The Effect of Channels of Communication on Accuracy in Detecting Deception in High-Stakes situations

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The Effect of Channels of Communication on Accuracy in Detecting Deception in High-Stakes situations

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This work is original and has not been submitted in relation to any other degree or qualification.

Jonathan Parry **Dr Clea Wright**

…….. **……..**

Acknowledgements

I would like to thank my supervisor, Dr Clea Wright, for guidance and support, and Bryan Hiller, for assistance in preparing the online survey. Thanks to SJ for support.

Record of meetings with Dr Clea Wright

Two preliminary meetings before supervisor allocation, discussing deception in general.

18/01/2017 Meeting in office of Dr Clea Wright

JP selected project from brief: channels of communication.

1 way ANOVA, 4 levels: all info (visual + audio)

Visual info

Audio info (verbal + paraverbal)

Text (verbal)

Between subjects.

DV = accuracy

Lab or web based – likely to be web based

Tasks:

JP: familiarise with literature.

Begin ethics application; initial aim for Feb 3rd deadline

Check video editing software -> ensure familiarity with process for editing videos for each condition

CW: send JP meta-analysis

Select videos

18/1/17 E mail correspondence

CW: sent meta-analysis of deception detection

JP: informed CW that Moira Lafferty had been contacted re: ethics form.

25/1/17 Meeting in office

CW: explained the participant sheet, debrief sheet and other elements of ethics form.

25/1/17 E mail correspondence

CW: sent examples of debrief form and participant sheet.

JP task to study these forms and complete draft of forms for project.

30/1/17 E mail correspondence

JP: Sent revised ethics form and appendices A-E to CW. Arranged to meet on 1/2/17.

CW: responded to e mail with necessary amendment suggestions for ethics form.

31/1/17 E mail correspondence

CW: explained the detail necessary for rationale section of ethics form.

2/2/17 E mail correspondence

JP: explained that due to time constraints, it would not be possible to submit ethics application before deadline of 3/3/17. It was agreed that the month of February would be spent preparing the project.

7/2/17 E mail correspondence

CW: explained that appointments were available for meetings before the March 10th deadline for ethics application submission.

7/2/17 E mail correspondence

JP: submitted an updated version ethics form to CW.

8/2/17 E mail correspondence

CW: agreed to go through ethics form in next meeting.

9/2/17 Email correspondence to all students

CW: sent out notification of meeting times

15/2/17 Meeting in office

Discussion of ethics form, and what needed to be done: JP to add more detail to various sections of form.

27/2/17

CW: sent out available times for meetings.

27/2/17 E mail correspondence

JP: sent all updated ethics forms to CW.

28/2/17 e mail correspondence

CW: Signed off ethics form for submission to ethics committee

3/3/17 E mail correspondence

JP: informed CW that ethics form had been sent

29/3/17 Meeting in office

Discussion of literature on deception detection. JP given further direction on history of deception detection and journals to be read.

4/5/17 Meeting in office

Further discussion of literature.

Ethics form discussion.

4/5/17 E mail correspondence to all students

CW: informed group of students of deadline submission day, and deadline submission for 1st draft for feedback

22/5/17 E mail correspondence

JP: mentioned difficulty in adding edited video clips to BOS page. Notified CW that Bryan Hiller had also been given access to BOS page.

CW: Offered a solution; agreed to assist with edited videos.

25/5/17 E mail correspondence

CW: Sent links to Audio-visual and Visual Only uploaded files that were to be added to BOS.

26/5/17 E mail correspondence

CW: sent links to all edited videos. Explained that JP needed to resubmit the Audio Only files in a video format. Videos were all re-named to clarify future correspondence, and sent to JP.

6/6/17 E mail correspondence

CW: sent JP all links to Audio Only files to be included in BOS.

11/6/17 E mail correspondence to all students

CW: sent notification of dates over summer when not available.

12/6/17 E mail correspondence

JP: notified CW that BOS page was reaching completion. All video clips had been randomised. CW and BH both had access to page.

14/6/17 E mail correspondence

CW: requested JP collect approved ethics form from office.

21/6/17 E mail correspondence

JP: informed CW that a pilot run of the BOS had been activated.

22/6/17 E mail correspondence

CW: informed JP of a problem with the BOS: one of the links was not connecting to the videoclip. Informed JP of need to check all links in all conditions.

3/7/17 E mail correspondence

JP: informed CW that the BOS was corrected, and was ready for to be activated live.

4/7/17 E mail correspondence

CW: stated that BOS could be activated as all issues had been addressed.

11/7/17 E mail correspondence

CW: informed JP that one of the passwords was not working on the BOS.

12/7/17 E mail correspondence

JP: informed CW that the issue had been resolved, and the BOS was collecting data efficiently.

9/8/17 E mail correspondence to all students

CW: informed students of submission deadlines

15/8/17 E mail correspondence

JP: suggested date for feedback.

CW: arranged time: 11:00, 1/9/17

11/9/17 E mail correspondence

JP: Requested final meeting before submission. Requested opportunity to verbally discuss the revised structure of dissertation.

CW: suggested meeting at 10:00, 18th September.

18/9/17 Meeting in office of Dr Clea Wright

Brief meeting in which the general structure was discussed: what had been cut from original; the theme of new additions to the text.

Discussed submitting dissertation that afternoon, 18/9/17.

Jonathan Parry …… Dr Clea Wright……..

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Abstract

Much of the past research into deception detection has utilised low-stakes lies as stimulus, with globally poor results in accuracy levels. The present research used real-life recordings of high-stakes lies to investigate a between-subjects model of four different channels of communication: Audiovisual; Visual Only; Audio Only; Transcript Only. The dependent variable was the accuracy score obtained in each channel of communication in detecting deception. Considering available research results, it was hypothesised that the Audio Only group would score significantly higher than the Visual Only group, the Audiovisual group would score significantly higher than the Transcript Only group, and that the Transcript Only group would score significantly higher than participants in the Visual Only group. The lack of research into the channel of communication of Transcript Only provided further rationale for the present study. Due to the high-stakes nature of stimuli materials it was hypothesised that all participants would score higher than chance. Each participant group (N=20) observed 20 clips of people making public pleas for information about a missing or murdered relative. Half of the clips included people involved in the crime (attempting to deceive the public) and the other half were innocent (truthful, and not attempting to deceive the public). Scores ranged between 50.8% accuracy (audio visual) and 56.5% accuracy (visual only). There was no statistically significant difference between mean scores, $F(3,76)=.30$, $p=.826$, $\eta^2=.01$. T-tests were conducted to test acuracy levels within each group. Accuracy levels were not significantly above chance. Suggestions for further research are discussed.

Review of relevant research in deception detection

Investigations have proven over time that people are generally poor at detecting deception (Kraut, 1980; Vrij, 2000), accuracy levels above 70% in deception detection research only occur on rare occasions; for example, in high-stakes situations (Wright Whelan, Wagstaff, & Wheatcroft, 2015; Wright & Wheatcroft, 2017) and it has been suggested that high and low-stakes contexts yield similar levels of accuracy (Kalbfleisch,1990). A possible reason for this lack of ability is confidence in stereotypical verbal and nonverbal cues that are ultimately misleading but nevertheless believed (Bond Jr & DePaulo, 2006; Hartwig, Granhag, Stromwall, Wolf, Vrij, & Hjelmsäter, 2011; Bogaard, Meijer, Vrij, & Merckelbach, 2016). Vrij (2000) posited that the low standard of lie detection ability stems from the blurred line between objective cues (cues that have been proven to be associated with deception) and subjective cues (cues widely *believed* to be associated with deception).

