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**High Stakes Lies: Verbal and Nonverbal Cues to Deception in Public Appeals for Help
with Missing or Murdered Relatives**

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Abstract

Low ecological validity is a common limitation in deception studies. The present study investigated the real life, high stake context of public appeals for help with missing or murdered relatives. Behaviours which discriminated between honest and deceptive appeals included some previously identified in research on high stakes lies (deceptive appeals contained more equivocal language, gaze aversion, head shaking, and speech errors), and a number of previously unidentified behaviours (honest appeals contained more references to norms of emotion/behaviour, more expressions of hope of finding the missing relative alive, more expressions of positive emotion towards the relative, more expressions of concern/pain, and an avoidance of brutal language). Case by case analyses yielded 78% correct classifications. Implications are discussed with reference to the importance of using ecologically valid data in deception studies, the context specific nature of some deceptive behaviours, and social interactionist, and individual behavioural profile, accounts of cues to deception.

Key words: deception; lie detection; high stakes lies

**High Stakes Lies: Verbal and Nonverbal Cues to Deception in Public Appeals for Help
with Missing or Murdered Relatives**

Meta-analyses of several decades of research into deception have produced two major findings; these are that cues to deception tend to be unreliable and weak (DePaulo et al., 2003), and, in general, people are poor at detecting lies (Bond & DePaulo, 2006). For example, in DePaulo et al.'s (2003) meta-analysis of cues to deception, the duration and/or frequency of only a few of the behaviours investigated emerged as useful in discriminating between deceptive and truthful communication. Also, effect sizes were generally small (median $d = 0.10$), suggesting that these cues are weak and may be difficult to use in real life contexts. Bond and DePaulo's (2006) meta-analysis of deception detection indicated that people are generally poor at detecting lies, barely performing above chance. Hence, although a few groups and individuals who are able to detect deception have been identified (for example, Bond, 2008; O'Sullivan & Ekman, 2004), accurate detection does not appear to be the norm. These findings are obviously related; if the differences in behaviours between liars and truth-tellers are often inconsistent and small, they are likely to be difficult to detect and use in real life. However, so far, most deception research has been confined to laboratory based studies, involving low stakes lies (DePaulo & Morris, 2004; Frank & Svetieva, 2012; Granhag & Stromwall, 2004; Porter & ten Brinke, 2010; Vrij, 2004). Because laboratory experiments are limited by ethical considerations, the lies employed tend not to be of a serious nature and do not have serious consequences. Moreover, there is little motivation for liars to succeed in the lie, and liars are often instructed to lie by the experimenter and so are not responsible for their lies. Consequently, although the findings of these studies may be applicable

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to the low stakes situations in which they were carried out, they may be less relevant to more high stakes situations, such as forensic contexts.

This may be particularly important as DePaulo and Morris (2004) have suggested that highly charged situations in which motivation is strong, and consequences are serious, may produce more reliable cues to deception. For example, DePaulo et al. (2003) found that strong motivation to succeed in the lie, and lies about transgressions, were both moderating factors that produced more prominent cues to deception (even in relatively low stakes situations). And correspondingly, as these factors are more likely to emerge in high stakes situations than in laboratory studies, one might expect high stakes situations to produce more prominent and reliable cues to deception. However, although some efforts have been made to develop more ecologically valid paradigms using antisocial deception, for example, unsanctioned lying about cheating on an experimental task (Blair, Levine & Shaw, 2010; Feeley & deTurck, 1998), and participating in mock crimes (Hartwig, Granhag, Stromwall & Kronkvist, 2006; Kassin & Fong, 1999), it is unclear how closely these paradigms mirror the motivation and consequences of deception in high stakes contexts. In general, research focusing on real life, high stakes lies is relatively scant, and investigation of the complexities of deceptive behaviour in real world settings, particularly in high stakes forensic contexts, is nascent.

There are a number of factors related to lying that might be more pronounced in more ecologically valid contexts; these include, the effects of cognitive load, affect, arousal and impression management. For instance, a number of researchers have suggested that lying may be intrinsically more cognitively demanding than truth-telling, as the liar has to create novel material, remember what he or she has said, monitor how he or she is self-presenting to others, monitor the receiver's reactions, and simultaneously lie and suppress the truth. This may result

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in an increase in behaviours related to cognitive load during acts of deception, such as, speech disruptions and errors, gaze aversion, and a reduction in illustrators (see, for example, Vrij & Mann, 2001a; Vrij et al., 2008; Zuckerman, DePaulo & Rosenthal, 1981). In addition, a number of affective responses have been hypothesised to relate to lying; these range from guilt, fear, shame, and anxiety, to excitement in duping the receiver of the lie (Ekman, 1992; Zuckerman et al., 1981), all of which may produce behaviours related to the affective experience, and which liars may attempt to conceal. However, it has been suggested that liars may 'leak' evidence of these emotions in the form of facial expressions which they are unable to fully suppress (Ekman, 1992; ten Brinke & Porter, 2012). The psychological discomfort or excitement produced by acts of deception may also result in greater autonomic arousal (Zuckerman et al., 1981), in particular, physiological reactions related to activation of the sympathetic nervous system, such as, increased perspiration, blood pressure, heart rate, and respiration rates (Koper & Sahlman, 1991). Liars may also attempt to control their behaviour in an effort to suppress signs of deception, and simultaneously behave in a credible manner (Zuckerman et al., 1981); this may paradoxically result in behaviours that appear stilted or false. For example, liars may appear rigid or inhibited (Vrij, 2004), or may produce fake facial expressions which do not match the emotion they are claiming to experience (ten Brinke & Porter, 2012).

