AN EXPERIMENTAL STUDY ANALYSING EFFECT OF COMMUNICATION MEDIUM AND MOTIVATION ON DECEPTION DETECTION IN INTERPERSONAL DYADIC INTERACTIONS

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ABSTRACT

This thesis reports an experimental study that examines the role of communication medium and liar motivation on deception detection. Participants were randomly assigned to one of two dyadic communication conditions, text-based instant messaging or face-to-face, and to one of two motivation conditions, high or low. Participants engaged in a discussion of four topics, in which one participant was deceptive during two topics and truthful during the other two. No main effect of communication medium or motivation level was observed. However, an interaction effect suggests that highly motivated liars interacting in an instant-messaging medium were the most successful in deceiving their partners. The implications of these results are discussed both in terms of the elimination of nonverbal cues and the potential advantages offered by text-based communication settings to the motivated liar.

BIOGRAPHICAL SKETCH

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I dedicate this thesis to my Father, a man incomparable and gifted beyond words. He is a brilliant man and a wonderful human being. His caring and thoughtful gestures always bring out a smile in the lives of people around him. Whatever I am today is because of his support and confidence. He has always set stretch targets for me, and has always inspired me by his example. He has been a role-model to me all my life and I continuously strive to live up to, and exceed, his expectations. I am trying and hoping that I achieve a miniscule percentage of what he has achieved over a lifetime of professional excellence, selfless love and devotion to all.

"Papa, this is for you."

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INTRODUCTION

"It is as easy as lying."

- William Shakespeare, Hamlet Prince of Denmark (Hamlet III, ii) I

"A lie never lives to be old."

- Sophocles, Acrisius (frag. 59) (Shepard, 2004)

Truth and lying have been debated as part of communication ethics since time immemorial. An important component of this debate has the definition of lying. For example, some researchers distinguish between the terms deception and lying. Bok (1999) refers to lying as any deceptive message in a statement that is vocalized, while deception refers to the attempt to make others believe what you yourself do not and is considered as a broader concept that includes lying and other forms of deception such as deceptive gestures, disguise, and silence. Other scholars do not distinguish between the terms and use them interchangeably (e.g., DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996). Ekman (2001), for example, argues that concealment is just as much a lie as falsification, as long as there is an expectation that concealment will not occur. Similarly, Mitchell (1986) defines deception as a false communication intended to benefit the communicator. In contrast, a broken promise, the failure to remember, and sarcastically intended remarks are not considered deceitful (Ekman, 2001; Zuckerman, DePaulo, & Rosenthal, 1981).

For the purpose of the present research, deception is defined as "a successful or unsuccessful deliberate attempt, without forewarning, to create in another a belief which the communicator considers to be untrue" (Vrij, 2000, p. 6). That is, deception is a conscious attempt to mislead another person by either concealing or

giving false information, and involves willful manipulation of another individuals' ability to accurately assess the truthfulness of a statement or situation (e.g., Ekman, 2001).

Deception can be manifested in many forms, from the simple white lies that are often told for the purpose of facilitating social interaction (e.g., "I like your haircut" when in fact the person did not like the haircut), to more serious lies that involve crime or infidelity (e.g., President Clinton saying "I did not have sexual relations with that woman, Ms. Lewinsky."). Outright lies are complete falsehoods. On the other hand, exaggerations are lies with hyperbole, and the information conveyed exceeds the truth (e.g. embellishing one's strength in job interviews). More subtle lies are literal truths designed to mislead (e.g., President Bush saying "Yes, we found a biological laboratory in Iraq which the UN prohibited," when he actually meant that two modified truck trailers, used to fill weather balloons, were found.). A distinction can also be made between self-oriented lies and other-oriented lies. Self-oriented lies are intended to make the liar appear better or to gain personal advantage, while other-oriented lies are used by people to make others appear better or are told for the benefit of another person.

Deception appears to be an important part of our daily interactions. In one study, people were found to lie in one out of every three interactions, and to lie to 38% of the people with whom they interacted over a period of one week (DePaulo et al., 1996). Similarly, a study by Feldman, Forrest, and Happ (2002) found that 60% of participants told at least one lie during a 10 minute conversation where they were told to interact with a stranger, and on average, speakers told 2.9 lies during the conversation.

In general, people are not very good at identifying deceptive behavior. In fact, the accuracy of deception detection by non-experts tends to be at about, or only

marginally better than chance (Vrij, 2000). A review of the literature concerned with deception detection, however, suggests that there are a number of factors that can influence an individual's ability to successfully detect deceit. For example, a study by Porter, Woodworth, and Birt (2000) found that both Parole Officers and undergraduate students improved in their accuracy level after receiving training on empirically based factors of deception. Perhaps the most important of these factors are the verbal and non-verbal cues that tend to be associated with deception. The most well known of these are "leakage cues," which are non-strategic behaviors (usually non-verbal) that are assumed to betray the senders' deceptive intentions and true feelings or beliefs, such as the increased vocal tension in a liar's voice (Ekman & Friesen, 1969). Similarly, the emotions that liars experience, such as fear, may be reflected in "feeling cues," which include higher pitch, pauses, and speech errors, that are assumed to be indicative of detection apprehension (Ekman, 2001; Vrij, 2000).

A recent meta-analysis of the many cues that have been examined in the context of deception detection suggests there are in fact a small set of reliable verbal, nonverbal and vocal cues to deception (DePaulo, Lindsay, Malone, Muhlenbruck, Charlton, & Cooper, 2003). Verbal cues include verbal immediacy, in which liars use more linguistic constructions that seem to distance themselves from their listeners or from the contents of their presentations (e.g., talking about an incident in the third person and giving unnecessary background information) and logical structure, in which the structure of lie narratives tend to be less structured than truthful narratives. Nonverbal cues indicative of lies include more blinking by liars and greater pupil dilation. Vocal cues include changes in frequency and pitch, in which lies tend to be spoken in a higher pitch than truths.

Some theoretical approaches to deception detection support the reliance on different types of cues. For example, the early work by Ekman and Friesen (1969)

focused on leakage clues, which refer to a broad range of behaviors that reveal a liar is trying to hide something, typically how they really feel. These cues tend to be non-strategic behaviors, usually non-verbal, that may betray the senders' deceptive intentions and true feelings or beliefs. For example, when deceivers are nervous, increased vocal tensions "leak," giving the liar away despite their efforts to modulate their voice. These leakage cues can be conceptualized as 'apprehension cues'.

More recently, Ekman (2001) has proposed an approach that focuses on "feeling" cues that reveal the emotions that liars experience. This approach suggests that by understanding the liars' emotional experience, it is possible to predict behaviors that distinguish liars from truth tellers. For example, fear cues are assumed to be indicative of detection apprehension and include higher pitch, faster and louder speech, pauses, speech errors, and indirect speech. Guilt cues, in cases where liars are guilty about their lies, are said to include cues such as lower pitch, softer and slower speech, and downward gazing. Feeling cues can reflect both negative and positive emotions such as excitement about the challenge of lying or pride in succeeding at the lie; this delight may be revealed through higher pitch, faster and louder speech, and more use of illustrators (non-verbal gestures, and movements that demonstrate what is being said verbally). For example, hand gestures tend to be more animated when a person is excited. Other than focusing on some sign of the concealed emotion that may escape efforts to inhibit or mask the felt emotion, as reflected in leakage cues, the approach argues for the study of behavioral indicators of each specific emotion manifested by liars. This approach differs from the leakage cues by focusing on the actual felt emotions during deception.

Research developed by Zuckerman, DePaulo, and Rosenthal (1981) also emphasizes the role of non-verbal behavior in deception. They examined specific types of affect experienced during deception and found that as liars experience guilt

about lying or fear of getting caught, behaviors indicative of guilt and fear are shown more by liars than truth tellers. This would be manifested in the form of more fidgeting by liars compared to truth tellers, liars distancing themselves from their deceptive communication and hence communicating in more evasive and indirect ways than truth tellers, and maintaining less eye contact with their interaction partners. These can be conceptualized as 'arousal cues'.

Given that non-verbal behavior is arguably more difficult to control than verbal behaviors (e.g., Ekman, 2001), deception detection techniques that focus on the systematic non-verbal differences between truth-tellers and liars have been, to some degree, effective (Ekman, O'Sullivan, Friesen, & Scherer, 1991; Frank & Ekman, 1997). There is also evidence that composite methods, which rely on combining verbal and non-verbal cues, enhance deception detection rates. For example, Vrij, Edward, Roberts, and Bull (2000) report a study in which nursing students either told the truth or lied about a film they had just seen. The non-verbal behavior and speech content of the liars and truth tellers was analyzed. Seventy-eight percent of truth and lies could be detected on the basis of non-verbal behavior alone, while speech content analysis that focused on verbal cues only resulted in accuracy rates of approximately 70%. However, a combination of the lie-detection techniques resulted in an 81% accuracy rate, suggesting that deception detection is most accurate when both verbal and nonverbal cues are considered.

Physiological cues have also been usefully applied to deception detection (e.g., Porter & Yuille, 1996). The most commonly measured activities are palmar sweating, blood pressure and respiration, primarily using a polygraph (Honts & Perry, 1992; Lykken, 1998). The changes in these physiological activities are often associated with changes in arousal, and it is assumed that liars will be more aroused than truth-tellers.

This arousal can be the result of anxiety, fear or duping delight (excitement that accompanies lying) (Ekman, 2001).

To summarize, previous research has identified certain broad categories of cues to identify deceptive behavior. The first is by observing the liars' non-verbal behavior and cues indicative of deceptive behavior. Liars can reveal that they are not being truthful through their non-verbal behavior, such as more blinking and greater pupil dilation. Verbal cues that are indicative of deceptive behavior include whether or not the verbal statements are consistent, logical, or detailed, amongst other factors. Vocal cues of deception include identifying changes in vocal frequency and pitch. Finally, physiological and neurological cues include changes in respiration, palmar sweating, blood pressure, and brain electric activity.

A second important factor in the detection of deception is the motivation level of the deceiver. In particular, people who are highly motivated to get away with their deceptive behavior tend to act differently than those who are less concerned with the outcome, and their behavior is more likely to give them away than unmotivated liars (DePaulo, Lanier, & Davis, 1983; Forrest & Feldman, 2000; Vrij, 2000; Vrij, Semin, & Bull, 1996). Indeed, a meta-analysis conducted by Zuckerman and Driver (1985) revealed that the more motivated liars were to avoid getting caught, the more likely that their behavior gave their lies away. For example, in a seminal study, Ekman and O'Sullivan (1991) examined the detection of deceptive nursing students who were either highly motivated to lie when describing an unpleasant film as pleasant, or they were not motivated at all. The motivation manipulation involved telling the nursing students that their future success as nurses would depend on their ability to be deceptive. The results suggested that respondents who were highly motivated to deceive were much easier to detect by professional lie detectors compared to low motivated deceivers, primarily because they made fewer illustrators and hand

movements, and waited longer than less motivated liars before giving an answer, suggesting that motivated liars worked harder to control their messages.