The accuracy of lie-detection techniques and whether it is possible to spot a liar's verbal or nonverbal characteristics has fascinated both scientists and laymen for decades (Vrij, Granhag, & Porter, 2010) as the immediate comprehension of other people's goals and intentions plays an integral part of a successful social life (Frith & Frith, 2006). Common interactions may involve situations in which an individual feels it necessary to disect the behavioural pattern of their interactant, searching for physical or verbal cues to deception (Riggio & Friedman, 1983). Also, the common necessity of deception has been documented, stating an individual's daily micro-diversions from the truth may serve as a social tool, avoiding embarrassment, side-stepping harsh truths with lies of little consequence that are scripted and less of a cognitive strain than a meaningful truth (Bond Jr & DePaulo, 2006). Much of the research conducted over the last three decades suggests that individual personality traits can be identified in body language

(Heberlein, Adolphs, Tranel, & Damasio, 2004) and unconscious communication through the body also expresses moods (Chouchourelou, Matsuka, Harber, & Shiffrar, 2006) and deceptive intentions (Grezes, Frith, & Passingham, 2004). A major hindrance in communication and understanding of others arises when the truth is used sparingly; deception to mask transgressions occurs when the context might mean truth is a problem for the sender (Blair, Levine & Shaw, 2010) and this phenomenon poses a problem for the reciever as a functioning society needs people to believe one another (Bond Jr & DePaulo, 2006).

Ekman and Friesen (1969) suggested that people express emotions in different ways, and that these can be considered communication channels: the words we say; the paralinguistic and non-verbal manner used to communicate; the body language and discreet facial tics–all these may be independent factors in measurement of communication. It may be believed that describing a sad story with a smile or a subtle shaking of the head whilst confirming a fact by verbalising 'yes,' are elements that should create suspicion in observers that what is being said is not the whole truth (Ekman & Friesen, 1969). Also, liars are supposedly more guarded than truth tellers, their stories less detailed, interesting and coherent (Brinkley, Bernstein & Newman, 1999) and it has been suggested that liars may also take more time to consider what comes next in their narrative, and are often believed to speak in a higher pitch (Hartwig, Granhag, Stromwall & Anderson, 2004). While oddly lacking in everyday imperfections, a deceptive narrative seems to be more rigid and controlled albeit without exhibiting specific cues to deceit (DePaulo, et.al, 2003).

Blair, Levine and Shaw (2010) countered the popular focus on attention to individual mannerisms by positing the importance of the environment when considering whether a person is telling the truth. Simon (1990) used the metaphor of a pair of scissors to describe the importance of environment in any measurement of human behaviour, and it could be pertinent in deception detection research as much of the stimuli involves recordings of individuals in a

novel situation (e.g. in a television interview): one blade represents indivdual differences in personality or behaviour while the other blade acts as the situationist approach (Epstein, 1979) in which events occur; one blade without the other would not be sufficient to explain how scissors work (Simon, 1990). Behavioural research by Epstein (1979) suggested that all behaviour is a transaction between character trait and environment, and Funder (2006) claimed that a person outside of a situation has very little meaning, and that by careful consideration of context or environment, behaviour can be predicted, or influenced. Carroll and Russell (1996) state that an understanding of the context is of fundamental importance before emotion can be recognised and interpreted accurately.

The overarching point of this opinion of Blair, Levine and Shaw (2010) suggests that in the reality of a forensic setting, factors such as prior convictions of an individual, are usually present outside of observation of a suspect's mannerisms. However, it could be argued that attempts to recreate the importance of situational factors in the stimuli of many deception studies has yielded less than satisfactory results, e.g. student participants asked to relay fictional true/untrue stories in a laboratory is a condition which may offer a form of context, but the ecological validity of such research is in question as the success of the experiment rests almost entirely on the acting skills of the sender.

Ross and Nisbett (1991) also stated that high on the list of importance in studying human behaviour is the influence of the context in which events occur; a lesson often requiring relearning if it is to be applied to social science (Blair, Levine & Shaw, 2010). Deception detection can easily be assisted by context in real-life situations, for example, police may already be aware of a suspect's whereabouts at a specific time and any contradiction would be flagged up as a lie; when prior knowledge of an individual's normative behaviour, such as how they behave in any given situation, is available, it could also be useful contextual framing to assist observers (Whelan, Wagstaff & Wheatcroft, 2014). Indeed, comparing what is known to

what is presented by the sender might be the most efficient method for catching a liar in the act (Blair, Levine & Shaw, 2010).

The original argument of Ekman and Friesen (1969) stated that lying will create emotion in the liar, specifically an uncomfortable psychological burden which may lead to involuntary behaviour; it might be argued that this emotional arousal would increase activity in non-verbal communication channels, in turn generating visual cues to deceptive behaviour. The practicality of Ekman and Friesen's (1969) theory may suggest that a taxonomy of such cues and leakage symptoms would help practitioners to utilise these skills. However, Vrij (2008) stated that focusing attention only on nonverbal cues will lead to a lie-bias, arousing suspicion in the observer that ultimately leads to a judgement of deceit. He explained that it is often practice of police officers to focus on nonverbal cues as they labour under the assumption that nonverbal cues are more difficult to control and, therefore, are more likely to be leaked. This, he stated, was the fault, as many verbal cues are more diagnostic than nonverbal cues, and only paying strict attention to nonverbal cues results in less accuracy in detecting deception (Vri, 2008).

Furthermore, Vrij, Granhag, and Porter, (2010) argue that in attempting to determine the veracity of a real-life account, too much concentration is wasted on such things as nonverbal cues, an over-zealous approach to interpret a given cue such as fidgeting as a deceptive trait, neglecting the fact that personal differences in behaviour and character traits may be misleading, and generally relying on heuristics that have ingrained a false sense of ability in the detector. Indeed, individual differences in personality traits may mislead observers when attempting to detect deception (Vrij, Akehurst, & Morris, 1997; Mann, Vrij, & Bull, 2002; Bond & DePaulo, 2008).

Issues with Methodologies

Many previous deception studies are restricted by low-ecological validity, with a large amount of research laboratory-based and focused on detection of low-stakes lies, thus limiting real-life usage for findings (Wright Whelan, Wagstaff & Wheatcroft, 2014). Blair, Levine and Shaw (2010) posit that the presence of deception in research not about deception reveals a truth bias in humans (Hartwig, Granhag, Stromwall & Anderson, 2004; Bond & DePaulo, 2006). It was stated that even the unthinkable situations presented, e.g. the torture of a man in order to gain results on an experiment in the Milgram (1969) obedience experiment, are believed when people are not primed that they are about to experience deception, and that this fact is more salient than most findings in deception detection research.

Many deception detection experiments utilise lies of little gravity for the sender, and are used with barely any serious motivation to succeed in the act of deception as they are the construct of the experimenter, thus not allowing any emotional attachment (Wright Whelan, Wagstaff & Wheatcroft, 2014). It could be argued that, in a forensic environment, findings from such research are of little importance or utilty.

Another suggested flaw in deception studies is that participants are aware of the fact they are present in order to perceive lies, or not, as may be the case, and this expectancy may cause participants to rely on preconceived ideas about deception cues which may be inaccurate, or misleading e.g. gaze aversion, increased movement or fidgeting (Buller, Strzyzewski, & Hunsaker, 1991; Sporer, 2001; Bond Jr & DePaulo, 2006; Vrij, Granhag, & Porter, 2010; Bogaard, Meijer, Vrij, & Merckelbach, 2016). These cues relate primarily to nervousness, which may suggest people consider all liars to more than likely be feeling nervous during deception and should therefore behave so (Vrij, 2000).