Nevertheless, although one might expect such factors to be exaggerated in high stakes contexts, the few studies which have investigated cues relating to deception in real life, high stakes lies, have produced mixed results. For example, in a study investigating naturally occurring, high motivation deceptive communication, Koper and Sahlman (1991) found that liars were perceived to be more tense than truth-tellers; however, Mann and Vrij (2006) found that real life police suspects were perceived to be more tense when telling the truth than when lying.

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These contradictory findings may, in part, be due to a lack of contextual focus; i.e. lies in different high stakes contexts may have differing motivational, emotional and cognitive correlates. Indeed, a number of researchers have suggested that a range of situational factors may affect the production and salience of cues related to deception (see, for example, Porter & ten Brinke, 2010; Sporer & Schwandt, 2006; Vrij & Mann, 2004). For instance, in their study of 911 homicide calls, Harpster, Adams and Jarvis (2009) found 19 behaviours that discriminated between innocent callers requesting help, and callers who were actually involved in the homicide which they were reporting. However, a number of these were likely to have been context specific (for example; acceptance of death, location in the call of the plea for help). This suggests that a more contextual focus might be beneficial when examining high stakes lies.

As an illustration of this, Wright Whelan (2009) found that a number of cues to deception were not consistent across two high stakes, forensic contexts; these contexts were false public appeals for help with missing or murdered relatives, and false confessions. Thus, whereas false appellars were perceived as having significantly higher vocal pitch, more hesitant speech, less direct voices and more gaze aversion than truthful appellars, false confessors produced none of the cues to deception investigated in the study.

Nevertheless, some studies have suggested that there may be some deception related behaviours that can occur consistently across high stakes situations. These include, increases in speech errors (Davis, Markus, Walters, Vorus & Connors, 2005; Vrij & Mann, 2001a), word or phrase repetition (Davis et al, 2005; Harpster et al., 2009; Vrij & Mann, 2001a), the use of equivocal or tentative language (Adams & Jarvis, 2006; ten Brinke & Porter, 2012), head shaking (Davis et al., 2005; Mann, Vrij & Bull, 2006) and gaze aversion (Vrij & Mann, 2001a; Wright Whelan, 2009). Typical theoretical explanations of these results have invoked the kinds

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of factors mentioned earlier, either singly, or in combination; i.e. cognitive load, arousal, affective factors and impression management. For example, gaze aversion has been related to cognitive load (Vrij & Mann, 2001a), emotional responses such as shame (DePaulo et al., 2003), guilt (Ekman, 1992), and attempts by liars to be evasive and distance themselves from their communications (Zuckerman et al., 1981). Speech disfluency or disturbance has also variously been related to anxiety (Davis et al., 2005) and cognitive load (Vrij & Mann, 2001a). However, it is possible that these factors not only coexist but may interact; for example, anxiety may not only affect responses commonly associated with stress and tension, but may also increase cognitive load. The majority of the tasks identified as increasing cognitive load in liars could be described as ‘frontal’ tasks; i.e. they are likely to involve the frontal areas of the brain typically associated with making planned or ‘executive’ decisions. As such, performance of such tasks will likely be made more difficult by increases in anxiety and arousal, producing symptoms that are intrusive and ‘overload’ the brain’s executive capacity (Wagstaff, et al., 2008).

Given these considerations, the purpose of the current study was to investigate cues to deception in a real life, high stakes, situation, with a specific, defined, context. To this end, video footage was used of people appearing before the press and making public appeals for help in finding out what happened to a missing or murdered relative. Approximately half of the appealers were later convicted in the death or disappearance of their relative, and half were not involved in the death or disappearance of their relative.

As several researchers have advocated a multi-cue approach to deception detection (for example, ten Brinke & Porter, 2012; Vrij & Mann, 2004), three analyses are described; the first, concerned verbal behaviours, the second, nonverbal behaviours, and the third was a case by case analysis to assess the potential of each cue to predict veracity. On the basis of previous research,

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it was expected that some general cues to deception, previously identified in high stakes situations, would also generalise to this appeals context; for example, speech errors, gaze aversion, equivocation and head shaking. However, it was also expected that there may exist cues related more specifically to the context of making an appeal, which have not previously been identified. Finally, it was predicted that a combination of cues might be more effective in detecting deception than any individual cue (see, for example, ten Brinke & Porter, 2012; Vrij & Mann, 2004).

Method

Materials

Video footage of people making public appeals for help with missing or murdered relatives was collected from various news and media sites from the United States, the United Kingdom, Canada and New Zealand. One of the problems inherent in research using real life lies is the problem of determining ground truth; for instance, the fact that an individual may be found guilty or not guilty by a court may not of itself be a reliable indicator that he or she committed the offense in question. To address this concern, cases were included in the final selection only if they satisfied the criteria used in other published research in this area by Vrij and Mann (2001b), and ten Brinke and Porter (2012). Hence, appealers were classified as honest or deceptive only if there was overwhelming evidence indicating the extent of their involvement in the death or disappearance of their relative using these criteria. Such evidence included: forensic evidence (for example, soil traces, pollen traces, fibers linking the accused to the crime scene, blood spatter patterns); presence of the victim's blood (for example, in the car or home of the accused); other DNA linking the accused to the crime (for example, skin, hair, body fluids); footage from

