

Truth and Deception in Informants' Accounts of Criminal Admissions

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Abstract

Informants who report admissions to crime can be powerful and dangerous players in the criminal justice system. Some informants, such as jailhouse informants, are considered deceitful, in part because they can receive incentives to report criminal admissions. However, little research has examined the nature of information that informants provide. In particular, no recent published research has examined whether there are valid behavioural cues that distinguish deceptive from truthful informants. In addition, no published study to date has explored whether informants' reports and demeanours are affected by the incentives that they receive. Participants in this study either did or did not hear a criminal admission and then were interviewed one week later about details of the admission they had allegedly heard. Some participants were offered an incentive to report the criminal admission in a way that appeared accurate and forthcoming. The results of this study suggest that there may be behavioural cues emitted during the reporting of criminal admissions that distinguish truthful from deceptive informants. However, the direction of differences for some cues may deviate from other types of witnesses to crime. In addition, the findings of this study indicate that being offered an incentive may induce informants to emit cues during the reporting of criminal admissions that make them appear more truthful, regardless of whether or not they are actually telling the truth. The findings of this study raise concerns about whether informants' honesty should be assessed in the same way as other witnesses, and about potentially negative consequences of offering incentives to informants in exchange for their reports of criminal admissions.

Keywords: informants; snitches; criminal admissions; deception; incentives

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Chapter 1.

Introduction

The ability to detect deception accurately is a coveted skill among laypersons and legal professionals alike. Routinely, both groups encounter situations in which they must distinguish between truthful and deceitful statements (DePaulo et al., 2003). However, serious consequences tend to arise when legal professionals, such as police investigators or judges, fail to detect lies (Frank & Feeley, 2003). Among those who suffer such consequences are innocent people who are wrongly convicted of crime due to false claims of their guilt. Numerous empirical studies have been conducted to improve efforts at lie detection (see DePaulo et al., 2003; Hartwig & Bond, 2011), most of which have focused on detecting deception in suspects' confessions to crime (e.g., Kassin & Gudjonsson, 2004) or denials of involvement in crime (e.g., Strömwall, Granhag, & Jonsson, 2003). However, relatively little research attention has been paid to the veracity of crime reports made by those other than suspected and actual perpetrators.

One such group is informants - those who report admissions to crimes made to them by others (Neuschatz et al., 2012)¹. The paucity of research on the accounts of informants is notable in light of the notoriety of a particular type of informant: the jailhouse informant. A jailhouse informant is one who claims to have heard statements about crime made by an alleged perpetrator while both are held in custody (Federal/Provincial/Territorial Heads of Prosecutions Committee Working Group, 2009). Such informants have been described as "the most deceitful and deceptive group of witnesses known to frequent the courts" (Cory, 2001, pg. 1). Indeed, their testimony is one of six leading causes of wrongful convictions (Garrett, 2011). If behavioural cues that distinguish truthful from deceptive informants as they recount criminal admissions could be identified in research, such cues could assist legal professionals in identifying dishonest reports, which could lead to a decrease in the prevalence of wrongful convictions due to false informant reports.

¹ Though the term informant can be used to mean anyone who provides information to court, for the purpose of this project, "informant" is intended to mean one who reports verbal admissions to crime made to them by a perpetrator.

Though much research has been conducted on lie detection generally, the corresponding results may not apply to informants who report criminal admissions specifically. In particular, the manner in which criminal admissions are recalled may differ from how details of crimes which are experienced firsthand are recalled. This difference in retrieval processes could affect the behavioural cues exhibited during reports of criminal admissions, which may in turn complicate legal professionals' efforts to detect lies about criminal admissions relative to other lies about criminal activity (such as the denial of a crime by a perpetrator). Thus, the purpose of the current study was to observe the mannerisms of informants as they recounted a criminal admission to identify any verbal, paraverbal, and non-verbal cues that are diagnostic of honesty or deception.

1.1. A History of Informants: From Ancient Greece to Present Day

The use of reports by third parties to assist in the apprehension and conviction of perpetrators of crime dates back to Ancient Greece. In the 4th century BCE, informants were called upon by the Athenian government to thwart plots to overthrow it. In order to escape capital punishment, treasonists who were captured could receive a lesser sentence of banishment if they reported the confessed plots of their accomplices (Neuschatz et al., 2012). Informing on others occurred during biblical times as well, as evidenced by references in the Bible to Judas Iscariot's betrayal of Jesus for thirty pieces of silver (Redden, 2001). During the same period, Sun Tzu espoused the virtues of informants in *The Art of War*, stating that "knowledge of the enemy's dispositions can only be obtained from other men" (as cited in Madinger, 2000, p. iii).

Informants also contributed to the foundations of many modern legal systems. For instance, informants' reports were critical to the functioning of the grand jury, created in English common law around 1166 AD (Madinger, 2000). The first grand juries were comprised of freemen, called upon by the government to meet in their respective neighbourhoods and discuss crimes they heard had occurred. If sufficient evidence of wrongdoing was presented at the meeting, those suspected of the crimes would be indicted. Failing to report admissions to crime and thus, failing to take on the role of an informant, was a punishable criminal offence (*Statute of Winchester*, 1285; as cited in Adams & Stephens, 1901).

After the dark ages, trepidations about informing on crimes likely stemmed not from the repercussions of failing to inform, but rather the consequences of being falsely informed upon by others. For example, informant reports that led to convictions during the Salem Witch trials were motivated not from seeing or overhearing confessions to acts of witchcraft but by boredom and jealousy (Redden, 2001). In 18th Century England, Parliament offered rewards called “blood money” to those who reported criminal admissions made by others to authorities. However, though such acts could be noble, routine collectors of blood money were feared and reviled (Centre on Wrongful Convictions, 2005). Soon after, informant networks were used by investigators to combat crime during the Industrial Age, laying groundwork for the first detective and private investigator bureaus in Europe and North America (Madinger, 2000; Redden, 2001). Unfortunately, head investigators would often plot crimes themselves, only later to “catch” those hired to commit the deeds (Madinger, 2000).

Since the 20th Century, informants have made critical contributions to both private and public sector organizations. Allan Pinkerton, founder of the US Secret Service, planted informants in early labour organizations in order to detect their leaders and convict them on trumped up charges intended to quash attempts at worker mobilization (Redden, 2001). Today, companies like Safe2Tip (www.safe2tip.org) offer services to businesses whereby they establish anonymous tip lines for customers, employees, students, and bystanders to reveal criminal plots and practices at work. In the public sector, individual citizens are called upon often to report the crimes of others. For instance, ordinary citizens were critical to the success of “slacker raids”, campaigns to identify draft dodgers during war times; children who complete the DARE program are asked to report substance use confessed to by family and friends; and countries across the world participate in Crime Stoppers International programs, one of which manages tip lines that permit citizens to report anonymously any crimes they have heard occurred (Redden, 2001).

Today, informants are used most commonly by law enforcement agencies as sources of evidence to detect, apprehend, and convict criminal offenders. Specifically, accomplices, undercover informants, and jailhouse informants report on crimes or confessions they have witnessed to the police, Federal Bureau of Investigation, Central Intelligence Agency, and Secret Service in the US (Madinger, 2000), as well as the Royal Canadian Mounted Police and the Canadian Security Intelligence Service

(Hamilton, 2011). Often, these informants testify in court, and in that capacity fulfill a unique role in the criminal justice system. Though it seems similar to hearsay evidence, which is ordinarily inadmissible in court, a secondary report of a criminal admission can be admissible for two reasons. First, a report of a criminal admission made by another person is an exception to traditional hearsay rules (Rose, 2001). Moreover, such testimony tends to meet the threshold for reliability and necessity when using the principled approach to admission of hearsay evidence now employed by Canadian courts (see *R v. Khelawon*, 2006). Second, a statement made against one's own personal interest is deemed truthful as a result in court (Brockman & Rose, 2006). The assumption that other people only make negative statements about themselves if they are true results from a cognitive bias termed the fundamental attribution error, whereby others' actions are judged to be due to their internal characteristics rather than external circumstances (Kassin, 2008). Though most research on this bias has been conducted on evaluations of personal statements, recent studies indicate that we make the same error when evaluating informant reports as well; that is, when informants claim to have heard an admission to crime made by another person, if accepted by triers-of-fact, it is considered to reflect the truth (Neuschatz et al., 2012; Wetmore, Neuschatz, & Gronlund, 2013).

All in all, informants have played and will play a critical role in various settings to assist in the detection of the misdeeds of others. Unfortunately, in fulfilling that role, problems exist in the criminal justice system that lead to serious consequences for those affected by unreliable or deceptive informant reports.

1.2. Issues Surrounding the Use of Informants

Wrongful conviction cases exemplify some of the dangers posed by unreliable informants. A review of the first 250 Americans exonerated by DNA evidence for crimes they did not commit reveals that informant testimony is the fourth leading cause of wrongful convictions (after faulty eyewitness testimony, inaccurate forensic science evidence, and false confessions), present in over 15% of criminal proceedings for exonerees (Garrett, 2011)². Further, a review by the Centre on Wrongful Convictions

² Eyewitnesses are cited as the leading cause of wrongful convictions. Yet Duke et al. (2007) argue that because it is relatively rare to hear eyewitness evidence in court compared to

(2005) found that when the analysis is restricted to capital punishment cases, informant testimony becomes the leading cause of wrongful convictions (Warden, 2004). Though a similar published review of Canadian wrongful convictions is not available to date, informant testimony was presented at the trials of James Driskell, Randy Druken, Peter Frumusa, David Milgaard, Guy Paul Morin, and Thomas Sophonow, culminating in 65 years of their wrongful imprisonment. What is apparent from the above is that informants can report false information, with potentially harmful consequences for the wrongfully accused.

Yet despite these negative outcomes, support for the use of informants is maintained in part due to public interest in criminal detection and prosecution (US Senate, 1976). Further, the value and efficacy of using informants to thwart illegal actions is expressed in numerous court decisions in the US and Canada (e.g., *United States v. Bernal-Obeso*, 1993; *R. v. Stinchcombe*, 1991). As such, legal professionals find themselves in a quandary when deciding if informant reports are reliable enough to inform legal proceedings. All in all, despite a recommendation that one type of informant (i.e., the jailhouse informant) be excluded outright from testifying in court (Cory, 2001), the perceived benefits of using informants' reports appear to outweigh the disadvantages such that legal authorities will continue to use informants and the statements they provide to aid in investigations and prosecutions of criminal offenders.

To combat against faulty testimony of informants, there are legal safeguards in place. Some of these safeguards apply to witness testimony generally. For example, there are legal provisions in Canada (*R v. Abbey*, 1982) and the US (Sixth Amendment, US Constitution; Swanner, Beike, & Cole, 2010) that allow for cross-examination, a procedure used to test the validity of trial evidence (Langbein, 2003). But cross-examination is not a foolproof approach to assessing honesty, as deceptive testimony still affects trial outcomes. Other safeguards apply to informant testimony specifically. For instance, when informants testify in Canadian courts, jurors can receive a *Vetrovec* warning, whereby jurors are cautioned about accepting evidence from unsavoury witnesses (*Vetrovec v. The Queen*, 1982). However, the issuing of a *Vetrovec* warning is up to the discretion of the judge, and even when they do receive it, jurors do not always follow judges' directives, as research indicates that they often misunderstand

recollections of past (presented in nearly every court case), informing about out of court statements has greater potential to result in wrongful convictions.

judicial instructions (Ogloff & Rose, 2005) or disregard them altogether (Stebly, Hosch, Culhane, & McWethy, 2006).

Procedural recommendations have also been made to protect against false informant reports (Swanner et al., 2010). First, pre-trial hearings should be held to detect discrepancies in informants' reports and reveal incentives offered in exchange for testimony (Gershman, 2002). Prosecutors are compelled to divulge information which calls into question the veracity of evidence presented (e.g., *Brady v. Maryland*, 1963; *R. v. Stinchcombe*, 1991). The problem is that incentives are not always revealed at pre-trial hearings, either because they are concealed (Garrett, 2011) or made after informants testify (Neuschatz, Lawson, Swanner, Meissner, & Neuschatz, 2008). Yet research has found that knowing an informant's testimony is incentivized does not, on average, affect the verdicts that mock jurors reach (Neuschatz et al., 2008). Furthermore, prosecutors can take actions that achieve the same outcome as granting incentives (such as dropping criminal charges against informants) that they are not obligated to report at pre-trial hearings. For example, an informant who testified in *R v. Ostrowski* (1989) was acquitted at his own trial when no evidence was entered against him (McKeown & Karp, 2010). Clearly, pre-trial hearings will be ineffective in signalling dishonesty if triers-of-fact cannot access information that discredits informants' testimony.

Second, courts in the United States are encouraged to permit qualified experts to testify about interview tactics that can elicit unreliable reports from witnesses (Gershman, 2002). However, no empirical research has yet observed how interviewing affects informants specifically. Even if such experts were permitted in court, at least one study has found that expert testimony on perceived honesty of informants did not affect verdicts rendered by triers-of-fact (Neuschatz & Wilkinson, 2009). Furthermore, in Canada, case law dictates that experts are not permitted to speak directly to whether witnesses at trial are honest or not because such an assessment is within the ken of the trier-of-fact (*R. v. D.D.*, 2000). Thus, expert testimony about informants may be ineffective at informing judges and juries of how and when informants are deceptive.

Third, the most common recommendation (made for all interviews and interrogations) is the mandatory electronic recording of interviews with informants (Cory, 2001; Gershman, 2002; MacCallum, 2008). Moreover, it has been proposed that

disincentives for lying should be established during interviews to deter the submission of false informant reports (Neuschatz et al., 2012), and also that permission for informants to testify should only be granted if informants are deemed credible by those who manage them (Cory, 2001). The success of these suggestions depends on how skillfully that informants' honesty can be determined. Yet the universality of that skill is suspect for two reasons. First, many legal professionals do not receive training in lie detection (Frank & Feeley, 2003). As a result, their lie detection accuracy often barely exceeds chance levels (Bond & DePaulo, 2006), when, as will be discussed in a forthcoming section, training does yield improvements in lie detection accuracy. Second, accuracy of detecting lies specifically in informants' reports is unknown as it has yet to be evaluated in published research.

Of course, the quandary faced by legal professionals and triers-of-fact when considering whether to accept potentially deceptive reports of informants would not exist if informants were so unreliable in recollecting admissions to crime as to bar them from testifying in court. One study (Boydell & Read, 2011) has explored how accurately admissions to crime can be recalled; participants viewed a video of a criminal admission and then freely recalled as many of its details as they could after a delay. On average, recall accuracy of central, more legally-pertinent details was higher than that of peripheral details from the admission. These findings suggest that when being truthful, the average informant can recall details from an admission with fair accuracy. Thus, informant testimony cannot be deemed inadmissible based on faulty recollective abilities.

Of course, not all informants are honest in their reports; in fact, laboratory research suggests that informants may provide false reports of criminal admissions willingly. In an adaptation of Kassin and Kiechel's (1996) computer crash paradigm, Swanner et al. (2010) examined whether both true and false reports about another person's admission to causing a computer crash could be elicited in a laboratory setting. Upon arriving at the study, each participant was assigned to the role of a "reader", who read information aloud for a second participant, the "typist" (a confederate), to enter into a computer. The experimenter warned the typist against pressing the TAB key, which would cause the computer to crash and all session data to be lost. Secretly, the computer was programmed to crash shortly after the task began. Afterwards, the typist remarked aloud that the TAB key either had or had not been struck.

Next, after taking the reader into a separate room, the experimenter posed a series of questions to the reader designed to elicit a report that the typist had admitted to crashing the computer. Those who reported an admission were handed a pad of paper and told to write, "The other participant admitted to me that she/he hit the TAB key and caused the computer to crash" and sign their name. One-half of participants were offered an incentive - exemption from a rescheduled session - if they reported the typist's admission. Compared to those not given an incentive, a higher rate of false but not true reports that the typist admitted to hitting the TAB key was provided by those offered an incentive³. Not only did they lie of their own accord, but participants were more likely to make a false report if they were promised an incentive compared to if they were not.

Obviously, the consequences of falsely reporting an admitted misdeed that occurred in a laboratory are less severe than what would follow from falsely reporting an admission to a real crime. Furthermore, the incentive of avoiding a rescheduled research session would not motivate a false report as effectively as escaping a criminal conviction or correctional incarceration. Yet a number of anecdotal cases exist in which informants provide false reports of criminal admissions in exchange for incentives (c.f. Centre for Wrongful Convictions, 2005). Of further concern, the findings of Swanner et al. (2010) run contrary to the expectation that offering an incentive for reporting a misdeed will motivate mostly truthful witnesses to come forward, because incentives motivated only deceptive participants to report the typist's admission. Unfortunately, jurors may not take offers of incentives into account in their decision making, such as leniency in sentencing for crimes committed by informants. For example, Neuschatz et al. (2008) conducted a study in which mock jurors read a trial transcript wherein an informant testified. The proportion of Not Guilty verdicts reached by mock jurors who were told that an offer of leniency in sentencing was made to the informant did not differ significantly from that of participants who were not informed about the incentive. Though this is the finding of only one study, it suggests that triers-of-fact may disregard information which signals dishonest evidence in criminal cases. This failure to attend to information that can signal deceit in informants indicates that guidance is needed in the assessment of honesty of informants.

³ This finding may be due partly to the fact that true reports of admissions to wrongdoing were quite high overall (87%-90%) and may have been at ceiling for responding.

All in all, despite legal safeguards and procedures intended to prevent its entry into court, admission of faulty informant testimony occurs and exerts adverse effects on criminal justice outcomes. Further, these reports appear to be motivated largely by extrinsic gain on the part of the informants, something that may not be taken into account by triers-of-fact as signalling dishonesty, even when such information is highlighted by an expert witness. Clearly, research that examines the honesty of informants more directly could yield useful and salient information to assist decision-makers who assess the veracity of reports of criminal admissions.