Another issue is the viewpoint that humans are burdened with a truth-bias (Street & Kingstone, 2016). This could mean that the highest levels of accuracy recorded in deception research are when the communicator is telling the truth, suggesting that results in deception detection research will not surpass slightly above chance when the stimuli is mixed truth and lies (Levine, Park & McCornack, 1999). In support of this, Bond Jr and DePaulo (2006) found less than 50% accuracy in detecting deception, and over 60% accuracy in classifying truth as nondeceptive. Although Blair, Levine and Shaw (2010) found results of accuracy consistently higher than chance, their stimulus included mock crimes, lies about cheating and relatively small financial benefit from cheating in an exercise; it is argued that these stimuli may not constitute a high-enough-stake for the sender, thus distorting results within a forensic setting. It could be argued that the tangle of objective and subjective cues may be the cause of the poor performance in lie detection studies (Hartwig, Granhag, Stromwall & Anderson, 2004).

A further concern with deception detection studies is inherent in most of the research. For example, for an individual partaking in a deception detection study, spotting deception in a speaker would not be out of the ordinary, but participants exposed to bizarre or stange behaviour in other studies rarely claim that the person is deceptive, but only behaving out of the ordinary, thus possibly missing any deception that may be present (Levine et al., 2000). An example if this would be the forementioned Milgram (1969) obedience study, in which not a single subject guessed that the victim of electric shocks was only an actor. It could be argued, however, that the Milgram (1969) study did not require subjects to spot deception, therefore particpants were concentrating only on the job at hand and not even considering the element of deception, whereas participants in deception studies are aware of the need to presume deception at some point, thus introducing the chance level of success (Blair, Levine, & Shaw, 2010).

Applied use of research

Meta-analytically, 54% of participants score above chance in deception detection studies (Bond & DePaulo, 2006). O'Sullivan, Frank, Hurley and Tiwana (2009) posit that expertise does exist within the context of high-stakes lies, suggesting a statistical interaction between level of consequence and level of accuracy in detection of the lies, thus possibly rendering student samples or low-stakes situations irrelevant. Levine, Clare, Blair, McCornack, Morrison and Park (2014) support the concept of lie-detection experts, but suggested that research in lie detection is fundamentally flawed as it is rarely interactive, as it is in real-life, and it is this low ecology in the lab that is manifest in the general poor levels of accuracy in the research.

deTurck, Feeley and Roman, (1997) claimed that training will produce higher success rates in deception detection and that those trained in specific areas, such as visual or aural cues, will always score higher than novices. Park, Levine, McCornack, Morrison, and Ferrera (2002) posit that stimuli in deception research does not reflect the skills required by experts to catch liars, therefore rendering typical research procedures intrusive in the process, and of no help. According to Park et al. (2002) experts in the field would use witness statements, already gathered data or physical evidence if the suspect did not confess, all of which are not possible in research projects.

The research of Wright and Wheatcroft (2017) found that police officers stated smiles gave them cues to deception, a declaration that would otherwise be innacurate within meta-analytic findings (Bond & DePaulo, 2006). Within the context of that experiment their deductions were correct, suggesting that the police officers managed to use the given context to determine if a smile was a cue to deceit or honesty; this further raises the salient point that the classification of any given cue may not always be accurate.

Further support of laboratory-based research projects is the finding that interrogating a crime suspect will not yield desired results of a confession any more than passively observing them; it is the expert knowledge of how to design probing questions and present them in a successful manner that will elicit a narrative closer to the truth (Levine et al., 2014). Indeed, it was suggested that interviews in which the interviewer behaved in an accusatory manner elicited false confessions from people (Vrij, Mann, Kristen, & Fisher, 2007). It is also argued that lie-detection research should focus more on construction of the questions interviewers should ask to provoke a cue to deception or elicit truthful answers (Vrij & Granhag, 2012) and utilise temporal questions that further investigate exact times to avoid generalised answers, e.g. 'I was at the supermarket' (Vrij, Granhag & Porter, 2010). Also, Vrij, Mann, Fisher, Leal, Milne and Bull, (2008) found that instructing narrators to tell their story in reverse order elicited many more cues than a linear, chronological order, possibly due to an increase in cognitive load (Zuckerman, DePaulo & Rosenthal, 1981; Bond Jr & DePaulo, 2006), making it more difficult to lie than simply tell the truth.

Channels of Communication and High-Stakes Lies

The role of channels of communication in deception detection in high-stakes lies is still unclear (Evanoff, Porter, & Black, 2016). In deception detection studies investigating channels of communication, to create the Audio-visual channel of communication, investigators may utilise video clips that are completely unchanged from their original form. These clips play as would be experienced by an individual with normal or corrected hearing and vision in the original setting (for example, on a national news television channel). Full audio-visual experience exposes participants to the following: the words that an individual may use, and how they sound

in terms of cohesion and coherence. Also, viewers are exposed to the paraverbal cues – the tone, cadence, and pitch of the voice of the speaker. This may or may not play an important factor in how an individual interprets the words that are spoken. The Audio-Visual medium may also raise the possibility that viewers will assess, and possibly have their judgement influenced, by how the speakers look; if the speaker's clothes appear expensive or cheap, or if they appear clean, or unkempt, for example. Observers may also focus on the apparent mental state of the speaker via both the visual and audio mediums; whether the speaker appears nervous, excited, calm, arrogant, or distressed, for example, may be traceable through the audio medium (verbal and parabverbal cues) or the visual medium, for example, body language (apparent level of relaxation, twitching, scratching, fidgeting etc.) Furthermore, interaction, such as maintaining eye-contact with the interviewer, or the camera, or any other individuals present, might also be considered by the participant. The inferences made from each of these visual and verbal cues could assist the participant in reaching a decision on the truthfulness of the speaker.

In deception detection studies investigating channels of communication, the Visual Only channel of communication utilises the same video clips as those that are experienced in the Audio-Visual channel, but these clips have been edited, and all soundtrack removed. This modification deprives observers of the opportunity to consider all verbal cues: level of coherence and cohesion of speech; choice of words; and para-verbal cues, the tone, cadence, and pitch of the speaker's voice. Each of these missing elements might have contained cues to the truthfulness of the speaker that could be utilised (as stated above), and therefore a decision on the veracity of each statement is reached using less stimuli as guidance.

In deception detection studies investigating channels of communication, the Audio Only channel of communication utilises the same video clips as the Audio-Visual and Visual Only channels, but these clips have been edited, and all visuals removed. This modification deprives observers of the opportunity to consider all visual cues: how the speakers look in their choice of clothing, if

they appear clean, or unkempt; the apparent mental state of the speaker that might be inferred visually in how nervous, excited, calm, arrogant or distressed they may present themselves. Visual interpretation of the speaker's interaction with other people, for example, eye contact with the interviewer, and interaction with the camera and other present individuals, is also unavailable. Each missing element of the visual channel of communication might have held important cues for the participant to consider. Therefore, a decision on the veracity of each speaker's statement is reached with less communication channels to assist the participant.

The Transcipt Only channel is a written account of the words spoken in the same clips as were used in the above channels of communication groups. However, in this channel of communication, all audio soundtrack and visuals have been removed. Participants are deprived of all paraverbal and all visual elements that may have presented cues to the veracity of the statement made by the speaker. Participants' decisions on the truthfulness of the speaker are reached by the written account only.