The theoretical approaches to deception detection, discussed earlier, support the correlation between motivation to lie and deception detection accuracy. Ekman (2001) argues that there should be greater detection apprehension in high stake situations in which liars are motivated to deceive (e.g., illegally crossing an international border). Consistent with Ekman's approach, increased motivation to succeed at deception task is assumed to lead to increased arousal, greater attempted control, stronger emotions and greater cognitive effort, which, when taken together, suggest that increases in motivation should lead to more frequent or accurate deception detection (Zuckerman, DePaulo, & Rosenthal, 1981).

The observation that highly motivated liars are more likely to be detected has been referred to as the *motivational impairment effect* (DePaulo & Kirkendol, 1989). The motivational impairment effect appears to operate primarily through non-verbal cues, such as facial displays, increased behavioral rigidity and decreased finger and hand movements.

There is some evidence, however, that moderate levels of motivation, under certain conditions, can be a positive factor in deception. According to Burgoon and her colleagues (Buller & Burgoon, 1996; Burgoon, Stoner, Bonito, & Dunbar, 2003), deceivers can be conceived as active agents who strategically plan and adapt their interpersonal behavior to maximize credibility and deception success (Buller & Burgoon, 1996). As the sender chooses from the available verbal and non-verbal cues to enhance their deception success, the receiver of deceptive messages may signal their suspicion. Motivated liars that detect that their partner is becoming suspicious may alter their performance to enhance credibility. For example, motivated deceivers may use more direct, clear and complete verbal messages, along with a more pleasant,

truthful demeanor (Burgoon & Floyd, 2000). Because moderately motivated liars strategically control and manipulate their behavior to a greater degree than less motivated liars, they should less likely to be detected.

Considered together, the data from previous research suggest that motivation plays a role in deception detection in FtF interactions. The key indicators of deception detection, with a motivated liar, involve primarily verbal and non-verbal cues. In certain situations, motivation impairs the non-verbal aspects of deceptive performances, which can result in greater deception detection accuracy (DePaulo et al., 2003; Ekman, 2001). In certain other situations, where the deceiver is sufficiently, but not overly motivated to strategically control their verbal and non-verbal behavior, motivation has been shown to play a positive role in enhancing the credibility of the deceiver and lowering deception detection accuracy (e.g., Burgoon & Floyd, 2000).

The preceding analysis suggests that both verbal and nonverbal cues and the motivation of the liar play an important role in deception detection. Previous research, however, has been limited primarily to deception detection in face-to-face (FtF) contexts. Increasingly, our social interactions with others take place in text-based media, such as email, in which participants send messages asynchronously, and instant messaging, in which participants send messages in real time. Collectively, these new media are referred to as Computer-Mediated-Communication (CMC). How are CMC interactions different from FtF, and how might CMC affect deception detection and the operation of the two factors described above, cues to deception and motivation levels?

CMC is a broad term that covers a wide variety of communication environments, each with its own inherent features and characteristics. CMC can be achieved through multiple formats including electronic mail (single user to user contact), electronic mailing lists or Listserv programs (where a single user sends a

message to a number of specific receivers), IRC and Usenet News (which involves a group of subscribers having access to all the group information) and MUD participants (which involves a specific groups of users, with the users having to identify themselves with their log-in and password). In addition, CMC information transfer can utilize a variety of media types, including text, sound, graphics, images, video, or executable files.

Obviously there are important differences between these CMC settings and FtF interactions, and researchers have analyzed a number of these differences (e.g., Clark & Brennan, 1991; Garcia & Jacobs, 1999). For example, there are several dimensions along which communication media can vary, and interactions can be categorized according to the immediacy of conversations, the medium in which they take place, and the level of control afforded to the speakers in the conversation (Clark, 1996). CMC varies from FtF interactions on several dimensions (see Table 1). In CMC interactions, participants are distributed and do not share the same physical environment, where as in FtF interactions, they are physically co-present. Text-based CMC renders participants anonymous to each other, as they are invisible and inaudible, unlike FtF interactions where the participants can see and hear each other.

While FtF settings allow for instant transmission and reception of each other's actions, CMC media vary in levels of instantaneity from no perceptible delay from when the message is initially transmitted (text-based instant messaging) to extended delays (e-mail). Also in FtF interactions, participants can receive and produce messages simultaneously, and formulate and execute their actions in real time, unlike CMC in which the interactions are less simultaneous and extemporaneous, and varies from limited (text-based instant messaging) to non-existent (asynchronous e-mail messages). In addition, the CMC medium is relatively permanent, persisting even after

the interactions are over, unlike FtF medium which fades quickly, and leaves no record of the participants' actions (i.e., is evanescent and recordless).

Table 1 Participant characteristics in FtF versus text-based CMC interactions

DIMENSIONS	**SETTING**	
(*meaning*)	**FtF**	**Text-based CMC**
Co-presence (*participants share the same physical environment*)	Physically co-present	Distributed
Visibility (*participants can see each other*)	Visible	Invisible
Audibility (*participants can hear each other*)	Audible	Inaudible
Instantaneity (*participants recognize each other's actions at no perceptible delay*)	No delay	Delayed
Evanescence (*the medium fades quickly*)	Fades	Does not fade
Recordlessness (*participants actions leave no artifact*)	No record	Recorded
Simultaneity (*participants can receive and produce at once and simultaneously*)	Simultaneous	Simultaneous
Extemporaneity (*participants formulate and execute their actions in real time*)	Extemporaneous	Delayed

How might these important differences across CMC and FtF affect the operation of cues and motivation in deception detection? Perhaps the most obvious impact is the elimination of nonverbal and vocal cues in CMC. Recall that nonverbal cues, such as vocal tension and nervous behaviors, have been identified as playing an important role in deception detection, both on their own (DePaulo et al., 2003; Ekman, 2001) and in conjunction with other methods (Vrij, Edward, Roberts, & Bull, 2000). Because text-based settings limit interactions to the verbal channel, the visual and audible cues that may be employed in deception detection are not available in CMC.

As such, although verbal cues (e.g., the logical structure of a partner's messages) can be assessed in text-based interactions, the nonverbal cues described above, such as vocal properties, gestures and other behaviors, are not transmitted. In particular, because text-based CMC participants are visually anonymous to one another during their interaction, facial characteristics like gaze aversion, smile duration, eye blinking or broken eye contact, each of which may facilitate deception detection (DePaulo et al., 2003), are not accessible. Similarly, body movements like self-manipulations, illustrators, and shifting (or rigid) body positions are not transmitted in CMC environments. As such, the elimination of nonverbal, vocal and physiological cues in text-based CMC environments could potentially undermine deception detection. Indeed, individuals tend to overestimate the importance of non-verbal cues and underestimate the potential importance of speech content in deception detection.

The elimination of nonverbal cues may also have important implications for the motivational impairment effect, in which highly motivated liars tend to be detected more frequently than less motivated liars (DePaulo & Kirkendol, 1989). Recall that the motivation impairment effect operates primarily through the leaking or involuntary transmission of nonverbal cues, such as rigid posture, less blinking, and less head movements (e.g., Vrij, 2000). Because these types of nonverbal cues are eliminated in text-based settings, leakage cues are not transmitted to the receiver. As such, the motivation impairment effect should be attenuated for highly motivated liars interacting in CMC.

In fact, if Burgoon and her colleagues (Buller & Burgoon, 1996; Burgoon & Floyd, 2000) are correct in their argument that moderately motivated liars are more likely to engage in strategic communication behaviors to enhance their credibility, then there are several aspects of the CMC environment that suggest that the motivational impairment effect might actually be *reversed* in a text-based interaction.

For example, while FtF speakers must produce their messages on the fly (i.e., *extemporaneously*), as they are being constructed, CMC speakers construct their utterances *before* transmitting them to the addressee. Similarly, because CMC interactions tend to be less *instantaneous* than FtF interactions (i.e., replies to messages tend to be delayed in CMC relative to FtF), speakers in CMC settings should have additional time to develop deceptive messages. Indeed, previous research suggests that CMC interactions tend to last four to five times longer than similar FtF interactions (Hancock & Dunham, 2001a; Walther, 1996). Because the construction of deceptive messages tends to take more cognitive effort than truthful messages (Zuckerman et al., 1981), the increased time available in CMC settings should be particularly advantageous to the motivated liar engaged in strategic communication processes (Burgoon & Floyd, 2000). Ekman (2001), for example, has recently suggested that increased preparation time is one potential advantage for deceptive individuals.

Another potential feature of a text-based CMC setting that may be strategically useful to a motivated liar is the property of *editability*. CMC settings enable the sender to carefully edit their messages before transmitting them to their partner, which allows speakers greater control over message generation and transmission (Dennis & Valacich, 1999). It is important to note that even in synchronous CMC communication settings, in which participants interact in real-time (e.g., Internet Relay Chat, Instant Messaging), senders still have the opportunity to edit their messages before transmitting, primarily because there tends to be at least a several seconds between responses (Hancock & Dunham, 2001b). Indeed, in text-based CMC exchanges, participants can intentionally select, accentuate and present certain information about themselves to their interaction partners. The ability to selectively present information about oneself in text-based settings has been referred to as *selective self-presentation*

(Walther, 1996), which should be particularly useful to a deceptive communicator that is sufficiently motivated to take the time to edit their messages.

Considered together, a sufficiently motivated liar in a CMC setting may have several advantages over an FtF liar, such as more time and increased control over message production, and may be less likely to be subject to the motivational impairment effect. As such, CMC settings that reduce non-verbal cues may not only attenuate the motivational impairment effect, they may also enhance a motivated liar's success at deception.

Despite the importance and pervasiveness of the new CMC medium, a survey of the literature reveals that there are surprisingly few studies that have compared deception detection abilities across CMC and FtF media. Hollingshead (2000) reports an unpublished study (Hollingshead & Dun, 2000) that examined deception detection across CMC and FtF settings. The study compared the expression of truthful and deceptive opinions on the legalization of marijuana in FtF and CMC interactions. Half of the participants were asked to present a pro-marijuana legalization position to their partner, while the other half were asked to present a con-position regardless of their actual opinions, which were assessed after the conversation. The participants discussed the issues for either three minutes in the FtF condition or for fifteen minutes in CMC condition. A comparison of deception detection accuracy failed to reveal any significant difference in accuracy rates across FtF and CMC interactions. Participants were perceived as equally convincing in the CMC and FtF conditions regardless of whether they were actually expressing their true opinions or not.

While the Hollingshead study is an important first step in examining the effect of communication settings on deception detection, it raises several methodological concerns. One concern is that the forced time procedure may have played a differential role in the ability to detect deception across the two conditions. The

accrual of interpersonal effects is slower and develops in proportion to the accumulation of message exchanges in CMC relative to FtF (Walther, 1993, 1996). Although FtF participants were given less time (three minutes) than CMC participants (fifteen minutes), it is difficult to determine whether these time limits affected deception detection. For example, it is not clear whether equal amounts of information were exchanged during the FtF and CMC interactions. Previous research has avoided this problem by removing time limits and instructing participants to perform a task until they feel they have completed it (e.g., Hancock & Dunham, 2001a).

