



Getting to know you: Face-to-face versus online interactions

Bradley M. Okdie^{a,*}, Rosanna E. Guadagno^a, Frank J. Bernieri^b, Andrew L. Geers^c,
Amber R. Mclarney-Vesotski^d

^a Department of Psychology, University of Alabama, P.O. Box 870348, Tuscaloosa, AL 35487-0348, United States

^b Psychology Department, Oregon State University, 204C Moreland Hall, Corvallis, OR 97331, United States

^c Department of Psychology, Mail Stop #948, 2801 West Bancroft Street, University of Toledo, Toledo, Ohio 43606-3390, United States

^d Alpena Community College, 665 Johnson St., Alpena, MI 49707-1495, United States

ARTICLE INFO

Keywords:

Computer-mediated communication
Person perception
Personality
Self-other agreement
Impression formation

ABSTRACT

It is an open question as to how impressions formed via computer-mediated communication (CMC) differ from those formed face-to-face (FtF). Some research suggests that judgments of others formed while interacting over CMC are more favorable than judgments formed in FtF, while other researchers argue the pattern is in the opposite direction. We sought to settle this conflict by examining impressions formed via each communication mode while controlling for the other. Participants interacted with a partner twice: once FtF and once CMC. When controlling for each communication mode, participants interacting FtF, formed more positive impressions of their partner than did those in the other sequence. Furthermore, FtF participants had greater self-other agreement than those who interacted via CMC. Implications for impressions formed over the Internet are discussed.

© 2010 Elsevier Ltd. All rights reserved.

1. Introduction

An emerging body of literature on the use of the Internet suggests that forming relationships via computer-mediated communication (CMC) may differ from those formed face-to-face (FtF) (Nowak, Watt, & Walther, 2005; Sproull & Kiesler, 1985; Walther, 1996). Some have noted that communication via CMC is relatively depleted emotionally because it lacks the rich nonverbal and environmental cues present when interacting face-to-face (Sproull & Kiesler, 1985). They argue that the richness and abundance of interpersonal and expressive cues present in face-to-face interactions lead to more positive impressions. But others have argued precisely the opposite, suggesting that the reduction in these cues can actually enhance the interpersonal bond between interactants (Walther, 1996). This study empirically examines whether first impressions based on CMC or FtF are more positive, and whether communication mode impacts the extent to which one's first impression of their partner agrees with their partner's description of themselves, otherwise known as self-other agreement (e.g., Kenny & West, 2010).

1.1. Instant messaging and anonymity

Instant messaging is a text-based form of computer-mediated communication (CMC) involving real time messages that are

exchanged by interactants. Its characteristics are similar to other methods of CMC such as email and text messaging. Research indicates that CMC interactions such as instant messaging attenuate physical distance, can be relatively anonymous, and cause a reduction in the importance of physical appearance (see McKenna & Bargh, 2000 for review).

The obvious draw to CMC is that interactants need not be geographically near one another allowing interactions to take place virtually across any distance, earthbound or otherwise. However, recent surveys indicate that 24% of those who use instant messaging programs do so to communicate with others easily accessible within their own physical space (Pew Internet and American Life Report, 2004). This preference for instant messaging over FtF interaction indicates that individuals not only have the option to engage in new methods of interaction but appear to be embracing them at the expense of live social intercourse.

As in most forms of computer-mediated communication, individuals interacting via instant messaging can be relatively anonymous if they so choose. That is, individuals communicating via instant messaging are most often identified to one another by user-generated screen names that can range from being descriptive (e.g., John.Smith) to revealing little about their owners (e.g., Green). One consequence of this is that the costs of disclosing negative or taboo aspects of oneself are reduced, which may lead increased and reciprocated self-disclosure (McKenna & Bargh, 1998; McKenna & Bargh, 2000; McKenna, Green, & Gleason, 2002; Pennebaker, 1990). This in turn leads directly to increased empathy and liking (Bargh, McKenna, & Fitzsimons, 2002). Another

* Corresponding author.

