & Leal, 2008; Vrij, Granhag, & Porter, 2010). Some indications of high cognitive load occur in speech, such as providing fewer details, more speech hesitations, longer pauses, and in body language, such as decreased illustrator use (Vrij, 2005; Vrij & Mann, 2001; Vrij, Mann, Leal, & Fisher, 2010). A liar also may attempt to disassociate him/herself from the lie, either to keep attention from him/herself or relieve him/herself of the guilt associated with the transgression. This psychological distancing may emerge in the liar's speech patterns with the use of tentative words, negative emotional words, or reduced use of first person pronouns (Newman, Pennebaker, Berry, & Richards, 2003). An individual's emotional arousal may lead to behavioural manifestations when lying. This is related to Darwin's inhibition hypothesis, and the inability of an individual to completely mask or fake strong emotions (Ekman, 2003). When an individual is engaged in a lie, particularly a high-stakes lie, he/she attempts to mask his/her true emotions and simulate another emotion. This is likely to lead to facial 'leakage', which indicates discrepancies between what they should be feeling and what they are actually feeling (e.g., ten Brinke & Porter, 2012). Despite the abundance of cues potentially available, lie catchers continue to perform at chance when asked to differentiate liars from truth-tellers.

An interesting recent proposal is that observers may do better at evaluating this type of deception ‘indirectly’ versus being directly asked ‘is that person lying?’ (see ten Brinke, Stimson, & Carney, 2014). ten Brinke *et al.* (2014) evaluated this using two measures of unconscious deception detection, an implicit association task and a semantic classification task, designed to assess the relationship between honest/deceptive targets and truthful/untruthful words in addition to explicit veracity assessments. On both tasks, participants performed below chance on explicit veracity assessments and were significantly more accurate at indirectly identifying deceptive targets. These results are congruent with a growing body of evidence demonstrating the implicit ability to detect deception (e.g., Albrechtsen, Meissner, & Susa, 2009; Hartwig & Bond, 2011).

Other indirect approaches to lie detection have involved asking observers to assess for particular verbal and non-verbal behavioural patterns (see Granhag, 2006 for a review). For example, having participants identify speakers who appear to be ‘thinking hard’ yielded more accurate lie/truth categorizations than explicit attempts at lie detection (Vrij, Edward, & Bull, 2001; also see Anderson, DePaulo, & Ansfield, 2002). In a similar vein, this study explored for the first time whether sincere and deceptive emotional communication in a high-stakes context might unconsciously elicit differing emotional responses in observers, even if the same observers were poor at assessing honesty explicitly.

Presentation modality

Considering the many types of cues that may be present throughout a high-stakes lie (e.g., verbal, facial expressions, body language), it is important to consider the manner in which the lie is presented (e.g., the number and types of cues available) to the lie-catcher. The manner in which a target is presented to an observer has implications for the observer’s attention to, comprehension of, and memory for, the target (e.g., Black, Woodworth, & Porter, 2014; Walther, 2012). That is, varying types of media differ in the quality and quantity of information that they convey (e.g., Daft & Lengel, 1986). Media richness theory (MRT) posits that media-rich presentation modalities (e.g., media that provides more communication channels, such as those with audio and video information) are most useful when the observer is attempting to evaluate more ambiguous messages and, conversely, that media lacking in rich cues (e.g., text only) are most helpful when attempting to evaluate more simple or concrete messages (Daft & Lengel, 1986; Gilman & Turner, 2001; Purdy, Nye, & Balakrishnan, 2000). As the evaluation of a target’s veracity is an ambiguous, complex task, MRT might suggest that presenting the observer with a media-rich modality would convey more information, allowing the observer to make a more informed decision.