1.3. Purported Versus Valid Cues Used to Detect Deception

Many researchers have searched for ways to distinguish between honest and deceptive individuals accurately. The ability to achieve this involves a multiple step process that can be illustrated by Brunswick's (1956) lens model (as described by Hartwig & Bond, 2011). According to the model, the phenomenon of lying must be studied in two main ways to develop sound methods to increase detection accuracy. First, it must be established that there are in fact behavioural indicators that distinguish the behaviours of honest from dishonest communicators (referred to as "cue validity"). If not, there would be no sense in trying to distinguish liars and truth-tellers based on their behaviours. Second, the assessor must attend to the diagnostic behavioural cues *and* be able to perceive differences in those cues between liars and truth-tellers (referred to as "cue utilization"). Simple awareness of diagnostic truth and deception cues will not ensure success at detection if the assessor cannot properly perceive differences in those cues.

Deception detection research tends to explore either cue validity or cue utilization. In the former type of research, the behaviours of liars and truth-tellers as they describe an event are examined and compared to one another. This research is driven by numerous theories which explain why liars may differ from truth-tellers in the verbal contents of speech and/or the nonverbal behaviours they exhibit while describing those events. For example, the theory of Reality Monitoring (RM) suggests that those who have engaged in a real event report different details within the contents of their speech than those who report an imagined event (that never occurred) because the source of each "memory" is comprised of different qualities (e.g., Steller, 1989; Vrij, Akehurst, Soukara, & Bull, 2004). In this theory, accounts of real events are assumed to be

analogous to truthful accounts, whereas reports of imagined events are thought to parallel deceptive reports. It is assumed that the number and quality of details recalled about real events differ from that of imagined events. Specifically, truthful or real memories are usually sharp, clear, and vivid, containing more sensory, spatial, and temporal details than imagined events. Conversely, accounts of false or imagined events are usually less precise and concrete than real events, containing fewer details in less depth.

Other theories have been advanced to explain why lying induces changes in non-verbal behaviours (Vrij, 2004; Sporer & Petermann, 2011). One early theory of deception detection is based on the premise that liars and truth-tellers experience different kinds of emotions when recounting events they have allegedly experienced. Suspects who lie about crimes they have committed may feel guilty or fear punishment if their culpability is revealed (Ekman, 2009). Some liars derive enjoyment from deceiving others, which is common in suspects with psychopathic personalities (Lilienfeld & Fowler, 2007), an occurrence referred to “duping delight” (Ekman, 2009). It is argued that under conditions of stress, emotions leak through efforts to suppress them (Ekman, 1992). Frank and Ekman (1997) argue that emotions are betrayed mainly through nonverbal means because verbal cues are controlled more easily in comparison. Findings of research studies lend some credence to the idea that emotional reactions do betray liars in some cases. For instance, there is a positive correlation between the amount of attention paid by investigators to suspects’ displays of emotion and their accuracy in detecting lies (Ekman & O’Sullivan, 1991). Further, deception detection is more accurate when an emotional response is exhibited by the deceiver than when no emotion is shown (Warren, Schertler, & Bull, 2009). However, theories based on emotional suppression have fallen out of favour in recent years, as research has revealed that emotional reactions may not distinguish liars from truth-tellers as reliably as once thought, thus any differences in non-verbal cues exhibited by liars versus truth-tellers may be better supported by other theories (Hartwig, 2012).

Another theory of lie detection posits that the act of telling a lie is presumed to be more cognitively complex than telling the truth (Vrij, Fisher, Mann, & Leal, 2006; Vrij & Mann, 2004; Vrij, Mann, Fisher, Leal, Milne, & Bull, 2008; Walczyk, Schwartz, Clifton, Adams, Wei, & Zha, 2005; Zuckerman, DePaulo, & Rosenthal, 1981). Numerous studies indicate that deception is positively associated with cognitive load. For instance,

neuroimaging studies have found that lying results in greater overall brain activity compared to truth telling, suggesting that lying requires more cognitive resources (Spence et al., 2004). Furthermore, tasks that boost cognitive load tend to magnify behavioural differences between liars and truth-tellers (Vrij et al., 2008), and cognitive load increases as liars' motivation to be believed by the listener increases (Vrij et al., 2008). In fact, many empirically supported cues to deception are also signs of cognitive load (Mann, Vrij, & Bull, 2002; Vrij & Mann, 2003). Possible reasons why cognitive load is elevated during acts of deception compared to truth-telling include: liars require greater cognitive resources; liars are less likely to take their self-presentation for granted; liars are more concerned with how convincing they are; liars focus on the act of role playing; liars find suppressing the truth to be cognitively demanding; and liars find formulating a lie is less automatic than reporting the truth (Leal, Vrij, Fisher, & van Hooff, 2008; Vrij, Granhag, & Porter, 2010).

Finally, some theorists argue that when describing an event, liars exert more control over their behaviour than truth-tellers do. In doing so, liars engage in impression management to convince listeners of their honesty (Buller & Burgoon, 1996; Hocking & Leathers, 1980). In particular, liars try to act in ways that are contrary to stereotypical beliefs about deceptive behaviour in order to appear honest (Vrij & Mann, 2004). However, when given ample time to prepare their stories, liars may adopt overly-controlled demeanours, making their presentation appear rehearsed and suspicious (DePaulo & Kirkendol, 1989). All in all, when situations arise in which emotionality, cognitive load, and attempted control are elevated, the task of distinguishing liars from truth-tellers should be facilitated by the presence of behaviours signalling their honesty (Vrij et al., 2010).

Though the above theories convey reasons why liars may act differently than truth tellers, the expression of these cues across individuals is less straightforward. That is, despite numerous attempts to identify cues to deception, no single cue has been detected, akin to Pinocchio's nose growing, that all liars exhibit in all situations (Frank & Feeley, 2003; Vrij, 2004). Indeed, there is substantial variability in the cues exhibited between individuals, and any differences detected in the frequencies of cues present in the behaviours of liars and truth-tellers, while statistically significant, are small (DePaulo et al., 2003). Indeed, it is generally agreed that differences in cues emitted by liars and truth-tellers tend to be faint and unreliable (DePaulo et al., 2003). Despite these issues,

some valid cues have been discovered that, on average, do distinguish deceptive from honest individuals. Each cue can be assigned to the category of a verbal (or content), a paraverbal, or a nonverbal cue (Hart, Fillmore, & Griffith, 2010; Sporer & Schwandt, 2006). Verbal cues to deception are found in the contents of speech, while paraverbal cues are vocal cues that accompany verbal speech but do not pertain to content (such as voice pitch or silent pauses). Conversely, nonverbal cues are physical movements made by the person being assessed that can be observed visually. While there can be some overlap between these cue categories, typically nonverbal cues are measured while observing the persons of interest, while verbal and paraverbal cues are examined in written statements, interview transcripts, or tape recordings of the accounts of those individuals.

The number of valid cues to deception identified in empirical research differs between cue categories. First, research examining verbal cues to deception – including both meta-analyses and individual experiments – has found consistent and statistically significant effects whereby liars, when speaking, tend to: use fewer first person pronouns (Newman, Pennebaker, Berry, & Richards, 2003); use fewer exclusive words (e.g., “except”; Newman et al., 2003); reveal details of poorer quality and quantity directly after an event (DePaulo et al., 2003; Granhag et al., 2003; Vrij, 2004; Vrij, Akehurst, Soukara, & Bull, 2004; Vrij, Edward, Roberts, & Bull, 2000; Vrij, Leal, Granhag, Mann, Fisher, Hillman, & Sperry, 2009; Vrij et al., 2008); include fewer spontaneous corrections (Vrij et al., 2004; Vrij et al., 2000); include less contextual embedding (Vrij et al., 2004; Vrij et al., 2000); are more consistent in statements made over time (Strömwall & Granhag, 2003a); include fewer reproductions of conversations (Vrij et al., 2004; Vrij et al., 2000); use more cognitive operations in their speech (Vrij et al., 2008); produce less plausible accounts of events (DePaulo et al., 2003); produce accounts that are less logical (DePaulo et al., 2003); be more likely to include discrepant or ambivalent content (DePaulo et al., 2003); appear less expressive (DePaulo et al., 2003, Vrij, 2000); appear more passive (DePaulo et al., 2003, Vrij, 2000); seem less confident (DePaulo et al., 2003, Vrij, 2000); be less involved in conversation (DePaulo et al., 2003, Vrij, 2000); appear more tense (DePaulo et al., 2003, Vrij, 2000); be less cooperative (DePaulo et al., 2003, Vrij, 2000), and appear less pleasant (DePaulo et al., 2003, Vrij, 2000) compared to truth-tellers.

Fewer paraverbal cues have been found to be diagnostic of either lying or truth-telling, though a few valid indicators have been identified. Specifically, liars appear to: have a higher pitched voice (DePaulo et al., 2003; Ekman, Friesen, & Scherer, 1976; Vrij, 1998; 2004; Vrij & Mann, 2004); repeat words and phrases more often (DePaulo et al., 2003); make more speech hesitations and errors when describing complex events (Vrij, Edward, & Bull, 2001a; Vrij et al., 2000; Vrij et al., 2008); speak for smaller proportions of interviews (DePaulo et al., 2003); and speak and answer questions more slowly (Vrij et al., 2008) than their honest counterparts. The discovery of fewer paraverbal cues to deception relative to other cues is unsurprising as some consider paraverbal cues to be the least reliable cue category (e.g., Hart et al., 2010).

Finally, a moderate number of nonverbal cues, relative to verbal and paraverbal cues have been identified as distinguishing between honest and dishonest individuals' behaviours. In particular, liars tend to: appear to think harder when recalling an event (Vrij, 2004; Vrij et al., 2001); use fewer illustrators (Mann, Vrij, & Bull, 2004; Vrij, 2004; Vrij et al., 2001; Vrij et al., 2000), as well as digit and limb movements (Baker, Stern, & Goldstein, 1990; DePaulo, 1992; De Paulo et al., 2003; Hartwig, Granhag, Strömwall, & Andersson, 2004; Sporer & Schwandt, 2007; Vrij, 2000; Vrij et al., 2004; Vrij et al., 2001; Zuckerman, Spiegel, DePaulo, & Rosenthal, 1982); blink less often (Leal et al., 2008; Mann et al., 2002; Vrij & Mann, 2004); smile less often (Hartwig et al., 2004; Vrij et al., 2001); purse their lips more often (DePaulo et al., 2003); show increased pupil dilation (DePaulo et al., 2003); and employ self-adaptors (Zuckerman et al., 1982) compared to those who are telling the truth.

On the other hand, cue utilization research explores what assessors pay attention to in communicators' behaviours when determining their honesty. Lie detection is performed either by people who assess the behaviours of others using their own perceptual abilities or via use of specialized hardware (e.g., polygraph, fMRI) or software (e.g., *Agent99Analyzer*; Fuller, Biros, Burgoon, Adkins, & Twitchell, 2006; web-based memory detection tests; Kleinberg & Verschuere, 2015). This review will focus on lie detection research conducted on the former (but see Hauch, Blandón-Gitlin, Masip, & Sporer, 2015 for an excellent review of the shortcomings of human lie detection and the merits of computer aided deception detection). Cue utilization research has examined the accuracy of deception detection, as well as the types of behavioural cues that are relied upon by individuals who either have little to no training in deception detection or

those who have received specific, more extensive training in deception detection. For untrained lie detectors, results of these studies indicate that unfortunately they often rely upon cues that are widely believed to signal deception but are not supported by empirical research as diagnostic cues (Akehurst, Köhnken, Vrij, & Bull, 1996; Strömwall & Granhag, 2003b; Zuckerman et al., 1982). For example, commonly held beliefs are that, compared to truth-tellers, liars are more likely to behave nervously [The Global Deception Research Team (GDRT), 2006; Hartwig et al., 2004], showing behaviours such as increased gaze aversion (GDRT, 2006; Mann et al., 2004; Sitton & Griffin, 1981; Strömwall & Granhag, 2003b; Vrij, 2004; Vrij, 2008; Vrij & Semin, 1996) and increased bodily movements (GDRT, 2006), including increased limb and digit movements, fidgeting, and use of self adaptors (Mann et al., 2004; Strömwall & Granhag, 2003b; Vrij, 2004; Vrij, 2008; Vrij & Semin, 1996). Notably, there is substantial cross-cultural agreement in beliefs about how liars' behave (GDRT, 2006).

However, most research does not support all of the above notions about lying. For example, liars and truth-tellers do not differ on average in levels of gaze aversion in most research studies. In the few studies that have yielded differences in levels of gaze aversion, liars have been found to avert their gaze less, not more, than truth-tellers (e.g., Hartwig et al., 2004; Sitton & Griffin, 1981). Similarly, when assessors do rely on valid cues to deception, often they err by predicting that differences in cues exhibited by liars and truth-tellers will be in the wrong direction. For instance, it is generally believed that liars smile more (Vrij, 1998), blink more (Vrij et al., 2008), and are less consistent in their statements over time than truth-tellers, when research indicates that liars actually smile less (Hartwig et al., 2004; Vrij et al., 2001), blink less (Vrij et al., 2008), and are more consistent in their statements (Strömwall & Granhag, 2003a).

The problem of untrained lie detectors relying on invalid cues is further complicated by the fact that stereotypical beliefs about lie detection are promoted in some published research. For example, detecting deception via the use of microexpressions – brief facial expressions that are discordant with expressed emotions (Porter & ten Brinke, 2008) – has received considerable attention in scientific literature for decades, particularly in the work of Paul Ekman (e.g., Ekman & Matsumoto, 2012; Ekman & O'Sullivan, 1991). Yet, the only validation study to date (see Porter & ten Brinke, 2008) concluded that levels of lie detection accuracy when relying on microexpressions are not as high as claimed previously (e.g., by Frank & Ekman, 1997).

Common knowledge beliefs that legal professionals hold about which cue category one should rely upon when detecting deception also often diverge from the findings of empirical research. Specifically, many investigators rely on nonverbal over verbal indicators of deception (Mann et al., 2004; Vrij, 2008), despite the fact that most research suggests that the latter are more diagnostic of deception (Vrij, 2008). The focus on nonverbal indicators may be due to a number of factors, including the fact that we are used to making inferences about nonverbal behaviour, the fact that suspects who deny criminal involvement or refuse to speak emit predominantly nonverbal cues, evaluating nonverbal behaviours is simpler and less cognitively taxing, and prominent researchers in the field have focused primarily on nonverbal cues (Vrij, 2008). This is not to say that investigators ignore verbal cues; observers will pay attention to the content of speech from the outset when they are familiar with the information discussed, when they have access to other statements to compare to the speaker's statement, and when the verbal cues produced are distinct and easy to observe (Vrij, 2008). Police also report that they focus on contextual issues in addition to nonverbal cues, and they pay attention to verbal contradictions in the speech of those they are monitoring for deception (Masip & Herrero, 2015). Monitoring of verbal cues become difficult, however, when investigators cannot establish ground truth, only one suspect is interrogated, or verbal cues are difficult to observe. Unfortunately, focusing on nonverbal cues has not been found to improve lie detection. In fact, having access solely to visual cues has been found to impair deception detection, and actually increases the likelihood that someone who is telling the truth will be deemed deceptive (Bond & De Paulo, 2006; DePaulo, Lassiter, & Stone, 1982). However, it is important to note that many of the studies examining deception detection via nonverbal cues measure stereotypical cues that are not indicative of lying (Mann et al., 2004).

Cues that have been used historically to detect deception are not entirely without merit. For instance, Porter and ten Brinke (2008) did find small but reliable differences in the microexpressions produced between liars and truth-tellers. Further, there are at least a few commonly-held beliefs about lying that are valid (e.g., liars make increased speech hesitations and errors; Vrij, 1998; 2008; liars provide fewer detailed accounts; Strömwall & Granhag, 2003a). Legal professionals also differ widely between and within professions in the beliefs they hold about lie detection (Strömwall & Granhag, 2003b), thus they may not all rely on the same cues to detect deception. On the whole,

however, the majority of cues used to detect deception are not in fact diagnostic indicators of truth-telling or deception and will not lead lie detectors to make accurate decisions.

Of course, holding incorrect beliefs about lie detection may not translate into an impaired ability to detect lies. In fact, most people have difficulty pinpointing which cues they use to determine whether a person is lying (Strömwall & Granhag, 2003b), which may reflect a dissociation of their beliefs about deception from their ability to detect deception. Furthermore, if criminal investigators as a group were highly accurate at lie detection, it would render holding erroneous beliefs surrounding deception detection inconsequential. However, when detecting deception, criminal investigators' accuracy tends not to exceed chance levels and their performance does not differ significantly from that of laypeople, despite the fact that criminal investigators are significantly more confident in their abilities (Kassin, 2008). This poor accuracy rates likely stem from the fact that legal professionals receive little in the way of deception detection training; it is estimated that less than 10% of law enforcement personnel receive adequate training this area (Frank & Feeley, 2003).

It may be surprising that so few law enforcement officers receive lie detection training, given that perpetrators who are interrogated about criminal activity are highly motivated to deceive police. However, police officers estimate that they encounter deceit around 75% of the time: a high base rate of deception that they likely believe negates the need for substantial lie detection training (Frank & Feeley, 2003). However, research examining accuracy rates in deception detection by untrained observers suggest otherwise. Such individuals demonstrate what is called the *veracity effect* (Levine, Park, & McCornack, 1999). That is, untrained observers are predisposed to believe rather than disbelieve what another person tells them. As such, these individuals demonstrate a truth bias: they are more accurate in detecting truths than lies simply because they decide that people are telling the truth more often. One meta-analysis reports a mean accuracy rate of deception detection of roughly 54% by untrained lie detectors, whereby rates of 47% and 61% were achieved for lies and truths, respectively (Bond & DePaulo, 2006). Accuracy rates do vary depending on the nature of the contents of the lies and truths. For example, increasing the ecological validity of the materials used in deception detection studies can boost mean detection accuracy rates to anywhere from 65% up to 77% (e.g., Mann et al., 2004; Porter, Woodworth, &

Birt, 2000; Vrij, 2004; Vrij, Mann, Robbins, & Robinson, 2006) for untrained individuals. But regardless of the contents of lie detection materials, what is clear is that effective training programs are needed to improve the skills of legal professionals in detecting lies.