E-mail address: Bmokdie@crimson.ua.edu (B.M. Okdie).

obvious quality of CMC is that demographic information immediately obvious in FtF, such as age, gender, and race are less salient or even absent when interacting online (Amichai-Hamburger & McKenna, 2006; Morton, Zetzelmeier, & Silvia-Risso, 2003). Thus, appearance cues such as physical attractiveness that are known to constrain impression formation (e.g., Eagly, Ashmore, Makhijani, & Longo, 1991; Shannon & Stark, 2003) may be rendered irrelevant within CMC to the extent they are invalidly provided or not provided at all.

1.2. Hyperpersonal interaction

The appreciation of the above mentioned attributes of CMC has led some to argue that text based asynchronous communication enhances the positivity of interpersonal communication because it creates *hyperpersonal interactions* where the receiver may idealize the sender, strategic self-presentation is optimized, and self-presentation is magnified due to the reduction of demographic and nonverbal cues that can be distracting in FtF (see Walther (1996) for review). Tidwell and Walther (2002) demonstrated that individuals interacting over a computer can develop intimate personal relationships and overcompensate for the apparent limitations of the medium leading to hyperpersonal interactions. Studies have shown, in fact, that individuals communicating via CMC experience more socially desirable interactions than when communicating FtF (Bargh et al., 2002; Walther, 1995). Furthermore, the very medium itself provides an alternative communication channel (written text) through which an entirely unique channel specific set of cues may become interpersonally relevant (Tanis & Postmes, 2003).

Hyperpersonal interactions can occur because individuals interacting via a computer may choose to present aspects of themselves more selectively to their partners. That is, individuals interacting via CMC have time to rethink, edit, and possibly censure the information they convey to their interaction partners ensuring they are perceived the way they intend (Walther, 1996). For example, McKenna et al. (2002) had individuals interact both FtF and over the computer and varied which communication mode participants used to initially communicate. Participants who met over the computer first reported liking their interaction partner more and were better able to selectively present aspects of themselves than those who interacted FtF. Thus, if individuals are better able to manage their self-presentation via CMC, then it seems feasible that individuals might report having better interactions via CMC compared to FtF.

1.3. Functional model of nonverbal exchange

Other theorists have argued precisely the opposite and propose that the impoverished interpersonal ecology of CMC results in less effective and satisfying social interactions (e.g., Sproull & Kiesler, 1985). Text based communications are devoid of the naturally occurring nonverbal and expressive cues that are normally present when in the physical presence of another. For example, Patterson's (1982, 1991) *functional model of nonverbal exchange* identifies seven different purposes or functions served by FtF interactive behavior including among others, regulating the interaction, expressing intimacy, managing affect, exercising social control, and facilitating service and task goals. These functions have a direct impact on an individual's concurrent physiological, behavioral, cognitive, and affective state and thus literally *move* an individual throughout the course of FtF interactions, whether or not one is conscious of it (e.g., Lakin & Chartrand, 2003). FtF interactions are by their very nature inherently engaging physically, cognitively, and emotionally (Patterson, 1991).

Studies have demonstrated that the expressive nonverbal behavior of interactants is strongly linked to their liking of one another, as well as the rapport they establish (Ambady, Richeson, & Bernieri, 2000). From this perspective, the increased arousal and affective tone within FtF interaction would intensify the experience of any positively toned interaction and lead to higher levels of satisfaction, enjoyment, and rapport—at least among those who did not *dislike* their partner.