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security cameras, CCTV, police surveillance videos, and speed cameras (for example, CCTV of the accused dumping the body of the victim); knowledge of the location of the missing person's body; knowledge of unreleased or undiscovered details of the crime (for example, knowledge of the cause of death before the body was found by police); confessions which included intimate knowledge of the crime and were not recanted; admission at trial (for example, admitting guilt and apologizing to family members); post mortem evidence (for example, evidence that the victim could not have been alive at a time when the accused claimed that he or she was alive); medical evidence (for example, expert testimony that it was impossible for a person to be rendered unconscious for 10 hours by a drug administered in a way that the accused claimed); computer search history of the location of the crime or of the body (for example, zoomed-in satellite images before the relative was reported missing, of the exact, remote location where the body was later found); eyewitness testimony (for example, identifying the accused at the crime scene); possession of the murder weapon; possession of items from the crime scene; phone records; incriminating financial transactions; and an account of events, or an alibi, inconsistent with the evidence (for example, a man claiming to have spent the morning searching for his wife, when CCTV footage shows him taking a mattress to a dumpster, and till receipts show that he then purchased a new mattress. His wife's body was later found wrapped in a bloody part of a mattress). The large majority of cases involved multiple pieces of evidence as described above. Following the protocol established by ten Brinke and Porte (2012), Table 1 provides a summary of the types of evidence used to classify cases as deceptive or honest.

Thirty two appeals were accordingly included in the final selection, 16 deceptive and 16 honest. All the appeals were made within a short time frame after the relative went missing or was murdered. In the group of appeals classified as deceptive, in all cases except one, the

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appealer had also been convicted in a criminal court of involvement in the death (or kidnapping, in one case) of their relative. The exception concerned a mother suspected of killing her missing child who led police to the child's body, buried in a remote location, whilst she was under surveillance, and, at the time of writing, she is currently awaiting trial charged with murder. In the group of appeals classified as honest, in 12 of the cases another person has been convicted of the death of the appellants' relative, and in three cases the relative was found with no evidence of foul play. The remaining case classified as honest was that of a father who made an appeal for help when his daughter disappeared whilst in the care of her mother, from whom he was separated. CCTV footage from the day the girl was reported missing clearly shows a man, an acquaintance of the girl's mother, carrying the girl down a hotel corridor. In an affidavit for a warrant to search the man's car, investigators stated that the man admitted that he collected the girl from her home and drove her to the hotel. The girl's body was found shortly afterwards. The man was charged with first degree murder, rape of a child and kidnapping, the mother was charged with murder, human trafficking, child abuse involving prostitution, and filing a false police report, and at the time of writing they are awaiting trial. The father who made the appeal lived in a different state to his daughter, was never named as a person of interest or a suspect in the case, and the CCTV footage from the hotel clearly shows with whom his daughter was just before she died.

The status of the relative (missing or dead) was balanced between the honest and deceptive groups; in both the deceptive and honest groups there were 10 cases in which the relative's body had not been found (relative missing and not publicly known to be dead), and six cases in which the body had been found (relative publicly known to be dead).

Analysis 1: Verbal Cues

The first analysis concerned verbal behaviours. Seventeen cues were investigated. Of these, six were expected to relate to honesty. Four of these first six cues were derived from a study by Wright Whelan (2012), which looked at the cues that accurate detectors said they used in discriminating between liars and truth-tellers. With the exception of the cue 'plea for help', which was also identified by Harpster et al. (2009) in their study of 911 homicide calls, to the best of our knowledge, none of these six cues has previously been identified in the literature. Specifically, it was hypothesized that honest appellants would be more likely to show expressions of positive emotion towards the relative (including describing the relative in positive terms, expressions of love, and terms of endearment), avoid the use of brutal language (for example, saying 'gone' or 'taken from us' instead of 'murdered'), and, in cases where the body of the relative had not been found, express hope of finding the missing person alive (for example, 'I think that she's out there' and 'I'm waiting for you honey'), and make a plea for help or for the relative to return (for example, 'please come back' and 'if you have any information, please come forward'). A further two possible cues related to honesty were noticed by the researcher whilst examining the appeals and were included in the analysis. Accordingly, it was also hypothesized that honest appellants would be more likely to show expressions of concern for the relative, or of grief, or pain (for example, 'we just want to know she's all right' and 'this has distressed all of our family'), and references to norms of emotion or behaviour, including violations of norms (for example 'how could anybody do this' and 'any parent knows how we feel').

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The other 11 verbal cues selected were expected to relate to deception; i.e. it was specifically hypothesized that deceivers would show more of the following behaviours. Of these, four were selected as they have been found to discriminate between honesty and deception in previous research by other authors on real life, high stakes lies in other contexts; these were, equivocation, including words or phrases that minimise or convey uncertainty or vagueness, for example, ‘just’, ‘kind of’, ‘possibly’, ‘a bit’ (Adams & Jarvis, 2006; ten Brinke & Porter, 2012); speech errors, including grammatical errors and incomplete words and sentences (Davis et al., 2005; Vrij & Mann, 2001a); phrase repetition (Davis et al., 2005; Harpster et al., 2009); and filled pauses i.e. non lexical sounds, for example, ‘um’ and ‘er’ (Davis et al., 2005).