On the contrary, there is evidence that media-rich presentations overwhelm the limited cognitive resources that observers possess, reducing the attention that they can afford each of the channels of communication presented, resulting in a loss of information (Dennis & Kinney, 1998). Research comparing observers’ ability to recall information learned across various presentation modalities (e.g., text only, text-audio, and text-audio-video) has shown that richer media results in less acquired information (Rockwell & Singleton, 2007). Further, a second line of work suggests that more information may be gleaned from text alone (a media-lean presentation modality) versus audio and audio-visual modalities (Furnham, Benson, & Gunter, 1987; Salomon & Leigh, 1984). This is attributed to the cognitive focus required to read text rather than listen to audio or view a video; increased focus results in increased attention and memory

(Salomon & Leigh, 1984). It also is possible that the assessment of visual communication (in-person or via video) versus the written word is more engaging and could be associated with higher motivation to be accurate. Considering deception, this line of research suggests that the complex task of observing both audio and video communication by a target may inundate one's cognitive capacity to the point of distraction and that simply reading a transcript alone may allow an observer to focus solely on the plea, improving their ability to evaluate the target.

The role of presentation modality has received little attention in relation to detecting deception and those studies that have been done have evaluated low-stakes lies. For example, a meta-analysis of deception detection accuracy reported that lie-catchers are least accurate when making decisions based on video alone (Bond & DePaulo, 2006). Similarly, Burgoon, Blair, and Strom (2008) considered the influence of presentation modality on deception detection for a mock theft and also found that lie-catchers were least accurate in the video-only presentation modality and most accurate when presented with audio-only clips (also see Mann, Vrij, Fisher, & Robinson, 2008). This may be due to a lack of media-rich cues or the liar's ability to distract the lie-catcher with non-verbal behaviour (e.g., illustrators, manipulators; Levine *et al.*, 2011). Indeed, in addition to the role of cognitive load in relation to the type of media presented to an observer, there also are unique considerations with the types of communication involved in high-stakes lies. Specifically, the presentation of non-verbal information increases the amount of social information that must be processed, which could increase the likelihood of an erroneous judgment (Levine *et al.*, 2011). This suggests that tasks focusing only on linguistic cues may yield better results as the listener is exposed to limited social information. This also is supported by Davis, Markus, and Walters (2006) study that found that observers were most accurate when presented with lies in an audio-only format and least accurate when assessing transcripts. Contrary to these findings, Porter, Campbell, Stapleton, and Birt (2002) examined the influence of modality when evaluating honest/deceptive emotional memories and found no effect of presentation modality. The role of presentation modality in assessments of high-stakes lies remains unclear. Interestingly, in light of some of the above research and many miscarriages of justice in which 'demeanour' evidence was considered by the judge, there have been informal discussions within the legal community about whether witnesses in court should be heard but not seen to prevent jurors from being distracted by non-verbal behaviour such as nervousness or gaze aversion.

The current study

Little research has evaluated the ability to detect high-stakes lies and whether deceptive 'leakage' in verbal versus non-verbal behaviour influences perceived honesty. This study was the first to assess the role of presentation modality in deception detection accuracy using powerful, high-stakes lies. Although the research on the influence of presentation modality is mixed, most work suggests that the inclusion of multiple communication channels is a detriment to the evaluation of the content. As such, it is hypothesized that observers will detect deception most accurately in the media-lean modalities (e.g., transcript-only and/or audio-only). Further, social information theory and previous research suggest that observers are often distracted by non-verbal behaviour resulting in the hypothesis that observers will be least accurate at detecting deception in the video-only and audio-video modalities (e.g., Burgoon *et al.*, 2008; Levine *et al.*, 2011; Mann *et al.*, 2008).

This study also was among the first studies to assess the accuracy of explicit versus implicit veracity decisions. The implicit measure of veracity employed was the observers' degree and type (positive or negative) emotional reactions to honest and deceptive pleas. As there is mounting evidence for the merit of unconscious decisions, it is hypothesized that sincere emotional communication in a high-stakes context might unconsciously elicit stronger emotional responses related to sympathy in observers than when they observe a fraudulent story, even if the same observers were poor at assessing honesty explicitly. Further, it also was hypothesized that emotional responses (such as sadness and sympathy) elicited in observers when processing a target's story would be more influential in audio-video condition, given that these channels provide a wealth of information (e.g., both verbal and non-verbal cues).