Media Richness Theory (MRT) posits that media consisting of more channels of communication, for example, providing both audio and visual channels, is more useful to an observer when trying to analyse equivocal statements (Daft & Lengel, 1986). This may suggest that more informed decisions will be made following observation of a higher number of channels of communication (Evanoff, Porter, & Black, 2016). It may therefore be suggested that the para-verbal cues (tone, cadence, and pitch of voice), present in both Audio-Visual and Audio channels of communication, are salient points to consider when discussing the task facing a participant in the Transcript Only channel of communication. For example, the Transcript Only medium only allows access to the words that were spoken by the speaker. As all other channels of communication are unavailable, participants will not be able to make any social judgements of the individual who is saying the words. For example, as stated above, these judgements may be how the speakers are dressed, if they appear clean, or unkempt. Also, the apparent mental

state of the speaker may be considered via visual and audio mediums, or if the speaker appears to look or sound nervous, excited, calm, arrogant, distressed, and the degree of interaction of the speaker and whether they maintain eye contact. Stimuli to assist this may be offered by the visual and audio mediums, thus possibly presenting a baseline against which the verbal and para-verbal cues may subsequently be gauged. Considering this, it could therefore be possible that a high level of success of participants in the Transcript Only group may offer evidence of the importance of attention to the words said when attempting to detect deception, as opposed to how they were said, and by whom. Similarly, a low score in this group may suggest evidence to the contrary, and support the theory of Daft & Lengel (1986).

Other possible differences between channels of communication have been researched with varying results. Opposing the theory of Daft and Lengel (1986) that MRT increases accuracy in analysing statements, evidence has suggested that an observer of visual and audio channels of communication may be overwhelmed by the quantity of data, thus reducing attention to each channel and possibly losing information in the process (Dennis & Kinney, 1998). Research has also shown that it may be possible to absorb more information from a Transcript Only channel of communication, due to the cognitive focus necessary to read, as opposed to simply watching or listening; it is this focus that assists attention and increases accuracy (Salomon & Leigh, 1984). There is, however, a possibility that the participants in the visual and audiovisual channels of communication may experience more desire to be accurate in their decisions as the stimuli are more engaging (Evanoff, Porter, & Black, 2016). In contrast to this viewpoint, while it may be considered an advantage to observe a higher number of channels of communication, visual information could increase the amount of information that requires processing, thus resulting in an incorrect judgement (Levine, et., 2011).

In their meta-analytic research across 206 documents and 24, 483 judges in deception detection, Bond Jr and DePaulo (2006) found that people achieve an accuracy rate of 54%, with

47% of lies being detected as deceptive, and 61% of true accounts being detected as nondeceptive. People were found to be more successful at detecting audible rather than visible lies. It was also found that people appear deceptive when they are motivated to present themselves as honest. Furthermore, in general, people believe the person with whom they are conversing to be honest. It could be argued that the higher success rate in detecting honesty (61%) is related to the tendency to believe an interaction partner is being honest, as can be seen in the frequently reported truth-bias (Evanoff, Porter, & Black, 2016; Hartwig, Granhag, Stromwall & Anderson, 2004; Bond & DePaulo, 2006).

High-stakes situations differ from low-stakes situations in the effect of the context on the speaker. For example, an attempt to lie about something that would only ever carry a negligible punishment if caught in the lie does might not create a great deal of stress, if any, in the speaker. High-stakes situations, in contrast, usually exist in an entirely different context. Often existing in a forensic setting, in which an individual is experiencing extreme emotional stress, high-stakes contexts might create visible reactions in speakers. Whether an individual is lying or telling the truth, the context may introduce pressure that could possibly effect the way in which any given individual can present themselves. A person free of guilt may still present with, for example, a tremble in their voice, as they are not scared of being caught in a lie, but are anxious about the well-being of a loved one.

When an individual is attempting to deceive in a high-stakes situation, the struggle they endure has been suggested to manifest itself in several ways. The Four Factor Model (Zuckerman, DePaulo & Rosenthal, 1981) suggests that an increase in cognitive load and variety of cognitive work disadvantages the speaker e.g. recalling detail of a fabricated account whilst simultaneously engaged in other tasks elicits behaviours linked with this phenomenon; also, affected responses involved with deception such as indignity, remorse, distress, dread and apprehension. It is this discomfort that may cause arousal in the autonomic nervous system as

they experience involuntary physiological responses. Also, not secure in how credible they seem, persons attempting to deceive might well try to control their behaviour to then affect a picture of innocence. In support of this, Lee, Klaver and Hart (2008) posit that deceitful narratives are usually shorter than true accounts of events due to the cognitive load; liars attempt to control the course of the narrative excessively, and so typically say less.

Very little research has investigated high-stakes situations, but among the limited results, findings suggest that people often score little higher than chance when asked to identify deception (Levine, et al. 2014). A suggested reason for this is the lack of motivation to detect a lie as accepting a fabricated story is less stressful than forcing the communicator to adapt their version of events, or understand a truth that may be unpleasant (Vrij, Granhag, & Porter, 2010).

DePaulo et al. (2003) found that cues to deceptive behaviour in high stakes situations may be easier to detect due to the very nature of the motivation to succeed in the lie. Wright Whelan, Wagstaff and Wheatcroft (2014) found that deception may be more obvious to perceive than honesty, perhaps due to a higher number of cues, the fact that the cues are less subtle, making it less complicated to spot, and the violation of 'normal' behaviour in a social context. This may be linked to a lack of confidence in the lie, forcing the liar into an unnatural behaviour that is designed to simultaeously mask the deception and present a façade of honesty (Zuckerman, DePaulo & Rosenthal, 1981). Also, it has been suggested that there will be an increase in equivocal language (Wright Whelan, Wagstaff & Wheatcroft, 2014; Wright & Wheatcroft, 2017) and speech dysfluency (Davis, Markus, Walters, Vorus & Connors, 2005) present in high-stakes deception. Conversely, research has also shown that people intent on misleading are difficult to detect, with higher levels of accuracy recorded in observers of people communicating the truth rather than a lie (Feeley & DeTurck, 1995).

Observer's opinions of the subject may influence judgements more than the detail of the narrative they are relaying (Wright Whelan, Wagstaff & Wheatcroft, 2015) and it was suggested

that reputation of the speaker determines how he or she is judged in this context (Bond Jr & DePaulo, 2008). This could imply prior knowledge is required to yield high accuracy rates, wheras DePaulo and Morris (2004) claim that observers may rely on other cues to deception that only arise in high-stakes situations.

In research of 911 homicide calls, Adams and Jarvis (2009) identified 19 behaviours that articulated a distinction between innocence, and callers that were later proven to be involved in the crime, e.g. the accpetance of the death of the victim, a cry for help for the caller not the victim, and insulting the victim. These findings, lacking the visual modality, may carry implications for research in vocal cues and verbal cues. Much research has suggested that a variety of verbal cues are more systematically helpful as tools in detecting deception than nonverbal cues (Vrij, 2008).

The Criteria-Based Content Analysis (CBCA) is at the root of the Statement Validity Assessment (SVA) (Lee, Klaver and Hart, 2008), the method suggested for analysing veracity in verbal statements, positing that content and quality in true accounts will differ from false accounts (Ruby & Brigham, 1997). For example, credibility is raised in a subject when they spontaneously correct (Lee, Klaver & Hart, 2008) and Sporer (1997) analysed the content of statements made to police with accuracy levels defined as above chance. However, although findings suggested that participants instructed to concentrate on the communicators' verbal cues scored significantly higher than participants passively observing, this only occurred when observing truthful messages and stating their truthfulness, while there was no difference in accuracy levels when stating if a deceptive narrative was deceptive (DePaulo, Lassiter & Stone,1982). Nevertheless, Porter and Yuille (1995) posit that less accuracy in detection occurs when observers only consider the nonverbal cues, ignoring what the suspect says, and it has been recommended that in the context of police questioning, closer inspection of the words said and other verbal cues is implemented (Vrij, 2008) as well as further consideration for question

probes, as these elicited significant verbal cues to deception (Hartwig, et al., 2011). Furthermore, verbal cues were utilised more than nonverbal cues when participants scored well above average (Hartwig, Granhag, Stromwall & Anderson, 2004) and Lee, Klaver and Hart, (2008) found differences in verbal presentation between true and false accounts.