Cue utilization research on those who receive training in deception detection has recently yielded more promising results. Early research on deception detection training did not reveal it to be useful in increasing accuracy of deception detection. In fact, that research found those who received deception detection training would develop what is referred to as an *investigator bias* (Meissner & Kassin, 2002), whereby they were more likely to judge others to be deceptive rather than truthful. However, the development of this bias is likely due to the fact that training techniques used at the time, such as the Inbau technique (Inbau, Reid, Buckley, & Jayne, 2001), relied upon visual or nonverbal cues to deception that may also appear in the demeanours of truthful individuals. One study found that training in the Inbau technique can result in decreases rather than increases in accuracy of deception detection (Kassin & Fong, 1999). This finding is likely due to the fact that most of the cues to deception promoted by the Inbau technique have not been found to indicate deception in independent studies (e.g., Mann et al., 2004).

Fortunately, when trained in empirically-based methods, legal professionals can improve their deception detection abilities (Vrij et al., 2009). A meta-analysis of training techniques used prior to 2003 found that training resulted in small but dependable, positive gains in lie detection (Frank & Feeley, 2003). The authors argue that the positive effect of training in this study was likely underestimated, due to common shortcomings in the methodology employed in the studies reviewed⁴. When considering studies that have focused on lie detection methods based on different cue categories, accuracy rates vary but are still improved relative to rates achieved by those who have not received training in deception detection. Most published studies have examined training in techniques whereby statements are judged from recorded videos or transcripts, rather than in real time. For instance, studies using techniques which focus on the verbal content of speech, such as Criterion Based Content Analysis (CBCA;

⁴ Shortcomings noted were the use of low stakes lies (which often fail to induce differences in behaviour between lie and truth-tellers); lies based on content unfamiliar to participants; provision of only brief training sessions; and improper pre- and post-testing of participants.

Köhnken & Steller, 1988; Raskin & Esplin, 1991; Steller & Köhnken, 1989; Vrij, 2008) & Reality Monitoring (Alonso-Quecuty, 1992; Johnson & Raye, 1981; Sporer, 1997; Vrij et al., 2004; Vrij et al., 2000), result on average in a 70% rate of accurate detection of lies and truths. In fact, accuracy rates range from 65%-90% when the content of a statement is judged by trained individuals (Vrij, 2008). In addition, training in the use of nonverbal cues to deception that have empirical support boosts lie detection accuracy: accuracy rates between 80% and 86% have been found on average when observers were trained to use cues such as smiling and pitch of voice (Ekman, O'Sullivan, Friesen, & Scherer, 1991; Vrij et al., 2000). Notably, most research on lie detection and training has been conducted on detecting lies after a statement is made, when more recent research has focused on detecting lies *in vivo*, using techniques to boost differences between liars and truth tellers in order to facilitate deception detection and to detect lies in real time. Fewer studies on active interviewing to detect deception exist but a recent review indicates that deception detection accuracy after training in active interviewing techniques is around 70% for cognitive based approaches (such as Strategic Use of Evidence, or asking unanticipated questions) and 80% when polygraph-based approaches are used (Vrij & Fisher, 2016).

In summary, although some law enforcement officials hold erroneous beliefs about behavioural cues that signal deception and many receive inadequate training in deception detection, receiving proper training does appear to improve lie detection. Though the conventional wisdom is to focus on verbal cues within the content of communicators' accounts, it is more likely that if law enforcement officials pay attention to a diverse set of cues rather than just one category, and to cues that are found to reliably distinguish between liars and truth-tellers in empirical research, they should optimize their success at catching liars. Thus, in reference to the present study, it is possible that, if informants do differ in their behaviours while lying versus telling the truth while recounting criminal admissions, law enforcement officials could be trained to detect deceit in informants' accounts and behaviours at higher accuracy rates than in the past.

1.4. Impetus for Research on Criminal Admissions

An extensive literature has been amassed examining the veracity of admissions to crimes made by perpetrators themselves, which begs the question: is it necessary to study lies within the second-hand reports of admissions as well? Technically, both the

perpetrator of a crime and a witness to a perpetrator's admission to crime should provide the same thing: a report outlining details of a criminal act. Yet there is reason for caution in assuming that perpetrators' accounts of a crime they committed will be identical to an informant's reports of another's admission to crime. Specifically, there are major contextual and role differences between perpetrators and informants that could affect the nature of their accounts, as well as any behaviours exhibited as those accounts are recalled.

For instance, perpetrators are present at and participate in the crimes committed, while informants who report criminal admissions typically do not witness or participate in the crimes reported⁵. Therefore, the target event that each would report is different. In addition, perpetrators report, often at length, details of their crimes, including statements of their own admissions of guilt. Conversely, while informants may provide specific details of witnessing admissions to crime, investigators are primarily interested in their verbatim recall (or very nearly so) of what the perpetrators said about the crime that they committed, as well as how those details were stated (Duke et al, 2007).

Even if target events reported by criminal perpetrators and informants are similar and they are interviewed with similar goals for information extraction by investigators, the nature of the role that they play in the target events they experience will likely affect what they subsequently report about those events. For example, when discussing the details of a personally-experienced event, perpetrators provide accounts that differ qualitatively from non-perpetrators. In one study, perpetrators were found to minimize their involvement and blame, as well as the extent and severity of their actions in their accounts of events surrounding a serious interpersonal conflict compared to accounts of victims (Baumeister, Stillwell, & Wotman, 1990). Further, there is significant potential for the contents of a report of an admission to crime to differ substantially from the details of a firsthand admission to the crime. Indeed, seminal research on memory for stories (e.g., Bartlett, 1932), and more recent replications of that work (e.g., Bergman & Roediger, 1999), have found that the content of recollections of stories can change dramatically from what was contained in the original source with each subsequent

⁵ An apparent exception to this would be an accomplice who tattles on another perpetrator; however, by definition of having participated in the planning of a crime or involvement in the commission of a crime, the accomplice would be more similar to either a witness or a perpetrator than an informant.

retelling, within and across respondents, depending on a number of factors including personal schemas and biases that affect encoding and retrieval of information. Thus, the roles that perpetrators and informants play in the reception of details of the crime could in and of themselves produce substantially different reports of the same crime by both parties.

Baumeister et al. (1990) argue that the differences in the contents of reports of the same crime likely result from differences in motivations behind reporting the crime. Indeed, the factors that motivate people to report crimes also appear to distinguish perpetrators from informants, particularly when one further distinguishes between true and false reports of criminal activity. These distinct motivations may result in qualitatively different reports of crime delivered by perpetrators versus informants, as personal motivations can affect what is reported in truthful versus deceptive accounts (e.g., Steinel, Utz, & Koning, 2010). Regarding true reports, an honest admission to a crime is typically motivated by a perpetrator's desire to clear his or her conscience, the realization of limited courses of action, or the need to seek absolution for social, religious, or legal reasons (Kassin & Gudjonsson, 2004). Conversely, honest reports of admissions to crime made by informants are likely motivated by a sense of civic duty; just as one should report crimes that they witness, one should similarly report confessions to crimes that are described to them. Yet the consequences of providing truthful accounts of crime are much greater for perpetrators, who will likely face punishments for their actions, than for informants who, aside from retaliation by the person whose admission they report, are normally not at risk to be punished for reporting admissions.

On the other hand, motivations for providing false accounts of crime also distinguish perpetrators from informants. Three types of false confessions made by perpetrators have been identified (Kassin & Wrightsman, 1985), differing in both the manner by which they are elicited and whether or not the confessors believe what they have reported is true. First, a voluntary false confession, provided by an innocent person who knows the confession is false and has not experienced external pressures to confess, is usually reported to gain fame and notoriety or to protect a loved one who committed the crime. The second type, a coerced-compliant false confession, is also known to be false by the confessor but is provided when a suspect experiences external pressures to confess, such as the stress of an interrogation, the threat of harm or

punishment, or the perceived promise of a reward. Finally, a coerced-internalized false confession occurs when, during the course of an interrogation, a suspect comes to wrongly believe that he committed the crime. The latter two false confessions are similar in that their likelihood is affected by internal personality characteristics of the confessor, such as those who score high on measures of compliance and suggestibility.

Though a published review of the types of false reports of admissions to crime does not exist similar to above, anecdotal evidence suggests that when informants convey false reports of criminal admissions, they more frequently and simply seem to be motivated by escape from punishment. Informants may claim that another person admitted to a crime that they in fact committed or falsely claim to have heard an admission to crime committed by another person in order to receive a shorter prison term or a monetary reward, as some informants receive compensation for testifying (Innocence Project, 2011). Thus, if motivations do differ between informants and perpetrators, the characteristics of their reports could vary too.

Finally, and most pertinent to this analysis, despite there being numerous cues and methods used to detect deception at often reasonable levels of accuracy, there too are numerous instances in which the failure to detect false reports of criminal admissions has resulted in serious consequences for wrongfully accused persons. One reason for these failures is that detecting deception accurately in informant reports may be more difficult than in perpetrators' confessions. That is, an issue may arise when attempting to detect deception in informants' reports of criminal admissions which is related to the way in which informants encode and retrieve details of admissions.

Specifically, anecdotal evidence suggests that informants may actually try to imagine what the original crime looked like to assist in their recall of the criminal admission. Unpublished data from a study conducted by Boydell and Read (2011) indicates that some participants reported that they tried to visualize the crime to which the perpetrator confessed in order to help them recall a criminal admission, and seemed to focus on reporting the details of the crime they had never seen rather than the characteristics or specific details of the admission itself. According to RM theory, imagined events that are reported have characteristics similar to those found in deceptive reports. Thus, efforts at imagining the crime may in turn affect recall of the accounts; that is, if honest informants engage in imagining the crime reported to them,

and dishonest informants report an imagined criminal admission that they did not actually hear, truthful and deceptive accounts of criminal admissions may not differ quantitatively and qualitatively as much as truthful and deceptive confessions made by criminal perpetrators do, because in neither case do these informants have access to the same sensory or emotional information as do perpetrators. That is, the act of imagining the original crime might make the verbal contents of truthful and false accounts of criminal admissions look and sound more similar to each other than other true versus false accounts of crime (such as confessions). As a result, it is possible that nonverbal cues may better distinguish truthful from deceptive reports of criminal admissions than content or verbal cues, in part because no evidence to date indicates that imagining affects nonverbal behaviours expressed during the reporting of events.

In summary, the type of event reported, role played in the event reported, and motivations for reporting crime differ significantly between perpetrators and informants, calling into question the similarity of reports they provide and the generalizability of research on perpetrators to informants. As a result, these differences warrant further study of informants, particularly of the contents of their reports and the behaviours they exhibit during presentation of those reports that could signal whether their reports are credible. Therefore, the purpose of this study is to examine and identify what types of verbal, paraverbal, and nonverbal cues, if any, best distinguish between truthful and deceptive reports of criminal admissions, and to determine what factors may contribute to any detected differences in their behaviours. Any cues found to be diagnostic of lies and truths could eventually, after further empirical inquiry, inform training that would assist legal professionals in distinguishing honest from deceptive informants.

1.5. The Current Study

In the current study, one-half of participants witnessed an admission to a crime made by a perpetrator while the remaining participants did not witness the admission, but rather were given a brief description of its contents. In a second session, held exactly one week later, participants were asked to either report the confession that they heard or to concoct a false report of the confession that they allegedly would have heard. Participants were audio- and video-recorded as they reported the details of the true and fabricated confessions aloud. The recordings were transcribed as well as

coded for verbal, paraverbal, and nonverbal cues via content analysis by raters blind to the experimental condition of participants.

In addition to examining behavioural cues emitted during truth- versus lie-telling, some participants were given an incentive for providing an accurate and convincing account of the confession. Specifically, in Session 1, all participants were randomly assigned to one of three incentive conditions: the Positive Incentive condition (entry into a draw for \$200), Negative Incentive (mandatory participation in four additional hours of research participation), or No Incentive. The rationale for including the Incentive variable was two-fold: first, it was included to boost the ecological validity of the experiment. Second, it was examined in this study to increase the stakes of the lies being told by participants.

This study is largely exploratory, examining which cues could theoretically distinguish between those who are reporting an admission to a crime truthfully and those who did not witness a criminal admission but rather are fabricating having heard it. Though the complexities of a real world criminal investigation cannot be captured completely in a laboratory setting, it was important to carefully control the variables in this study relevant to informants in an experimental approach to explore which cues could be diagnostic of deception or truth-telling in informants.

1.6. Hypotheses: Experiment Results

Based on anticipated difficulties using verbal cues to detect deception in reports of criminal admissions discussed earlier, it is predicted that a greater number of statistically significant differences will be found between truthful and deceptive participants for non-verbal behavioural cues compared to verbal or paraverbal behavioural cues that they emit while reporting a criminal admission. It is also predicted that the ratings on a self-report measure used in past research to distinguish between reports of real versus imagined events, called the Self-ratings of Memory Characteristics Questionnaire (SMCQ; Sporer, 2004), will not discriminate between truthful and deceptive participants to the extent they have in past research studies because truthful participants in this study may imagine the crimes reported to assist in their reports of the criminal admission.

Further, it is predicted that any differences detected in behavioural cues between liars and truth-tellers (including SMCQ ratings) will be amplified for incentivized participants compared to participants who are not offered an incentive for providing a convincing report of a criminal admission. This prediction is based on research which indicates that behavioural differences between truth-tellers and liars may increase when there is motivation to provide an accurate or convincing account, such as receipt of positive (monetary) or negative incentives (avoidance of incidents with campus security; e.g., Bradley, 1988; Colwell, Hiscock-Anisman, Memon, Taylor, & Prewett, 2007), or when the stakes of providing an account are high (e.g., O'Sullivan, Frank, Hurley, & Tiwana, 2009; Vrij & Mann, 2001).

1.7. Hypotheses: Manipulation Checks

We make additional predictions about whether independent variables manipulated did indeed induce changes in participants in this study. One measure used to perform these checks was the Russell Affect Grid (Russell, Weiss, & Mendelsohn, 1989). First, we predicted that participants assigned to the Deceptive condition would report higher levels of arousal and lower levels of pleasantness on the Affect Grid compared to participants in the Truthful condition, because the experience of lying has been found in research to be more arousal-inducing and less pleasant than truth-telling on average (e.g., Ekman, 2009). Second, it was predicted that rated arousal levels would vary by incentive condition. Specifically, it is conjectured here that, as a result of a likely stronger response to the possibility of a negative outcome than a positive outcome, those in the Negative Incentive condition would feel more arousal than those in the Positive Incentive condition; and as a reflection of such greater arousal these participants would provide higher arousal ratings on the Affect Grid. In turn, those in the Positive Incentive condition were expected to report higher arousal levels than those in the No Incentive condition, as the former group is provided with a stronger motivation to recall accurately or fabricate convincingly the admission than those in the No Incentive group. These predictions are also based on the general finding that negative reinforcements are more effective in inducing short term changes in behaviours than positive incentives (e.g., Bloom et al., 2007; Fagerström et al., 2007; Iwahara & Tanabe, 1963; Jones, 1961; Meyer & Offenbach, 1962; Piazza, Patel, Gulotta, Sevin, & Layer, 2003; Reed et al., 2004). Negative reinforcement may be superior because avoiding

negative events typically exerts greater changes in emotion, arousal, and memory than experiencing positive events (Magoon & Critchfield, 2008). Further, pleasantness ratings were predicted to be higher in the Positive Incentive condition than the Negative Incentive condition, because potential rewards are more likely to elicit emotions of positive valence, whereas a potential undesirable outcome is more likely to elicit emotions of negative valence (e.g., Harmon-Jones, 2011).

Another measure used to perform manipulation checks in this study was the Preparation Questionnaire. This check was employed because how participants prepared for their interviews could affect the content of their accounts (for example, higher levels of preparation could result in accounts that are longer in duration). As such, we wanted to explore whether any differences in behavioural cues between Veracity conditions or Incentive conditions could be attributed to differences in preparatory activities. First, it was predicted that Deceptive participants would prepare more for their interview about the criminal admission than Truthful participants. Second, it was predicted that participants in the Positive and Negative Incentive conditions would indicate that they employed more strategies to prepare for the interview than reported by those in the No Incentive condition. The greatest amount of preparation was expected to be demonstrated by Deceptive participants who received Negative Incentive instructions, because the pressures of having to lie and to avoid returning for research participation should produce the greatest motivation to prepare to perform well in the Session 2 interview relative to other experimental conditions.

Chapter 2.

Methods

2.1. Participants

One hundred and twenty undergraduate students (24 male, 93 female⁶; $M_{\text{age}} = 20$ years, range: 17-48) were recruited for this study via the online Research Participation System managed by Simon Fraser University's Department of Psychology. All students received credit toward their grades in lower division psychology courses in exchange for their participation.

2.2. Design

This study is consistent with a 2 (Veracity: Truthful vs. Deceptive) x 3 (Incentive: Positive Incentive vs. Negative Incentive vs. No Incentive) between-subjects factorial design. Participants were assigned randomly to and were represented in equal numbers across the six experimental conditions. The primary dependent variables of interest in this study are the mean frequencies of various verbal, paraverbal, and nonverbal behaviours exhibited by participants as they reported a criminal admission aloud, as coded by raters blind to participants' conditions from both transcripts and digital video recordings of the participants' accounts. Appendix A describes the nature and coding of the cues assessed in this study. Cues were selected upon review of the empirical literature on deception detection as some of the cues which have distinguished liars from truth-tellers successfully in research experiments. In addition, we examined participants' mean scores on scales of the Self-ratings of Memory Characteristics Questionnaire (SMCQ; Sporer, 2004). Other dependent variables, used as manipulation checks, were the number of strategies that participants employed to prepare for an interview about a criminal admission, as measured by the Preparation Questionnaire and ratings of two dimensions of mood as assessed by the Affect Grid (Russell et al., 1989) at different points in the study. These measures are described in a later section.