All of the remaining seven cues to deception were again selected as they had been identified in the study by Wright Whelan (2012) as cues that accurate detectors said they used in discriminating between liars and truth-tellers in appeals; and also again, to the best of our knowledge, none of these seven cues has previously been identified in the literature on high stakes lies. Thus it was hypothesized that deceptive appellers would be more likely to use a sentence or make a statement that does not make sense (illogical or unclear), avoid first person pronouns (for example, ‘Just want her back’), refer to other people or groups of people (not including the police or family), in cases in which the relative was not publicly known to be dead, express a lack of hope of finding the missing person alive (for example, ‘nothing can be done to make things better’), use lists (for example, of people, actions, emotions), make irrelevant statements (extraneous information, outside the context of the incident), and use brutal language or detail about the relative (for example, ‘blood’ and ‘murdered’). It can be noted, therefore, that actuarial rather than theoretical prediction provided the primary rationale for the inclusion of these cues at this stage; possible theoretical explanations for their efficacy are explored later.

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Procedure for verbal cues

The 32 video clips of truthful and deceptive appeals were transcribed, and then one coder counted frequencies of the selected verbal behaviours in the transcripts, and a second coder, who was blind to the veracity of the appeals, coded a random sample of 25% of the deceptive appeals and 25% of the truthful appeals. Both coders were researchers studying deception. Inter-rater reliabilities for the frequency counts were high, ranging from $r = .90$ to $r = 1$; for 12 of the 17 cues, r was 1 (see Table 2). In two cases, inter-rater reliability could not be computed because at least one variable was constant (due to floor effects). Given the high inter-rater reliability for the random sample, frequency counts produced by the rater who had coded all of the transcripts were used in all analyses.

Results for verbal cues

Preliminary analyses revealed no overall effect of the length of the appeals, as measured by word count, on veracity (i.e. whether the appeal was truthful or deceptive), $F(1, 31) = 0.01, p = .99$. However, to account for the differing lengths of the appeals (15 - 336 words, $M = 110.81, SD = 80.64$), each cue score for each appeal was divided by the word count for the particular appeal and multiplied by 100 to produce a percentage frequency score.

To investigate which cues were associated with honesty, a MANOVA with veracity as a between subjects independent variable, was conducted on the percentage frequency counts for the following cues: expressions of positive emotion towards the relative, avoids brutal language

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or detail, makes a plea, expressions of concern, grief, or pain, and references to norms of emotion or behaviour. Means, standard deviations, confidence intervals, and effect sizes are shown in Table 2.

Using Pillai's Trace, the multivariate test was significant, $F(1, 26) = 13.16, p = .033$, and a series of follow up, univariate analyses was conducted. As hypothesized, there was a significant effect for 'references to norms of emotion or behaviour'; truthful appeals contained a larger proportion of references to norms than deceptive appeals. The cue, 'expressions of concern, grief, or pain', also approached significance ($p = .032$, one-tailed); again, as hypothesized, truthful appeals contained a larger proportion of expressions of concern, grief, or pain than deceptive appeals.

The cue 'avoids brutal language or detail' also approached significance ($p = .038$, one-tailed); however, it was assumed that this cue might be affected by the status of the appellant's relative; i.e. appellants would be more likely to use this cue more frequently in cases where the relative was publicly known to be dead. Accordingly, a 2 x 2 ANOVA (veracity x status) was conducted on the data. This showed significant effects for veracity ($F(1, 28) = 5.52, p = .042$) and status ($F(1, 28) = 8.21, p = .008$). As predicted, appeals for help with dead relatives ($M = 1.52, SD = 1.66$) contained a larger proportion of avoidance of brutal language than appeals for help with missing relatives ($M = 0.32, SD = 0.81$). The interaction between veracity and status was not significant ($F < 1$).

As the cue 'expressions of hope of finding the relative alive', would also not be relevant in cases where the relative was publicly known to be dead, a separate analysis was conducted for this cue using only cases in which the relative was missing (i.e. no body had been found). Ten deceptive appeals and 10 honest appeals were included in this analysis. A one way ANOVA

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(with veracity as the factor) showed, as expected, that honest appeals ($M = 2.27$, $SD = 1.91$) contained a significantly higher proportion of expressions of hope than deceptive appeals ($M = 0.63$, $SD = 0.94$), $F(1, 19) = 5.96$, $p = .025$.

Although the cue 'positive emotion expressed towards the relative' did not discriminate significantly using the mean percentage scores (see Table 2), examination of the data showed that an extreme outlier was producing a very pronounced skew in the data (one deceptive appellant produced a very high number of expressions of positive emotion towards his fiancé). Consequently, this cue was also coded dichotomously as present/absent, and a further binary analysis was conducted. This yielded a significant result in the predicted direction; expressions of positive emotion were more likely to be present in honest appeals ($n = 11$ or 69%) than in deceptive appeals ($n = 5$ or 31%), $\chi^2(1) = 4.50$, $p = .034$.

To investigate which cues were associated with deception, two separate MANOVAs, with veracity as a between subjects independent variable, were conducted on the percentage frequency scores of the cues. One was conducted on the four cues identified in previous research on high stakes lies (equivocation, speech errors, phrase repetition, and filled pauses), and the other was conducted on the seven cues suggested in the study by Wright Whelan (2012) which focused specifically on appeals (sentence or statement that does not make sense, avoids using first person pronoun, referring to others, lists, irrelevant statements, and using brutal language or detail).

Using Pillai's Trace, the multivariate test on the cues identified in previous research on high stakes lies was not significant, $F(1, 27) = 1.63$, $p = .196$. However, it can be noted that all the cues had means in the expected direction, and two of the cues, equivocation and speech errors, had substantial effect sizes, particularly the former (see Table 2). Consequently,

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notwithstanding the lack of significance of the overall MANOVA, the cue 'equivocation' was also analyzed individually; as predicted, deceptive appeals contained a significantly higher proportion of equivocal language than honest appeals, $F(1, 31) = 4.79, p = .036$.