1.4. Predictions

Interpersonal sensitivity is the ability to accurately assess and respond effectively to the attributes of those we interact with socially (Bernieri, 2001). Reviews of the literature demonstrate conclusively that individuals are able to assess characteristics of others within seconds with some degree of accuracy (Ambady et al., 2000; Ambady & Rosenthal, 1992). For example, participants and even children were able to accurately judge several different personality traits after viewing only a minute or two of behavior on video tape (McLarney-Vesotski, Bernieri, & Rempala, 2006). Further, social scientists purport that nonverbal cues such as appearance – a cue not typically found in most text-based forms of CMC – aid in the accuracy of these first impressions (Burgoon & Saine, 1978). Thus, interacting over a medium in which cues used to form impressions are absent, such as the computer, is likely to decrease an individual's ability to form accurate assessments. Whereas this conclusion seems compelling, at least one study found no difference in impressions formed via CMC compared to FtF (Boucher, Hancock, & Dunham, 2008). Hancock and Dunham (2001) reported more intense impressions formed over CMC than FtF, and McKenna et al. (2002) argued that CMC increases the extent to which individuals display more of their “true” selves. In addition, other research supports the notion that accurate impressions can be formed from static content displayed online such as personal web sites and online profiles (Gosling, Gaddis, & Vazire, 2007; Vazire & Gosling, 2004). However, none of these investigations assessed interpersonal sensitivity as defined above. Therefore, we predicted that self-other agreement will be greater within FtF interactions than within CMC given the diagnosticity of expressive behavior conveyed FtF that is known to predict attitudes, emotions, personality, motivations, and relationship outcomes (Ambady et al., 2000). In this study, we will examine self-other agreement as our measure of sensitivity. Self-other agreement is the extent to which a description of another matches that other's description of themselves (Kruglanski, 1989) and is a widely used measure of social perception success (e.g., Ambady et al., 2000; Funder, 1995; Kenny & West, 2010).

The Five-factor model was employed as our measure of personality impression as it is accepted as the predominant taxonomy of personality traits (John, Naumann, & Soto, 2008), especially as used by the layperson in their day-to-day interpersonal interactions (McCrae & John, 1992).

- H1: Self-other agreement will be greater within FtF interactions than within CMC interactions.

With respect to self-awareness, empirical research has found that people are less perceptive of their internal states and desires when communicating FtF than when via CMC (Matheson & Zanna, 1988; Matheson & Zanna, 1990). In addition, individuals communicating via CMC appear to have a heightened focus on the self and overestimate their contributions to discussions (Weisband & Atwater, 1999) and the clarity of their communication (Kruger, Epley, Parker, & Ng, 2005). Heightened self-awareness when interacting over CMC is believed to be caused by the lower cognitive load demands in CMC relative to FtF, which requires more

visual processing and more behavioral emotional management (Sassenberg, Boos, & Rabung, 2005). In other words, interactants in CMC have more cognitive resources to direct towards their own thoughts and desires than those in FtF interactions, and thus can be more self-aware.

- H2: Participants interacting over the computer will be higher in self-awareness than participants interacting via FtF.

1.5. The present investigation

The present study examined how first impressions were affected by different communication modes (i.e., CMC or FtF). According to hyperpersonal interaction theory, participants interacting over the computer should form more positive impressions of their partners and rate the interaction as more desirable than individuals interacting FtF (Walther, 1995). In contrast, Patterson's (1991) functional model of interactive behavior predicts that participants interacting fact-to-face will form more positive impressions of their partner. In terms of self-other agreement, we expected greater self-other agreement FtF because of the greater amount of diagnostic information available. However, the lack of empirical findings demonstrating this inhibited us from making this prediction confidently.