Perhaps a more important concern is that participants were not randomly assigned a priori to the truth-telling vs. lie-telling conditions. Recall that participants were instructed to provide a pro or con position on the legalization of marijuana, regardless of their actual opinions. Assessment of their beliefs after the experiment determined whether they were lying to their partner or telling the truth. As such, participants were assigned to the deception or truth-telling condition based on their pre-existing beliefs (i.e., pro or anti-marijuana legalization), which raises concerns that pre-existing differences between the two groups may have undermined the study's ability to detect differences in deception detection across the two communicative environments.

For example, given the emotional and attitudinal salience associated with issues such as the legalization of marijuana, it is possible that the motivation levels of participants may have differed across the pre-existing pro vs. con legalization groups. One group, such as participants in support of marijuana legalization that were instructed to argue against it (i.e., the post hoc lie condition), may have been less motivated to convince their partner than if they had been instructed to argue for legalization (i.e., the post hoc truth condition). Because, as noted above, motivation has been shown to have an important influence on deception detection (Vrij, 2000),

the results of the study may have been confounded. For example, people who are highly motivated to get away with their deceptive behavior may act differently than those who are less concerned with the outcome, and their behavior is more likely to give them away than unmotivated liars, at least in FtF environments (Vrij, 2000; Zuckerman & Driver, 1985).

The objective of the present research was to examine the effect of both the communication setting and motivation level on deception detection. In an effort to overcome some of the methodological limitations of the Hollingshead and Dun procedure (Hollingshead, 2000), an experimental procedure developed by Burgoon, Buller, and Floyd (2001) was adapted. Participants interacted with an unacquainted partner, and were randomly assigned a-priori to a text-based CMC or FtF interaction condition, and to a low or high motivation to lie condition. During their conversation, participants were both truthful and deceptive, and they were not constrained by any time limits.

As suggested by the preceding analysis, because CMC settings eliminate nonverbal cues, which should undermine the detection of deception, and because there are several features of the CMC setting that may be advantageous to the deceivers, such as more time to construct and edit deceptive messages, deception detection was expected to be less accurate overall in CMC than in FtF settings:

H1: The receiver's accuracy regarding the truthfulness of the sender's remarks would be higher in the FtF than the text-based CMC condition.

With regard to the motivation manipulation, because the preponderance of empirical evidence suggests that highly motivated liars tend to be detected more frequently than unmotivated liars (i.e., the motivational impairment effect) (DePaulo & Kirkendol, 1989; Ekman, O'Sullivan, Friesen, & Scherer, 1991; Forrest & Feldman,

2000) a main effect of motivation, in which highly motivated liars will be detected more frequently than unmotivated liars, was also predicted:

H2: The receiver's accuracy regarding the truthfulness of the sender's remarks would be higher when the sender is highly motivated.

The question of whether the effect of motivation levels on deception detection would be different across the two communication environments was also of interest in the present research. One possibility is that, because CMC settings reduce nonverbal cues, liars in the CMC setting should be more immune to the motivational impairment effect, which operates primarily via the nonverbal cues eliminated in CMC settings (DePaulo & Kirkendol, 1989). If this were the case, then an interaction would be expected, in which highly motivated FtF liars would be detected more frequently than unmotivated FtF liars, but highly motivated CMC liars would be detected with the same accuracy as unmotivated CMC liars.

Another possibility, however, is that motivated liars may choose to employ some of the features of the CMC environment to enhance their deception than unmotivated liars. In particular, highly motivated CMC liars may be more likely to take strategic advantage of the increased time available to construct, edit, and produce their messages than less motivated liars. If this were the case, then, in contrast to the FtF condition, in which more motivated liars should be more likely to be detected, a reverse trend would be expected in the CMC condition, in which more motivated liars should be less likely to be detected.

R1: What is the nature of the interaction between motivation levels of the deceiver and the communicative environment in which the deceiver is producing messages?

METHOD

Participants

Participants (n = 148) were upper-level students at a northeastern American university, and they participated for course credit. Participants were randomly paired to form 74 same-sex, unacquainted dyads. They were recruited for a study examining how unacquainted people interact on various conversation topics in CMC and FtF environments. One dyad (2 participants) was discarded due to problems with the materials, and 3 dyads (6 participants) were excluded because the participants failed to follow instructions.

Procedure

Upon reporting to the laboratory, participants were led separately to remote rooms where they completed an initial set of forms, including informed consent form, and a questionnaire assessing their computer experience and familiarity with computer-mediated communication.

All participants were told that they would be having a conversation with an unknown partner. They were instructed that they would discuss 5 topics, which were then provided to the participants on a set of cards. These topics were taken from a game designed to encourage self-disclosure and open communication. The first topic was always “When I am in a large group, I…” This initial topic was designed to allow the participants to become comfortable interacting with their partner, and was not included in any analyses. After this topic, participants began a discussion of the four experimental topics: “Discuss the most significant person in your life”, “Talk about a mistake you made recently”, “Describe the most unpleasant job you have ever had to do” and “Talk about responsibility.” There was no time limit and participants were asked to discuss each topic until they had exhausted it and understood each other’s responses.

One of the two participants was randomly assigned to the role of sender, and the other to the role of receiver. Senders were asked to deceive their partner. In particular, they were instructed "to NOT tell 'the truth, the whole truth, and nothing but the truth'" (Burgoon, Buller, & Floyd, 2001) on two topics, and to be truthful on the other two topics. Examples of lies were given to the senders, and it was emphasized that the sender should try to produce large magnitude lies (e.g., saying that they went on a vacation when in fact they did not) rather than small magnitude lies (e.g., saying that they wore a blue sweater yesterday when in fact they wore a red one). Senders had approximately five minutes to plan their stories. Receivers were blind to the deception manipulation.

The sequence in which the topics were discussed, and the order in which the sender lied, was counterbalanced across 16 orders. Senders were instructed to lie on either the first two topics or on the last two topics. Half of the senders followed a truth-first, deception-second order. The remainder followed a reverse order. Because topics followed a diagram-balanced Latin square order within truth and within deception, all topics appeared within a given time period.

Participants were randomly assigned to either FtF or CMC conditions. Participants in the FtF condition discussed their topics in an interaction room where they sat at a table across from each other. The interaction room was adjoining an observation room that had a one-way mirror, which allowed unobtrusive videotaping of the conversation. The FtF participants were aware that they were being videotaped, and provided their consent to do so.

In the CMC condition, participants performed the task at isolated computer terminals. Participants used one of two desktop computer stations while the experimenter monitored and recorded the interaction from a third station. The CMC participants were notified that their exchanges were being monitored and recorded,

and provided their consent to do so. Once participants were seated at their terminals, the experimenter briefly demonstrated the use of the computer interface, in which participants typed their message in a private composition window and hit enter to send their message to a shared window. Note that participants could edit their message before transmitting it to their partner. Participants then proceeded to complete a 1-minute typing test.

Once participants finished the discussion task, they were asked to complete a series of questionnaires based on their conversation. FtF participants returned to their original, separate rooms were they were provided with a videotape copy of their interactions. Participants assigned to the sender role were instructed to review their discussion on each topic and to rate their level of truthfulness for each of the 4 topics. Specifically, the sender was asked to describe, on a scale of 0-10, their truthfulness during the discussion of that particular topic, with 0 representing 'not at all truthful' and 10 representing 'completely truthful'.

Receivers were instructed to review each topic and rate their perception *of their partner's* truthfulness on each of the 4 topics. Specifically, the receiver was asked to describe, on a scale of 0-10, their perception of their partner's truthfulness during the discussion of that particular topic, with 0 representing 'not at all truthful' and 10 representing 'completely truthful.' Before answering the questionnaires, receivers were informed that their conversation partner "may have lied to them on some or none of the conversation topics."

Participants in the CMC condition remained at their computer station to complete the questionnaires, and were given transcripts of their conversation rather than videotapes. The sender and receiver received the same instructions for completing the questionnaires as their counterparts in the FtF condition.

Both the sender and the receiver also completed a series of questionnaires that assessed their verbal and non-verbal performance for each of the four topics. The data from these questionnaires are not reported here.

Motivation manipulation

Senders were also randomly assigned to one of two motivation conditions: 'low motivation to lie' or 'high motivation to lie'. The motivation manipulation was based on previous research procedures used to manipulate motivational levels of liars (e.g., Forrest & Feldman, 2000). In the case of high motivation manipulation, senders were falsely informed "that they had to make sure that they were able to convince their partner on the topics that they were lying about, as it was a very important skill to be able to deceive others in daily interactions." They were also told that "research clearly shows that the ability to lie to others successfully is a good predictor of their future success in social settings, various jobs like consulting and counseling and for the maintenance of friendships, and that it was therefore important that they could make their partner believe their lies." In the low motivation condition, senders were simply informed to lie on the topics given to them. Only senders received the motivation manipulation; receivers were blind to the motivation manipulation.

As part of the post-interaction questionnaires that the sender completed, one of the Likert-scale items was used in assessing the effectiveness of the motivation manipulation, "It was important for me to deceive my partner" (1 = not at all, 7 = very important).

After completing the post-interaction questionnaires, each member of the dyad was brought to a common room, and introduced to his or her partner and they were fully debriefed. The debriefing included a discussion of the background and general rationale for the project, and senders in the high motivation condition were informed

that in fact no relationship between lying ability and future success has actually been documented.

RESULTS

Sender deception

The first analysis was concerned with the sender's level of truthfulness. A 2 (discussion type: truth vs. lie) x 2 (topic: first vs. second) x 2 (setting: CMC vs. FtF) x 2 (motivation level: low vs. high) mixed General Linear Model (GLM), with discussion type and topic entered as repeated measures, and setting and motivation entered as between-subject factors, was conducted on the sender's responses to the truthfulness item. Note that the order factor was not significant and it did not interact with any of the other factors.

No main effect of topic number was observed nor did the topic factor interact with any other variable. A main effect of truthfulness was significant $F(1, 66) = 1017.37$, $p < .001$. Senders rated themselves as less truthful during discussion topics in which they were instructed to "not tell the truth, the whole truth, and nothing but the truth" ($M = 1.78$, $SE = .21$) than when they were told to be truthful ($M = 9.37$, $SE = .14$), suggesting that senders appropriately followed the instructions to lie to their partner. A main effect of motivation was also observed, $F(1, 66) = 5.67$, $p < .05$, in which highly motivated senders were more deceptive overall ($M = 5.30$, $SE = .19$) than unmotivated liars ($M = 5.92$, $SE = .18$), which provides some evidence that the motivation manipulation was effective. No other effects were observed, suggesting that the magnitude of sender's deceptions did not differ across the two communication conditions or across topics.

Receiver perception of deception

The second analysis was conducted on the receivers' perceptions of their partner's truthfulness. A second 2 x 2 x 2 x 2 mixed GLM was conducted on the

receivers' response to the truthfulness item (i.e., "how truthful was your partner?"). No main effect of topic number was observed nor did the topic factor interact with any other variable. A main effect of discussion type was observed, $F(1, 66) = 10.36$, $p < .01$. Receiver's rated their partners as less truthful when they were lying ($M = 6.86$, $SE = .24$) than when they were telling the truth ($M = 7.72$, $SE = .24$), suggesting that receivers were somewhat sensitive to the truthfulness of their partner, although receivers continued to rate their partner as truthful (i.e., above the midpoint of the scale) regardless of whether they were lying or not. These data suggest that receivers were biased towards expecting their partners to be truthful.