The multivariate test on the cues suggested in the study by Wright Whelan (2012), sentence or statement that does not make sense, avoids using first person pronoun, referring to others, lists, irrelevant statements, and using brutal language or detail, was not significant, $F(1, 25) = 1.06, p = .411$.

As the cue 'lack of hope of finding the relative alive', would not be relevant in cases where the relative was publicly known to be dead, this was not included in the MANOVA; instead a separate analysis was conducted for this cue using only cases in which the relative was missing (i.e. no body had been found). However, a one way ANOVA (with veracity as the factor) was not significant, $F(1, 19) = 1.00, p = .331$.

Taken together, although not all were significant individually, these results could be considered to broadly support the hypotheses. Indeed, 15 were in the hypothesized directions, which is, in itself, significant by binomial test ($p < .003$).

Analysis 2: Nonverbal Cues

The behaviours used in the second analysis were four nonverbal behavioural cues to deception identified in previous research on real life, high stakes lies, but subject to restrictions placed by the quality of footage available. For example, although a decrease in blink rate (Mann, Vrij & Bull, 2002), and in self-adaptor and illustrator gestures (Koper & Sahlman, 1991), have been found to relate to deception, the clarity of the video clips was often not sufficient to measure

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blink rate, and often the hands were not visible. Hence, on the basis of previous findings it was hypothesized that deceptive appealers would show more gaze aversion, headshaking and shrugging.

Gaze aversion was used despite mixed findings in the literature (for example, Akehurst, Kohnken, Vrij & Bull, 1996), as there is some evidence that this cue may discriminate in situations where the motivation to succeed in lying is high (DePaulo et al., 2003; Vrij & Mann, 2001a; Wright Whelan, 2009). Appealers were coded as averting their gaze when they were not looking directly at the cameras or interviewer, but instead looked down, up, or to the side. Appealers who were wearing sunglasses or hats so that their eyes were not visible, or whose eye-line was unclear, were not included in the analysis (three deceptive appealers and two truthful appealers were excluded for this reason). Appealers who were reading a statement were also not included in the analysis of gaze aversion, as this was considered to be a form of gaze aversion not indicative of factors that may be related to deception. One of the 16 deceptive appealers was reading a statement, and eight of the truthful appealers were reading a statement. Research by other authors has also identified head shaking, i.e. a side to side motion, and increased shrugging (Davis et al., 2005; Mann, Vrij & Bull, 2006) as indicators of deception, though it was not possible to code the latter in three of the deceptive appeals as the shoulders were not visible.

Procedure for nonverbal cues

The stimuli were the same video clips used in Analysis 1. Again one coder counted frequencies of predetermined nonverbal behaviours in the 32 video clips and, as in the first study, a second coder, who was blind to the veracity of the appeals, coded a random sample of 25% of the deceptive appeals and 25% of the truthful appeals. Inter-rater reliability for the frequency counts

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was again high, ranging from $r = .93$ to $r = 1$ (see Table 2), so again the frequency counts produced by the rater who had coded all the transcripts were used in all analyses.

Results for nonverbal cues

Preliminary analyses of the nonverbal cues again revealed no effect of the length of the appeals on veracity, $F(1, 31) = 0.10, p = .757$; however, to account for the differing lengths of the appeals (11 - 158 seconds, $M = 50.17, SD = 34.82$), each cue score for each appeal was divided by the length (in seconds) of the appeal, to produce a percentage frequency score.

It was not possible to conduct a MANOVA on these data, because, as discussed earlier, not all cues were visible in all the appeals. Consequently, to investigate cues associated with deception, a series of one way ANOVAs, with veracity as a between subjects factor, was conducted on the adjusted frequency counts. Means, standard deviations, confidence intervals, and effect sizes are also shown in Table 2.

Results indicated that deceptive appealers produced significantly more gaze aversion ($F(1, 19) = 7.16, p = .016$), and head shakes ($F(1, 31) = 4.32, p = .046$), than honest appealers. However, no difference was found for shrugging. (Because of small and unequal sample sizes in some cases, all analyses were repeated using non-parametric tests, with equivalent results.)

Analysis 3: Case by case analysis

As an additional way of construing the same data, a case by case analysis was also conducted to assess the potential of each cue found to be significant to predict veracity. This idea has been used previously in the literature (see, for example, Ekman, O'Sullivan, Friesen & Scherer, 1991;

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Leal, Vrij, Mann & Fisher, 2010), and has been considered important on the grounds that, even if we were to assume that any significant results are robust and reliable in a statistical sense, it would not necessarily follow that they would have any practical predictive value in the field. In other words, the idea here is not to assess whether these cues significantly predict veracity (as by the criterion for selection, inevitably they must), but the *relative extent* to which they might predict veracity, assuming they are reliable.

Procedure and materials for case by case analysis

The cues considered in this analysis were those that had significantly discriminated between liars and truth-tellers on two-tailed tests in the previous analyses (expressions of positive emotion towards the relative as a dichotomous variable, expressions of hope, references to norms of emotion or behaviour, equivocation, gaze aversion, and head shaking). For each case (appeal), the frequency score produced by that individual for each of the cues was compared with the overall cue mean. For the deceptive appeals, cue scores that fell above the cue mean on the cues to deception (equivocation, gaze aversion, and head shaking) were classified as a 'hit', and cue scores that fell below the cue mean on cues to honesty (expressions of hope, and references to norms of emotion or behaviour) were also classified as a 'hit'. For the honest appeals, cue scores that fell above the cue mean on cues to honesty were classified as a 'hit', along with cue scores that fell below the cue mean on cues to deception. The cue 'expressions of positive emotion towards the relative' (which related to honesty when coded dichotomously as present/absent), was classified as a 'hit' if present in an honest appeal, and a 'hit' if absent in a deceptive appeal. In this way, a percentage of 'hits' was calculated for each cue (i.e. the percentage number of cases in which a 'hit' was scored).