Method

Participants

Participants were 231 undergraduate students, 76 men ($M = 19.73$ years, $SD = 1.77$) and 155 women ($M = 19.86$ years, $SD = 2.08$), from a Canadian university, who participated in the study in return for course credit. Of the 231 participants, 168 identified as Caucasian, 26 identified as Asian, and 36 identified as 'other' (e.g., Aboriginal, East Indian, and Hispanic).

Materials

The stimuli used for this study were 'pleader videos' gathered from news agencies in Australia, Canada, the United Kingdom, and the United States (for a more detailed description see ten Brinke & Porter, 2012; ten Brinke, Porter, & Baker, 2012). Twenty videos depicting individuals who made televised pleas for the safe return of, or information regarding, a missing family member were used as target stimuli. Of these, 10 were honest and 10 were deceptive (i.e., guilty of the missing person's murder), as indicated by overwhelming incriminating evidence. Each video was separated into different components to allow for varied presentation modality; the speech of the pleaders was transcribed, the audio soundtrack was exported, and the audiovisual was kept intact. This allowed for four different presentation modalities: audiovisual, video-only (sound muted), audio-only, and transcript-only (creating 80 possible clips). The original plea videos were edited to include only the direct plea in which the pleader spoke directly to (1) the perpetrator, (2) the missing person, and/or (3) the public. The videos were closely focused on the pleaders themselves, displaying only their upper body and face. Together the edited videos had an average length of 17 s, with a range of 8–27 s (an average of 17.3 s for deceptive pleaders and 17.8 s for honest pleaders). Each of these videos has been previously analyzed for observable cues to emotion deception in the face, body language, and in language (ten Brinke & Porter, 2012).

The plea video evaluation form, designed specifically for this study, was comprised of a dichotomous rating of honesty/deception and a rating of the possible emotions elicited (e.g., happiness, sadness, fear, disgust, anger, surprise, and sympathy on a 7-point Likert scale) from the clip. To ensure internal consistency, Cronbach's alpha reliabilities were calculated for each item included in the evaluation form. Reliabilities ranged from .89 to .97, above the acceptable cut-off of .07 (see Nunnally & Bernstein, 1994), and were thus deemed appropriate for use in subsequent analyses. Additionally, a demographics questionnaire was completed.

Procedure

Observers were randomly assigned to one of the four possible conditions: audiovisual, video-only, audio-only, or transcript-only. First, each participant filled out the demographics questionnaire, and then watched/listened to/or read all 20 clips (in the same order that also had been randomly determined) and filled out the plea video evaluation form after each clip. Participants were given unlimited time between clips to fill out the evaluation form.

Results

Overall explicit accuracy

Observer data, organized by condition, are provided in Table 1. The total mean for overall accuracy was 52.53% ($SD = 9.75$), significantly above the level of chance, $t(230) = 3.95$, $p < .001$. A one-way ANOVA to evaluate the first hypothesis, whether condition affected overall accuracy, was not significant, $F(3, 227) = 0.91$, $p = .44$.¹ The strength of the relationship between presentation modality and overall accuracy, as assessed by partial eta-squared, was low and accounted for only 1.2% of the overall variance in detection accuracy.

Explicit accuracy for honest versus deceptive pleaders

The difference between overall accuracy for truthful ($M = 55.2\%$; $SD = 16.64$) and deceptive pleaders ($M = 49.87\%$, $SD = 15.79$) was significant, $t(230) = 3.128$, $p = .002$, $r = .20$; observers were more accurate at identifying genuine than deceptive pleaders. Subsequently, one-way ANOVAs were used to assess the influence of condition on accuracy. The analysis for honest accuracy was significant, $F(3, 227) = 6.82$, $p < .001$, partial $\eta^2_p = .083$, as was the analysis for deception accuracy, $F(3, 227) = 2.91$, $p = .04$, $\eta^2_p = .037$. Follow-up analyses indicated that observers in the transcript-only condition had a higher mean accuracy for honest pleaders than observers in all other conditions. Analyses also indicated that the observers in the transcript-only condition had a significantly lower mean accuracy for deceptive pleaders than the audio-only group. There were no gender differences in overall accuracy, honest nor deceptive accuracy (all $ps > .05$).