This main effect, however, was modified by a three way interaction between discussion type, motivation, and communication setting, $F(1, 66) = 4.23$, $p < .05$ (see Figure 1). Simple effects analyses revealed that, in the FtF condition, receivers' ratings of highly motivated senders were significantly lower when their partner was lying than when s/he was telling the truth, $t(17) = -3.59$, $p < .01$. However, this was not the case for FtF receivers interacting with unmotivated liars, $t(16) = -1.01$, *ns*, suggesting that FtF receivers were more suspicious of their partner's truthfulness when their partner was highly motivated than when they were not.

The opposite pattern of effects was observed in the CMC condition. CMC receivers rated their partners as less truthful when their partner was deceptive than when s/he was telling the truth, but only if their partner was not motivated to lie, $t(17) = -2.86$, $p < .05$. This effect was not significant when their partner was highly motivated, $t(16) = -.16$, *ns*, suggesting that, in contrast to FtF receivers, CMC receivers were more suspicious of their partner when their partner was not motivated to lie than when they were highly motivated.

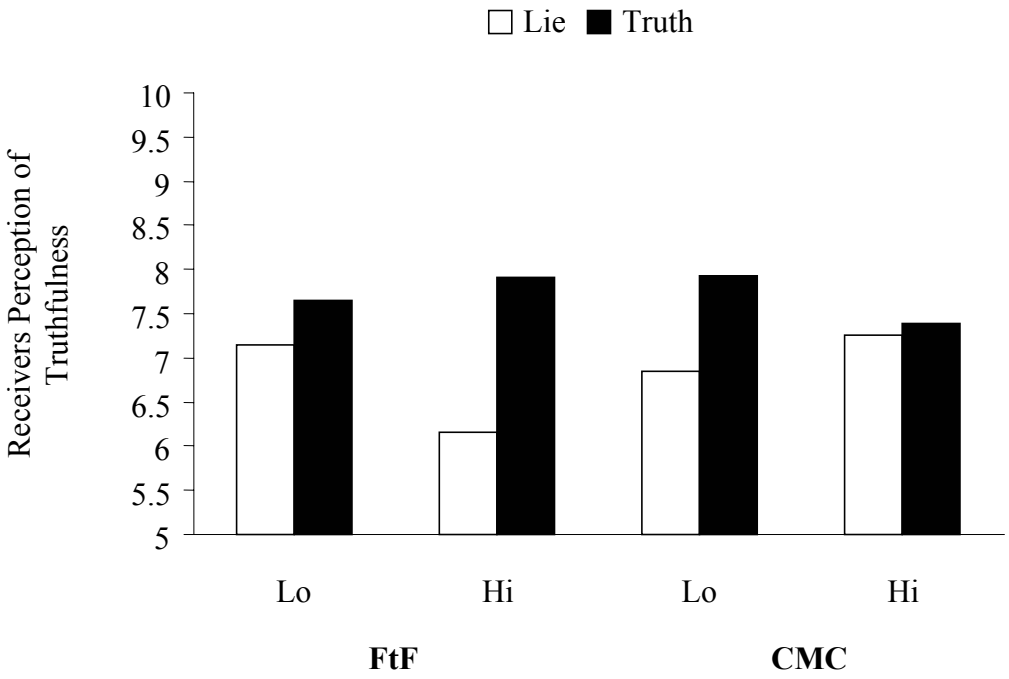

Figure 1 Receiver's perception of truthfulness of their partner as a function of type of medium and motivation, across truth and lie conditions

Deception detection accuracy

Deception detection accuracy was operationalized as the absolute difference between the senders rating of their truthfulness (on a scale from 0, completely untruthful, to 10, completely truthful) and the receiver's rating of the sender's truthfulness (on the same scale). As such, lower scores represented higher accuracy. For example, a score of zero on a given topic indicated that the receiver had accurately detected the truthfulness of the sender's messages for that topic, while a score of ten indicated that the receiver was completely inaccurate in his/her perception of the sender's truthfulness.

A third 2 x 2 x 2 x 2 mixed GLM was conducted on the deception detection accuracy scores. Once again, no main effect of topic number was observed nor did the

topic factor interact with any other variable. The analysis revealed a main effect of discussion type, $F(1, 66) = 63.06$, $p < .001$. Deception detection was more accurate when the sender was being truthful ($M = 2.21$, $SE = .23$) than when the sender was being deceptive ($M = 5.33$, $SE = .26$), suggesting that receivers were less accurate at perceiving the truthfulness of discussions in which the sender was lying than when the sender was speaking being truthful.

Contrary to Hypothesis 1, no main effect of communication medium was observed, $F(1, 66) = 1.16$, *ns*. Deception detection accuracy in the CMC condition ($M = 3.62$, $SE = .20$) was not significantly lower than deception detection accuracy in the FtF condition ($M = 3.93$, $SE = .20$). Similarly, in contrast to Hypothesis 2, the main effect of motivation was not significant, $F(1, 66) = 2.10$, *ns*. The truthfulness of highly motivated liars ($M = 3.98$, $SE = .21$) was not detected more accurately overall than unmotivated liars ($M = 3.57$, $SE = .20$).

A significant interaction between the setting and motivation factors, however, was observed, $F(1, 66) = 5.21$, $p< .05$ (see Figure 2). Simple effects analyses at each level of the communication setting revealed that motivation level did not affect deception detection accuracy in the FtF condition, $t(33) = .62$, *ns*, but that in the CMC condition deception detection was significantly less accurate in the high motivation condition than in the low motivation condition, $t(33) = -2.86$, $p < .05$. That is, highly motivated CMC liars were more successful in deceiving their partners than unmotivated CMC liars, while motivation level did not reliably affect deception success in the FtF condition.

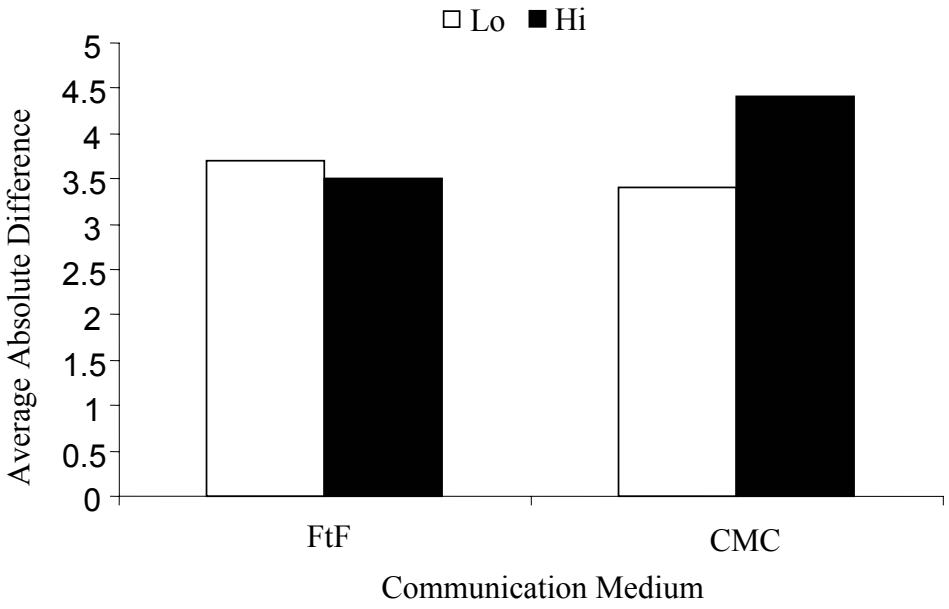

Figure 2 Average absolute differences between the senders' rating of their truthfulness and the receiver's rating of the sender's truthfulness

Motivation manipulation check

A 2 (setting) x 2 (motivation) between-subjects GLM was conducted on the motivation manipulation check item *How important was it for you to deceive your partner?* The analysis revealed a main effect of motivation, $F(1, 65) = 5.73$, $p < .05$. Deceiving their partner was more important for motivated senders ($M = 5.22$, $SE = .29$, 1 = not at all important, 7 = very important) than for unmotivated senders ($M = 4.24$, $SE = .29$), suggesting that the motivation manipulation was effective. No other effects were observed, suggesting that the motivation manipulation was equally effective across the two communication conditions.

Ancillary analyses

Several ancillary analyses were conducted to determine whether deception detection accuracy was affected by participants' typing proficiency. The analyses were limited to participants in the CMC condition. The correlation between the

senders' typing speed and deception detection accuracy was negative, although this correlation did not achieve significance, $r = -.24$, $p = ns$. Similarly, the typing speed of the receiver was not significantly correlated with deception detection accuracy, $r = .01$, *ns.* Taken together, these data suggest that typing speed did not play a significant role in deception detection accuracy.

DISCUSSION

The objective of the present research was to examine the detection of deception in interpersonal conversations that took place in FtF and CMC based conversations. In order to examine deception detection in conversation, it is necessary to consider both the magnitude of the sender's deception and the receiver's perception of the deception.

Consider first the magnitude of the sender's deception. Senders reported that they were more truthful when they were instructed to be truthful than when they were instructed to be deceptive, which suggests that the senders followed the instructions appropriately. A main effect of motivation was also observed with regard to the magnitude of the sender's deception. More motivated senders were less truthful overall during their discussions than less motivated senders. This observation is consistent with our motivation manipulation check, which indicated that it was more important for highly motivated senders to deceive their partner than unmotivated senders. Consistent with Forrest and Feldman (2000), senders that were told that lying is important for future personal and financial success tended to be more concerned with successfully deceiving their partner than those who did not receive these instructions.

It is also important to note that the effect of the motivation manipulation was equal across the two communication conditions, which suggests that the manipulation did not have a differential effect on senders in the CMC and FtF conditions. One

potential concern, for example, may have been that the motivation manipulation may have had less impact on CMC participants who were interacting with a visually anonymous partner. This does not appear to have been the case, as the magnitude of the lies told in CMC and in FtF were not reliably different, nor were senders' responses to the motivation manipulation check.

Consider next the receivers' perception of their partner's level of truthfulness. First, receivers rated deceptive discussions as less truthful when the sender was lying than when the sender was telling the truth, suggesting that receivers were somewhat sensitive to whether they were being deceived or not. In particular, on average, receivers rated their partner's truthfulness 6.85, on a scale of zero to ten, when they were being deceptive and 7.72 when they were being truthful. Note that the receivers' average rating of deceptive messages remained above the mid-point of the scale, which suggests that although they rated their partners as less truthful when they were deceptive, they nonetheless considered their partner more truthful than deceptive. This observation is consistent with the frequently observed *truth bias*, which refers to the fact that people tend to be hesitant in attributing deception to others (Levine, Park, & McCornack, 1999; Vrij, 2000). The fact that differences in the receivers perception of truthfulness across deceptive and truthful messages were observed despite this truth bias suggests that this type of procedure, adapted from Burgoon, Buller, and Floyd (2001), in which a participant's perception of deception and truthfulness are compared along a continuum, is perhaps a more informative approach to examining deception detection accuracy than simply examining dichotomous responses of deception vs. truth. For instance, if our participants, who rated deceptive communications above the mid-point of our scale, were forced to identify their partner only as either deceptive or truthful, they would have generally chosen truthful even if they were somewhat suspicious.

