The Motivational *Enhancement* Effect: Implications for our chosen modes of communication in the 21st Century

Mike Woodworth
UBC Okanagan
mwoodwor@dal.ca

Jeff Hancock
Cornell University
jth34@cornell.edu

Saurabh Goorha
Cornell University
sg278@cornell.edu

Abstract

Research has indicated that highly motivated liars will typically be detected more frequently than unmotivated liars because of additional emotional demands. However, previous research on this Motivational Impairment Effect has been limited to investigating deception detection in face-to-face contexts. The current research compared the effect of motivation across face-to-face and Computer-Mediated (CMC) environments.   Results indicated that, contrary to Face-to-Face conversations, in a CMC environment, receivers were not sensitive to deception when their partner was highly motivated to succeed at deceiving them. Instead, motivated liars in CMC environments were significantly more successful in their deceptions.   It is proposed that liars in the CMC setting were more immune to the motivational impairment effect, which operates primarily via nonverbal cues that are eliminated in CMC settings.   Further, it is suggested that there may be features unique to a CMC environment that may actually facilitate a motivated deceivers success, resulting in a motivational enhancement effect.

1. Introduction

The accuracy of deception detection by both experts and non-experts tends to be at about, or only marginally better than, chance [e.g. 1].   However, a review of the literature concerned with deception detection, suggests that there are a number of factors that actually can influence an individual's ability to successfully detect deceit.   For example, a study by Porter, Woodworth, and Birt [2] 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 verbal and non-verbal "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 a decrease in illustrators and/or body movements [1]. 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 [3].

1.1 Motivational Impairment Effect

One factor that appears to make these cues particularly transparent to the sender is the motivation level of the deceiver. Specifically, it is possible that there are potentially serious costs for the deceiver, or their may be relatively innocuous consequences if the lie should be detected.   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 [4, 5]. Indeed, a meta-analysis conducted by Zuckerman and Driver [6] revealed that the more motivated liars were to avoid getting caught, the more likely that their behavior gave their lies away. For example, Ekman and O'Sullivan [7] examined the detection of deceptive nursing students who were highly motivated to lie when describing two films as pleasant, when one of the films was unpleasant and included scenes of amputations and burn victims. The nurses were motivated by being informed 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 detected at levels much higher than chance by professional lie detectors (such as the Secret Service, judges, and psychiatrists) because they more readily displayed facial and vocal signs indicative of emotion when lying. Indeed, the most accurate observers reported attending to the nonverbal behavior of respondents, whereas least successful observers attended only to the verbal behavior of respondents.

The observation that highly motivated liars are more likely to be detected has been referred to as the *motivational impairment effect* [8]. 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.   It has been proposed that the added emotional (e.g., guilt, fear, excitement) and cognitive demands of a lie with particularly high states will make it easier to determine the veracity of individual's statement [e.g. 9].   For example, the attempted over-control theory [1] suggests that the additional cognitive demands of a high-stakes lie may result in the deceiver attempting to

overcompensate for stereotypical cues to deception (e.g., nervous behaviour) and that they will appear rigid and unnatural. In fact, a number of studies have demonstrated that the higher the stakes for deception, the more effective informed lie detection will be [e.g. 7, 10]. This finding has been observed for both negative (some type of perceived punishment) high stakes and positive (some type of benefit or gain) high stakes [11].

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 [12, 13], deceivers can be conceived as active agents who strategically plan and adapt their interpersonal behavior to maximize credibility and deception success [12]. For example, moderately motivated deceivers may use more direct, clear and complete verbal messages, along with a more pleasant, truthful demeanor [14].

1.2 Features Unique to a Computer-Mediated Context

Previous research 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 might CMC affect deception detection and the role of motivation levels?

Perhaps the most obvious impact is the elimination of nonverbal and vocal cues in CMC. 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 [15], 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

This elimination of nonverbal cues may arguably have particularly salient implications for the motivational impairment effect, in which highly motivated liars tend to be detected more frequently than less motivated liars [8].

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. 1]. 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, a previous study by DePaulo et al. [16] examined the effect of motivation across verbal and non-verbal conditions on participants ability to successfully lie to a panel of judges. Results indicated that highly motivated deceivers were, in fact, *more* successful than less motivated deceivers when judges only had access to their verbal report (a verbatim typed transcript). However, when judges had access to nonverbal (audio and visual) cues as well, highly motivated deceivers were less successful than less motivated deceivers. Depaulo et al.[16] speculated that it may be easier for deceptive senders to control their verbal presentation, or alternatively, that they may have focused an inordinate amount of attention on their verbal presentation, to the detriment of their non-verbal presentation. The current study was the first to examine if this motivation impairment *and* enhancement effect would be obtained for an interactive conversation between two individuals, as well as in a text-based CMC environment.

If Burgoon and her colleagues [12, 14] 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 as well. 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 [17, 18]. Because the construction of deceptive messages tends to take more cognitive effort than truthful messages [19], the increased time available in CMC settings should be particularly advantageous to the motivated liar engaged in strategic communication processes [14]. Ekman [3], 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 [20]. 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 [21]. 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* [18], 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 actually enhance a motivated liar's success at deception.

1.3 Hypothesis

The objective of the present research was to examine the effect of communication setting and motivation level on deception detection. Participants interacted with an unacquainted partner, and were randomly assigned to a text-based CMC or FtF interaction condition, and to a low or high motivation to lie condition.

The question of whether the effect of motivation levels on deception detection would be different across the two communication environments was of primary 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 [8]. 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.

2. Methods

2.1 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 of how unacquainted men and women interact on various conversation topics in CMC and FtF environments."