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Results for case by case analysis

The individual cues had hit rates between 79% (gaze aversion) and 65% (expressions of hope). See Table 3 for details.

The information from the cues was then combined to classify individual cases (appeals) as deceptive or truthful. For each case, the number of ‘hits’ on the cues was calculated (ie. the number of times the appellant scored in the expected direction on each of the cues). Cases which scored above 50% ‘hits’ on the cues were categorised as correctly classified (the appellant scored in the expected direction on the majority of the cues). Cases which scored 50% ‘hits’ on the cues were categorised as unclassified, and cases that scored below 50% ‘hits’ on the cues were categorised as misclassified (the appellant did not score in the expected direction on the majority of the cues). In this way, 12 deceptive appellants were correctly classified (75%), 2 were unclassified (13%) and 2 were misclassified (13%). Of the honest appellants, 13 were correctly classified (81%), 1 was unclassified (6%) and 2 were misclassified (13%). Overall, therefore, using these criteria, 78% of cases were correctly classified, 9% were unclassified and 13% were misclassified.

General Discussion

The present study contributes to the small body of existing research that has examined cues related to deception in real life, high stakes situations, and may have implications for our understanding of deceptive behaviour across high stakes contexts, and also within a very specific

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context. In particular, the findings support DePaulo and Morris's (2004) contention that, although in the kinds of low stakes situations found in laboratory situations cues to deception may be difficult to detect, in real life, highly charged situations in which motivation is strong, and consequences are serious, more reliable cues to deception may emerge.

Nevertheless, given the variety of cues that were identified as of possible use, it is difficult to explain them in terms of any single, overarching, theoretical perspective, although some are more readily accommodated by existing theoretical viewpoints than others. For example, a number of behaviours which have previously been found to discriminate between honesty and deception in other real life, high stakes contexts, also appeared to discriminate in the present study. Thus, equivocation, speech errors, gaze aversion, and head shaking were found to be significantly, or near significantly, more prevalent in deceptive appeals than in honest appeals. Of these gaze aversion is of particular interest given that it was the most successful cue for predicting veracity (79% correct), yet previous research in low stakes deception situations has shown that gaze aversion is not related to deception (DePaulo et al., 2003), or even that liars may increase eye contact in an attempt to appear honest, or monitor how their receiver is responding to their lies (Mann et al., 2012). As noted earlier, there are a variety of a priori reasons why we might expect gaze aversion to increase with deception; these include affective reactions to feelings of shame and guilt (DePaulo et al., 2003; Ekman, 1992), emotions that may be particularly relevant in the context of somebody who is lying about killing their own relative, or increased cognitive load whilst lying (Vrij & Mann, 2001a). However, particularly in the present context, it is possible that increased gaze aversion may also be used as a form of distancing behaviour. Honest appeals are likely to be a genuine attempt to communicate with the public and ask for help, hence honest appealers are more likely to behave in a way that facilitates this

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communication; for example, by using direct eye contact. Nevertheless, the motivation of deceptive appealers is clearly not the same, as they do not actually want the public to assist in finding out what happened to their relative. Deceptive appealers may, therefore, produce behaviours that inhibit direct communication, such as, gaze aversion. It is also notable that, in their meta-analysis, De Paulo et al. (2003) argue that deception may be associated with linguistic constructions that distance the liar from the subject of their speech. In the same way, therefore, equivocal language could also be construed as a form of psychological evasion or distancing from feelings of guilt (Zuckerman et al., 1981), or an attempt to evade or diminish the psychological conflict produced by the discrepancy between the deceptive appealers' knowledge of their own guilt, and their appeals for help.

The finding that deceptive appealers produce more head shaking than honest appealers is also in line with some previous research on real life, high stakes lies (Davis et al., 2005; Mann et al., 2006). Some researchers have suggested that this may be a piece of deliberately exaggerated behaviour intended to convey an appearance of honesty; i.e. an example of 'protesting too much' in a Shakespearean sense (Davis et al., 2005). Alternatively, or additionally, head shaking could be construed as a 'leakage' cue (Ekman, 1992); i.e. a manifestation of the negative emotions that the appealers are experiencing as a consequence of his or her deception. It is not clear from the present study which explanation may be more appropriate; the head shakes varied in magnitude from very small to quite large movements; it could be that the former are more indicative of leakage, and the latter of exaggerated behaviour. This possible distinction may be worth following up in future research. The finding of a possible trend for deceptive appeals to contain more speech errors than honest appeals, also lends some support to findings from previous research on high stakes lies; speech errors in high stakes situations have variously been

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interpreted as resulting from increased anxiety and fear of apprehension (Davis et al., 2005; Ekman, 1992), and cognitive load (Vrij & Mann, 2001a).