It was also intriguing to observe a *truth bias* in the CMC condition. It may have been expected, for example, that individuals interacting with strangers in a visually anonymous text-based environment may have been more suspicious of their partner than individuals that could physically see and hear their partner (e.g., Bos, Olson, Gergle, Olson, & Wright, 2002). This did not appear to be the case in the present study, as the truth bias was equal across the CMC and FtF conditions.

These data suggest that receivers were more suspicious of their partners when they were lying than when they were telling the truth, although their explicit judgment of their partner's truthfulness remained above the midpoint. This is supported by further analysis of sender and receiver responses done to assess the verbal and non-verbal performance of the sender (see Hancock, Curry, Goorha, & Woodworth, 2004). In particular, the linguistic analysis of the data revealed that receivers asked more questions when they were being lied to than when they were being told the truth, suggesting that receivers were suspicious of their partner when they were being lied to. Note that these data suggest that although receivers were blind to the deception manipulation they seemed to be implicitly aware that they were being lied to. This implicit suspicion seems to be consistent with their more explicit judgments concerning their partner's truthfulness described above.

The suspicion observed in receiver's perception of truthfulness was, however, moderated by an interaction between truthful vs. deceptive discussions, communication environment and motivation. In the FtF condition, when senders were highly motivated, receivers rated their partner's truthfulness significantly lower when the sender was being deceptive than when the sender was telling the truth. That is, FtF receivers were sensitive to whether or not highly motivated senders were being deceitful or truthful. In contrast, receivers' perceptions of unmotivated senders' level of truthfulness did not differ across the sender's truthful and deceptive messages.

Taken together, these data suggest in the FtF communication environment receivers were more sensitive to deception when the sender was highly motivated than when the sender was unmotivated, which is consistent with the motivational impairment effect (DePaulo & Kirkendol, 1989). As noted earlier, previous FtF research suggests that highly motivated liars tend to be detected more frequently than unmotivated liars because high levels of motivation may cause non-verbal "leakage cues," and more overt signs of the additional emotional burden stemming from the higher motivational demands. The motivational impairment effect operates primarily through arousal in FtF conditions. For example, liars may attempt to over-control their behavior and appear rigid and deliberate in their movements (e.g., Vrij, 1998).

The opposite pattern of results was observed in the CMC condition. In particular, CMC receivers were sensitive to the truthfulness of their partner only when their partner was *unmotivated*. That is, CMC receivers rated unmotivated senders as less truthful when they were lying than when they were telling the truth. In contrast, receivers' ratings of highly motivated liars did not differ at all between truthful and deceptive discussion, suggesting that CMC receivers were not sensitive to deception when their partner was highly motivated to succeed at deceiving them.

The primary objective in the present study, however, was to examine the *accuracy* of deception detection, which was operationalized as the absolute difference between the sender's self-reported rating of truthfulness and the receiver's perception of the sender's truthfulness. The first question of interest was whether deception detection accuracy would be decreased in a text-based communicative environment, in which cues that may facilitate deception detection, such as nonverbal and vocal cues (DePaulo et al., 2003), are eliminated. Given this reduction of cues, it was expected that participants in the CMC environment should find it particularly difficult to distinguish between truthful and deceitful messages. Contrary to the expectations,

however, deception detection was no less accurate in the CMC condition on average than in the FtF condition. The elimination of nonverbal cues in the CMC setting was not sufficient in the present study to reduce deception detection below levels observed in the more signal-rich FtF communication environment.

This finding suggests that there may be an over-reliance on non-verbal cues for deception, given that when they were unavailable in a CMC environment receivers' accuracy level did not change significantly relative to the FtF environment. One potential explanation could be that sometimes the abundance of non-verbal stimuli may actually act as a distraction for a receiver in a FtF environment, and that in certain contexts, the elimination of these cues may not necessarily be a negative factor. Indeed, a number of researchers have cautioned against relying too heavily on non-verbal cues (e.g., Gudjonsson, 2003).

These data may also suggest that deception detection accuracy can be affected simply by an examination of content cues, and that certain techniques that have been developed, such as Statement Analysis (e.g., Porter & Yuille, 1996), should be considered as potential avenues to increasing accuracy levels. While the exact utility of methods such as Statement Analysis is still debatable, participants in the current study could arguably have done better if they had reviewed the content of their CMC interaction using some type of content analysis technique, such as Statement Analysis. In fact, this observation speaks to what is certainly one of the main disadvantages for a liar in CMC environments. Specifically, the sender is leaving a written record of his/her interaction that can subsequently be analyzed, whereas evidence from FtF conversations is evanescent (Hancock, Thom-Santelli, & Ritchie, 2004, in press).

Although there was no main effect of the communication environment, a reliable interaction between environment and motivation was observed. In the FtF condition, levels of deception detection accuracy across levels of motivation were not

significantly different, although the direction of the difference was consistent with the motivational impairment effect described above (i.e., accuracy was slightly higher for motivated senders relative to unmotivated senders). Indeed, the receiver's perceptions discussed above suggest that despite the lack of a statistically significant difference with regards to deception detection accuracy in the FtF condition, receivers were at least more sensitive regarding the truthfulness of highly motivated senders relative to unmotivated senders.

In contrast, in the CMC condition, deception detection was significantly less accurate when the sender was highly motivated than when the sender was unmotivated. Indeed, a comparison across the four conditions in the study reveals that the highly motivated CMC senders were the *most* successful in their ability to deceive their partner.

Why were highly motivated CMC senders more successful than any other type of sender in deceiving their partner? As noted above, the CMC environment may offer motivated liars several advantages. First, because the CMC setting does not transmit nonverbal and vocal behavior, the motivated CMC sender should not be susceptible to the motivational impairment effect observed in FtF contexts. Second, CMC senders had enhanced control over the production of their messages relative to FtF senders. In particular, the CMC communicative environment allows senders to 1) take more time to construct their messages (Hancock & Dunham, 2001a), 2) edit their messages before transmitting them to their partner (Hancock & Dunham, 2001b), and 3) engage in selective self-presentation (Walther, 1996). Each of these factors should improve a deceiver's ability to deceive their partner. The fact that highly motivated senders were significantly more successful at deception than unmotivated senders in CMC, however, suggests that participants must be sufficiently motivated to take advantage of these various features.

These data provide some support for Burgoon and colleagues' (Buller & Burgoon, 1996; Burgoon et al, 2003) contention that motivation is not necessarily a negative factor in deception, but that under some circumstances higher levels of motivation may actually improve deception success. As suggested by the present research, motivated senders may be more likely to engage in strategic communication behaviors that maximize credibility and deception success (Buller & Burgoon, 1996). However, very high levels of motivation for deceivers might play a different role in deception success. A very high level of motivation may produce cognitive and emotional "overload" and hence adversely affect deception success. This would suggest a curvilinear relationship between deception success at low, medium and high levels of motivation. Further research is required to examine the impact of motivation on deception at multiple levels (e.g., low, medium, and high).

Another potential limitation of the current study is that it is somewhat unclear what specific influence motivation manipulation had on the participants. For example, a study conducted by Frank and Ekman (1997) suggested that it is "high stakes" deception (i.e., that also include the potential for punishment or negative consequences) that is important, rather than simply being highly motivated. Further, it is also worth contemplating if the effects of motivation are perhaps not as pronounced (or somehow different) within an interactive conversational setting, rather than the type of "monologue" or continuous uninterrupted self-report that is most commonly viewed by participants in research studies (e.g., Vrij, 2000). Indeed, a recent paper by Dunbar, Ramirez, and Burgoon (2003) found that interactive deception does in fact differ in important ways from non-interactive deception.

The two communication settings also differed in a number of other important ways (see Table 1). The present form of CMC examined, namely instant-messaging, is relatively synchronous, although not as synchronous as FtF interactions. Other forms

of CMC, such as email, which is asynchronous, would provide participants with even more time to construct deceptive messages and to examine incoming messages. Additional research can use other CMC spaces like e-mail to determine how deception detection accuracy is affected by different factors across media.

This thesis identifies communication medium and motivation as two important predictors of deception detection success. However in this research, only the deceiver was motivated to lie. The receivers were blind to motivation manipulation. In real world situations, this may not be the case all the time. Not all receivers have an equal stake in identifying deceptive behavior (e.g., police officers have a high stake in identifying deceptive behavior.) Further research can manipulate receiver motivation levels, across both FtF and CMC conditions, and study the process of deception detection.

There can be other variables that play a role in deception and deceptive detection, especially in the increasingly common CMC settings. The present study only used same-sex dyads in identifying deceptive behavior to minimize gender effects (e.g., variability in dyads due to personal effects like flirting.) However gender might play an important role in deception in CMC settings. In FtF settings, previous research indicates that women are better than men in interpreting non-verbal messages, but are not better than men in deception detection (DePaulo, Epstein & Wyer, 1993). To the best of my knowledge, this has not been tested in a CMC environment. Herring (2000) has identified differences between males and females in asynchronous and synchronous computer-mediated communication on multiple parameters including message length, language type and interaction style. This seems to suggest that gender might play a role in deception success, depending on the sex of the receiver. Mixed-dyads can be used to check for deception detection accuracy as a function of the deceiver or the receiver being of a different sex.

Another important variable that can play a role is relational aspect between the interacting parties. Many situations in real life involve detecting lies told by a person with whom we are familiar. However there is no evidence to support the intuitive assumption that it is easier to detect deception in friends or lovers than in strangers (Vrij, 2000). How these will this play out in a CMC setting is open to interpretation. Relationship goals tend to be diffuse more slowly in CMC environment, but can be much stronger due to greater attribution and salience of minimal cues (Walther, 1996). Given that CMC participants have greater control over the medium, previous relationship with the partner should facilitate deception detection.

In summary, to my knowledge, this is one of the first studies to empirically demonstrate that there are potentially important differences for detecting deceit depending on whether the interaction occurs FtF or in a computer mediated context. As more and more people communicate in on-line environments, these results will have an increasing number of important implications for social, business and even criminal electronic communications. For example, the Federal Bureau of Investigation recently indicated that there are a growing number of individuals/consumers that were falling prey to deceptive practices and information that they had received through computer mediated contexts such as the internet (Internet Fraud Complaint Center, 2003). Further, for a number of years investigators have warned of the increasing number of generally highly motivated sexual offenders (particularly pedophiles) who have been using various on-line communication forums to lure potential victims. This is a particularly important development, given the results of the present study that suggest that highly motivated liars in CMC contexts are not detected very accurately. Considering the substantial amount of trust that many individuals invest in the internet, I believe it is essential that additional research examine deception in the context of mediated communication.

Although additional research will be required to determine how exactly motivated CMC senders engaged in strategic communication to deceive their partner, the present research advances our understanding of how communication media and levels of motivation affect our ability to detect deception. First, medium alone does not appear to affect deception detection accuracy. Instead, my data suggests that the medium may interact with the motivation level of the sender such that motivated liars in CMC environments will be relatively more successful in their deceptions. As noted above, these data have important implications for interpersonal deception detection as text-based forms of communication, such as instant messaging, become increasingly ubiquitous, but they also have theoretical implications. In particular, theoretical perspectives regarding deception detection need to consider both the medium in which the communication occurs as well as the motivation of the liar.