⁶ Information about age and gender was not provided by three participants.

2.3. Power Calculation

To determine the minimum number of participants required for this study, an a priori power calculation was conducted for a 2 x 3 Factorial MANOVA with six dependent variables, the average number of dependent variables for each of the three MANOVAs run to examine potential differences in verbal, paraverbal, and nonverbal cues between the experimental conditions in the study. For it to be possible to detect moderate significant effects of the independent variables of interest with 80% power at a significance level of $\alpha = .01$ (adjusted to compensate for inflation of familywise error), 120 participants were required for this study.

2.4. Materials and Measures

2.4.1. Perpetrator Videos

All participants in this study watched a video in which they saw and heard a perpetrator speak, but only one-half of participants actually heard the perpetrator admit to committing criminal offences. One option for the procedure of this study would have been to show a video to only one-half of participants, but to then have all participants report what they recalled allegedly about the criminal admission whether they saw the video or not. However, an informant would typically be familiar with the appearance and mannerisms of the person on whom they were informing. Indeed, proving that the confessor was in close proximity to the informant would be critical to establishing the validity of the confessor's admission. Often, deceptive informants will ensure that there is documented evidence (e.g., surveillance video in a jail cell) that they have spent time in the vicinity of the person whose admission they will later report so that there would have been ample opportunity for information transfer to take place (Neuschatz et al., 2012). The ability of the informant to replicate these mannerisms, such as ensuring that words commonly used by the confessor are included in the informant's report of the admission, may serve to increase the success of deceptive informants in convincing legal authorities that they are providing an honest account of a criminal admission.

Therefore, all participants in this study observed the appearance and mannerisms of the perpetrator. Each participant saw one of two perpetrator videos. In the Truthful condition, participants watched a video of a male perpetrator (played by an

actor) confessing to crimes he committed with an accomplice; specifically, the assault, robbery, and murder of a waiter. This video is referred to hereafter as the admission video. Details reported include the setting of the crimes, feelings about the situation surrounding the crimes, and descriptions of the criminal events like weapons used and the outcomes for the victim and perpetrators (Boydell & Read, 2011). Conversely, participants assigned to the Deceptive condition viewed a video of the perpetrator (played by the same actor), who appears to be interviewed by police. In this video, he reveals various details about his background, such as his name and occupation, and his whereabouts on the night of the crimes, but he does not confess to the crimes. This video is referred to hereafter as the suspect interview. In both videos, the perpetrator's head and shoulders, as well as some background, are visible. Both videos were approximately 4 min. in length. Two different versions of each video (where each version displayed a different actor) were used to boost the ecological validity of the study, and participants were randomly assigned to view only one version each. No statistical differences between the different versions of the admission videos or between the different versions of the suspect interviews were detected via statistical analyses in the behavioural cues emitted by participants during the Session 2 interviews.

2.4.2. Incentive Instructions

Some participants in this study received incentives for providing an accurate and convincing account of the perpetrator's admission to crime. The positive incentive in this study was entry into a draw for \$200, whereas the negative incentive was the avoidance of returning to the laboratory for four hours of tedious research participation. These incentives were chosen to create incentives relevant to those received by informants in real life, based on the types of incentives used in previous research, and to address practical concerns of conducting ethical research. Monetary rewards are used commonly in research studies to elicit desired behaviours in participants, such as convincing an observer that one is telling the truth when actually lying (e.g., Bradley & Cullen, 1993). It was presumed here that a draw for \$200 would sufficiently motivate the student-participants, while being affordable for the experimenter. As for avoiding a negative outcome, Swanner et al. (2010) successfully used an escape from returning to the lab to redo a failed experiment as an incentive for participants to report both true and false criminal admissions made by another person. Additionally, it was thought that

having to return for four hours of research participation would be 1) relevant to participants and 2) sufficiently motivating to busy undergraduate students without violating ethical guidelines.

To assess the differential levels of motivation engendered by these incentives, data was collected from students enrolled in an undergraduate psychology course, whereby they were asked about what it would take to compel them to spend 30 minutes to prepare an assignment outside of class time that would not count toward their final grade. Eight questions were posed to students about what would be effective in motivating them to complete the assignment, half of which were about positive incentives (entry into a draw for \$50, \$100, \$200, or \$400) and half of which were negative incentives (being required to complete one, two, four, or eight hours of boring research participation). Over 90% of students indicated that they would prepare the assignment if they were offered entry into a draw for \$200 or would avoid four hours of required research participation. Thus, these incentives were deemed sufficient for this study.

2.4.3. Cognitive Interview

Due to time constraints, an abbreviated version of the Cognitive Interview (Fisher & Geiselman, 1992) was used to interview participants in Session 2 of this study about the admission to crime that they allegedly heard in Session 1. The procedure enshrined four main features of the Cognitive Interview. Participants were instructed to report all of the details, large or small, that they could recall about what they saw and heard during the admission, and to reinstate their physical and mental context when they viewed the perpetrator video in Session 1. Authority was conferred onto participants to let them know that they were in control of the interview. Participants were also encouraged to report the sequence of the details of the criminal admission in different orders. It is worthy of note here that the Cognitive Interview is more akin to an information-gathering interview, which is more likely to produce reports that distinguish liars from truth tellers, than an accusatory-style interview (Vrij et al., 2010).

Once they had finished freely recalling details from the criminal admission they had allegedly heard, participants answered a number of directed questions to assess their recall of the perpetrator's appearance and their own mood at the time of his

admission, as well as to allow them to provide any additional details about the admission that they neglected to reveal during the free recall. The study instructions and experiment protocol, including those for the Cognitive Interview, are contained in Appendix B.

2.4.4. Self-ratings of Memory Characteristics Questionnaire (SMCQ)

After completing the Cognitive Interview in Session 2, all participants completed the SMCQ (Sporer, 2004). This self-report measure is based on theories underlying RM and was adapted from a questionnaire called the MCQ developed by Johnson, Foley, Suengas, and Raye (1988). While not intended for use by forensic examiners, the SMCQ has been used in empirical studies to distinguish real from imagined event reports, and is based in memory theory and research (Vrij, 2008). The SMCQ is a 39-item questionnaire comprised of questions that assess a variety of different characteristics of memory. The 39 items comprise 7 different scales based on factor analyses of the SMCQ and theoretical considerations (see Sporer, 2004, for the items that comprise each scale): 1) Clarity and vividness of the account, 2) Sensory information, 3) Spatial information, 4) Time information, 5) Emotions and feelings, 6) Reconstructability of the story, and 7) Cognitive operations. Each item is rated by the participant on a 7 point scale (from 1-7) and the ratings are based on each participant's memory for a target event. In this study, the target event was the confession that was heard or allegedly heard. Higher scores indicate an increased presence or quality of the item (e.g., increased clarity of recall, more visual details, etc.), which are achieved typically by those who report true, compared to false, events. A number of studies have established the discriminate validity of this measure in distinguishing true from fabricated accounts (e.g., Barnier, Sharman, McKay, & Sporer, 2005).

Appended to the end of the SMCQ were items that assessed participants' views on deception detection. These items were examined separately from the SMCQ items. Participants were asked to indicate (by selecting "Yes" or "No") if they thought they were good lie detectors, as well as to name five behaviours that they thought were indicative of 1) truth-telling and 2) lying. Refer to Appendix C for the SMCQ and additional items assessing perceptions of lying and truth-telling.

2.4.5. Preparation Questionnaire (Manipulation Check Measure)

Upon completion of the SMCQ, participants completed a questionnaire to assess actions that they took between Sessions 1 and 2 to prepare for the interview. At the end of Session 1, participants were instructed that they could do anything they wished in order to prepare for the interview (with the exception of discussing the study with other participants). Possible strategies that were listed on the questionnaire included rehearsing the confession aloud or asking others for advice on how to appear credible during interviews. On the questionnaire, participants indicated which strategies they used and, when appropriate, estimated how many times they used that strategy. Level of preparation was scored for participants by summing total number of times that they prepared for the interview. Refer to Appendix D for the full questionnaire.

2.4.6. Russell Affect Grid (Manipulation Check Measure)

Participants completed the Russell Affect Grid, which is used to measure single instances of affect on two distinct dimensions: pleasure and arousal (Russell et al., 1989). Grids were filled out at three points in the study: at the beginning of Session 1 (baseline or Time 1), as well as just prior and subsequent to the Session 2 interview (Times 2 and 3). The purpose of obtaining information about participants' affect was to determine if participants' appraisal of their emotions and arousal varied depending on their task, if they were asked to lie, and whether their interview performance in Session 2 was incentivized. The measure consists of a 9 x 9 grid, whereby the columns represent ascending levels of intensity of pleasantness or unpleasantness the farther they depart from the centre column, while the rows represent ascending levels of arousal starting at the bottom of the grid. Participants were asked to rate how they currently felt by making a mark in the box that best represented their how they were feeling at the current moment. Each mark yielded two rated scores, ranging from -4 to +4, that corresponded to their levels of pleasantness and arousal. Appendix E displays the Affect Grid. This tool has been established as "a moderately valid measure of the general dimensions of pleasure and arousal" (Killgore, 1998, p. 639).

2.5. Procedure

Participants were recruited for a two-session experiment on perceptions of admissions to crime and were run through the study one at a time. After completing informed consent, a baseline measurement was taken using the Affect Grid. Next, all participants were told that they would be watching a video of a young male admitting to a series of crimes committed one evening. Prior to playing the video, the experimenter gave each participant a brief overview of what the criminal perpetrator would discuss. One-half of participants were randomly assigned to watch the admission video, as described by the experimenter (Truthful condition). However, the other half of participants did not in fact see that video, but instead viewed the suspect interview (Deceptive condition), after which they were informed that they would not in fact be seeing the video of the actual confession, but rather would pretend as if they had during Session 2. After watching their respective video, each participant was told that they would be interviewed about the criminal admission one week later. Participants in the Truthful condition were directed to report everything they remembered from the admission video during the Session 2 interview. In contrast, participants in the Deceptive condition were asked in Session 2 to report a fabricated account where they would report the admission as if they had heard it.

At this point in the study, all participants were told that their Session 2 interviews would be videotaped and viewed by an independent rater who was unaware if they had actually seen the admission video. They were told that it was their goal in Session 2 to convince the rater that they had heard the criminal admission and were recalling its details accurately and completely. Some participants received information to motivate them to perform optimally during the Session 2 interview. One-third of participants was randomly assigned to the Positive Incentive condition, and was told that they would be entered into a draw for \$200 if they were highly convincing as to how honest and accurate their reports were. Another one-third of participants was randomly assigned to the Negative Incentive condition, in which participants were instructed that if they were unsuccessful at convincing an independent rater of the honesty and accuracy of their reports, they would have to return for four additional hours of boring and tedious research experiments; however, they would avoid this outcome if they were successful at convincing the rater. The remaining participants did not receive a positive or negative

incentive (No Incentive condition); rather, they were told, just as all participants were, to complete the task to the best of their ability.

All participants returned to the laboratory one week after Session 1 to provide an account of the criminal admission. Two experimenters administered the study materials in Session 2. One experimenter, who was present during Session 1, provided instructions for the second session, and administered the second Affect Grid. Then another experimenter, who was blind to the participants' study condition and was not present at Session 1, conducted the Session 2 interview. Participants were interviewed individually using an abbreviated version of the Cognitive Interview. All interviews were digitally recorded. Upon completion of the interview, the other experimenter returned and had participants complete the third Affect Grid, the SMCQ, and finally, the self-administered Preparation Questionnaire.

Finally, participants were debriefed as to the aims and implications of the study. During debriefing, all participants were informed that they would be entered into a draw for \$200, which was conducted upon completion of data collection. Participants in the Positive Incentive condition were told specifically that they would be entered into the draw regardless of their performance in the Session 2 interview. Participants in the Negative Incentive condition were apprised that they would not be asked to return for additional research participation but that they would be entered into a draw for \$200.

2.6. Scoring of Dependent Variables

Video recordings and transcripts of participants' accounts of the criminal admission from the Session 2 interview were scored by two independent raters for the selected verbal, paraverbal, and nonverbal cues. For each participant, the order in which cues were coded was selected at random. The manner in which each cue was scored varied, depending on the type of behaviour that was assessed. For example, some cues were scored by counting the number of times that each appeared in the transcript of the interview (e.g., the number of first person pronouns), while others were scored for how many times raters observed the participant making a particular movement (e.g., the number of times the participants moved their arms). Appendix A describes in more detail how each verbal, paraverbal, and nonverbal cue was detected

and coded by the raters. In addition, scale scores on the SMCQ were calculated based on the item ratings made by participants.

One of the issues with using simple counts of behavioural cues as dependent variables is that the number of cues emitted is confounded with the length of time that the behaviour is measured. Thus, if participants in one condition typically provided longer accounts than another, which is often observed when participants are telling the truth compared to lying, any differences in cues emitted by participants may simply be due to the fact that they spoke for a longer period of time rather than due to true effects of the variables under study. Therefore, this confound was controlled for in the scoring of the data. Specifically, scores for individual verbal and paraverbal cues were recalculated for analyses by dividing the count of each cue (e.g., the total number of speech hesitations) by the total number of words spoken by each participant, as participants only had the opportunity to express these cues while they spoke and many of the cues were comprised of frequencies of certain types of words already. In contrast, total counts for nonverbal cues were each divided by the total length of the interview in seconds, rather than by word count, as participants had the opportunity to emit these cues at any time during the interview, regardless of whether they were speaking or not.

Chapter 3.

Results

3.1. Management of Missing Data and Outliers

All measures were reviewed for missing data and outliers. Items for which data was missing and/or that had values which contained outliers are reported in Table 1. Any missing data was replaced with the mean cell value for the respective variable. In most cases, missing data was due to inability to code a variable (e.g., if a participant's hands were not visible during the interview), or experimenter error (e.g., failure by one research assistant to administer the Affect Grid in Session 2). Outliers were replaced via truncation, which allows for retention of legitimate outliers without violating assumptions of inferential statistics (Osborne & Overbay, 2004). To achieve this correction, all outliers that were greater than two standard deviations below the mean value of the variable were replaced by the lowest possible value within two standard deviations from the mean, whereas outliers greater than two standard deviations above the mean were replaced with the highest value within two standard deviations of the variable's overall mean. For variables that were transformed (i.e., the verbal, paraverbal, and nonverbal cues), truncation of outliers was done after the transformations were calculated.

Table 1: Frequency of Participants Whose Data Was Missing and/or Contained Outliers

	Missing Data	Data Contained Outliers
Verbal Cues		
Personal pronouns	0	4
Exclusion words	0	3
Spontaneous corrections	0	4
Reproduction of conversations	0	4
Cognitive operations	0	3
Paraverbal Cues		
Total length free recall (sec)	0	0
Repetition phrases	0	1
Speech hesitations	0	4
Speech errors	0	4
Response latency (sec)	0	4
Speech rate (WPM)	0	5
Nonverbal Cues		
Illustrators	0	5
Limb movements	1	6
Digit movements	4	1
Eye blinks	2	8
Gaze aversion	5	3
Smiles	0	4
Fidgeting/ Self-Manipulations/Adaptors	0	1
SMCQ Scales		
Clarity/Vividness	1	0
Sensory Information	1	0
Spatial Information	1	0
Time Information	1	0
Emotions and Feelings	1	0
Reconstructability of Story	1	0
Cognitive Operations	1	0
Affect Grid Ratings		
Arousal – Time 1	6	4
Pleasantness – Time 1	6	4
Arousal – Time 2	17	3
Pleasantness – Time 2	17	4
Arousal – Time 3	17	1
Pleasantness – Time 3	17	3
Preparation Questionnaire		
Number of rehearsals in head	3	5
Number of rehearsals for others	2	2
Number of rehearsals by writing/typing	3	2

3.2. Verbal, Paraverbal, and Nonverbal Cues

Three separate MANOVAs were conducted to measure any effects of Veracity and Incentive on the proportions of 1) verbal cues, 2) paraverbal cues, and 3) nonverbal

cues that participants exhibited during their Session 2 interview. Cue frequencies were transformed to control for interview length and total words uttered for inferential statistical analysis.

3.2.1. Inter-rater Analyses

Two independent raters, blind to participant condition, assessed the verbal, paraverbal, and nonverbal data via content analysis. Rater 1 coded 75% of the total cases, while those remaining were coded by Rater 2. A subset of cases ($n = 29$) were randomly selected for inter-rater analyses (intraclass correlation coefficients, two-way random). With the exception of one variable (repetition of phrases), analyses revealed that intraclass correlations were very good to excellent for all variables. These values are reported in Table 2.