Research has suggested that visual cues to deception include smiling less and not averting their gaze as much as a truth-teller (Granhag and Strömwall, 2002). However, stereotypical beliefs about cues to deception such as gaze aversion and an increase in movement have mislead police interrogators who were also found to have over-estimated their own skills in deception detection (Bogaard, Meijer, Vrij, & Merckelbach, 2016; Elaad, 2009). Offering further insight into visual cues, Swerts, van Doorenmalen and Verhoofstad (2013) conducted research finding that visual cues to deception were more obvious when videos were slowed, enhancing definition.

Buller, Strzyzewski, and Hunsaker (1991) stated that research showed participants in deception studies sometimes relied on cues that were misleading; when observing conversations between a potential liar and interviewer, particpants relied on inaccurate vocal cues, while interviewers relied on facial cues that also proved to be incorrect. In the context of questioning suspects, police officers will usually pay more attention to the visual cues, the nonverbal behaviour of a suspect, than to the verbal cues in attempts to determine the veracity of a statement (Vrij, 2008).

It was posited by Millar and Millar, (1995) that restricting information has a significant effect on accuracy in detection deception: lies told by people familiar to the judge were detected more frequently when the visual medium was withheld. This may suggest that the audio medium gave cues to deception that were otherwise masked when the visual medium was present in senders acquainted with the judges. These findings may also suggest the audio medium holds more objective cues to deception when judge and sender are previously acquainted. It could therefore suggest that senders found it more difficult to restrict verbal leakage when acquainted with the

judge. Or, conversely, it could suggest that senders found it easier to distract judges via visual means, e.g. hand gestures, facial expression etc. when acquainted with the judge. These findings may suggest that the element of familiarity between sender and judge may have implications for the consistency of how an individual presents him, or herself, in each channel of communication. Millar and Millar, (1995) also found that accuracy in detecting the deceptions of strangers was higher when judges observed visual and verbal cues. This may suggest that when unfamiliar with the sender, judges require more stimuli to reach the correct conclusion. This has implications for much deception detection research, as it may be uncommon for sender and judge to be personally acquainted in a forensic setting.

Analysis of transcripts suggest that when attempting to deceive, people tend to use more words, particularly in sense-based words, e.g. see, touch and more pronouns relating to other people (Hancock, Curry, Goorha, & Woodworth, 2007). Smith, Hancock, Reynolds and Birnholtz (2014) posit that most people lie in text messages, while Van Swol and Braun (2014) found that detection of deception was easier in text messages. However, Qin, Burgoon, and Nunamaker (2004) stated that, across the board, text-based research in deception detection is minimal, with poor results.

In their recent research, Evanoff, Porter, and Black (2016) conducted tests on the effect of channels of communication on accuracy in detecting deception. Using 20 videos divided into 4 groups, Audiovisual, Visual Only, Audio Only and Transcript Only, (using a similar method to that described above) they tested 231 participants. They hypothesised that (1) accuracy would be higher in Transcript Only, and/or Audio Only, and (2) the least accuracy would occur in the Visual Only and Audiovisual channels of communication. These hypotheses were based on the assertions that the overload of information in multiple channels of communication creates difficulty in detecting deception (Rockwell & Singleton, 2007) and, also, that participants are possibly distracted by gestures, such as hand movements. They also hypothesised that (3)

honest speakers in the high-stakes context would elicit more smpathy in participants than deceptive speakers. A further hypothesis was that (4) emotional responses elicited from participants would occur more frequently in the Audiovisual channel group as it provided more stimuli for the participants.

An evaluation form was used to mark a dichotomous rating of honest or deceptive. Using a 7-point Likert scale, participants were given time to rate emotions elicited by the clips: happiness, sadness, fear, disgust, anger, surprise and sympathy. They found a total mean for overall accuracy of 52.5%, tests confirming this was significantly above chance. Findings confirmed that accuracy was higher when detecting honesty rather than deceit. The difference between the mean overall accuracy for truthful speakers (55.2%) and deceptive speakers (49.87%) was significant (Evanoff, Porter, and Black, 2016).

The channel of communication observed did not significantly effect overall accuracy. The relation between channel of communication and overall accuracy accounted for just 1.2% of the overall variance in deception detection accuracy (Evanoff, Porter, and Black, 2016).

Participants in theTranscript Only group scored higher for honest speakers than participants in all other groups; it was suggested that this was due to the exhibition of a truth-bias (Evanoff, Porter, and Black, 2016). The Transcript Only group also showed higher levels of sympathy for both honest and deceptive speakers which may suggest there was a distinct lack of emotional arousal experienced in the Transcript Only group. This may also have resulted in a truth bias (Hartwig, Granhag, Stromwall & Anderson, 2004; Bond Jr & DePaulo, 2006). However, participants in the Transcript Only condition scored significantly lower than the Audio Only group participants in detecting deceptive speakers. This finding might help towards determining a dichotomous classification of the discrepancies between truthful and deceitful cues.

There was no overall significance in the differences of emotional reactions to honest and deceptive speakers (Evanoff, Porter, and Black, 2016).

In general, all channels of comunication proved to be mediocre in their performance in lie detection. The relative success of the Transcript Only group in detecting honesty may have been only due to naïvety in their trusting of what they read, as opposed to the groups observing behaviour (Evanoff, Porter, and Black, 2016). Whilst this research investigated which emotions are elicited in the observer, thus raising the possibility of a correlattion between emotions elicited and decision reached, the findings seemed to highlight specifically the lack of emotion, and its possible consequences, aroused in the Transcript Only group. The lack of significant difference between channels of communication, and the overall mean of 52.5%, is very close to the meta-analytic findings of Bond Jr and DePaulo (2006).

Objectives & hypotheses

The present study investigated deception-detection accuracy in high-stake situations through four channels of communication: Audiovisual clips; Visual only clips; Audio only clips; and Transcript only accounts of people making public appeals for assistance with missing or murdered relatives. The focal interest was in participant's ability to judge deception using only these channels of communication. The argument of Blair, Levine and Shaw (2010) that use of external personal information to contextualise the stimulus is necessary was not relevant in the present study; participants were only exposed to stimulus for less than a minute, and experienced no baseline exposure to the sender; prior knowledge was not expected. Indeed, an option was available for participants to not answer, claiming prior knowledge of the case. The

added real-life stimulus of contextual information that may contradict a suspect's narrative, or information witheld from the suspect or indeed circumstantial evidence, albeit undoubtably useful, was not required for the present study. The focus in the present research was the general observable behaviours of senders. The research compared accuracy levels of participants presented with stimuli across four different channels of communication.

Presented to participants were clips of motivated senders in high-stakes contexts in 4 different ways. This is a condition believed to create wider discrepancy in truth and lie cues in the sender (Bond Jr & DePaulo, 2006). The meta-analysis by Bond Jr & DePaulo, (2006) stated that people were generally more successful at detecting audible rather than visible lies. It was therefore hypothesised that participants in the Audio Only group would score significantly higher than those in the Visual Only group.

Evanoff, Porter and Black (2016) suggested the possibility that participants in the Transcript Only group of their experiment may have exhibited a truth-bias due to the lack of emotion they could observe in that channel of communication, thus reducing their suspicions of the speakers. This may have made them more trusting, and possibly naïve, compared to those participants with access to more channels of communication. Media Richness Theory (MRT) (Daft & Lengel, 1986) posited that a higher number of channels of communication is more useful to an observer when attempting to analyse statements. With these two findings considered, it was therefore hypothesised that the Audiovisual group would score significantly higher than the Transcript Only group.