Honest versus deceptive guesses

To assess observers' potential evaluative biases, one-way ANOVAs were conducted with the number of honest/deceptive guesses across condition. The analysis for honest guesses

Table 1. Detection accuracy across conditions

Measure	Transcript-only		Audio-only		Video-only		Audio-video	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Overall accuracy (%)	54.10	10.08	52.81	9.65	51.97	9.96	51.24	9.33
Honest accuracy (%)	63.40	14.91	52.81	17.53	52.93	15.78	51.60	15.82
Deception accuracy (%)	44.83	16.36	52.88	15.09	50.84	16.05	50.95	14.81
Honest guesses	11.79	2.41	9.93	2.61	10.19	2.48	10.00	2.38
Deceptive guesses	8.19	2.41	9.95	2.62	9.76	2.47	9.81	2.42

¹ Statistical significance for this, and all reported analyses, was assessed using the Bonferroni adjustment feature on SPSS

was significant, $F(3, 227) = 7.39, p < .001, \eta^2_p = .089$, such that the observers in the transcript-only condition identified pleaders as honest more often than those in all other conditions. The analysis for deceptive guesses also was significant, $F(3, 227) = 6.49, p < .001, \eta^2_p = .079$, and revealed the inverse of the previous analysis, that observers in the transcript-only condition identified pleaders as deceptive less often than those in all other conditions.

Elicited emotions/indirect lie detection

First, overall mean levels of emotions elicited for honest versus deceptive pleaders were compared (see Table 2 for means) using paired sample t tests; results indicated that the means for each of the seven emotions were not significantly different, $ps > .05$. That is, overall observers experienced similar emotional reactions to both honest and deceptive pleaders.

Next, to test the remaining two hypotheses, the influence of pleader veracity (H2) or presentation modality (H3) on the emotional reactions of observers was examined. To do so, seven 2 (honest/deceptive) \times 4 (audio-video/audio/video/transcript) mixed ANOVAs with emotional reaction as the dependent variable were conducted (see Table 2 for means). There was a main effect of presentation modality for happiness, $F(3, 227) = 2.17, p = .09, \eta^2_p = .028$, with post-hoc analyses indicating that observers in the transcript condition had a higher level of elicited happiness than those in the audiovisual condition. For sadness, there was a significant interaction between veracity and presentation modality, Wilks $\lambda = .944, F(3, 226) = 4.47, p = .005, \eta^2_p = .056$. In the transcript-only condition observers reported experiencing elevated levels of sadness, $t(57) = -3.03, p = .004$, for honest versus deceptive pleaders. The main effect for presentation modality also was significant, $F(3, 226) = 3.01, p = .031, \eta^2_p = .038$. However, post-hoc analyses indicated no significant differences between the four modalities.

There was a significant interaction between veracity and presentation modality for sympathy, Wilks $\lambda = .953, F(3, 226) = 3.733, p = .012, \eta^2_p = .047$. In the transcript-only condition, observers reported experiencing elevated levels of sympathy, $t(57) = -2.48, p = .016$, for honest versus deceptive pleaders. The main effect of presentation modalities was significant, $F(3, 226) = 4.424, p = .005, \eta^2_p = .055$. Post-hoc analyses revealed that the transcript group had a significantly higher level of sympathy than the video-only group. For fear, there was a significant interaction between veracity and presentation modality, Wilks $\lambda = .948, F(3, 226) = 4.173, p = .007, \eta^2_p = .052$. In the transcript-only condition, observers reported experiencing elevated levels of fear, $t(57) = -3.05, p = .003$, for honest versus deceptive pleaders. There were no significant results for reactions of disgust, anger, or surprise.

Discussion

Individuals relaying high-stakes lies exhibit different observable verbal and non-verbal cues than those who are genuine. This study sought to determine whether (1) observers are able to accurately identify such high-stakes lies explicitly, (2) the manner in which the stories are communicated influences accuracy, and (3) indirect measures of lie detection relating to observer emotional responses may have validity. Overall, our sample distinguished liars from truth-tellers slightly but significantly above the level of chance (52.5%), fully in line with previous findings with various types of lower stakes lies (see Bond & DePaulo, 2006).