APPENDIX 1: CONSENT FORM FOR SENDER IN CMC CONDITION

Online Communicating Study

Consent Form

You are invited to participate in a research study on interpersonal communication patterns. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

Background Information: The purpose of this study is to understand how people communicate in different settings. We will be examining how people converse about several different topics.

Procedures: If you agree to be in this study, we will ask you to do the following:

1. Engage in five topic discussions with another student (each discussion may take up to 5-15 minutes)
2. You will be asked to lie or equivocate in some of the conversation tasks that take place in the study. In particular, you will be asked to not "tell the truth, the whole truth, and nothing but the truth" during parts of the conversation.
3. You will complete some forms (may take up to 30 minutes)
4. You will be debriefed, and you will have an opportunity to ask any questions you may have about the study.

The total time for this experiment is usually about 1 hour, but may take up to 1 hour and 30 minutes.

Risks and Benefits of being in the Study: We do not anticipate any risks for you participating in this study, other than those encountered in day-to-day life. However, some people may feel uncomfortable being deceptive during their conversation. There are no direct benefits associated with participating. One indirect benefit for participating is learning about how studies examining interpersonal communication are conducted.

Compensation: You will receive class credit for participation.

Voluntary Nature of Participation: Your decision whether or not to participate will not affect your current or future relations with the University or the Communication department. If you decide to participate, you are free to withdraw at any time without affecting those relationships. If you decide not to participate after signing up or during the study, notify your coordinator and you will be free to leave the study (and still receive your credit).

Confidentiality: We will keep the transcripts of the conversations. The records of this study will be kept private. In any sort of report we might publish, no information identifying you will be available. Research records will be kept in a locked file; only the researchers will have access to the records. Note, if you communicate with us via email, there is a chance that your email could be read by a third party.

Contacts and Questions: The primary researchers conducting this study are Professor Jeff Hancock, Saurabh Goorha, and Yufen Chen. Please ask any questions you have now. If you have questions later, you may contact them via email at jth34@cornell.edu or sg278@cornell.edu or yc282@cornell.edu, or by phone, at 607-255-4452. An alternative contact is Professor Joe Walther, joe.walther@cornell.edu. If you have any questions or concerns regarding your rights as a participant in this study, you may contact the University Committee on Human Subjects (UCHS) at 5-2943, or access their website at http://www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm. You will be given a copy of this form to keep for your records.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to participate in the study. I also agree for my conversations to be recorded for research purposes only.

Signature _____ Date _____

This consent form was approved by the UCHS on [date of approval].

APPENDIX 2: CONSENT FORM FOR SENDER IN FtF CONDITION

Online Communicating Study

Consent Form

You are invited to participate in a research study on interpersonal communication patterns. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

Background Information: The purpose of this study is to understand how people communicate in different settings. We will be examining how people converse about several different topics.

Procedures: If you agree to be in this study, we will ask you to do the following:

1. Engage in five topic discussions with another student (each discussion may take up to 5-15 minutes)
2. You will be asked to lie or equivocate in some of the conversation tasks that take place in the study. In particular, you will be asked to not "tell the truth, the whole truth, and nothing but the truth" during parts of the conversation.
3. You will complete some forms (may take up to 30 minutes)
4. You will be debriefed, and you will have an opportunity to ask any questions you may have about the study.

The total time for this experiment is usually about 1 hour, but may take up to 1 hour and 30 minutes.

Risks and Benefits of being in the Study: We do not anticipate any risks for you participating in this study, other than those encountered in day-to-day life. However, some people may feel uncomfortable being deceptive during their conversation. There are no direct benefits associated with participating. One indirect benefit for participating is learning about how studies examining interpersonal communication are conducted.

Compensation: You will receive class credit for participation.

Voluntary Nature of Participation: Your decision whether or not to participate will not affect your current or future relations with the University or the Communication department. If you decide to participate, you are free to withdraw at any time without affecting those relationships. If you decide not to participate after signing up or during the study, notify your coordinator and you will be free to leave the study (and still receive your credit).

Confidentiality: We will record the conversations on a video tape. The records of this study will be kept private. In any sort of report we might publish, no information identifying you will be available. Research records will be kept in a locked file; only the researchers will have access to the records. Note, if you communicate with us via email, there is a chance that your email could be read by a third party.

Contacts and Questions: The primary researchers conducting this study are Professor Jeff Hancock, Saurabh Goorha, and Yufen Chen. Please ask any questions you have now. If you have questions later, you may contact them via email at jth34@cornell.edu or sg278@cornell.edu or yc282@cornell.edu, or by phone, at 607-255-4452. An alternative contact is Professor Joe Walther, joe.walther@cornell.edu. If you have any questions or concerns regarding your rights as a participant in this study, you may contact the University Committee on Human Subjects (UCHS) at 5-2943, or access their website at http://www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm. You will be given a copy of this form to keep for your records.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to participate in the study. I also agree for my conversations to be recorded for research purposes only.

Signature _____ Date _____

This consent form was approved by the UCHS on [date of approval].

APPENDIX 3: CONSENT FORM FOR RECEIVER IN CMC CONDITION

Online Communicating Study

Consent Form

You are invited to participate in a research study on interpersonal communication patterns. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

Background Information: The purpose of this study is to understand how people communicate in different settings. We will be examining how people converse about several different topics.

Procedures: If you agree to be in this study, we will ask you to do the following:

1. Engage in five topic discussions with another student (each discussion may take up to 5-15 minutes)
2. You will complete some forms (no longer than 30 minutes)
3. You will be debriefed, and you will have an opportunity to ask any questions you may have about the study.

The total time for this experiment is usually about 1 hour, but may take up to 1 hour and 30 minutes.

Risks and Benefits of being in the Study: We do not anticipate any risks for you participating in this study, other than those encountered in day-to-day life. There are no direct benefits associated with participating. One indirect benefit for participating is learning about how studies examining online communication are conducted.

Compensation: You will receive class credit for participation.

Voluntary Nature of Participation: Your decision whether or not to participate will not affect your current or future relations with the University or the Communication department. If you decide to participate, you are free to withdraw at any time without affecting those relationships. If you decide not to participate after signing up or during

the study, notify your coordinator and you will be free to leave the study (and still receive your credit).

Confidentiality: The records of this study will be kept private. In any sort of report we might publish, no information identifying you will be available. Research records will be kept in a locked file; only the researchers will have access to the records. Transcripts of the online discussions do not contain any identifying information about you. Note, if you communicate with us via email, there is a chance that your email could be read by a third party.

Contacts and Questions: The researchers conducting this study are Professor Jeff Hancock, Saurabh Goorha, Yufen Chen. Please ask any questions you have now. If you have questions later, you may contact them via email at jth34@cornell.edu or sg278@cornell.edu or yc282@cornell.edu, or by phone, at 607-255-4452. An alternative contact is Professor Joe Walther, joe.walther@cornell.edu. If you have any questions or concerns regarding your rights as a participant in this study, you may contact the University Committee on Human Subjects (UCHS) at 5-2943, or access their website at http://www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm. You will be given a copy of this form to keep for your records.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to participate in the study. I also agree for my conversations to be recorded for research purposes only.

Signature _____ Date _____

This consent form was approved by the UCHS on [date of approval].

APPENDIX 4: CONSENT FORM FOR RECEIVER IN FtF CONDITION

Online Communicating Study

Consent Form

You are invited to participate in a research study on interpersonal communication patterns. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

Background Information: The purpose of this study is to understand how people communicate in different settings. We will be examining how people converse about several different topics.

Procedures: If you agree to be in this study, we will ask you to do the following:

1. Engage in five topic discussions with another student (each discussion may take up to 5-15 minutes)
2. You will complete some forms (no longer than 30 minutes)
3. You will be debriefed, and you will have an opportunity to ask any questions you may have about the study.

The total time for this experiment is usually about 1 hour, but may take up to 1 hour and 30 minutes.

Risks and Benefits of being in the Study: We do not anticipate any risks for you participating in this study, other than those encountered in day-to-day life. There are no direct benefits associated with participating. One indirect benefit for participating is learning about how studies examining online communication are conducted.

Compensation: You will receive class credit for participation.

Voluntary Nature of Participation: Your decision whether or not to participate will not affect your current or future relations with the University or the Communication department. If you decide to participate, you are free to withdraw at any time without affecting those relationships. If you decide not to participate after signing up or during

the study, notify your coordinator and you will be free to leave the study (and still receive your credit).

Confidentiality: We will record the conversations on a video tape. The records of this study will be kept private. In any sort of report we might publish, no information identifying you will be available. Research records will be kept in a locked file; only the researchers will have access to the records. Note, if you communicate with us via email, there is a chance that your email could be read by a third party.

Contacts and Questions: The researchers conducting this study are Professor Jeff Hancock, Saurabh Goorha, Yufen Chen. Please ask any questions you have now. If you have questions later, you may contact them via email at jth34@cornell.edu or sg278@cornell.edu or yc282@cornell.edu, or by phone, at 607-255-4452. An alternative contact is Professor Joe Walther, joe.walther@cornell.edu. If you have any questions or concerns regarding your rights as a participant in this study, you may contact the University Committee on Human Subjects (UCHS) at 5-2943, or access their website at http://www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm. You will be given a copy of this form to keep for your records.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to participate in the study. I also agree for my conversations to be recorded for research purposes only.

Signature _____ Date _____

This consent form was approved by the UCHS on [date of approval].

APPENDIX 5: COMPUTER USAGE FORM

Subject:	Date:

FORM A

This questionnaire is intended to get demographic information about you and to assess your computer experience. As appropriate, please complete the question or CIRCLE the most appropriate choice.

1. Are you male or female? Male Female
2. How old are you? _____
3. Is English your first Language? Yes No (First language: _____)
4. How often do you use a computer?

   Never 1 2 3 4 5 Everyday
5. How long have you been using computers?

   This year 1 2 3 4 5 Many years
6. What do you use computers for? (Circle as many as are appropriate).

   Email Newsgroups Chat Instant Messaging Bulletin Boards (e.g., ICQ)
7. How often do you check your e-mail? _____ Times Per Day
8. How long have you been using email? _____ Years _____ Months
9. Approximately how many e-mails do you compose a day? _____ Per Day
10. Approximately how much time do you spend per day using email?

    _____ Hours _____ Minutes Per Day
11. Do you use Instant Messenger? Yes / NO
12. If you use Instant Messenger, how long have you been using it?

    _____ Years _____ Months
13. If you use Instant Messenger, approximately how much time do you spend per day using it? _____ Hours _____Minutes

14. If you use Instant Messenger, how many people are on your buddy list? _____

15. How often (if ever) do you use a CHAT program (e.g., IRC, Yahoo Chat, etc.)?

Never 1 2 3 4 5 Everyday

16. How often (if ever) do you use a MUD or MOO (e.g., Lambda Moo)?

Never 1 2 3 4 5 Everyday

17. How often (if ever) do you post to a message board?

Never 1 2 3 4 5 Everyday

----------[To be completed by Experimenter]----------

wpm: _____ acc: _____%

APPENDIX 6: INSTRUCTIONS FOR SENDER IN HIGH MOTIVATION CONDITION

Instructions

Sometimes situations arise where it is NOT in one's best interests to tell 'the truth, the whole truth, and nothing but the truth'- for instance, to present your best image, to protect another's feelings, to avoid unpleasant circumstances. A certain level of communication skill is necessary to be able to adapt to these situations. We would like you to practice these skills in the upcoming discussion and to allow us to determine how well others can detect these deceptions.