As posited by Salomon and Leigh, (1984) due to the limitation in channels of communication, participants in a Transcript Only group may achieve higher levels of focus on the task. It was therefore hypothesised that the Transcript Only group would score significantly higher than participants in the Visual Only group.

Further rationale for the present research was the limited number of salient findings in deception detection research using Transcript Only as stimuli. Due to the high-stakes nature of the stimuli materials it was hypothesised that all participants would score higher than chance.

Method

Participants

80 participants including Chester university students and respondents to a public advertisement on Facebook were recruited to complete the research. All research was conducted online without time limit. The participants took part voluntarily, and all participants were aged 18 and over. Participants were required to have normal or corrected hearing and vision as they may have been assigned to a Visual, Audio or Transcript only group. All data was anonymised, eliminating considerations of gender, ethnicity and location. Each group contained 20 participants.

Materials

Following the methodology devised by Wright Whelan, Wagstaff and Wheatcroft (2014) 20 video clips of individuals making public pleas on television for missing or murdered relatives were used as stimuli. Given the commonality of these types of public appeals when a person goes missing or is murdered, the stimuli would be of a recognisable nature to participants.

Sometimes, the person in the clip making the appeal is not making a genuine appeal for information that may lead to the capture of an abductor or murderer. Sometimes the appealer is attempting to manipulate the beliefs of others by concealing their knowledge of the crime; their appeal is a deliberate effort to deceive the public, as they themselves were the perpetrator of the crime or are linked in some way to the crime. In the present study, 20 clips were used; 10 of the clips were honest appeals, 10 were deceptive.

Stimuli for each group was specifically prepared so each group experienced a different channel of communication. The same 20 clips were experienced by each group, with modifications to the video clips. Group 1 was Audio Visual. Participants witnessed the video clips with full exposure to the audio track and visual images. Group 2 was Visual Only. The audio track was edited from the video clips. Participants experienced the clips with full exposure to the visual images, but did not experience the audio track. Group 3 was Audio Only. All visual images were edited from the video clips. Participants experienced the clips with full exposure to the audio track, but no visual images. Group 4 was transcript. Participants only experienced the transcript of what was said by the speaker. Visual images and audio tracks were not experienced. Thus, 4 channels of communication were created. Total N=80. For each channel of communication N=20.

All clips were real-life, and taken from news channels in the UK, The USA, Canada, Australia and New Zealand. The mean length of the video clips was 34 seconds. The mean number of words for the independent variable of Transcript was 85.

In each case, the sender's motivation to succeed in the deception was high. In all cases, the perpetrator of the crime has been sentenced. All material is open source.

Procedure

Psychology students at the University of Chester were able to sign up for participation in the research and would gain 3 credits for completing the exercise. Non-students acquainted with the investigator on facebook would have observed an advertisement for the research project on the public wall. Upon observing the Facebook advertisement, interested parties were instructed to send a private message to either member of the investigative team. The potential participant was then sent a link to one of the above modalities (audio visual; visual; audio; transcript). Link dissemination order was randomised. The link connected to the participant information page, where potential participants were informed that they would observe short clips of people appealing for help in locating missing relatives and would then state whether they thought each appealer was lying - involved in the disappearance - or telling the truth - not involved in the disappearance. Potential participants were then asked to declare that they had understood all aspects of the study and had decided to continue, or to leave the page and terminate the exercise. Clicking to continue with the exercise would then lead to the first clip in that channel of communication.

No extra contextual information was provided for participants, i.e. names of appealers or missing relative were sometimes on the screen in the audio visual and visual channels of communication, and were sometimes mentioned in the narrative, but were not supplied by the research investigators. No detail of who was missing, or the relation of the appealer, was supplied by the investigators. No ages were supplied by the investigators of the missing people or the appealers. The only information available was that which was contained within the clip. Ommiting contextual information restricted participants to using only the given stimuli and the knowledge that a person was missing. This prevented inference of how an individual may consider, for example, how a man should behave when his daughter goes missing.

Participants were instructed to check a box signalling if they were aware of the outcome of the case in question, and move on to the next question. For the independent variable of Audio-Visual, this box was checked 24 times in total. For the independent variable of Visual Only, this box was checked a total of 26 times. For the independent variable of Audio Only, this box was checked 14 times. For the independent variable of Transcript, this box was checked 8 times.

Design and Analysis

A one-way ANOVA with four levels was conducted with post-hoc tests for comparisons in the case of a significant difference in accuracy scores between groups. Each group was assigned a different channel of communication. The independent variable for the first group was Audio Visual, and the dependent variable was Accuracy. The independent variable for the second group was Visual Only, and the dependent variable was Accuracy. The independent variable for the third group was Audio Only, and the dependent variable was Accuracy. The independent variable for the fourth group was Transcript, and the dependent variable was Accuracy. It was a between-subjects design. To test whether participants scored higher than chance 1 Sample T-tests were conducted.

Ethical considerations

All participants were 18 years old or above. All materials used are open source, taken from news channels. Ethical approval for the study was granted by the ethics board at the University of Chester.

Results

80 participants were divided equally into 4 channels of communication groups: Audiovisual; Visual; Audio; Transcript. Accuracy scores were converted to percentages. A one-way between groups analysis of variance was conducted to explore the impact of channel of communication in accuracy levels in detecting deception. Means and Standard deviations are shown in the table below.

Table 1: Means and Standard deviations of accuracy scores in each condition as expressed in percentages

	Mean	Standard Deviation	N
Audio visual	50.8	19.8	20
Visual	56.5	17.2	20
Audio	52.5	20.7	20
Transcript	53.2	19.4	20

Using the Kolmogorov test for normality, the general accuracy score for 'audio visual' $D(20) = .0.130$, $p = .200$ did not differ significantly from normality; scores for 'visual', $D\ (20) = .147$, $p = .200$ did not differ significantly from normality; scores for 'audio', $D(20) = .142$, $p = .200$ did not differ significantly from normality; scores for 'transcript', $D(20) = .118$, $p = .200$ did not differ significantly from normality. A Levene test showed that there was no significant deviation from homogeneity of variance $F(3, 76) = .430$, $p = .732$. A one-way ANOVA test with four levels, Audiovisual (n=20), Visual (n=20), Audio (n=20), Transcript (n=20) showed that the means did

not differ significantly, $F(3, 76) = .30$, $p = .826$, $\eta^2 = .01$. No further analyses were conducted as ANOVA was not significant.

To test participants scored above chance levels, T-tests were conducted. All four groups failed to score significantly above chance. Audio Visual, $t(19) = .169$, $p = .867$. Visual Only, $t(19) = 1.685$, $p = .108$. Audio Only, $t(19) = .541$, $p = .595$. Transcript, $t(19) = .645$, $p = .527$. None of the hypotheses were supported.

Discussion

The present research was conducted to test that the hypotheses clarify that a significant difference in accuracy scores would be found between groups in detecting deception. Results did not offer support for any of the hypotheses. The mean scores for each channel of communication (Audiovisual, 50.8%; Visual Only, 56.5%; Audio Only, 52.5%; Transcript Only, 53.2%) were not significantly higher than chance.

The results suggest mediocrity in deception detection skills across all 4 channels of communication, although participants in each channel of communication scored above 50%.

The meta-analytic finding of Bond Jr and DePaulo (2006) suggested people are better at detecting audible rather than visual lies. This was support for the hypothesis that the Audio Only channel would score significantly higher than the Visual Only channel. The present study did not categorise accuracy into the dichotomous classification of accuracy in detecting lies, and accuracy in detecting truth. Nevertheless, the hypothesis was not supported by the results, with Visual Only scoring 56.5% and Audio Only scoring 52.5%.