Table 2: Inter-rater Reliability Statistics

	Rater 1	Rater 2	ICC₂	95% CIs
Verbal Cues				
<i>Personal Pronouns</i>	15.5 (12.4)	15.3 (12.3)	.999	.998, 1.00
<i>Exclusive Words</i>	13.7 (12.4)	13.7 (12.5)	.998	.996, .999
<i>Spontaneous Corrections</i>	1.0 (1.3)	1.4 (1.5)	.901	.788, .953
<i>Reproduction of Conversations</i>	.8 (1.3)	.8 (1.4)	.904	.796, .955
<i>Cognitive Operations</i>	8.9 (8.3)	8.2 (7.6)	.984	.966, .992
Paraverbal Cues				
<i>Length of Free Recall (sec)</i>	106.7 (70.5)	105.6 (70.4)	.998	.995, .999
<i>Repetition of Phrases</i>	.21 (.56)	.21 (.49)	.653	.260, .837
<i>Speech Hesitations</i>	29.7 (21.2)	29.5 (20.9)	.998	.996, .999
<i>Speech Errors</i>	7.5 (10.3)	7.4 (8.9)	.982	.961, .991
<i>Response Latency (sec)</i>	1.5 (.93)	1.4 (1.10)	.885	.756, .946
<i>Speech Rate (WPM)</i>	146 (23.1)	148.0 (23.4)	.987	.972, .994
Nonverbal Cues				
<i>Illustrators</i>	2.8 (3.5)	2.4 (3.0)	.878	.740, .943
<i>Limb Movements</i>	49.3 (59.1)	48.2 (56.0)	.995	.988, .997
<i>Digit Movements</i>	165.1 (125.2)	152.0 (111.4)	.989	.977, .995
<i>Blinking</i>	144.9 (127.0)	138.5 (123.7)	.993	.985, .997
<i>Gaze Aversion</i>	33.9 (17.0)	31.3 (15.9)	.970	.933, .986
<i>Smiling</i>	3.5 (3.7)	3.6 (4.2)	.948	.889, .975
<i>Fidgeting/Self-Manipulations/ Adaptors</i>	53.4 (166.9)	58.2 (199.1)	.991	.980, .996

Mean for each scale in bold, standard deviation from mean in parentheses; ICC₂ =, intraclass correlation coefficient, two way random; CIs = confidence intervals (average measures values)

3.2.2. Verbal Cue Analyses

The first MANOVA was run to detect any effects of Veracity and Incentive on the following cues: personal pronouns, exclusive words, spontaneous corrections, reproductions of conversations, and cognitive operations. Mean values for these cues are reported by condition in Table 3.

Table 3: Verbal Cue Values (Transformed) by Experimental Condition

	Incentive Condition		Veracity Condition		<u>Total</u>
	No Incentive	Positive Incentive	Truthful	Deceptive	
First Person Pronouns					
	<i>No Incentive</i>		.0343 (.0136)	.0400 (.0193)	.0341 (.0165)
	<i>Positive Incentive</i>		.0268 (.0142)	.0414 (.0177)	.0341 (.0365)
	<i>Negative Incentive</i>		.0279 (.0114)	.0450 (.0166)	.0365 (.0165)
	<u>Total</u>		.0297 (.0133)	.0401 (.0182)	.0349 (.0167)
Exclusive Words					
	<i>No Incentive</i>		.0249 (.0091)	.0269 (.0136)	.0259 (.0115)
	<i>Positive Incentive</i>		.0246 (.0113)	.0312 (.0139)	.0279 (.0129)
	<i>Negative Incentive</i>		.0290 (.0080)	.0311 (.0124)	.0301 (.0103)
	<u>Total</u>		.0262 (.0096)	.0297 (.0132)	.0280 (.0117)
Spontaneous Corrections					
	<i>No Incentive</i>		.0011 (.0016)	.0012 (.0023)	.0011 (.0020)
	<i>Positive Incentive</i>		.0014 (.0018)	.0011 (.0022)	.0013 (.0020)
	<i>Negative Incentive</i>		.0027 (.0025)	.0015 (.0020)	.0021 (.0023)
	<u>Total</u>		.0017 (.0021)	.0013 (.0021)	.0015 (.0021)
Reproductions of Conversations					
	<i>No Incentive</i>		.0015 (.0022)	.0002 (.0008)	.0009 (.0018)
	<i>Positive Incentive</i>		.0018 (.0020)	.0014 (.0016)	.0016 (.0020)
	<i>Negative Incentive</i>		.0031 (.0025)	.0011 (.0021)	.0021 (.0024)
	<u>Total</u>		.0022 (.0023)	.0009 (.0015)	.0015 (.0021)
Cognitive Operations					
	<i>No Incentive</i>		.0132 (.0091)	.0153 (.0107)	.0143 (.0100)
	<i>Positive Incentive</i>		.0129 (.0094)	.0185 (.0101)	.0157 (.0100)
	<i>Negative Incentive</i>		.0140 (.0091)	.0176 (.0103)	.0158 (.0100)
	<u>Total</u>		.0133 (.0090)	.0171 (.0103)	.0152 (.0100)

Table values = mean of transformed variable, standard deviation from mean in parentheses

Multivariate tests (*Wilks Lambda*) revealed significant main effects of Veracity [$F(5, 110) = 5.47, p < .001, \eta_p^2 = .199$] and Incentive [$F(10, 220) = 1.93, p = .04, \eta_p^2 = .081$] on the verbal cues; however, the Veracity x Incentive Interaction [$F(10, 220) = 1.76, p = .07, \eta_p^2 = .074$] only approached significance. Levine's test of equality of

variance in the dependent variables was significant for one dependent measure: reproduction of conversations [$F(5, 114) = 4.70, p = .001$]. However, given the fact that sample sizes were equal between conditions, this assumption violation is less concerning than if sample sizes were unequal between conditions (Tweedy & Lunardelli, 2001).

A series of 2x3 univariate ANOVAs were run as follow-up analysis of the effects of Veracity and Incentive on each verbal cue individually. A Bonferroni adjusted *a priori* p value of .01 (.05/5) was used for the follow-up analyses for each independent variable, as well as for the interaction between the independent variables. For Veracity, statistically-significant effects were detected on the frequency of personal pronouns [$F(1, 114) = 13.36, p < .001, \eta_p^2 = .105$] and on reproduction of conversations [$F(1, 114) = 12.22, p = .001, \eta_p^2 = .097$]. A simple main effect of Veracity on cognitive operations approached significance [$F(1,114) = 4.39, p = .04, \eta_p^2 = .037$]. The accounts of participants in the Truthful condition contained a higher proportion of reproductions of conversations and a lower proportion of personal pronouns and cognitive operations than those in the Deceptive condition.

For Incentive, no statistically-significant simple main effects of Incentive were detected on the individual verbal cues. One simple main effect of Incentive (on reproduction of conversations) approached significance however [$F(2, 114) = 3.88, p = .02, \eta_p^2 = .064$]. Post hoc testing (using Dunnett's t-test) revealed that participants had higher proportions of reproductions of conversations in their reports of the criminal admission if they had received Negative Incentive compared to No Incentive instructions [Mean difference (MD) = .001, 95% $CIs = .0002, .0022$].

Finally, follow-up analyses of the Veracity x Incentive interaction on each individual verbal cue did not yield any statistically-significant effects. Only one Veracity x Incentive effect approached significance, on personal pronouns [$F(2, 114) = 3.60, p = .03, \eta_p^2 = .059$]. Consistent with hypotheses, a greater proportion of personal pronouns was found in participants' accounts of the criminal admission if they were in the Deceptive compared to the Truthful condition, but only for the Positive Incentive ($MD = .015, 95\% CIs = .004, .025$) and Negative Incentive ($MD = .017, 95\% CIs = .008, .026$) conditions. Figure 1 illustrates this finding. As predicted, but only for one verbal cue,

having an incentive to report a confession appeared to boost behavioural differences between liars and truth tellers as they reported that confession.

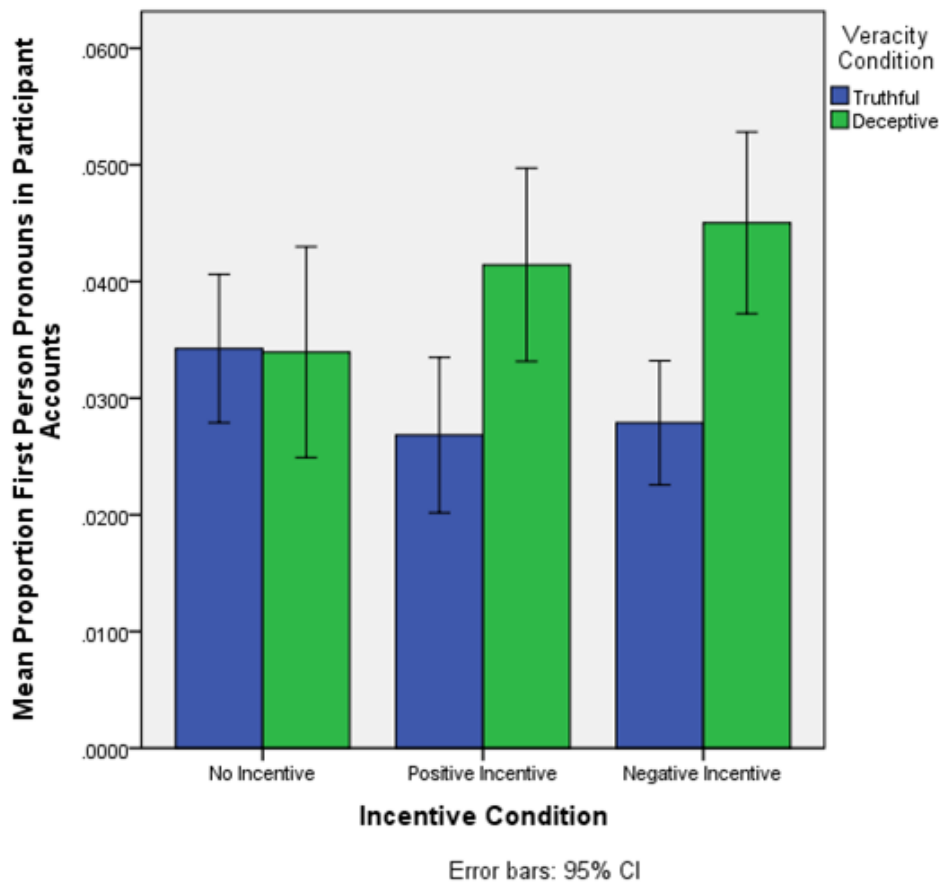


Figure 1: Veracity x Incentive Interaction on First Person Pronouns

3.2.3. Paraverbal Cue Analyses

One MANOVA and two univariate ANOVAs were run to examine the effects of Veracity and Incentive on the paraverbal cues assessed in this study. The MANOVA examined the effects of the independent variables on the proportion of repeated phrases, proportion of speech hesitations, proportion of speech errors, mean response latency to follow-up questions posed by the interviewer, and number of spoken words per minute. The two univariate ANOVAs were run to detect any effects of the independent variables on the total number of words spoken and the total length of interview in seconds. These dependent variables were analyzed separately from the MANOVA because they were used to transform other dependent variable values in this

study and therefore could not be analyzed with those transformed variables. Mean values of the paraverbal cues assessed here are reported by condition in Table 4.

Table 4: Paraverbal Cue Values (Transformed) by Experimental Condition

	Incentive Condition	Veracity Condition		Total
		Truthful	Deceptive	
Length Free Recall (sec)*		<i>Truthful</i>	<i>Deceptive</i>	<u>Total</u>
	<i>No Incentive</i>	117.25 (49.95)	68.15 (30.50)	92.70 (47.82)
	<i>Positive Incentive</i>	147.15 (52.40)	99.75 (59.46)	123.45 (60.30)
	<i>Negative Incentive</i>	129.45 (39.62)	82.00 (35.92)	105.73 (44.39)
	<u>Total</u>	131.28 (48.44)	83.30 (44.99)	107.29 (52.41)
Repetition of Phrases		<i>Truthful</i>	<i>Deceptive</i>	<u>Total</u>
	<i>No Incentive</i>	.0033 (.0030)	.0012 (.0020)	.0022 (.0027)
	<i>Positive Incentive</i>	.0021 (.0035)	.0027 (.0040)	.0024 (.0037)
	<i>Negative Incentive</i>	.0007 (.0021)	.0005 (.0014)	.0006 (.0018)
	<u>Total</u>	.0021 (.0031)	.0015 (.0028)	.0017 (.0029)
Speech Hesitations		<i>Truthful</i>	<i>Deceptive</i>	<u>Total</u>
	<i>No Incentive</i>	.0500 (.0251)	.0732 (.0302)	.0614 (.0300)
	<i>Positive Incentive</i>	.0575 (.0325)	.0672 (.0365)	.0623 (.0345)
	<i>Negative Incentive</i>	.0493 (.0182)	.0616 (.0411)	.0555 (.0320)
	<u>Total</u>	.0521 (.0258)	.0673 (.0360)	.0597 (.0520)
Speech Errors		<i>Truthful</i>	<i>Deceptive</i>	<u>Total</u>
	<i>No Incentive</i>	.0141 (.0101)	.0143 (.0084)	.0142 (.0092)
	<i>Positive Incentive</i>	.0125 (.0092)	.0154 (.0096)	.0140 (.0094)
	<i>Negative Incentive</i>	.0105 (.0071)	.0140 (.0087)	.0122 (.0080)
	<u>Total</u>	.0123 (.0089)	.0146 (.0088)	.0135 (.0089)
Response Latency (sec)*		<i>Truthful</i>	<i>Deceptive</i>	<u>Total</u>
	<i>No Incentive</i>	1.56 (.84)	2.05 (1.16)	1.81 (1.03)
	<i>Positive Incentive</i>	1.88 (1.12)	1.68 (1.01)	1.78 (1.06)
	<i>Negative Incentive</i>	1.56 (1.04)	1.59 (.81)	1.58 (.92)
	<u>Total</u>	1.67 (1.00)	1.77 (1.01)	1.72 (1.00)
Speech Rate (WPM)*		<i>Truthful</i>	<i>Deceptive</i>	<u>Total</u>
	<i>No Incentive</i>	150.00 (28.86)	135.30 (21.23)	142.67 (26.09)
	<i>Positive Incentive</i>	150.50 (28.70)	143.90 (28.05)	147.20 (28.21)
	<i>Negative Incentive</i>	154.80 (26.06)	153.60 (27.54)	154.20 (26.47)
	<u>Total</u>	151.77 (27.51)	144.27 (26.45)	148.02 (27.13)
Total Word Count*		<i>Truthful</i>	<i>Deceptive</i>	<u>Total</u>
	<i>No Incentive</i>	491.30 (289.94)	282.95 (119.98)	387.13 (243.10)
	<i>Positive Incentive</i>	578.20 (243.33)	397.80 (196.51)	488.00 (236.65)
	<i>Negative Incentive</i>	573.50 (280.12)	407.05 (185.96)	490.28 (249.36)
	<u>Total</u>	547.67 (270.24)	362.60 (177.34)	455.13 (245.83)

Table values = mean of transformed variable, standard deviation from mean in parentheses

*Variable did not require transformation

Multivariate tests (*Wilks Lambda*) did not detect statistically significant effects of either Veracity or Incentive on the five paraverbal cues. Levine's test revealed inequality in error variances across experimental conditions for repetition of phrases [$F(5, 114) = 4.25, p = .001$] and speech hesitations [$F(5, 114) = 3.90, p = .003$], but again, concerns over violations of this assumption are reduced because sample sizes were equal across experimental conditions.

A series of 2x3 univariate ANOVAs were run as follow-up analyses of the effects of Veracity and Incentive on the paraverbal cues individually, with a Bonferroni-adjusted p value of .01 to account for familywise error. A significant effect of Veracity was detected on the proportion of speech hesitations only [$F(1, 114) = 7.01, p = .009, \eta_p^2 = .058$]. Deceptive participants had a significantly higher proportion of speech hesitations in their accounts of the criminal admission than those in the Truthful condition. As for Incentive, statistically significant effects were detected on repetitions of phrases [$F(2, 114) = 4.90, p = .009, \eta_p^2 = .079$]. Dunnett's t-test revealed that participants in the Negative Incentive condition had a significantly lower proportion of phrase repetitions in their accounts than participants in the No Incentive condition ($MD = -.0016, 95\% CIs = -.0030, -.0002$). None of the interaction effects on any of the individual paraverbal cues were statistically-significant.

Results of the two univariate ANOVAs run to detect effects of Veracity and Incentive on the total word count and total length of interview indicated that statistically-significant effects of Veracity only were detected on both dependent variables [$F(1, 114) = 19.93, p < .001, \eta_p^2 = .149$; $F(1, 114) = 11.55, p = .001, \eta_p^2 = .092$]. In both cases, participants in the Truthful condition had Session 2 interviews that contained a greater number of words and were significantly longer in duration than participants in the Deceptive condition.

3.2.4. Nonverbal Cue Analyses

Finally, a MANOVA was run to examine the effects of Veracity and Incentive on the frequency of the following nonverbal cues emitted during the Session 2 interview: illustrators, limb movements, digit movements, eye blinks, instances of gaze aversion, smiles, and fidgeting/self-manipulations/adaptors. Table 5 displays the mean values for

the nonverbal cues by condition. Levine's tests of equality of error variances for all dependent variables were non-significant.