Table 2. Means and standard deviations of emotions elicited by honest and deceptive pleaders by presentation modality

Emotion	Presentation modality														
	Overall			Audiovisual			Audio-only			Video-only			Transcript-only		
	Honest M (SD)	Deceptive M (SD)		Honest M (SD)	Deceptive M (SD)		Honest M (SD)	Deceptive M (SD)		Honest M (SD)	Deceptive M (SD)		Honest M (SD)	Deceptive M (SD)	
Happiness	1.32 (0.67)	1.34 (0.63)		1.19 (0.48)	1.21 (0.43)		1.24 (0.59)	1.23 (0.54)		1.31 (0.75)	1.37 (0.73)		1.55 (0.75)	1.53 (0.72)	
Sympathy	3.57 (1.21)	3.51 (1.11)		3.66 (1.01)	3.69 (1.04)		3.52 (1.06)	3.36 (0.96)		3.12 (1.26)	3.18 (1.20)		3.97 (1.35)	3.72 (1.21)	
Sadness	3.49 (1.28)	3.46 (1.18)		3.69 (1.34)	3.78 (1.19)		3.26 (1.08)	3.21 (1.04)		3.22 (1.27)	3.28 (1.23)		3.80 (1.37)	3.56 (1.22)	
Fear	2.09 (1.26)	2.05 (1.14)		2.02 (1.27)	2.00 (1.19)		1.94 (1.09)	2.00 (0.99)		1.96 (1.19)	1.96 (1.14)		2.43 (1.43)	2.22 (1.21)	
Disgust	2.41 (1.14)	2.45 (1.10)		2.52 (1.20)	2.58 (1.16)		2.34 (1.03)	2.42 (1.01)		2.28 (1.12)	2.34 (1.03)		2.49 (1.24)	2.47 (1.20)	
Anger	2.32 (1.21)	2.35 (1.14)		2.54 (1.29)	2.59 (1.19)		2.13 (0.94)	2.11 (0.98)		2.13 (1.22)	2.19 (1.10)		2.48 (1.33)	2.50 (1.23)	
Surprise	1.82 (0.97)	1.86 (0.94)		1.74 (0.95)	1.86 (0.97)		1.80 (1.21)	1.78 (0.82)		1.68 (0.97)	1.75 (0.98)		2.06 (1.07)	2.07 (0.99)	

Although we had hypothesized that observers would explicitly detect lies most accurately in the media-lean modalities (transcript-only and/or audio-only), presentation modality overall did not exert any influence. Similar results have been found for the influence of modality on the assessment of true and false descriptions of emotional memories (Porter *et al.*, 2002). Despite a lack of overall differences across modality, observers were better at identifying truthful pleaders than deceptive pleaders, particularly in the transcript-only condition. This likely was due to observers in the transcript condition exhibiting a truth bias, categorizing more pleaders as honest than deceptive. As this truth-bias had a direct impact on accuracy of veracity evaluations, it is important to consider the reasons that transcript-only observers were more likely to endorse this bias. We think that the lack of observable emotional cues present in the transcripts may have resulted in less of an emotional reaction (speculated to be an unconscious assessment of veracity) to the clips, reducing the observers' suspicion of the pleaders. Indeed, observers in the visual conditions reported significantly lower levels of elicited happiness than observers in the transcript-only condition from clips that typically are subjectively distressing. Similarly, the transcript condition was associated with significantly increased levels of sympathy for both honest and deceptive pleaders. This suggests that the transcripts may not provide sufficient cues for observers to assess emotional sincerity, and because they are not able to use emotional cues to distinguish liars from truth-tellers, they are less distressed, experience more sympathy for all pleaders, and in turn are more likely to fall back on the default honesty bias found among human observers more generally (Bond & DePaulo, 2006).