2.2 Procedure

Upon reporting to the laboratory, participants were led separately to remote rooms where they completed an initial set of forms. The following methodology was based primarily on a series of studies by Burgoon and her colleagues (e.g., [22]). 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. 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'" on two topics, and to be truthful on the other two topics. 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. 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.

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. 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.

2.3 Motivation manipulation

Senders were 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 [4]. 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).

3. Results

3. 1 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.

3.2 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 were 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.

3.3 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, $F(1, 66) = 4.23$, $p < .01$). Please refer to 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 they were 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 they were 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.
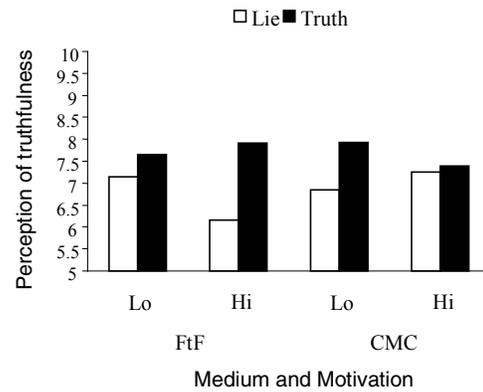

Figure 1. Receiver's perception of truthfulness of their partner as a function of type of medium and motivation, across truth and lie conditions.

3.4 Deception detection accuracy

Deception detection accuracy was operationalized as the absolute difference between the sender's 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 their 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 our expectations, 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, 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, $F(1, 66) = 5.21, p < .05$. Please refer to Figure 2.
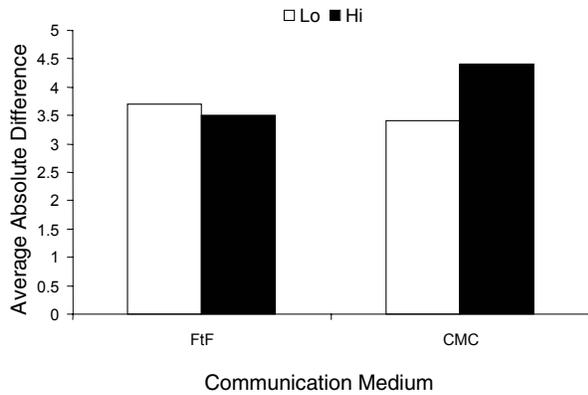

Figure 2. Average absolute difference between the senders' rating of their truthfulness and the receiver's rating of the sender's truthfulness.

Simple effects analyses 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.

4. Discussion

The objective of the present research was to examine the effect of motivation on the detection of deception across both CMC and FtF interpersonal conversations. 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 [4], 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. Of course, this manipulation certainly did not reach the "high stakes" levels found in some real life situations (such as fear of being prosecuted for a crime). However, results indicated that it did provide a situation where subjects in the high motivation group were considerably more motivated to lie than other participants.

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.

Of primary interest, an interaction was observed 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 [8]. 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. For example, liars may attempt to over-control their behavior and appear rigid and deliberate in their movements [e.g. 10].

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.

We were also interested in the receivers accuracy compared to the magnitude of the sender's deception (i.e., deception detection accuracy was calculated as the absolute difference between the sender's reported level of deception and the receiver's perceived level of deception). Although there was no main effect of the communication environment on deception detection accuracy, 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 accuracy 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. These results are consistent with Depaulo et al.'s [16] study that found when only verbatim transcripts were available to judges, highly motivated deceivers were actually more successful than their less motivated counter-parts. However, while the above study was conducted in a static and non-interactive interview style format, the current study investigated both FtF and CMC environments, and employed a dynamic interactive conversational format for both the conditions.

Why were highly motivated CMC senders more successful than any other type of sender in deceiving their partner? We propose that these results suggest a motivational *enhancement* effect. 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 [17], 2) edit their messages before transmitting them to their partner [21], and 3) engage in selective self-presentation [18]. 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 also provide some support for Burgoon and colleagues' [12, 13] 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 [12].

Interestingly, a linguistic analysis by the co-authors of the current paper also reveals some interesting differences between high and low motivated individuals within a CMC environment [23]. For example, deceptive senders who were highly motivated avoided causal phrases that may have lead to detection, while the unmotivated deceivers tended to use less sophisticated forms of lying (e.g., simple negation). Also, when confronted with a highly motivated deceptive sender, receivers asked less questions than when the deceptive sender was not motivated. This suggests that receivers were more suspicious when confronted with the less sophisticated forms of lying employed by the unmotivated deceivers, compared to the more creative and complex lies of the motivated deceivers.

However, one potential limitation of the current study is that it is somewhat unclear what specific influence our motivation manipulation had on the participants. For example, a study conducted by Frank and Ekman [11] 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. 1]. Indeed, a recent paper by Dunbar, Ramirez, and Burgoon [24] found that interactive deception does in fact differ in important ways from non-interactive deception. Finally, admittedly, it is not entirely clear if the current results are most directly attributable to a true 'motivational enhancement effect' in the CMC environment, or are primarily attributable to preparation time, editability, selective self-presentation, or perhaps some other factor like decreased cognitive load. One study that could more closely examine this question would be to transcribe a message that was initially delivered in FtF, and to then provide it to the participants in the CMC condition. One other potential study could allow participants in the FtF condition the exact same amount of preparation time as the CMC participants.

In summary, to our knowledge this is one of the first studies to empirically demonstrate that there are

potentially important differences for detecting deceit depending on whether the motivated sender is interacting in a FtF or in a computer mediated context. As an increasing number of individuals begin to communicate in on-line and electronic 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 is 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 [25]. 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, we believe it is essential that additional research examine deception in the context of mediated communication. Indeed, some researchers have speculated that a failure to understand more about deceit and devise more accurate deception detection techniques could become a major concern for today's society [26].

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. Our data suggest 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.

5. References

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