Table 5: Nonverbal Cue Values (Transformed) by Experimental Condition

	Incentive Condition	Veracity Condition		Total
		<i>Truthful</i>	<i>Deceptive</i>	
Illustrators	<i>No Incentive</i>	.0232 (.0200)	.0147 (.0197)	<u>.0189 (.0200)</u>
	<i>Positive Incentive</i>	.0211 (.0257)	.0130 (.0184)	<u>.0170 (.0223)</u>
	<i>Negative Incentive</i>	.0188 (.0181)	.0124 (.0152)	<u>.0156 (.0169)</u>
	<u>Total</u>	<u>.0210 (.0212)</u>	<u>.0134 (.0174)</u>	<u>.0172 (.0197)</u>
Limb Movements	<i>No Incentive</i>	.2557 (.1747)	.1716 (.1792)	<u>.2137 (.1798)</u>
	<i>Positive Incentive</i>	.1921 (.1986)	.2573 (.1846)	<u>.2247 (.1921)</u>
	<i>Negative Incentive</i>	.1528 (.1103)	.1774 (.1198)	<u>.1651 (.1143)</u>
	<u>Total</u>	<u>.2002 (.1681)</u>	<u>.2021 (.1658)</u>	<u>.2011 (.1663)</u>
Digit Movements	<i>No Incentive</i>	.5061 (.1956)	.4088 (.2097)	<u>.4574 (.2062)</u>
	<i>Positive Incentive</i>	.4562 (.2446)	.3886 (.2413)	<u>.4224 (.2422)</u>
	<i>Negative Incentive</i>	.4766 (.2139)	.4165 (.1526)	<u>.4465 (.1859)</u>
	<u>Total</u>	<u>.4796 (.2162)</u>	<u>.4046 (.2014)</u>	<u>.4421 (.2114)</u>
Eye Blinks	<i>No Incentive</i>	.5197 (.1609)	.5465 (.2370)	<u>.5331 (.2004)</u>
	<i>Positive Incentive</i>	.5322 (.2094)	.4853 (.2003)	<u>.5087 (.2037)</u>
	<i>Negative Incentive</i>	.5005 (.2274)	.4761 (.2279)	<u>.4883 (.2250)</u>
	<u>Total</u>	<u>.5175 (.1982)</u>	<u>.5026 (.2207)</u>	<u>.5100 (.2090)</u>
Gaze Aversion	<i>No Incentive</i>	.1625 (.0578)	.1475 (.0614)	<u>.1550 (.0594)</u>
	<i>Positive Incentive</i>	.1465 (.0738)	.1584 (.0563)	<u>.1525 (.0651)</u>
	<i>Negative Incentive</i>	.1411 (.0462)	.1445 (.0466)	<u>.1428 (.0458)</u>
	<u>Total</u>	<u>.1501 (.0600)</u>	<u>.1501 (.0545)</u>	<u>.1501 (.0571)</u>
Smiles	<i>No Incentive</i>	.0186 (.0179)	.0173 (.0185)	<u>.0180 (.0180)</u>
	<i>Positive Incentive</i>	.0177 (.0135)	.0185 (.0168)	<u>.0181 (.0151)</u>
	<i>Negative Incentive</i>	.0109 (.0110)	.0250 (.0163)	<u>.0180 (.0155)</u>
	<u>Total</u>	<u>.0158 (.0146)</u>	<u>.0203 (.0172)</u>	<u>.0180 (.0161)</u>
Fidgeting/ Self-Manipulators/Adaptors	<i>No Incentive</i>	.0204 (.0323)	.0618 (.1195)	<u>.0429 (.0885)</u>
	<i>Positive Incentive</i>	.0634 (.1471)	.0262 (.0264)	<u>.0448 (.1060)</u>
	<i>Negative Incentive</i>	.0881 (.1758)	.0681 (.0818)	<u>.0781 (.1357)</u>
	<u>Total</u>	<u>.0585 (.1340)</u>	<u>.0520 (.0856)</u>	<u>.0553 (.1120)</u>

Table values = mean of transformed variable, standard deviation from mean in parentheses

Multivariate tests did not reveal significant overall effects of Veracity [$F(6, 109) = 1.51, p = .18, \eta_p^2 = .076$] or Incentive [$F(12, 218) = 1.51, p = .83, \eta_p^2 = .033$] on the nonverbal cues. However, as for the verbal and paraverbal cues, a series of 2x3 univariate ANOVAs were run to detect any effects of Veracity and Incentive on the individual nonverbal cues assessed in this study. Against a Bonferroni-adjusted p -value of .007 to account for familywise error, an effect of Veracity approached significance for illustrators only [$F(1, 214) = 4.54, p = .04, \eta_p^2 = .038$]: a significantly higher proportion of illustrators were used by participants in the Truthful condition compared to the Deceptive condition. No statistically-significant effects of Veracity or Incentive were detected on any of the other nonverbal cues.

3.2.5. Verbal, Paraverbal, and Nonverbal Cue Findings–Summary

Partly consistent with hypotheses, there were at least some behavioural cues that distinguished between those who truthfully recounted a criminal admission they heard and those who lied about having heard such an admission. However, contrary to hypotheses, more verbal cues distinguished truthful from deceptive participants than nonverbal cues. Further, across nearly all cues examined here, incentive did not amplify differences in behavioural cues between Truthful and Deceptive participants in the Session 2 interview as predicted. In fact, as can be seen in Table 3, 4, and 5, incentives actually served to suppress differences between Veracity conditions for some cues.

3.2.6. SMCQ Analyses

A series of seven univariate ANOVAs were run to examine the effects of Veracity and Incentive on the seven self-reported SMCQ scales about participants' memory for the criminal admission that they had allegedly heard. Against a Bonferroni-adjusted p -value of .007 to account for familywise error, no statistically-significant effects of Veracity or Incentive were detected on any of the SMCQ scales. However, one simple main effect of Veracity approached significance for the Clarity and Vividness scale [$F(1, 119) = 6.93, p = .01, \eta_p^2 = .058$], whereby ratings on this scale were higher for participants in the Truthful condition compared to the Deceptive condition. Descriptive statistics for each of the seven scales of the SMCQ are reported by experimental condition in Table 6.

Table 6: SMCQ Scale Ratings by Experimental Condition

	Truthful			Deceptive		
	No Incentive	Positive Incentive	Negative Incentive	No Incentive	Positive Incentive	Negative Incentive
Clarity & Vividness	4.88 (1.07)	5.22 (.75)	5.08 (1.01)	4.33(1.04)	4.79 (1.00)	4.49 (1.07)
Sensory	2.69 (.93)	2.43 (.67)	2.66 (.54)	2.54 (1.13)	2.79 (1.10)	2.42 (.65)
Spatial	4.70 (1.54)	4.76 (1.26)	4.66 (1.28)	3.99 (1.32)	4.43 (1.34)	4.26 (1.43)
Time	3.75 (2.39)	3.03 (1.66)	3.55 (2.17)	2.76 (1.69)	3.72 (1.80)	3.26 (1.86)
Emotions & Feelings	2.79 (1.07)	3.41 (1.05)	3.43 (1.04)	3.38 (1.29)	3.27 (.92)	3.38 (1.07)
Reconstructability of Story	4.19 (1.41)	4.66 (.95)	4.43 (1.55)	4.00 (.98)	4.03 (.85)	4.20 (1.29)
Cognitive Operations	3.40 (.83)	3.32 (.85)	3.93 (.84)	3.41 (.86)	3.53 (.86)	3.77 (.91)

Mean for each scale in bold, standard deviation from mean in parentheses

3.3. Manipulation Checks

3.3.1. Affect Grid

At three points in the study (a baseline measure in Session 1, and measurements taken before and after the Session 2 interview), participants completed an Affect Grid to assess how they were feeling depending on their task. Table 7 displays the Affect Grid ratings by experimental condition.

Table 7: Affect Grid Arousal and Valence Ratings by Experimental Condition

		Truthful			Deceptive		
		No Incentive	Positive Incentive	Negative Incentive	No Incentive	Positive Incentive	Negative Incentive
Arousal Ratings							
	<i>Time 1</i>	-.13 (1.71)	.17 (1.34)	-.38 (1.63)	-.20 (1.51)	.11 (1.57)	-.55 (1.79)
	<i>Time 2</i>	.13 (1.89)	.50 (1.68)	-.13 (1.96)	-.15 (1.63)	-.11 (1.45)	.50 (1.88)
	<i>Time 3</i>	.75 (1.84)	1.33 (.99)	.63 (1.71)	.75 (1.21)	1.00 (1.24)	1.25 (1.62)
Valence Ratings							
	<i>Time 1</i>	1.13 (1.67)	1.33 (1.07)	1.69 (1.02)	1.15 (.99)	1.44 (1.20)	.85 (1.42)
	<i>Time 2</i>	.75 (1.61)	1.50 (1.45)	1.25 (1.81)	.35 (1.27)	.44 (1.50)	.60 (1.90)
	<i>Time 3</i>	1.06 (1.00)	1.50 (1.24)	1.06 (1.39)	.30 (1.26)	.89 (.96)	.90 (1.48)

Mean for each scale in bold, standard deviation from mean in parentheses

Two separate repeated measures ANOVAs were used to examine the effects of Veracity and Incentive (between-subjects factors) on the Affect Grid ratings for Arousal and Valence (within-subjects factors, where the ratings taken at the different time points comprised the three levels of Arousal or Valence, respectively). First, Mauchly's test indicated that the assumption of sphericity had been violated for the analysis of Affect Grid ratings of Arousal [$\chi^2(2) = 27; p < .001$], therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon = .825$). Tests of within-subjects factors detected a significant effect of Arousal rating only [$F(2, 188) = 26.6, p < .001, \eta_p^2 = .189$], whereby Arousal ratings varied by time of measurement. Pairwise comparisons revealed that compared to the Arousal rating made after the Session 2 interview, Arousal ratings were significantly lower at baseline ($MD = 1.11, 95\% CIs = -1.58, -.65$) and just prior to the Session 2 interview ($MD = .83, 95\% CIs = -1.19, -.46$). Figure 2 displays these findings. Statistically-significant differences in Arousal levels were not detected between Veracity or Incentive conditions. These findings indicate that being interviewed was a source of physiological arousal for participants irrespective of experimental condition.

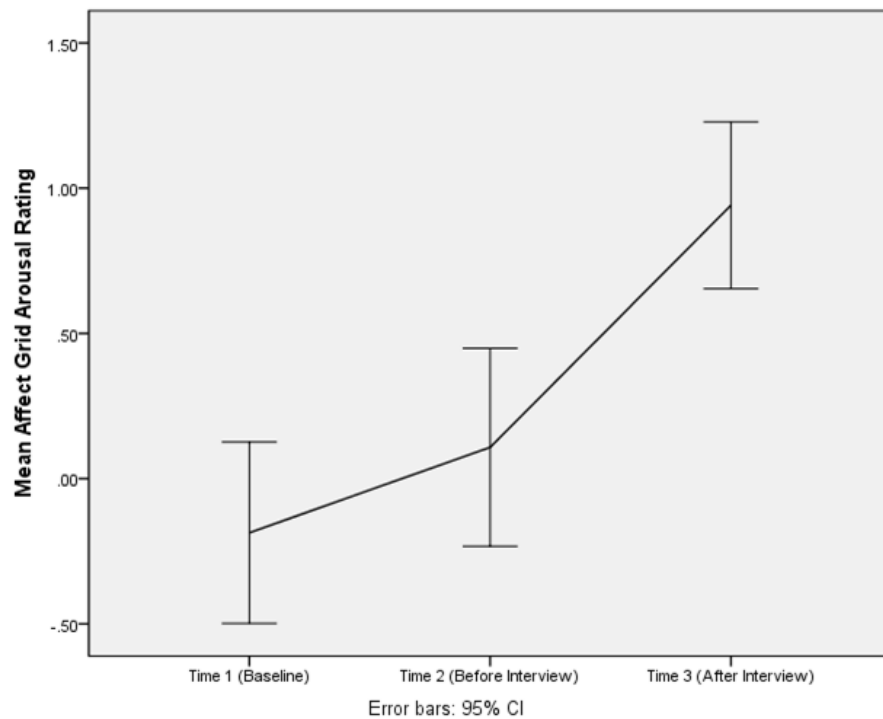


Figure 2: Affect Grid Arousal Ratings by Time of Measurement

Next, for the repeated measures ANOVA of Valence ratings, Mauchly's test indicated that the assumption of sphericity had again been violated [$\chi^2(2) = 6.3; p = .04$], therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon = .949$). A main effect of Valence rating was detected, whereby the ratings varied depending on the time at which they were measured during the study [$F(2, 216) = 3.51, p = .03, \eta_p^2 = .030$]. Pairwise comparisons revealed that overall, Valence ratings were significantly higher at baseline than immediately prior to the Session 2 interview ($MD = .45, 95\% CIs = .02, .88$), indicating that overall, participants felt less pleasant just prior to being interviewed than when they arrived at the first session of the study. Tests of between-subjects effects detected a significant effect of Veracity only [$F(1, 114) = 5.15, p = .03, \eta_p^2 = .046$], whereby Valence ratings in the Truthful condition were higher overall than for those in the Deceptive condition. Figure 3 illustrates this finding. Neither a significant effect of Incentive, nor a significant Veracity x Incentive interaction was detected on Valence ratings.

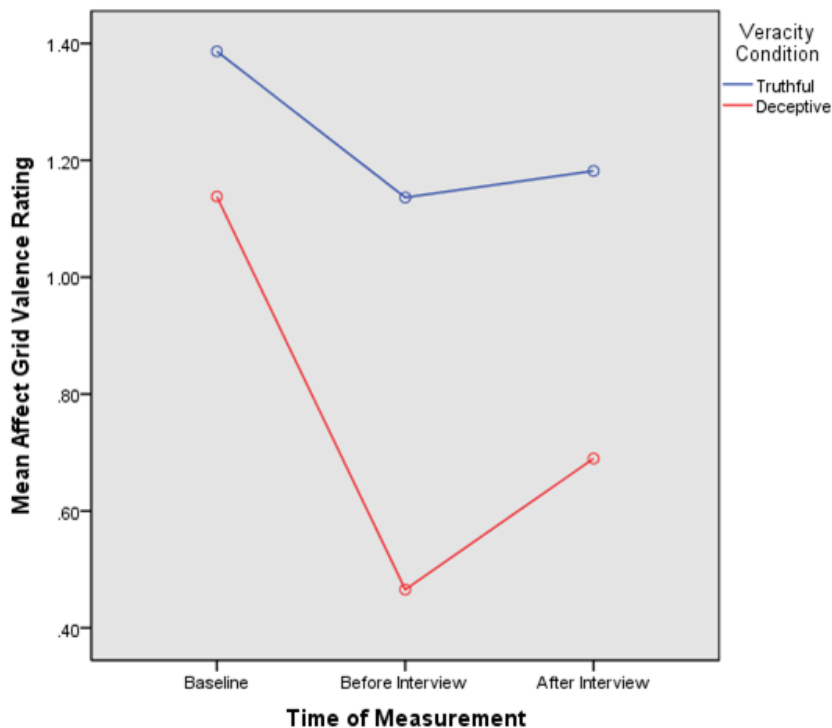


Figure 3: Affect Grid Valence Ratings by Veracity Condition and Time of Measurement

These findings are consistent in part with hypotheses regarding manipulations checks for this study. Contrary to hypotheses, arousal levels did not vary between Veracity or Incentive conditions, and participants did not vary in their overall arousal levels by which incentive instructions they received. However, consistent with hypotheses, participants who lied about seeing the admission video had less pleasant affective experiences than participants who saw it.

3.3.2. Preparation Questionnaire

Finally, to assess how participants had readied themselves in advance for the Session 2 interview, and to investigate if preparedness varied by experimental condition, participants were administered the Preparation Questionnaire. Results indicate that 92% of participants responded that they engaged in some preparation for the interview. The category endorsed most frequently was related to memory rehearsal: 83% of participants indicated that they mentally rehearsed what they were going to say ($M_{\text{times}} = 3$, range = 1-20). The next most common preparation strategy was writing or typing out the statement that would be provided during the interview: 48% of participants indicated that they had done so between one and four times. Ten percent of participants indicated that they rehearsed what they were going to say with another person once or twice. The remaining questionnaire items were endorsed infrequently; 3% of participants indicated that they researched what people typically say during interviews or how to appear honest, and another 3% provided alternative preparation strategies that were not listed (such as drawing on previous experience being interviewed by police and reflecting on crime television shows related to themes from the criminal admission). Finally, a single participant indicated that she had asked for advice from others as to how to conduct herself and appear honest during the interview. On average, participants endorsed two unique types of preparation strategies ($SD = 1.00$), and engaged in preparatory activities for the interview an average of three times prior to Session 2 ($SD = 1.88$).

A univariate ANOVA examined the effects of Veracity and Incentive on the total number of times that participants prepared for the Session 2 interview. Significant effects of Veracity [$F(1, 114) = .22, p = .64, \eta_p^2 = .002$] and Incentive [$F(2, 114) = 1.54, p = .22, \eta_p^2 = .026$] were not detected. However, a significant Veracity x Incentive interaction was detected [$F(2, 114) = 3.58, p = .03, \eta_p^2 = .059$], depicted in Figure 4.

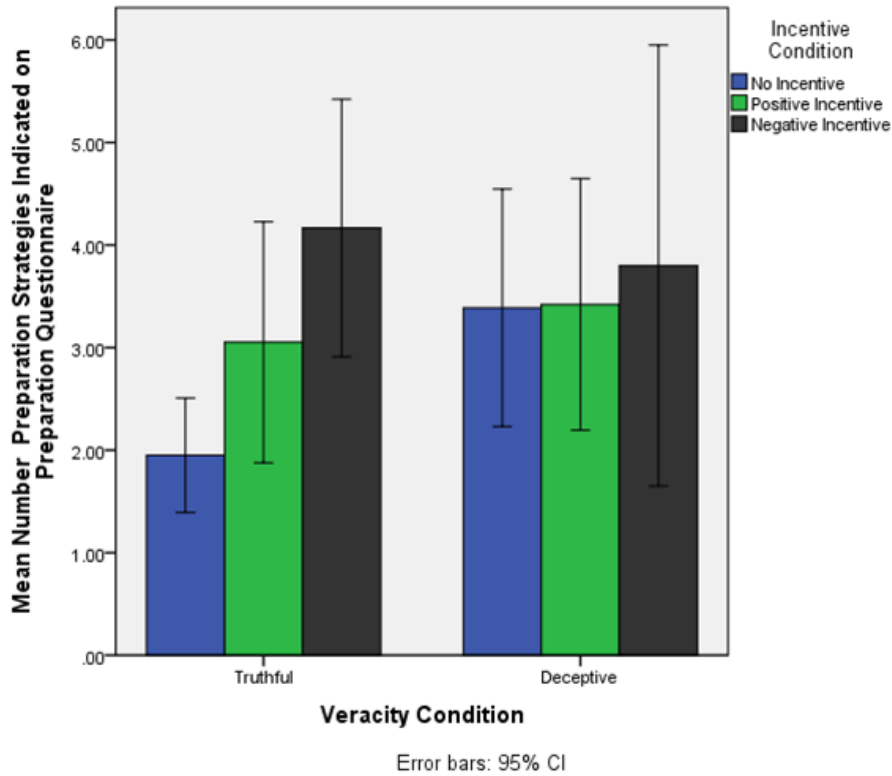


Figure 4: Total Number of Preparation Strategies by Experimental Condition

Pairwise comparisons revealed that within the Truthful condition, participants engaged in a significantly greater number of preparatory activities for Session 2 if they were in the Negative Incentive condition compared to the No Incentive condition only [$MD = 2.22$, 95% CI s = .52, 3.92]; significant pairwise comparisons between Incentive conditions were not detected within the Deceptive condition. Further, within the No Incentive condition, Deceptive participants prepared more for the Session 2 interview than Truthful participants [$MD = 1.44$, 95% CI s = .24, 2.64]; however, frequency of preparation did not vary between Truthful and Deceptive participants who were incentivized. Thus, partly consistent with hypotheses, having a negative incentive to prepare for the Session 2 interview seemed to motivate participants to prepare more frequently compared to those who were offered no incentive at all, at least amongst those who had heard the criminal admission.