Media Richness Theory (Daft & Lengel, 1986) claimed the higher the number of channels of communication experienced, the easier the task of analysis would be for an observer. The present finding of a 50.8% success rate in the Audiovisual channel of communication might appear to suggest otherwise. Indeed, this finding would appear to support the posit of Levine, et. al (2011) who claimed that visual information on top of audio may increase the strain of processing information, which may elicit erroneous decisions. This finding could also support the research of Dennis and Kinney (1998) and Rockwell and Singleton, (2007) who claimed that an individual may feel overwhelmed experiencing a higher richness of media, and lose information in the confusion between channels of communication.

The hypothesis that Audiovisual would score significantly higher than Transcript was influenced by the findings of Evanoff, Porter and Black (2016) who suggested that Transcript participants may have scored higher in detecting truth due only to a truth-bias, and not due to any other significant insight. The present findings, that Transcript Only with its sole channel of communication, achieving a higher rate of success than Audiovisual, the richest of communication channels, may offer some support for the theory that Transcript Only may assist concentration (Salomon & Leigh, 1984). However, the hypothesis that Transcript Only would score significantly higher than Visual Only was also not supported, with Visual Only scoring a higher mean than all other channels of communication, with a mean score of 56.5%, while Transcript Only scored a mean of 53.2%. The hypothesis was based on the findings of Salomon and Leigh, (1984) who posited the concentration levels of participants in a Transcript Only group would increase due to the lack of intererence of other channels of communication, thus gaining higher rates of success. It was the lean quantity of research into the Transcript Only channel of communicaiton that provided a further rationale for the present research. The mediocre result of 53.2% offers no significant findings above that which could have been gained at the toss of a coin.

The forementioned study by Evanoff, Porter and Black (2016) attempted to tease out implications for the emotion aroused in an observer and how that may influence their decision in a lie-detection study. In that study, implicit, indirect skills in lie-detection were defined as the emotion elicited by the clip that generated the decision on truthfulness (Evanoff, Porter & Black, 2016). These implicit cues were addressed as well as explicit cues. Their study focused on the degree of emotion aroused and whether it was positive or negative when observing/reading the accounts. The explicit overall accuracy was above the level of chance. It could possibly be argued that the chance level was passed due to a higher number of participants (*N*=231), whereas in the present study (*N*=80). The implicit results were non-significant, suggesting the emotion elicited was similar for both truthful and deceptive accounts. Overall, their findings suggested that the channel of communication had little effect on the accuracy scores, as was the case with the present study.

Furnham, Benson and Gunter (1987) and Furnham, Proctor and Gunter (1988) found that recall of information in advertisements was best through the Transcript Only channel of communication. Although these findings are not explicitly linked to deception detection, the recurrence of the Transcript Only channel as most likely to assist memory recall may suggest that insights into consistent objective cues to deception are possible via this medium.
The present study yielded the lowest mean score in the channel of Audiovisual (50.8%). This finding, and its lean level of accuracy, may support the finding of Burgoon, Blair, and Strom, (2008) who claimed that in the Audiovisual channel of their study, liars were perceived as more truthful than the honest speakers. These two studies may both offer support for Dennis and Kinney (1998) in their claim that the Audiovisual channel may offer an excess of information that an individual could struggle to process correctly.

Wider Past Research in Deception Detection with Significant Findings

The non-significant results in the present study raise the question of what needs to be learned from past research that can be used in future projects. The objective is to present an understanding of why certain experiments yield higher accuracy than others. The attempt of the present study, to highlight differences between channels of communication of the same case studies without providing context for the participants, did not gain accuracy scores above chance level.

It is important to consider previous studies that have yielded results above chance and to consider why this happened. Recent studies (Wright Whelan, Wagstaff, & Wheatcroft, 2015; Wright & Wheatcroft, 2017) have indeed garnered accuracy levels well above chance (up to 80%). In these studies, a population of police officers were tested against a student group, with the police officers not only scoring higher accuracy levels, but raising issues within the framework of what defines an objective cue to deception, e.g. the officers stated that a smile gave them a cue that the subject was lying; as this cue is not believed to carry much weight across meta-analytic findings (DePaulo, et al., 2003), it could suggest specific training or experience has enabled the police officers to tell the difference in small gestures and their myriad interpretations – it could also highlight an important issue in the maleability of what are considered objective cues, and this in turn surely demands further research. So, although it could be argued that this population should score higher than laymen as they can be considered experts working in the forensic field, accuracy in the profession has not always registered significantly higher scores than laymen across the literature (Bond & DePaulo, 2006; Carlucci, Compo, & Zimmerman, 2013; Hartwig, Granhag, Stromwall & Anderson, 2004). These results may reflect stronger focus on cues to deception in police training or, it may simply be that the

officers made decisions based on cues unknown to themselves (Hartwig, Granhag, Stromwall & Anderson, 2004).

Possible limitations of present study

Motivation to succeed in deception detection is raised in high-stakes real-life contexts, e.g. for police officers, judges, members of a jury. However, in a research project, the motivation for judges to succeed is based on a personal level of interest and may therfore be considered variable. In the present study, the clear dichotomy of participants, volunteering via an online advertisement to detect deception, and the real-life forensic setting of individuals pleading for a missing relative to be returned/information on the crime, motivation to succeed will always be in favour of the sender, which in the present study was always high. It is suggested that this variance in motivation may limit the research.

Whilst the position of Blair, Levine and Shaw (2010) in stating the importance of the situation, as well as characterisitcs or individual differences in deception detection seems plausible (see Epstein, 1979) the paradox in the present study must not be overlooked. Albeit a very real situation in terms of the threat of being caught in a lie, or fear at the prospect of losing a loved one, the fact each sender was being filmed for national television may create an element of performance. This may make the situation different to that of a police officer interviewing a suspect in an orthodox setting. Importantly, channels of communication may be altered in this context as speaking in public can cause anxiety, which may produce a voice tremor, gaze aversion, or shaking, for example. This modifies the channel of communication. This modification may be considered to comprimise the channel of communication as participants may not be experiencing the nuances of the speaker's natural behaviour. These cues (e.g.

voice tremor, shaking hands, nervous glances, gaze aversion) may be interpreted incorrectly by observers. This may mean that participants in the present study were at a mild disadvantage, with a layer or element of façade to see through. Although possibly a valid restriction to note, this predicament, however, may seem insurmountable in the context of research.

Suggestions for Possible Modifications to Research Model

A possible reason for the non-significant findings, and global poor accuracy levels within each channel of communication, may lie in the frequently adopted model of a non-defined participant population. The suggestion is that focus on individual populations (both within and without the forensic context) may assist greater learning in defining objective cues and the many layers therein. At the very least, it could help untangle research populations' levels of accuracy, thereby possibly further defining objective cues to deception in their specific channel of communication.

Examples of specific populations that found significant results far higher than that which could be achieved by the flip of a coin are, for example, prisoners that scored unusually high in detecting deception (Hartwig, Granhag, Stromwall & Anderson, 2004), with an accuracy matching that of FBI agents and clinical psychologists (Ekman, O' Sullivan, & Frank, 1999). Also, although exhibiting a lie-bias thought to be detrimental to determining truth from lies (Burgoon, Buller, Ebesu and Rockwell, 1994) it appeared that prisoners showed capability in also detecting truth tellers (Hartwig, Granhag, Stromwall & Anderson, 2004). Restricting channels of communication in such research may further highlight specific cues.