However, although to some extent it may be possible to explain the aforementioned cues in terms of general factors such as cognitive load, negative affective reaction, arousal, leakage, and distancing, in addition to these more familiar cues, the present study also drew attention to some more novel cues that are less obviously explicable in these ways, and might be more specifically related to the context of making an appeal. For example, ‘references to norms of emotion and behaviour’ were significantly more prevalent in honest appeals than in deceptive appeals, and honest appeals contained significantly more ‘expressions of hope of finding the missing relative alive’ than deceptive appeals in cases in which a body had not been found. Honest appeals were also significantly more likely to include an ‘expression of positive emotion’ towards the relative than deceptive appeals. Furthermore, honest appeals contained marginally significantly more ‘expressions of concern for the relative, or of grief, or pain’, and ‘avoidance of the use of brutal language or detail’. These findings would appear to endorse the view that, although theoretical approaches to cues to deception have traditionally focused on a range of emotions that may be generally associated with the act of deception, for example, fear, anxiety, guilt, shame and excitement (Ekman, 1992; Zuckerman et al., 1981), in high stakes contexts, such as that of making an appeal for a missing or murdered relative, the patterns of emotion may be more complex and context specific, requiring a different kind of explanation. For instance, broadly speaking, these additional, more context specific cues might be better accommodated by what we could term a ‘social interactionist’ perspective. That is, within the context of the kinds of cases used here, where there are offenders and victims, some cues to deception reflect the nature of the social relationships between the offender and the victim, and corresponding

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attitudes. So, for example, whilst it might be expected that somebody making an honest appeal would be more likely to express positive emotion towards his or her relative, somebody who has recently killed his or her relative may lack the same positive emotion towards the relative (indeed, the act of murdering the victim could be construed as an obvious manifestation of this). Similarly, one might expect that someone making an honest appeal would produce more expressions of concern, grief, or pain about the disappearance or death of the relative, than somebody who has recently killed the relative. Also, whereas an honest appealer may be averse to expressing any brutality towards their relative, a deceptive appealer may not be so reluctant.

In cases in which the relative was not publicly known to be dead, honest appealers were also found to produce more 'expressions of hope of finding their relative alive' than deceptive appealers. From a social interactionist perspective, this might simply be a cognitively driven behaviour that reflects an obvious change in the status of the victim within their interaction; i.e. the deceptive appealers (except in one case where the relative was kidnapped but still alive), knew that their relative was already dead and would, therefore, have no spontaneous reason for expressing such hope. Furthermore, honest appeals contained more 'references to norms of emotion and behaviour' (including violations of norms) than deceptive appeals; this may, in part, also be a cognitively driven behaviour reflecting the nature of the interaction between offender and victim. When honest appealers ask, 'how could somebody do this?' or, 'why would anybody want to hurt her?', they are presumably asking a genuine question to which they do not know the answer. A deceptive appealer, however, knows from personal experience how and why somebody could kill their relative. Although an additional possibility is that, in an attempt to mitigate cognitive dissonance, deceptive appealers may be less likely to refer to norms of emotion and behaviours which they know that they have violated.

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Another, possibly related, way of interpreting some of these cues is in terms of what we can call the ‘individual behavioural profile’ account of deception. This has yet to be systematically applied to studies of deception. According to this account, some cues may reflect general characteristics associated with the kinds of individuals who commit the crimes that the deceptive appealers have committed in a particular context (and who subsequently lie), rather than their acts of deception per se. That is, the cues may form part of the behavioural profile of individuals who engage in particular aberrant acts. In the present cases, and with most other high stakes deception contexts, honest and deceptive people differed not only in terms of whether they were lying, but also whether they had committed, or had been accomplices to, serious crimes of violence. For example, as with lying itself, showing fewer signs of positive emotion and empathy towards the victim, a failure to use references to appropriate norms of behaviour, and the use of brutal or aggressive language, could all be construed as consistent with the stereotype of a psychopath (Davies & Feldman, 1981). However, individual profile behaviours of this kind will obviously not be identifiable in standard low stakes laboratory situations where ‘normal’ participants are randomly assigned to lying and truthful conditions, and also, because they relate to deceptive individuals rather than deceptive behaviours, they may not be apparent in within subjects comparisons of truthful and deceptive conditions, even in high stakes situations.

To summarise, the present study was obviously limited in scope, both in terms of the sample size and the range of robust statistically significant results, and obviously requires replication before firm conclusions can be drawn. It is also unclear as to the extent to which the cues identified here are specific to the context of making an appeal for help with a missing or murdered relative. Nevertheless, the fact that the combined information from the cues correctly classified 78% of the appeals, suggests that a multi-cue perspective using the kinds of cues

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identified here may be worth investigating further. Notably, the only individual cue that was equivalent in terms of the ability to predict was gaze aversion, but it was not possible to measure this in every case. This illustrates a general problem with using a restricted range of cues; i.e. it may not always be possible to identify them in practice. Given that researchers such as ten Brinke and Porter (2012), and Vrij and Mann (2004) have argued a multi-cue approach is more likely to be more successful in the field, hopefully, the present research has possibly pointed to new directions to explore in this respect.