You will be given **sheet of paper with five topics** on it. Each topic would have a number next to it.

- You have to be **totally truthful** when answering the topics on the sheet with the **black numbers.**
- When encountering a **topic with a number and an asterisk (*)**, you have "to NOT tell 'the truth, the whole truth, and nothing but the truth" about that card's topic.

You have a number of different options for answering the questions on the topic with a number and an asterisk (*). You might give clear but completely untrue answers. You might be vague, indirect, unclear, and ambiguous, or you might withhold, omit, or avoid discussing relevant information. The primary aim is to use your own technique and communication style to give answers which fall short of being the 'truth, the whole truth, and nothing but the truth.'"

You should remember that the ability to deceive your partner in these conversation tasks represents an extremely important skill. Previous research has shown that the

ability to lie predicts future success in business, counseling, and health. It also predicts your ability to make and maintain friends, and is a good indicator of intelligence that is not measured by conventional IQ tests. As such, you should try your best to completely deceive your partner.

Your conversation will be with an anonymous partner and will take place over a computer network (much like an Internet chat room). The experiment will give you quick instructions on how to use the computer to interact with your partner.
You should discuss each conversation topic until you are both clear on each other's viewpoints. Typically, this takes about 5-10 minutes per conversation topic, although there is no time-limit for your discussion. Once you have finished discussing one topic, please move onto the next one with your partner.

When you have completed all of the conversation topics, you will have several questionnaires to complete, which will take about 15-30 minutes.

The Experimenter will go over these instructions with you before the study begins. Please wait until the Experimenter instructs you and your partner to begin before starting your conversation.

APPENDIX 7: INSTRUCTIONS FOR SENDER IN LOW MOTIVATION CONDITION

Instructions

Sometimes situations arise where it is NOT in one's best interests to tell 'the truth, the whole truth, and nothing but the truth'- for instance, to present your best image, to protect another's feelings, to avoid unpleasant circumstances. A certain level of communication skill is necessary to be able to adapt to these situations. We would like you to practice these skills in the upcoming discussion and to allow us to determine how well others can detect these deceptions.

You will be given **sheet of paper with five topics** on it. Each topic would have a number next to it.

- You have to be **totally truthful** when answering the topics on the sheet with the **black numbers.**
- When encountering **a topic with a number and an asterisk (*)**, you have "to NOT tell 'the truth, the whole truth, and nothing but the truth" about that card's topic.

You have a number of different options for answering the questions on the topic with a number and an asterisk (*). You might give clear but completely untrue answers. You might be vague, indirect, unclear, and ambiguous, or you might withhold, omit, or avoid discussing relevant information. The primary aim is to use your own technique and communication style to give answers which fall short of being the 'truth, the whole truth, and nothing but the truth.'"

You should try your best to deceive your partner. However, the ability to succesfully lie varies widely across different individuals, and your ability to successfully act

deceptively is not indicative of any skill level, nor is it a measure of how well you can communicate with others. Simply try your best.

Your conversation will be with an anonymous partner and will take place over a computer network (much like an Internet chat room). The experiment will give you quick instructions on how to use the computer to interact with your partner.

You should discuss each conversation topic until you are both clear on each other's viewpoints. Typically, this takes about 5-10 minutes per conversation topic, although there is no time-limit for your discussion. Once you have finished discussing one topic, please move onto the next one with your partner.

When you have completed all of the conversation topics, you will have several questionnaires to complete, which will take about 15-30 minutes.

The Experimenter will go over these instructions with you before the study begins. Please wait until the Experimenter instructs you and your partner to begin before starting your conversation.

APPENDIX 8: INSTRUCTIONS FOR RECEIVER IN CMC CONDITION

Instructions

During this experiment, you will converse with a partner on five topics listed on a sheet supplied by the Experimenter. The topics on the sheet are numbered in the order in which we would like you to discuss these topics.

We are interested in how people converse about different types of topics. Your instructions are to try to make the conversation go as smoothly as possible.
You should discuss each conversation topic until you are both clear on each other's viewpoints. Typically, this takes about 5-10 minutes per conversation topic, although there is no time-limit for your discussion. Once you have finished discussing one topic, please move onto the next one with your partner.

Your conversation will be with an anonymous partner and will take place over a computer network (much like an Internet chat room). The Experimenter will give you brief instructions on how to use the computer to interact with your partner.
When you have completed all of the conversation topics, you will have several questionnaires to complete, which will take about 15-30 minutes.

The Experimenter will go over these instructions with you before the study begins. Please wait until the Experimenter instructs you and your partner to begin before starting your conversation.

APPENDIX 9: INSTRUCTIONS FOR RECEIVER IN FtF CONDITION

Instructions

During this experiment, you will converse with a partner on five topics listed on a sheet supplied by the Experimenter. The topics on the sheet are numbered in the order in which we would like you to discuss these topics.

We are interested in how people converse about different types of topics. Your instructions are to try to make the conversation go as smoothly as possible.

You should discuss each conversation topic until you are both clear on each other's viewpoints. Typically, this takes about 5-10 minutes per conversation topic, although there is no time-limit for your discussion. Once you have finished discussing one topic, please move onto the next one with your partner.

When you have completed all of the conversation topics, you will have several questionnaires to complete, which will take about 15-30 minutes.

The Experimenter will go over these instructions with you before the study begins. Please wait until the Experimenter instructs you and your partner to begin before starting your conversation.

APPENDIX 10: CONVERSATION TOPICS FOR SENDER

-LYING ON #4 & #5

Topic 1

Complete the sentence, "*When I am in a large group, I ……*". In this activity, talk about how you would handle a specific situation. You should say how you would react to a group of people in the social, academic or professional setting.

Topic 2

Tell about the most significant person in your life. This person(s) could be a family member, significant other, relative, friend, colleague or any other role-model. It could be in your present life or from your past life. The objective is to talk about the person whom you consider the most important in your life.

Topic 3

We all make mistakes regularly. *Tell about a mistake you made recently.* You should mention any slip-up, gaffe, blunder, blooper or faux pas made by you recently. It could be anything you consider a mistake in hindsight- being rude to somebody; mixing up some assignment deadlines; slipping up in a party etc.

Topic 4*

Describe the most unpleasant job you have ever had to do. It could be any task or job that made you very uncomfortable and you felt unpleasant about it. It could vary from telling a person you don't like him/her to leaving a job/course you liked because of some personal reasons. It is up to you to define the job.

Topic 5*

Talk about responsibility. According to you, what constitutes responsibility and what is a responsible person supposed to be doing. Explain your personal opinion on aspects of responsibility.

APPENDIX 11: CONVERSATION TOPICS RECEIVER

Topic 1

Complete the sentence, "*When I am in a large group, I ……*". In this activity, talk about how you would handle a specific situation. You should say how you would react to a group of people in the social, academic or professional setting.

Topic 2

Tell about the most significant person in your life. This person(s) could be a family member, significant other, relative, friend, colleague or any other role-model. It could be in your present life or from your past life. The objective is to talk about the person whom you consider the most important in your life.

Topic 3

We all make mistakes regularly. *Tell about a mistake you made recently.* You should mention any slip-up, gaffe, blunder, blooper or faux pas made by you recently. It could be anything you consider a mistake in hindsight- being rude to somebody; mixing up some assignment deadlines; slipping up in a party etc.

Topic 4

Describe the most unpleasant job you have ever had to do. It could be any task or job that made you very uncomfortable and you felt unpleasant about it. It could vary from telling a person you don't like him/her to leaving a job/course you liked because of some personal reasons. It is up to you to define the job.

Topic 5

Talk about responsibility. According to you, what constitutes responsibility and what is a responsible person supposed to be doing. Explain your personal opinion on aspects of responsibility.

APPENDIX 12: POST-INTERACTION QUESTIONNAIRE - SENDER

Subject:	Date:

S

Post-Interaction Questionnaire

The following questionnaires are designed to assess the degree to which you "told the truth, the whole truth, and nothing but the truth" for each particular topic, as well as to gather some information on how you went about deceiving your partner or tried to convince your partner that you were telling the truth.

There are 5 questionnaires that follow. The first four are specific to each conversation task, while the last questionnaire contains general questions. **You will only be answering questions about the last four conversation topics.** The Experimenter will allow you to review each conversation topic, starting with your second conversation topic, in order to help you answer these questions.

For each questionnaire, please read each item carefully and circle the number that best describes your response. Describe yourself, your behaviors and your feelings as honestly and as accurately as possible.

Conversation Topic #2

Please complete these questions after reviewing your discussion of the second topic.

Please base your answers on your discussion of this topic only.

1. To what degree were you truthful about this topic (circle the most appropriate response)?

Not at all truthful Completely truthful

0 1 2 3 4 5 6 7 8 9 10

Please indicate how much you agree or disagree with the following statements by circling the most appropriate choice.

2. I gave information that wasn't true.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. I made statements that were exaggerated.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. I gave believable responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. I gave false responses to this discussion topic.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. I think my partner believed me.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. I was comfortable during this part of the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

8. I gave responses that were as informationally complete as possible.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

9. I gave vague and unclear responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

10. I did not provide specific details.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

11. I said things that could be interpreted in more than one way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

12. I did not commit to a definite answer.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

13. I gave superficial rather than in-depth responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

14. I used language that was very precise and concrete.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

15. I was skillful in managing the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

16. I was hesitant and halting in responding to my partner.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

17. I seemed nervous and flustered.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

18. I was not very smooth verbally.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

19. I seemed restless and uncomposed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Finally, could you describe in your own words how you went about being either truthful or deceptive? Please give examples of any techniques that you used to make your partner think you were being truthful or deceptive.

_____

_____

_____

_____

Conversation Topic #3

Please complete these questions after reviewing your discussion of the second topic.

Please base your answers on your discussion of this topic only.

1. To what degree were you truthful about this topic (circle the most appropriate response)?

Not at all truthful Completely truthful

0 1 2 3 4 5 6 7 8 9 10

Please indicate how much you agree or disagree with the following statements by circling the most appropriate choice.

2. I gave information that wasn't true.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. I made statements that were exaggerated.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. I gave believable responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. I gave false responses to this discussion topic.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. I think my partner believed me.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. I was comfortable during this part of the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

8. I gave responses that were as informationally complete as possible.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

9. I gave vague and unclear responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

10. I did not provide specific details.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

11. I said things that could be interpreted in more than one way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

12. I did not commit to a definite answer.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

13. I gave superficial rather than in-depth responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

14. I used language that was very precise and concrete.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

15. I was skillful in managing the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

16. I was hesitant and halting in responding to my partner.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

17. I seemed nervous and flustered.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

18. I was not very smooth verbally.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

19. I seemed restless and uncomposed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Finally, could you describe in your own words how you went about being either truthful or deceptive? Please give examples of any techniques that you used to make your partner think you were being truthful or deceptive.