As the only discriminating factor in the present study was that participants had to be of 18 years and older and have normal or corrected hearing and vision, divisions of success rates are

impossible to determine. This generalised viewpoint of the research is in keeping with the findings that accuracy in lie-detection is low for laymen. It may be suggested that more insightful findings would result from research specifically designed to only test specific populations. For example, in the present study, participants were instructed it was necessary to have normal or corrected vision and hearing as links to each of the channels of communication, Audiovisual, Visual Only, Audio Only and Transcript Only were disseminated randomly. The objective was to assess participants' accuracy levels within and across channels of communication. It could be argued that this model aids categorisation of subjective cues. However, it could also be argued that this model only invites each participant to rely on already ingrained subjective cues to deception within the given channel of communication. Furthermore, it may ultimately encourage participants to guess if unsure. Although this possibly gives an accurate reading of how poor general subjective cues are in each channel of communication, it only furthers research by supporting many previous non-significant findings. Whilst it is hoped that this support is a valid addition to the research in its replication, it is argued that the skills adopted by participant police officers in Wright and Wheatcroft's, (2017) experiment could be further defined and concreted if the individual cues were untangled further. With the accuracy rates of these studies of police officers considered, it is suggested that research could benefit if police officers that score above chance when observing complete Audiovisual clips are assigned a specific channel of communication. Results from these tests may offer clues as to the specificity of cues utilised, and in which channel of communication they exist.

A further possible inversion of this restriction on participant requirements, which may assist research in verbal and nonverbal cues, may be in the recruitment of only blind and deaf participants to observe the opposite channel of communication, i.e. blind participants only partake in audio clips, and deaf participants only partake in visual clips. Research into the possiblity that cross modal plasticity enables individuals blind or deaf in infancy to have sharper

hearing or vision than individuals not suffering sensory deprivation has mixed but inconclusive results (Gougoux, Lepore, Lassonde, Voss, Zatorre, & Belin, 2004; Lessard, Pare, Lepore, & Lassonde, 1998; Merabet, & Pascual-Leone, 2010; Niemeyer & Starlinger, 1981; Rettenbach, Diller, & Sireteanu, 1999). It is tentatively suggested that investigations into this area could benefit deception study research and help to define specific verbal and nonverbal cues in the stated channels of communication. This is because the cues relied on by blind and deaf individuals may be more consistent due to necessity, in keeping with the statement of Frith & Frith (2006) that social demands require individuals to monitor an interactant's veracity.

In keeping with the position of Blair, Levine and Shaw, (2010) the present study offered context in that stimuli contained a relative of a missing person as the sender of the narrative. This may be considered a similar context to that experienced by police in their professional life, thus raising the ecological validity of the present study and similar others. One of the reasons for the non -significant findings in the present study could be the length of exposure to the stimuli (the mean length of the video clips was 34 seconds and the mean number of words for the Transcript was 85). It could be argued that if each clip were longer, participants would have more stimuli to dissect.

Another possible modification to the research model is to use numerous clips of the same individual, supplying as much information for the participants as was given to the general public when the case was live. This could include excerpts taken from accounts at different stages of a criminal investigation. For example, segments taken from interviews at the earliest stage of the investigation, followed by, for example, televised public pleas for help with the investigation. Furthermore, detail of the case (as far as it was known before the case was solved) could be provided to participants to the extent of public awareness at the time, thus creating ecological validity of the study. This detail may offer a more rounded stimulus that encourages a more determined, exact opinion of participants, reducing guess levels.

A final suggestion is that future research may benefit from a similar design to the above mentioned modified model, but using only transcripts of verbal accounts or video clips. Research into only transcript investigation is limited; any significant results could be investigated further for consistency in cues used by participants in this channel of communication.

Conclusions

The present study was conducted to test the hypotheses that a significant difference in accuracy scores would be found between channels of communication in detecting deception. Results were non- significant. The accuracy scores between channels of communication were not significantly above chance.

The mean averages (Audiovisual, 50.8%; Visual Only, 56.5%; Audio Only, 52.5%; Transcript Only, 53.2%) may appear to be in keeping with the 54% accuracy in the meta-analytic findings of Bond Jr and DePaulo (2006). Evanoff, Porter and Black (2016) did not find significant differences between channels of communication, although significance was detected in participants' accuracy surpassing chance levels. It was suggested that this may be in part due to a larger population group (*N*=231). It was suggested that a higher number of participants than was recruited for the present study (*N*=80) may garner significant scores above the level of chance.

Population-specific groups for each channel of communication may also be beneficial for future research in determining which cues are consistently relied on for accuracy, and in which channel. Wright Whelan, Wagstaff, and Wheatcroft (2015) and Wright and Wheatcroft (2017) reported up to 80% accuracy in detecting ddeception in police officer populations. Specific

allocation to channels of communication with a police population may offer insight into which cues are consistent, and in which channel.

As the present research required normal or corrected hearing and vision, it was also suggested that blind participants in an Audio Only group may offer insight into which audio cues are consistent, and in which channel of communication. The same suggestion was made for deaf participants in a Visual Only group, with the objective of determining whether certain visual cues are consistent in detecting deception.

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Appendices

SPSS output

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	modality	Statistic	df	Sig.	Statistic	df	Sig.
accuracy score percentage	audio visual	.130	20	.200*	.975	20	.847
	visual	.147	20	.200*	.952	20	.391
	audio	.142	20	.200*	.956	20	.467
	transcript	.118	20	.200*	.976	20	.868

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptives

accuracy score percentage

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
audio visual	20	50.7500	19.81991	4.43187	41.4740	60.0260	10.00	95.00
visual	20	56.5000	17.25200	3.85766	48.4258	64.5742	30.00	90.00
audio	20	52.5000	20.67925	4.62402	42.8218	62.1782	20.00	90.00
transcript	20	53.0000	20.79980	4.65098	43.2654	62.7346	15.00	95.00
Total	80	53.1875	19.42600	2.17189	48.8645	57.5105	10.00	95.00

Test of Homogeneity of Variances

accuracy score percentage

Levene Statistic	df1	df2	Sig.
.430	3	76	.732

ANOVA

accuracy score percentage

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	348.438	3	116.146	.300	.826
Within Groups	29463.750	76	387.681		
Total	29812.188	79			

Multiple Comparisons

Dependent Variable: accuracy score percentage

Tukey HSD

(I) modality	(J) modality	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
audio visual	visual	-5.75000	6.22640	.792	-22.1055	10.6055
	audio	-1.75000	6.22640	.992	-18.1055	14.6055
	transcript	-2.25000	6.22640	.984	-18.6055	14.1055
visual	audio visual	5.75000	6.22640	.792	-10.6055	22.1055
	audio	4.00000	6.22640	.918	-12.3555	20.3555
	transcript	3.50000	6.22640	.943	-12.8555	19.8555
audio	audio visual	1.75000	6.22640	.992	-14.6055	18.1055
	visual	-4.00000	6.22640	.918	-20.3555	12.3555
	transcript	-.50000	6.22640	1.000	-16.8555	15.8555
transcript	audio visual	2.25000	6.22640	.984	-14.1055	18.6055
	visual	-3.50000	6.22640	.943	-19.8555	12.8555
	audio	.50000	6.22640	1.000	-15.8555	16.8555

T Tests Data set 1

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
accuracyscore	20	50.7500	19.81991	4.43187

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
accuracyscore	.169	19	.867	.75000	-8.5260	10.0260

Data set 2

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
accscore	20	56.5000	17.25200	3.85766

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
accscore	1.685	19	.108	6.50000	-1.5742	14.5742

Data set 3

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
accuracyscore	20	52.5000	20.67925	4.62402

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
accuracyscore	.541	19	.595	2.50000	-7.1782	12.1782

Data set 4

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
accscore	20	53.0000	20.79980	4.65098

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
accscore	.645	19	.527	3.00000	-6.7346	12.7346

Ethics