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Table 1

Frequency of case evidence used to establish ground truth

Evidence type	Honest appeals (<i>n</i> = 16)	Deceptive appeals (<i>n</i> = 16)
Forensic evidence (soil, pollen, fibre, blood spatter patterns etc)	14	7
DNA evidence (body fluids, hair, skin etc.)	3	4
Victim's blood	1	4
CCTV/video/speed camera evidence	6	3
Knowledge of location of victim's body	3	3
Knowledge of unreleased/undiscovered details of crime	3	3
Confession	8	7
Admission at trial	7	6
Post mortem evidence	1	5
Medical evidence	0	1
Computer search history of location of crime/body	2	0
Eyewitness testimony	5	5
Possession of murder weapon (appealer/accomplice)	0	2
Possession of items from crime scene	1	0
Phone records	0	2
Incriminating financial transactions	1	3
Account/alibi inconsistent with evidence	5	11

Note: totals exceed sample size as cases were classified based on several pieces of evidence

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Table 2

Inter-rater reliability, percentage means (SDs), confidence intervals, and effect sizes for verbal and nonverbal cues

	Inter-rater reliability (<i>r</i>)	<u>Deceptive</u> Mean (<i>SD</i>) CI	<u>Honest</u> Mean (<i>SD</i>) CI	Effect size
Verbal cues to honesty				
Positive emotion towards relative ^a	<i>r</i> = 1 <i>p</i> < .001	1.90 (3.77) 0.13 – 3.68	3.70 (3.15) 1.93 – 5.47	<i>d</i> = 0.52
Avoids brutal language/detail*	<i>r</i> = 1 <i>p</i> < .001	0.36 (0.96) -0.29 – 1.00	1.19 (1.51) 0.54 – 1.83	<i>d</i> = 0.65
Expressions of hope**	<i>r</i> = 1 <i>p</i> < .001	0.63 (0.94) -0.047 – 1.301	1.91 (0.60) 0.904 – 3.630	<i>d</i> = 1.62
Makes a plea	<i>r</i> = 1 <i>p</i> < .001	3.77 (4.52) 1.87 – 5.67	2.69 (2.68) 0.79 – 4.58	<i>d</i> = 0.29
Expressions of concern /pain*	<i>r</i> = .90 <i>p</i> = .003	1.47 (2.11) -0.24 – 3.17	3.74 (4.22) 2.04 – 5.45	<i>d</i> = 0.68
References to norms of emotion or behaviour**	<i>r</i> = 1 <i>p</i> < .001	0.08 (0.24) -0.50 – 0.65	0.98 (1.58) 0.40 – 1.55	<i>d</i> = 0.78
Verbal cues to deception				

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Equivocation**	$r = 1$	4.69 (4.40)	2.03 (2.07)	$d = 0.77$
	$p < .001$	2.93 – 6.45	0.27 – 3.78	
Speech errors*	$r = .98$	4.90 (3.75)	2.89 (1.85)	$d = 0.68$
	$p < .001$	3.39 – 6.41	1.38 – 4.40	
Phrase repetition	$r = .98$	4.84 (4.92)	4.72 (3.25)	$d = 0.03$
	$p < .001$	2.71 – 6.97	2.59 – 6.84	
Filled pauses	$r = 1$	1.47 (1.79)	1.10 (1.62)	$d = 0.22$
	$p < .001$	0.60 – 2.34	0.23 – 1.97	
Does not make sense	<i>All cases</i>	0.68 (1.07)	0.42 (0.61)	$d = 0.31$
	<i>checked 0</i>	0.24 – 1.13	-0.03 – 0.86	
Avoids using 1 st person pronoun	$r = 1$	0.81 (1.32)	0.82 (1.59)	$d = 0.01$
	$p < .001$	0.07 – 1.56	0.08 – 1.57	
Refers to others	$r = 1$	1.39 (1.75)	2.13 (2.13)	$d = 0.38$
	$p < .001$	0.39 – 2.38	1.13 – 3.12	
Lack of hope	<i>All cases</i>	0.67 (2.11)	0.00 (0.00)	$d = 0.45$
	<i>checked 0</i>	-.32 – 1.66	-0.99 – 0.99	
Lists	$r = 1$	0.54 (0.89)	0.10 (0.77)	$d = 0.55$
	$p < .001$	0.11 – 0.96	0.57 – 1.42	
Irrelevant statements	$r = 1$	0.49 (0.90)	0.22 (0.76)	$d = 0.33$

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	$p < .001$	0.07 – 0.91	-0.21 – 0.64	
Uses brutal	$r = 1$	0.38 (0.95)	0.06 (0.19)	$d = 0.46$
language/detail	$p < .001$	0.03 – 0.73	-0.29 – 0.42	
Nonverbal cues to deception				
Gaze aversion**	$r = 1$	59.35 (30.50)	23.53 (23.26)	$d = 1.32$
	$p < .001$	42.20 – 76.50	1.07 – 45.98	
Headshaking**	$r = .98$	25.26 (24.13)	11.04 (12.94)	$d = 0.73$
	$p < .001$	15.37 – 35.14	1.16 – 20.92	
Shrugging	$r = .93$	2.19 (4.33)	1.77 (4.58)	$d = 0.09$
	$p = .001$	-0.36 – 4.73	-0.52 – 4.07	

Note: ^a Cue differs significantly between deceptive/honest appeals when coded dichotomously as present/absent ($\chi^2(1) = 4.50, p = .034$).

** Means differ significantly from each other on a two-tailed test

* Means differ significantly from each other on a one-tailed test

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Table 3

Cue hit rates

	Hits Deceptive appeals	Hits Honest appeals	Hits All appeals
Positive emotion towards relative	69% (11/16 cases)	69% (11/16 cases)	69% (22/32 cases)
Expressions of hope	70% (7/10 cases)	60% (6/10 cases)	65% (13/20 cases)
References to norms of emotion or behaviour	94% (15/16 cases)	44% (7/16 cases)	69% (22/32 cases)
Equivocation	56% (9/16 cases)	81% (13/16 cases)	69% (22/32 cases)
Gaze aversion	75% (9/12 cases)	86% (6/7 cases)	79% (15/19 cases)
Headshaking	56% (9/16 cases)	81% (13/16 cases)	69% (22/32 cases)