These findings did not support the MRT (Daft & Lengel, 1986) in the context of deception detection, which suggests that media-rich presentation modalities (e.g., audiovisual clips) would be more useful than media-lean modalities (e.g., transcript-only). Nor was the notion that media-rich presentations would overwhelm the cognitive resources of observers, leading to impaired performance relative to media-lean presentations (e.g., Rockwell & Singleton, 2007). Instead, all modalities were associated with mediocre performance at lie detection, and transcript-only observers simply were more trusting of the stories they heard relative to other observers.

Next, whether sincere and deceptive emotions might unconsciously elicit differing emotional responses in our observers, despite their mediocre performance at assessing the honesty of the pleaders explicitly, was examined. It was hypothesized that truthful emotional communication (particularly accompanied by a visual component) might unconsciously elicit stronger negative emotional responses in observers versus when they perceived a deceptive story, a possible form of unconscious lie detection. This prediction was only partially supported, in that differences in emotional reaction only emerged according to modality. In the transcript-only condition, observers reported experiencing greater sadness, sympathy, and fear to honest versus deceptive pleaders. This may indicate that observers intuitively perceived the true emotional content of genuine pleas from language alone. However, this did not lead to overall better explicit judgments of honesty, as they continued to rely on a truth bias.

In real life, observers of the types of high-stakes messages used as stimuli in this study typically are perceived via an audiovisual medium. That is, the police, family members and public watch and listen to a public plea for a missing person. As such, we were especially interested in determining whether observers in the audiovisual condition would benefit from indirect lie detection measures. Indeed, we found that these observers reported overall increased feelings of sympathy for honest rather than deceptive pleaders, despite their poor performance via explicit evaluations of honesty. This is in line with mounting

evidence that has demonstrated that regardless of method of indirect lie detection (e.g., implicit association task, semantic classification, and now emotional reaction) humans are superior at indirect rather than direct deception detection (Albrechtsen *et al.*, 2009; Hartwig & Bond, 2011; ten Brinke *et al.*, 2014). Together, this offers the tantalizing possibility that humans successfully evaluate non-verbal and verbal emotional communication unconsciously but that this evaluation is then sabotaged by a reliance on stereotypical cues to deception and fail to achieve accurate conscious, explicit assessment of honesty (see Hartwig & Bond, 2011; ten Brinke *et al.*, 2014).

A number of limitations in this study should be noted. First, despite collecting data from a large sample of participants ($N = 60$ in each condition) a post-hoc power analysis revealed that the testing had low levels of power (.25) and a larger sample in each condition would be necessary to find more nuanced effects and reach the desired power level of 0.80. Future research should use larger samples, and also include varying sample groups (e.g., police officers, judges). Second, future research should continue to explore the role of modality in deception detection. For example, considering the degree of cognitive load required for evaluations of each modality, and whether varying types of video presentations (e.g., images of face vs. full body) influence deception detection accuracy. Finally, the results may not be applicable across all types of high-stakes, emotional lies. For example, an individual who issues a public plea for a missing family member may exhibit different emotional clues to deception than someone who is being interrogated for a heinous crime. As such, continued research on deception detection across lies in various contexts is warranted.

Enhancing the detection of high-stakes lies is relevant in various legal and security settings. Despite the wealth of observable cues available in the video-based clips that might enhance a lie-catchers' ability to discriminate between the truth and lies, the results of this study suggest that there is little relationship between the manner in which a lie is presented to an observer and the accuracy of detecting deception. On the other hand, observers reading a transcript were more trusting and showed a truth-bias in their evaluations of the high-stakes pleas relative to other modalities, suggesting that this modality does not provide sufficient emotional cues to achieve an accurate conclusion. Despite the legal community's wish to reduce the number of miscarriages of justice related to faulty evaluations of deception in the courtroom, this study suggests that the use of transcripts-only may diminish an observer's (e.g., judge, juries) ability to properly assess emotions which results in a truth-bias, ultimately culminating in decisions as inaccurate as those based on flawed demeanour evidence. The results also suggest that indirect measures of lie detection involving observers' emotional reactions to a target's tale may offer validity not conferred via explicit assessments of honesty.

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