In an attempt to examine these communication mode transitions, we had our participants interact twice with their partner, once within each mode of communication, all within the span of an hour. We collected their impressions of each other after each interaction. By assessing impressions as participants move from CMC to FtF and vice versa, we can document for the first time how impressions may, or may not, change as a relationship moves into another communication mode. Of course, within a repeated measures experimental design such as this one needs to take into account primacy effects where the very first impression might be biased in some way and might carry over into the subsequent interaction. In other words, the effect of interaction condition is completely confounded with whether or not the interaction was the first or last thus making interpretation of communication mode impossible. One solution to this problem is to simply counterbalance the order in which the communication modes were experienced. Furthermore, by employing a repeated measures ANOVA that incorporates the order effect (first interaction versus second interaction), one can test the significance of communication mode *after* accounting for the variance due to the first versus second interaction effect and the carry-over (sequence) effect from one treatment onto another (Rosenthal & Rosnow, 2008). Finally, this study included the gender composition of the dyad (Female–Female; Male–Male; Female–Male) in all of its analyses because of previously reported gender effects within CMC communications (e.g., Guadagno & Cialdini, 2002; Guadagno & Cialdini, 2007; McKenna et al., 2002).

2. Method

2.1. Participants & design

Participants were 136 (83 females, 53 males) undergraduate students enrolled in introductory psychology at a large Midwestern University who received course credit for their participation. Ethnicity was self-reported: 92 participants identified as Caucasian, 21 as African American, 12 as other, and 11 participants failed to report their ethnicity.

The present study employed a 2×3 (between) $\times 2$ (within) design. Communication mode sequence across the two interactions (FtF first versus CMC first) and gender composition of the dyad (fe-

male, male, mixed) were between subjects factors while Order (first interaction assessment versus second interaction assessment) served as the repeated measures variable. In this design, the sequence \times order interaction term actually defines the main effect of Communication mode (e.g., Rosenthal & Rosnow, 2008, pp. 192–193). Therefore, any differences between FtF and CMC will be indicated by a significant Communication mode sequence \times Order interaction effect. Gender composition was as follows: 28 all female dyads, 12 all male dyads, and 28 mixed sex dyads.

2.2. Procedure

Although participants engaged in the experiment in pairs, they signed up separately and arrived at separate times on separate floors. Thus, participants neither spoke nor saw one another prior to the start of the experiment. Participants were asked if they had prior contact with their interaction partners. Friends and acquaintances, when reported or revealed, were excluded from participating.

After arriving at the lab, participants were randomly assigned to one of two rooms containing a networked computer. Once in their separate rooms, participants filled out a questionnaire assessing their own personality with a modified version of Big Five inventory (Cattell & Dreger, 1978). Participants experiencing the CMC interaction first were informed they would be chatting with another participant through the computer for 10 min using a program entitled NetMeeting (Microsoft, 1997). Participants were identified during the chat by their assigned 5-digit participant number and were given no information about the other participant. They were informed that no topic of conversation was restricted and that they should try and get to know each other. Additionally, participants were instructed to try and maintain the chat for the duration of the interaction. Upon completion of the 10-minute computer interaction, participants completed a post-chat questionnaire – again in isolation – assessing the previous interaction and several judgments of their partner. Participants were then informed that there was a second part to the experiment. Each participant was informed separately that they would be interacting again with their prior interaction partner. Participants were then moved into another room where they were instructed to sit in two chairs placed in the center of the room. Participants were given the same instructions they received prior to the first interaction and were left alone to converse for 10 minute. Upon completion, each participant was led back to their original room and was given a post-interaction questionnaire that was similar to the previous one completed. The sequence of this procedure was reversed for half of the dyads (i.e., participants interacted face-to-face then interacted over the computer).

2.3. Dependent variables

Each participant filled out the same set of dependent measures twice, following each interaction. At each assessment, participants were asked to base their responses on the most recent interaction.

2.4. Rating the interaction

Participants assessed the interaction they had just completed on several attributes associated with ease and enjoyment. Two questions assessed the difficulty of holding a continuous conversation for the 10-minute time period. The first item asked: "How difficult was it to find topics to discuss during the interaction?" and employed a 7-point scale ranging from *easy to difficult*. The second item asked: "How much effort was required to keep the conversation going the allotted time?" on a 5-point scale ranging from *Strongly Agree* to *Strongly Disagree*. Participants also rated how enjoyable they found the session on the same scale.