Chapter 4.

Discussion

Though much research attention has been paid to behavioural cues to deception in criminal suspects and perpetrators, no recent published study has examined if there are valid cues that distinguish between truthful and deceptive informants who report criminal admissions. The current study investigated, in various ways, if we can observe behavioural differences between those recounting a criminal admission that they witnessed compared to those who pretend to have witnessed a criminal admission. Participants in this study either did or did not witness a videotaped admission to a crime, and then, one week later, reported the admission as if they had witnessed it. Some participants were offered a positive or a negative incentive to appear highly accurate and convincing in what they reported about the admission. Participants also completed other measures to assess qualities of their memory, affective experiences, and level of preparation to report the criminal admission. First, this study examined if there were differences between truthful and deceptive participants in verbal, paraverbal, and nonverbal cues as they reported a criminal admission. Second, the utility of a self-report measure, the Self-ratings of Memory Characteristics Questionnaire, in detecting deception in those who provide accounts of criminal admissions was investigated. Additionally, this experiment explored if and how the receipt of incentives alters the behaviours of informants while reporting a criminal admission. Finally, we observed how lying and incentives might affect the affective experiences of participants, as well as their willingness to prepare their reports of criminal admissions. This study offers some preliminary insights into how informants who report criminal admissions may behave, with and without incentives, while lying.

4.1. Behavioural Differences Between Truthful and Deceptive Informants' Accounts

The first prediction in this study was that a greater number of the nonverbal cues examined would distinguish truthful from deceptive accounts of a criminal admission than the verbal and paraverbal cues examined. The findings did not support this

hypothesis. There were at least some specific behavioural cues emitted while reporting the criminal admission that were found to be diagnostic of either deception or truth-telling. Truthful participants were significantly more likely to reproduce conversations (consistent with Vrij et al., 2004), provide longer free recall narratives and total interview durations, and to include a greater number of words in their accounts than deceptive participants (consistent with DePaulo et al., 2003). Deceptive participants' accounts of the criminal admission included proportionally more first person pronouns (a direction of differences inconsistent with Newman et al., 2003), more cognitive operations, and more speech hesitations than truthful participants (consistent with Vrij et al., 2008). Notably, no statistically-significant differences in the nonverbal cues examined here were detected between the behaviours of those who truthfully versus deceptively reported a criminal admission. Thus, if informants do imagine details of crimes that they did not witness but that they merely have described to them, such imagining may not exert the same effects on individual behavioural cues they emit while reporting criminal admissions to the extent initially predicted here.

However, a different finding in this study was consistent with that prediction. The second hypothesis in this study was that the SMCQ would not be successful at distinguishing truthful from deceptive informant reports. Indeed, only one of the seven scales yielded a meaningful difference on average between participants who were telling the truth versus lying about having heard a criminal admission. The SMCQ is based on the premise that the recollective properties of real events will differ from imagined events. Therefore, if in fact participants are using their imagination to recreate a crime that they were told about but never witnessed personally, this may explain why the SMCQ did not distinguish truthful from deceptive participants in this study. It is not argued here that the SMCQ cannot distinguish truthful from deceptive informant reports in a research setting, as that would require additional and more powerful experiments to be able to draw that conclusion. However, we did not find support for the SMCQ as a tool to detect lies in informant accounts in this study.

Of course, there are competing explanations as to why the SMCQ may have demonstrated poor discriminability in this study. One possible reason that the SMCQ did not distinguish true from false informants is that some of its scales might measure characteristics of reported events that do not feature prominently in reports of criminal admissions. For example, sensory information (like smell or touch) or spatial details

may appear less frequently in reports of criminal admissions. All participants in this study recalled the same event as well, thus their stories may simply not have varied enough for the SMCQ to distinguish between them. However, reports of criminal admissions still could have the potential to include details assessed by all SMCQ items, and there was substantial variation in the duration and level of details of the Session 2 interviews. Another reason why the SMCQ may have failed to distinguish liars and truth-tellers in this study is that the retrieval of an event that one has experienced may be qualitatively different than the retrieval of a conversation about an event that another person has experienced. For instance, participants in this study often reported the details of the criminal admission as if they were reporting details of the original crime, rather than describing features of their own experience of witnessing an oral account of a crime. In providing secondary accounts, they were more detached from the experience they were describing than eyewitnesses or perpetrators would be, an issue unforeseen prior to this experiment because participants were asked to recall everything they could remember about the admission to the crime. If the events that they report are not ones they experienced firsthand, perhaps informant accounts may not contain enough details for the SMCQ to be able to distinguish true from false informant accounts. Indeed, if informants provide accounts that appear less expressive or forthcoming, they act more like liars or those reporting imagined events.

Further, using the SMCQ as a deception detection tool may be problematic, even if it is only recommended for use in research settings. As mentioned previously, the SMCQ was adapted from the Memory Characteristics Questionnaire (Johnson et al., 1988), which was never intended as a tool to detect deception but rather to distinguish real from imagined events based on reported phenomenological characteristics of event memories. Though real events are assumed to be akin to true events, and imagined events akin to false events, and that real events should have greater or richer sensory and contextual details than imagined events, there is an issue with assuming that true and false events should differ in this way. The issue is that some studies have found that ratings of phenomenological qualities of memories can vary widely between different types of events that did in fact occur. For example, Byrne, Hyman, and Scott (2001) found that MCQ ratings are lower for memories of traumatic events than memories of positive experiences or other negative (but non-traumatic) experiences. Thus, if there are differences in MCQ ratings within real events, this calls into question whether lower

ratings of phenomenological characteristics of memory are valid indicators of deception. In any case, further exploration of the use of the SMCQ in assessing the veracity of informant reports is needed.

While we identified some behavioural cues to deception and truth-telling in informants as they report criminal admissions, detecting lies made by informants may not be exactly the same as with other witnesses. On one hand, nonverbal cues were not as useful in distinguishing truthful and deceptive informants as verbal or paraverbal cues. Therefore, cues which distinguish true from false reports of criminal admissions were more similar to the cues expressed by other types of witnesses than predicted. Though these findings were contrary to hypotheses, they do align with recommendations by lie detection experts to focus on verbal instead of nonverbal cues to deception (e.g., Vrij, Taylor, & Picornell, 2016). Obviously, lie detection is easier for criminal investigators if they can focus on the same, not different, behavioural cues across all people whose honesty they assess.

On the other hand, some findings here were inconsistent with past research. First, the majority of the SMCQ scales did not distinguish between lies and truths about hearing a criminal admission. Second, though all of the behavioural cues examined in this study have been shown to signal lying or truth-telling in past research (though not all in individual studies), some cues did not differ between truthful and deceptive participants. Not only were fewer behavioural cues to deception identified here, but the directions of differences for some cues between truthful and deceptive participants were opposite to those found in past research. For example, the frequency of first person pronouns was higher in the accounts of deceptive participants than truthful participants, but other lie detection studies (such as Newman et al., 2003, conducted based on linguistic analysis software of written statements of true and false events) have found the reverse. It is possible that the reporting of a criminal admission is done from an observer's perspective; that is, an informant does not witness the crime that occurred but merely provides a second-hand account of the crime. Thus, on one hand, truthful informants would not necessarily describe their interaction with the criminal perpetrator. Rather, they may relay the details of the crime as if repeating a story, rather than describing features of the source conversation. Dishonest informants, on the other hand, report more about the circumstances that led them to witness a criminal admission, because liars focus more on how they present their story (e.g., Vrij et al.,

2006), and may use more words like “I”, “me”, or “my” to convince an investigator of their active involvement in the conversation precipitating the criminal admission. Given the relative paucity of crime details to which they were privy, participants who fabricated reports of the criminal admission may have added more contextual comments to extend their narratives.

Of course, these are the findings of only one experiment, which is important to note because there is natural heterogeneity in the direction of behavioural cue differences between liars and truth-tellers across deception detection experiments (Levine & McCornack, 2014). Another study on informant reports could potentially find a greater number of personal pronouns in truthful compared to deceptive accounts. But if the findings here are valid and replicated, detecting lies in accounts of criminal admissions could be more challenging if any cues that typically signal truth-telling in other witnesses are cues to deception in informants (or vice versa).

Thus, the results of this study suggest a few things about deceptive behaviours in informants. First, there is preliminary evidence that there are some behavioural cues that can be used to distinguish those who falsely report criminal admissions from those who report them truthfully. Second, we should be cautious in assuming that findings of past lie detection studies apply to informants because this study did not support all cues to deception as cues to deception in informants, and found that some differences in shared diagnostic cues tended in different directions. Further, this study was not successful in demonstrating the use of the SMCQ as a tool that can distinguish between true and deceptive reports of criminal admissions in a research setting. However, more research is needed before strong conclusions can be drawn about which behavioural cues and measures are valid (or invalid) indicators of deception or honesty in informants.

4.2. Influence of Incentives on Informant Reports

This study also explored how inducements may affect both the contents of informants' reports of criminal admissions and the behaviours they express while providing those reports. The third hypothesis in this study was that any differences detected in behavioural cues and SMCQ ratings between liars and truth-tellers would be amplified for incentivized compared to non-incentivized participants. The results revealed that receiving an incentive to provide a criminal admission apparently did not

influence the verbal and nonverbal behaviours of participants to the extent anticipated. That is, incentives had no measureable effects on expression of any nonverbal cues expressed by participants during the Session 2 interview. One explanation for this finding comes from a meta-analysis by Hartwig and Bond (2014) which found that motivation to lie did not affect behavioural differences between liars and truth-tellers as strongly as once thought. However, incentives did affect some verbal and paraverbal cues in this study. Another possible explanation for this finding is that nonverbal cues are less susceptible to the influence of incentives. Indeed, Ekman and Friesen (1969) argue that nonverbal behaviours are harder to control than verbal behaviours. If incentivized participants were motivated consciously by incentives, it stands to reason that they would exert greater effects on verbal behaviours because participants can better control the contents of their reports than their nonverbal actions.

In fact, incentives did exert some effects on verbal and paraverbal behavioural cues in this study. The hypothesis that incentives would boost behavioural cue differences between deceptive and truthful participants relative to participants who were not offered incentives was only supported for one behavioural cue (first person pronouns). But incentives did affect the frequency of some behavioural cues across veracity conditions, yielding an unanticipated and curious pattern of results. For example, for personal pronouns, the difference in their frequencies between truthful and deceptive participants (whereby liars > truth-tellers) was more pronounced when incentives were offered to participants than if they were not. Yet most research has found that truthful individuals use more first person pronouns than liars. Similarly, reproductions of conversations were more frequent for participants who received a negative incentive compared to no incentive. Typically, reproducing conversations is associated with honesty. Participants who faced the prospect of returning for more research participation repeated phrases less often than participants who received no incentive for reporting a criminal admission. Most studies indicate that phrase repetition is a sign of dishonesty. Across these variables, a pattern emerged wherein incentives appeared to have altered the behaviours of participants in such a way that those who received incentives emitted behavioural cues in frequencies that made them appear more honest than un-incentivized participants, whether they were telling the truth or not.

This finding suggests that the promise of incentives could alter the perceived truthfulness of the report to the advantage of the informant. While the usual concern

about offering incentives is that they could motivate people to come forward to report criminal admissions that never occurred (e.g., Swanner et al., 2010), perhaps we should also be concerned that incentives could cause those reporting perpetrator admissions to present themselves in a way that makes them look more truthful than they actually are. If incentivized informants are deemed more credible than those not offered incentives, their statements or testimony could end up being more influential in the decision making of triers-of-fact than is justified, potentially leading to wrongful convictions.

Exactly why incentives might affect only some of the behavioural cues emitted by informants as they report criminal admissions remains unclear. If incentives motivated participants in this study to prepare more for their interviews, we would expect that incentivized participants would have prepared more times for their interview than those who did not receive an incentive. However, frequency of preparation was only higher for participants who received a negative incentive compared to no incentive, and only if participants truthfully recounted the admission. The failure to detect differences in number of preparation strategies within the Deceptive condition may reflect the fact that lying simply requires more preparation and resources than truth-telling, regardless of incentives. In any case, if incentives can make deceptive informants appear to be providing factual accounts, this is problematic. Given the power of confession evidence in court, it is important to ensure that the steps that law enforcement agents take to secure evidence do not compromise the integrity of that evidence.

4.3. Limitations

There are several limitations to this study. First, because this is one of the first studies to explore how informants lie, only a small proportion of the numerous behavioural cues and lie detection techniques examined in the deception detection literature were explored here. It is likely that there are some nonverbal cues that distinguish truthful from deceptive informants that were not examined in this experiment (e.g., voice pitch). Also, participants reported details from the same set of crimes, restricting the variety of details recounted from the criminal accounts and any potential behavioural cues associated with those reports. As a result, there may be cues that distinguish truthful from deceptive informants that have not yet been examined which are unique to or are more commonly found in reports of criminal admissions. For example, participants often mused during their interviews if the perpetrator was completely

forthcoming about his involvement in the crimes or if the crimes had happened as he said they did. If participants in this study had witnessed and reported an actual crime, it is unlikely that they would have questioned whether their eyes provided them with a true account of the crimes or if the perpetrator had committed the crimes as planned.

In fact, people who witness criminal admissions are expected to provide more diverse reports than eyewitnesses. When memory for conversations and oral communications are examined in legal proceedings, more details are relevant to proceedings than merely the specific details of the recollected conversation (i.e., the specific admission to a crime). For instance,

[s]ometimes the only issue is *what* was said, as is often the case when the conversation involved only two persons, and the time and context are clearly established. But often the issues are far more complex. Witnesses to group interactions may be asked to recall not only what was said, but *who* said it, and *to whom*. A particular utterance may have more or less probative value, depending on such *contextual issues* as the *personal histories* of the maker of the statements of those who hear it, *what else* was occurring concurrently, *when* the conversation took place, *who else* may have witnessed it, and *which of many* conversations in which a particular exchange took place (Davis & Friedman, 2007, pg. 4).

If investigators seek more varied details from witnesses who report crime-related conversations than from other types of witnesses, there is potential for the former reports to at least contain contents that are accompanied by cues to deception (or truth-telling) that do not routinely show up in the reports of the latter. Thus, this study does not represent an exhaustive analysis of all features of reports of criminal admissions or the techniques used to evaluate their veracity.

Second, this study did not examine actual informants to real criminal admissions, rather undergraduates in a laboratory setting. Real informants were not examined here in part because accessing their accounts of criminal admissions is extremely challenging. Informants could be difficult to recruit as research participants, given their rarity relative to other types of witnesses, a general unwillingness to be identified as a “snitch”, and the fact that a considerable amount of secrecy surrounds the handling of sources like informants. Further, the reports of informants are not recorded as frequently as perpetrator statements (Kassin, personal communication, June 21, 2010), and a repository of informant reports does not exist that is easily accessible to researchers. Indeed, if informants’ statements are taken and their identities are intended

to confidential, the existence of audio- or video-recording of those statements could endanger their safety.

It is possible that participants may have acted differently had they witnessed and reported a real criminal admission in their daily lives: the incentives offered in this study are unlikely to be as motivating as the incentives that real jailhouse informants receive, and lying to a researcher, when instructed to do so, is much different than deceiving a criminal investigator. Ethically, we are restricted in the intensity or strength of the incentives we can offer in experiments, and we cannot replicate the real world experience of reporting a criminal admission perfectly. As such, the stakes of the situation were undoubtedly lower for participants than real informants, which could have reduced any behavioural differences between our experimental conditions. The fact that no differences were found in Affect Grid arousal ratings between Veracity or Incentive conditions supports this notion. Behavioural differences between liars and truth-tellers are already small and difficult to detect (DePaulo et al., 2003), so anything that diminishes further those small differences could mask effects that exist in the real world. However, some researchers argue that intensity of the stakes in lie detection experiments does not diminish behavioural differences between liars and truth-tellers to the extent once thought (e.g., Levine & McCornack, 2014). Also, this study examined how people report verbal accounts of a crime that they heard or lied about hearing – we had no reason to expect that real-life informants would lie or tell the truth differently than undergraduate participants. This study did not attempt to capture the complexities of a real life scenario where an informant reporting a criminal admission, as previously mentioned, but rather sought to examine if any cues can distinguish a truthful report or a criminal admission from a deceptive report.

Third, it remains unclear if the SMCQ is sensitive to the effects of veracity or incentives. SMCQ scale ratings in this study did not vary by experimental conditions as some verbal and paraverbal behavioural cues did. In addition to the issue discussed earlier of whether the SMCQ can be used to detect deception in general, there may have been an issue with the study instructions specifically that could have affected the outcome. Participants in this study completed the SMCQ following the interview in Session 2 of the study. As most of the emphasis in the instructions centered on appearing honest and convincing during the interview, perhaps the strength of the effects of the experimental manipulations waned at the end of the study when they

completed the SMCQ. Participants were instructed specifically to complete the SMCQ ratings based on their memory of witnessing the admission video. However, participants were not specifically queried as to whether they felt compelled to appear honest and forthcoming in their reports on the SMCQ as during the interview, or if any incentive they received encouraged them to do so.

Finally, a notable shortcoming of this study is that it is a static, post-hoc analysis of the cues to truth-telling and deception that appear in the accounts of informants. On one hand, this type of analysis is needed to determine exactly what cues are diagnostic of deception in the accounts of informants. However, most deception detection experts now argue that researchers and criminal investigators should begin to move away from the post-hoc analysis of the contents of and behaviours exhibited during criminal accounts, and to move toward creating conditions whereby investigators do things during interviews to boost the differences between liars and truth-tellers to detect deception in real time (e.g., Hartwig, Granhag, & Luke, 2014).