_____

_____

_____

_____

Conversation Topic #4

Please complete these questions after reviewing your discussion of the second topic.

Please base your answers on your discussion of this topic only.

1. To what degree were you truthful about this topic (circle the most appropriate response)?

Not at all truthful Completely truthful

0 1 2 3 4 5 6 7 8 9 10

Please indicate how much you agree or disagree with the following statements by circling the most appropriate choice.

2. I gave information that wasn't true.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. I made statements that were exaggerated.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. I gave believable responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. I gave false responses to this discussion topic.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. I think my partner believed me.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. I was comfortable during this part of the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

8. I gave responses that were as informationally complete as possible.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

9. I gave vague and unclear responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

10. I did not provide specific details.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

11. I said things that could be interpreted in more than one way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

12. I did not commit to a definite answer.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

13. I gave superficial rather than in-depth responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

14. I used language that was very precise and concrete.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

15. I was skillful in managing the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

16. I was hesitant and halting in responding to my partner.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

17. I seemed nervous and flustered.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

18. I was not very smooth verbally.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

19. I seemed restless and uncomposed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Finally, could you describe in your own words how you went about being either truthful or deceptive? Please give examples of any techniques that you used to make your partner think you were being truthful or deceptive.

_____

_____

_____

_____

Conversation Topic #5

Please complete these questions after reviewing your discussion of the second topic.

Please base your answers on your discussion of this topic only.

1. To what degree were you truthful about this topic (circle the most appropriate response)?

Not at all truthful Completely truthful

0 1 2 3 4 5 6 7 8 9 10

Please indicate how much you agree or disagree with the following statements by circling the most appropriate choice.

2. I gave information that wasn't true.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. I made statements that were exaggerated.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. I gave believable responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. I gave false responses to this discussion topic.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. I think my partner believed me.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. I was comfortable during this part of the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

8. I gave responses that were as informationally complete as possible.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

9. I gave vague and unclear responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

10. I did not provide specific details.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

11. I said things that could be interpreted in more than one way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

12. I did not commit to a definite answer.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

13. I gave superficial rather than in-depth responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

14. I used language that was very precise and concrete.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

15. I was skillful in managing the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

16. I was hesitant and halting in responding to my partner.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

17. I seemed nervous and flustered.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

18. I was not very smooth verbally.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

19. I seemed restless and uncomposed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Finally, could you describe in your own words how you went about being either truthful or deceptive? Please give examples of any techniques that you used to make your partner think you were being truthful or deceptive.

_____

_____

_____

_____

General Questions

Please complete the following questions as honestly and as accurately as possible by circling the most appropriate choice.

1. In general, if I must, I am good at deceiving others.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

2. I believe that I am good at deceiving others in **Face-to-Face** interactions.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. I believe that I am good at deceiving others in **Email**.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. I believe that I am good at deceiving others in **Instant Messaging** conversations.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. I believe that I am good at deceiving others in **phone** conversations.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. It was important for me to deceive my partner.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. I believe I was successful in deceiving my partner.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

8. I was worried that my partner could tell I was lying.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

9. I believe that people generally tell the truth in conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

10. In everyday life, what signals, cues or strategies do you use to deceive your partner?

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APPENDIX 13: POST-INTERACTION QUESTIONNAIRE - RECEIVER

Subject:	Date:

R

Post-Interaction Questionnaire

The following questionnaires are designed to assess the degree to which you are able to determine whether you partner was telling "the truth, the whole truth, and nothing but the truth" for each particular topic, as well as to gather some information on how you went about determining whether your partner was attempting to deceive you or not.

There are 5 questionnaires that follow. The first four are specific to each conversation task, while the last questionnaire contains general questions. **You will only be answering questions about the last four conversation topics.** The Experimenter will allow you to review each conversation topic, starting with your second conversation topic, in order to help you answer these questions.

For each questionnaire, please read each item carefully and circle the number that best describes your response. Describe yourself, your behaviors and your feelings as honestly and as accurately as possible.

Conversation Topic #2

Please complete these questions after reviewing your discussion of the second topic. Please base your answers on your discussion of this topic only.

1. To what degree do you believe your partner was truthful about this topic (circle the most appropriate response)?

Not at all truthful Completely truthful

0 1 2 3 4 5 6 7 8 9 10

Please indicate how much you agree or disagree with the following statements by circling the most appropriate choice.

2. I am confident in my judgment about whether my partner was truthful or not.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. My partner thought that I believed him/her.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. My partner gave responses that were as informationally complete as possible.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. My partner gave vague and unclear responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. My partner failed to provide specific details.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. My partner said things that could be interpreted in more than one way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

8. My partner would not commit to a definite answer.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

9. My partner gave superficial rather than in-depth responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

10. My partner used language that was very precise and concrete.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

11. My partner was skillful in managing the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

12. My partner had a hesitant and halting communication style.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

13. My partner seemed nervous and flustered.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

14. My partner was not very smooth verbally.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

15. My partner seemed restless and uncomposed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Finally, could you describe in your own words how you decided whether your partner was lying or being truthful? Please give examples of any cues you observed that made you think your partner was being truthful or deceptive.

_____

_____

_____

_____

Conversation Topic #3

Please complete these questions after reviewing your discussion of the second topic. Please base your answers on your discussion of this topic only.

1. To what degree do you believe your partner was truthful about this topic (circle the most appropriate response)?

Not at all truthful Completely truthful

0 1 2 3 4 5 6 7 8 9 10

Please indicate how much you agree or disagree with the following statements by circling the most appropriate choice.

2. I am confident in my judgment about whether my partner was truthful or not.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. My partner thought that I believed him/her.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. My partner gave responses that were as informationally complete as possible.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. My partner gave vague and unclear responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. My partner failed to provide specific details.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. My partner said things that could be interpreted in more than one way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

8. My partner would not commit to a definite answer.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

9. My partner gave superficial rather than in-depth responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

10. My partner used language that was very precise and concrete.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

11. My partner was skillful in managing the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

12. My partner had a hesitant and halting communication style.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

13. My partner seemed nervous and flustered.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

14. My partner was not very smooth verbally.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

15. My partner seemed restless and uncomposed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Finally, could you describe in your own words how you decided whether your partner was lying or being truthful? Please give examples of any cues you observed that made you think your partner was being truthful or deceptive.

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Conversation Topic #4

Please complete these questions after reviewing your discussion of the second topic. Please base your answers on your discussion of this topic only.

1. To what degree do you believe your partner was truthful about this topic (circle the most appropriate response)?

Not at all truthful Completely truthful

0 1 2 3 4 5 6 7 8 9 10

Please indicate how much you agree or disagree with the following statements by circling the most appropriate choice.

2. I am confident in my judgment about whether my partner was truthful or not.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. My partner thought that I believed him/her.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. My partner gave responses that were as informationally complete as possible.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. My partner gave vague and unclear responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. My partner failed to provide specific details.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. My partner said things that could be interpreted in more than one way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

8. My partner would not commit to a definite answer.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

9. My partner gave superficial rather than in-depth responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

10. My partner used language that was very precise and concrete.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

11. My partner was skillful in managing the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

12. My partner had a hesitant and halting communication style.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

13. My partner seemed nervous and flustered.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

14. My partner was not very smooth verbally.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

15. My partner seemed restless and uncomposed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Finally, could you describe in your own words how you decided whether your partner was lying or being truthful? Please give examples of any cues you observed that made you think your partner was being truthful or deceptive.

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Conversation Topic #5

Please complete these questions after reviewing your discussion of the second topic. Please base your answers on your discussion of this topic only.

1. To what degree do you believe your partner was truthful about this topic (circle the most appropriate response)?

Not at all truthful Completely truthful

0 1 2 3 4 5 6 7 8 9 10

Please indicate how much you agree or disagree with the following statements by circling the most appropriate choice.

2. I am confident in my judgment about whether my partner was truthful or not.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. My partner thought that I believed him/her.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. My partner gave responses that were as informationally complete as possible.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. My partner gave vague and unclear responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. My partner failed to provide specific details.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. My partner said things that could be interpreted in more than one way.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

8. My partner would not commit to a definite answer.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

9. My partner gave superficial rather than in-depth responses.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

10. My partner used language that was very precise and concrete.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

11. My partner was skillful in managing the conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

12. My partner had a hesitant and halting communication style.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

13. My partner seemed nervous and flustered.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

14. My partner was not very smooth verbally.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

15. My partner seemed restless and uncomposed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

Finally, could you describe in your own words how you decided whether your partner was lying or being truthful? Please give examples of any cues you observed that made you think your partner was being truthful or deceptive.

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General Questions

Please complete the following questions as honestly and as accurately as possible by circling the most appropriate choice.

1. In general, I know when others are lying to me.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

2. I believe that I am good at detecting deceit in **Face-to-face** interactions.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

3. I believe that I am good at detecting deceit in **Email**.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

4. I believe that I am good at detecting deceit in **Instant Messaging** conversations.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

5. I believe that I am good at detecting deceit in **phone** conversations.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

6. I believe that people generally tell the truth in conversation.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

7. In everyday life, what do you feel are the most reliable signals or cues that someone is lying?

_____

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APPENDIX 14: DEBRIEFING FORM

Detecting Deception in FtF and CMC Conversations

Debriefing

As Computer-Mediated Communication (CMC) becomes more ubiquitous, it becomes increasingly important for us to understand how a variety of communication processes may be affected. For example, is it easier to tell if someone if lying when you are talking to them Face-to-Face or in a text-based interaction, such as an Email of in Instant Messaging? Also, how does motivation affect our ability to lie in these different types of settings? Previous research has not yet examined these questions and the goal of our research is to begin to address the impact of CMC and motivation levels on deception detection.

Rationale

In this experiment, we compare people's ability to detect deception in Face-to-Face and CMC interactions. We are also comparing the ability to detect deception by people that have either a high or low motivation to lie in these two different types of interactions.

Methods

Participants were randomly assigned to either the Sender role, who were instructed to not "tell the truth, the whole truth, and nothing but the truth" on two of the assigned conversation tasks, or to the Receiver role, who was instructed to try to detect the Sender's deceptions after the conversations were completed.

Participants assigned to the Sender role were also randomly assigned to a Low or High motivation condition. In order to increase participants' motivation to lie successfully, Senders in the High motivation condition were falsely told that lying ability can predict future success in their studies and employment. In fact, this is not the case –

lying ability varies widely across different individuals and is not indicative of any skill.

Results

So, what do you think? If you were a Sender, do you think the communication setting you were in affected your ability to lie successfully? How did your motivation level affect your ability to lie? If you were the Receiver, do you think the conversation setting affected your ability to detect your partner's deceptions? What cues did you use to try to identify your partner's deceptions? If you would like to know how the results turned out, just email us and we'll send you a report when we have collected and analyzed all the data.

Please note that it is very important that you **do not discuss the manipulations or results of this experiment** with others in your classes that have not participated in the experiment.

If you have any other questions, please feel free to contact Professor Hancock at jth34@cornell.edu or by phone (255.4452).

Thank you for you participation.

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