4.4. Future Research

There are a number of useful avenues of future research. First, the findings here should be replicated to see if the same cues to deception are found to be significant. Second, future studies should examine additional cues to deception and truth-telling in informants that were not studied here. It would be useful to examine the contents of accounts of criminal admissions more closely to determine if any of their unique features diverge in frequency, quality, or kind between truthful and deceptive informants. Third, more efforts need to be made to examine actual informant accounts to determine whether laboratory analyses of non-informants apply in the real world. Further, future studies should examine a greater variety of admissions to crime that informants could report upon. Finally, future studies should apply more modern approaches to detecting deception by exploring whether the techniques used to boost behavioural differences between honest and deceptive people as they are interviewed will also work with informants. Indeed, this approach is prudent given that confidential informants who report criminal admissions may not have their interviews recorded and thus their behaviours could not be analyzed post hoc. One such method is the Strategic Use of Evidence (SUE) technique (Hartwig et al., 2014), which involves the disclosure of evidence to a suspect in such a way as to induce liars to make within-statement

inconsistencies that signal their deception. If the strategies that liars employ to conceal their deception often hinge on their ability to keep track of numerous critical details about the admissions that they hear, and if, as discussed earlier, that more details are often requested of an informant than might be anticipated, this could be used against deceptive informants.

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Appendix A

Conceptualization & Operationalization of Verbal, Paraverbal, and Nonverbal Cues

<i>Verbal Cues</i>	
1 st Person Pronouns	Record frequencies of each first person pronoun present in transcript (e.g., I, me, my) and sum total.
Exclusion Words	Record frequencies of words present in transcript that signal exclusion of or restrict the meaning of the contents of speech (e.g., except, without, just, only) and sum total.
Spontaneous Corrections	Record frequency of details corrected by participant in transcript (e.g., "He argued with the man and then shot him...no wait, it was his friend that shot the man").
Reproductions of Conversations	Record frequency of instances in which participants repeat/recreate the contents of verbal accounts in transcript and video. Conversation must be a specific and unique instance in which verbal accounts are described, not just a recounting of details reported by the confessor. One unit = each description of specific verbal accounts of perpetrator (example: "Then the guy said, 'Who does he think he is, telling me I didn't tip him enough?"). Similar to quoting the perpetrator.
Cognitive Operations	Record frequency of instances in which the interviewee reports on their own mental state (e.g., recalling, believing, knowing, seeing) from transcript.
<i>Paraverbal Cues</i>	
Repetitions of phrases	Record frequency of standalone phrases repeated in transcript (containing a subject and verb at minimum). Example: "I remember him looking nervous; yes, I remember him looking nervous." One unit = any repetition of a phrase in close succession (only code repetition of phrase once, even if it is repeated multiple times).
Speech Hesitations	Record frequencies of all filled hesitations (e.g., "umm", "ahh", "hmm", "err") and silent pauses present in transcript, then sum total.
Speech Errors	Record "frequenc[ies] of word...repetition, sentence change, sentence incompleteness, and slips of the tongue" (Vrij, Edward, Roberts, & Bull, 2000) from interview transcript and sum total.
Length Free Recall	Record length of time (in s) of participant's free recall narrative from video using digital recorder.
Response latency	Record length of time (in ms) between conclusion of each interview question and beginning of response given using digital recorder. Take mean of all recorded response latencies.
Speech Rate	Calculate number of spoken words (using the word count option in Microsoft Word) and divide by Length of Informant Accounts variable converted to minutes.
<i>Nonverbal Cues</i>	
Illustrators	Record frequency of arm and hand movements from video intended to modify or supplement verbal contents of speech (example: participant moves hand into shape of gun and says, "And then he pulled out a gun and shot the waiter." One unit = observed initiation and termination of each illustrator (example: shaping a hand into a gun, then relaxing hand).
Limb Movements	Record frequencies of arm and leg movements from video and sum total. One unit = moving limb to and from baseline position (example: raising arm from and lowering it to lap).
Digit Movements	Record frequency of finger movements from video. One unit = movement of digit to and from a baseline position, such as raising and lowering finger from hand resting on table.
Blinking	Record frequency of eye blinks by participants from video. One unit = one blink.
Gaze Aversion	Record frequency of instances during video when participant averts gaze from interviewer. One unit = each observed initiation and termination of eye contact with interviewer.
Smiling	Record frequency of smiles and laughs. One unit = each observed initiation and termination of smile or laugh.
Fidgeting/Self-Manipulations/Adaptors	Record frequency of nervous or repetitive behaviour, or modifications to appearance (e.g., scratching head or wrists, touching hair; fiddling with strings or buttons on clothes, smoothing of clothing, readjusting sitting position). One unit = each observed initiation and termination of behaviour (examples: each time participant moved necklace pendant from left to right, brushed hair from face, or bit a fingernail).

Appendix B

Experiment Protocol and Research Assistant Script

First Session

Before Participant Arrives: Select an ID number out of the envelope marked “Conditions”. Check the “Conditions” sheet to determine the participants’ condition. Write the ID number on the sheet titled “Conditions and Participant Info”.

Instructions to All Participants

Thank you for participating in the first session of our study today. This study is composed of two sessions. The first one is today and the second is in one week. Are you able to come back in exactly one week at this time?

Write down date and time of participant’s second session on the “Conditions and Participation Info” sheet. Give participant consent form.

Here is the consent form. Please read it carefully and let me know if you have any questions. If you would still like to participate, please print your name, as well as sign and date the consent form, and we will get started.

Collect consent form and place in “Completed Consent Forms” folder. Collect demographic information from participant and write it on “Conditions and Participant Info” sheet.

In this study, we are investigating memory for criminal confessions. What you are going to do today is hear a confession to a crime. The confessor has been accused of committing and being an accomplice to several crimes. Essentially, the confessor is going to reveal that, on the night in question, he and a friend went out to dinner. The relationship between the two men is poor because the confessor’s friend always makes him pay the bill when they go out for meals. This night is no different, and as a result the two men get into an argument outside of the restaurant. In the clip you are about to watch, the confessor will reveal that, during the course of the argument, the waiter comes out of the restaurant and confronts the confessor about why he did not leave him

a tip proportionate to the expensive bill. The confessor reveals that he became so angry that he threw an object at the waiter's head, who subsequently fell down and had a seizure. The confessor's friend steps in and shoots the waiter and the two men exit the crime scene, but not before the friend steals the money used to pay the bill from the waiter.

Do you have any questions?

Instructions to Participants Who Will Be Exposed to the Clip

Here is the clip. It's quite short, so make sure that you pay close attention while it plays.

Play video clip.

We are almost finished up for today, but I have some important instructions for you to keep in mind for Session 2. In one week, you will be interviewed about the confession that you just heard, just as you would if the man had actually sat across from you and told you all about the criminal activity in which he was involved. If you had actually witnessed such a confession, law enforcement officials would be interested in interviewing you about what you heard, so I am going to get you to pretend that you will be interviewed for such a purpose.

What I would like you to do next week is try your best to accurately recall everything you can about what you heard in the confession, and to do so in a convincing fashion because an independent rater will be reviewing the videotape of your accounts to assess how convincing you are that you actually heard the confession. Between now and Session 2, you are free to do whatever you like to prepare what you will recall, just as you might in anticipation of such an interview with law enforcement. We will be asking you next week what you did to prepare for the interview, so please keep track of this.

Instructions to Those in the Positive Incentive Condition

As an added incentive for your performance in the Session 2 interview, if you are able to demonstrate high accuracy in your recall of the confession, and convince the independent rater that you did in fact hear the confession, you will be entered into a draw for a prize of \$200. The winner's name will be drawn at the end of the semester. Try your best to prepare adequately in order to get your name into the draw. OK?

Instructions to Those in the Negative Incentive Condition

Just to ensure that you prepare as well as you can for the interview, if your recall of the details of the confession is poor in the Session 2 interview, and you are not able to convince the independent rater that you did in fact hear the confession, you will be compelled to return for 4 additional hours of research participation in some pretty tedious and boring experiments. Try your best to prepare adequately in order to avoid returning for additional research participation. OK?

Note: if participants question if we are allowed to compel them to come back for 4 hours of research participation, tell them that this is a new rule, motivated by the fact that some students in previous years did not take their role as research participants seriously and their data had to be thrown out. Then tell them that as long as they take their task seriously, they should be fine.

Instructions to Participants Who Will NOT Be Exposed to the Clip

Actually, on second thought, I am going to ask you to complete this study a little differently than I just described. What I am going to ask you to do instead is to pretend as if you heard the clip that I just described to you.

If you had actually witnessed such a confession, law enforcement officials would be interested in interviewing you about what you heard, so I am going to get you to pretend that you will be interviewed for such a purpose. Of course, you have not actually heard the confession, so I am going to ask you to do your best to construct a fabricated confession, while pretending that you did see and hear the confession.

What I would like you to do next week is try your best to provide a convincing account of what you might have heard in the confession. An independent rater will be reviewing the videotape of your accounts to assess how convincing you are that you actually heard the confession. Between now and Session 2, you are free to do whatever you like to prepare what you will say, including using any information that I have given you today about the clip, just as you might in anticipation of such an interview with law enforcement. We will be asking you next week what you did to prepare for the interview, so please keep track of this.

Instructions to Those in the Positive Incentive Condition

As an added incentive for your performance in the Session 2 interview, we will be recording your interview and showing it to an independent rater. If you are able to convince him or her that you actually heard the confession and provided a truthful account, you will be entered into a draw for a prize of \$200. The winner's name will be drawn at the end of the semester. Try your best to prepare adequately in order to get your name into the draw. OK?

Instructions to Those in the Negative Incentive Condition

Just to ensure that you prepare as well as you can for the interview, we will be recording your interview and showing it to an independent rater. If you are NOT able to convince him or her that you actually heard the confession and provided a truthful account, you will be compelled to return for 4 additional hours of research participation in some pretty tedious and boring experiments. Try your best to prepare adequately in order avoid returning for additional research participation. OK?

Note: if participants question if we are allowed to compel them to come back for 4 hours of research participation, tell them that this is a new rule, motivated by the fact that some students in previous years did not take their role as research participants seriously and their data had to be thrown out. Then tell them that as long as they take their task seriously, they should be fine.

Instructions to All Participants

The session is over for today, thanks for coming in. When you return next week, the experimenter will not be informed as to whether you did or did not actually hear the confession. You will be returning to this room in one week at _____AM/PM to complete the second session of the study. It is very important that you return for the second session, otherwise we can't give you the 2% credit. I would also appreciate it if you could keep the specific details of what you did today to yourself just in case you know other students who are participating in this study – this is VERY important to the success of our study. Thanks. See you next week.

Second Session

Instructions to All Participants

Thanks for coming back today for the second part of the study. Let's get started. Put a check beside the participant ID on the "Conditions and Participant Info" sheet to note that they returned for Session 2.

In the first session of this study, you heard a confession to a crime. What I would like you to do today is just to try to recall as many details from what the perpetrator revealed to you as you possibly can. I know that it's been a little while since you heard the confession, but generally people find that if they are able to get back to the same "place" they were in when they initially heard the confession, they can not only remember more information, but they can also remember it more accurately. This includes reinstating not only your physical context – so where you were in the room, how far you were sitting from the confessor– but also your mental context, such as what you were thinking and how you were feeling as different details from the confession were revealed.

Try to report as many details as you can about what you heard in the confession, big or small. No detail is unimportant. Also, you are in control of the interview, so feel free to report the details in any order that you like. Feel free to backtrack and add more details as you remember them, as well as correct yourself if you feel you need to.

Just to remind you, we will be audio- and video-recording this interview. I am just going to read your participant number into the recorder and you can go ahead anytime after that when you are ready. OK?

Begin interview. Read in date, time, participant number, and session # into recorder and place in front of participant on desk.

I'd like to ask you a few more questions about the confession:

First, can you describe the appearance of the confessor when he revealed the details of the crime to you? For instance, his hair colour or what he was wearing?

Second, can you recall anything about your own thoughts and feelings last week as you listened to the confession? **Try to prompt them for information that they don't report on if they only report thoughts or feelings. Often participants will say things like, "I felt that the confessor was not being completely honest", which is a thought, not a feeling. Just make sure that they have the opportunity to report both thoughts and feelings.**

Third, are there any additional details that you can recall about what the confessor said about the crimes he committed on that occasion?

Great. The last thing that we are interested in is how confident that you are in your recollection of the confession. I would like you to rate your confidence on a scale of 0-100%, just in 10% increments, in the accuracy of your recall of all of the details that you revealed today. How would you rate your overall confidence?

Turn off video cameras and audio recorder.

Next, I would like you to complete one more rating of your current mood.

Give participant Affect Grid.

Next, I would like you to complete this questionnaire about your memory for the criminal confession that you heard last week.

Give participant SMCQ.

As I mentioned last week, we would like you to indicate on this sheet what you did in preparation for this interview.

Give preparation sheet.

Great, we're all finished. Thanks for helping us out today.

Fill out research participation slip and give to participant. Give debriefing form and inform them that they will be entered, regardless of their performance in the study, into a draw for a prize of \$200.

Remember to ask if we can contact them via their SFU email, or if there is an alternative email address that we should use to contact them if they win the draw. Inform them that we can only contact them if they win. Remind participants not to discuss the details of the study with anyone until the semester is over.

Appendix C

Self-ratings of Memory Characteristics Questionnaire

Please complete the following section on your memory for the confession you heard.

My memory for the event

- ___ 1. is 1 = dim, 7 = sharp/clear
- ___ 2. is 1 = black and white; 7 = entirely color
- ___ 3. involves visual detail 1 = little or none; 7 = a lot
- ___ 4. involves sound 1 = little or none; 7 = a lot
- ___ 5. involves smell 1 = little or none; 7 = a lot
- ___ 6. involves touch 1 = little or none; 7 = a lot
- ___ 7. involves taste 1 = little or none; 7 = a lot
- ___ 8. Overall vividness is 1 = vague; 7 = very vivid
- ___ 9. My memory for the event is 1 = sketchy; 7 = very detailed
- ___ 10. Order of events is 1 = confusing; 7 = comprehensible
- ___ 11. Story line is 1 = simple; 7 = complex
- ___ 12. Story line is 1 = bizarre; 7 = realistic
- ___ 13. My memory for the location where the event takes place is 1 = vague; 7 = clear/distinct
- ___ 14. General setting is 1 = unfamiliar; 7 = familiar
- ___ 15. Relative spatial arrangement of objects in my memory for the event is 1 = vague; 7 = clear/distinct
- ___ 16. Relative spatial arrangement of people in my memory for the event is 1 = vague; 7 = clear/distinct
- ___ 17. My memory for the time when the event takes place is 1 = vague; 7 = clear/distinct
- ___ 18. for the year is 1 = vague; 7 = clear/distinct
- ___ 19. for the season is 1 = vague; 7 = clear/distinct
- ___ 20. for the day is 1 = vague; 7 = clear/distinct
- ___ 21. for the hour is 1 = vague; 7 = clear/distinct
- ___ 22. The event seems 1 = short; 7 = long
- ___ 23. The overall tone of the memory is 1 = negative; 7 = positive
- ___ 24. In this event I was 1 = a spectator; 7 = a participant
- ___ 25. At the time, the event seemed like it would have serious implications: 1 = not at all; 7 = definitely
- ___ 26. Looking back, this event did have serious implications: 1 = not at all; 7 = definitely
- ___ 27. I remember how I felt at the time when the event took place: 1 = not at all; 7 = definitely
- ___ 28. Feelings at the time were 1 = negative; 7 = positive

- ___ 29. were 1 = not intense; 7 = very intense
- ___ 30. As I am remembering now, my feelings are 1 = not intense, 7 = very intense
- ___ 31. I remember what I thought at the time: 1 = not at all; 7 = clearly
- ___ 32. This memory reveals or says about me: 1 = not much; 7 = a lot
- ___ 33. Overall, I remember this event: 1 = hardly; 7 = very well
- ___ 34. I remember events relating to this memory that took place: in advance of the event: 1 = not at all; 7 = yes, clearly
- ___ 35. after the event: 1 = not at all; 7 = yes, clearly
- ___ 36. Do you have any doubts about the accuracy of your memory for this event? 1 = a great deal of doubt; 7 = no doubt whatsoever
- ___ 37. Since it happened, I have thought about this event: 1 = not at all; 7 = many times
- ___ 38. talked about it: 1 = not at all; 7 = many times

39. About when did this event happen? (Circle one)

just today yesterday few days ago last week few weeks ago last month few months ago last year longer (if childhood, indicate age)

Please complete the following section on your opinions related to detecting whether another person is credible or not. There is no wrong answer here; we are simply interested in your opinion.

40. On average, are you a good lie detector? (Circle one) Y N

41. Name five cues or behaviours that you think indicate that a person is telling the truth

42. Name five cues or behaviours that you think indicate that a person is lying.

Thank you for completing this questionnaire. Please return this form to the experimenter.

Appendix D

Preparation Questionnaire

Please read the list below and tick the box beside the statements that best describe how you prepared for the interview today (make multiple selections if appropriate):

- I rehearsed what I was going to say today in my head.
If selected, please indicate the number of times you rehearsed in this way: _____
- I rehearsed what I was going to say today for another person/other people.
If selected, please indicate the number of times you rehearsed in this way: _____
- I rehearsed what I was going to say today by writing down or typing out my statement.
If selected, please indicate the number of times you rehearsed in this way: _____
- I asked others for advice on how to best prepare for the interview.
- I did research (e.g., using Google search, reading articles, etc) on what people in my situation would say during such an interview.
- I did research (e.g., using Google search, reading articles, etc) on ways to make myself appear honest and forthcoming in the interview.
- Other (please specify in space provided):

- I did nothing to prepare for this interview.

Appendix E

Affect Grid