Participants then completed a modified version of the Other In the Self-scale (OIS; Aron, Aron, & Smollan, 1992; see Cialdini, Brown, Lewis, Luce, & Neuberg, 1997 for discussion), which measures the perceived union (e.g., *oneness*) between two individuals. The measure consisted of a series of nine pairs of concentric circles that varied in their degree of overlap. The scale ranged from 0 (*zero overlap and distal*) to 9 (*fully overlapped*). Participants chose the pair of circles that represented the level of overlap between their identity and that of their partners.

2.5. Self-awareness

Participants completed a 5-item self-awareness questionnaire, $\alpha = .59$. A sample item read: “I felt self-conscious throughout the interaction.” Each item was assessed on a 5-point scale ranging from *Strongly Disagree* and *Strongly Agree*. Higher scores on the scale indicate higher self-awareness.

2.6. Personality self-ratings

To assess personality, a five item self-other assessment scale was constructed to assess the Big Five traits. A brief definition of each trait dimension was taken from Costa and McCrae (1985) and preceded each item. Each item was rated on a 7-point scale anchored by the following trait adjectives: *Introverted/Extraverted* (*Extraversion*); *Calm/Worrying* (*Neuroticism*); *Antagonistic/Cooperative* (*Agreeableness*); *Traditional/Imaginative* (*Openness*); *Not Organized/Organized* (*Conscientiousness*). The Five-Factor model was selected as our measure of personality as it is accepted as the predominant taxonomy of personality traits (John et al., 2008).

2.7. Ratings of partner personality

Participants also assessed characteristics of their partner after each interaction. Participants rated their partner on the same Big-5 items described above and rated their partner on likability (*Not likable/Very likable*) and self-centeredness (*Not self-centered/Very self-centered*); all on 7-point scales.

Table 1
Intercorrelations between dependent variables.

Scale	1	2	3	4	5	6
1. Oneness						
2. Liking	.31					
3. Difficulty of generating topics	-.00	-.09				
4. Self-awareness	-.10	-.03	.22			
5. Self-centered	-.07	-.25	.02*	.26		
6. Difficulty of keeping conversation going	-.19*	-.26*	.52*	.28*	.11*	

Note. Correlations were computed within time, then collapsed by averaging their Fisher z transformed values before transforming them back to Pearson r's for display. When the n's differed between the interaction 1 and interaction 2, the significance level for the lower n time was used.

* $p < .01$.

Table 2
Significant mean post-interaction reports as a function of communication mode^a.

Dependent variable	Oneness	Liking	Difficulty of finding topics	Difficulty of carrying on conversation	Self-centered	Self-aware
FtF	5.71(1.85)	6.06(0.96)	2.81(1.55)	2.08(1.02)	2.11(1.20)	2.28(.74)
CMC	5.12(1.78)	5.85(1.15)	2.05(1.54)	1.68(1.02)	2.48(1.27)	2.42(.72)

Note. Higher numbers equal more of dependent variable (e.g., higher numbers equal more liking for partner). Standard deviations are noted within parentheses.

^a Half of the participants experienced FtF before CMC and half experienced it after.

3. Results

Data were analyzed using a series of 2 (Sequence: FtF first versus CMC first) \times 3 (dyad gender: female versus male versus mixed-sex) \times 2 (Order: first interaction versus second interaction) Analyses of Variance (ANOVA). In this design, the sequence by order interaction term defined the main effect of interest—in this case the effect of Communication Medium—on each of the dependent measures. Table 1 reports the intercorrelations between the dependent variables measured.

3.1. Communication mode effects

Results revealed a significant sequence by order interaction (i.e., Communication mode main effect) on participant's level of *oneness* with their partner, $F(1, 121) = 11.98, p = .001, \eta_p^2 = .09$ (See Table 2 for summary of all communication mode effects). Specifically, participants who interacted face-to-face felt greater *oneness* with their partner than did participants who interacted over the computer. A significant sequence by order interaction (i.e., communication mode main effect) was also revealed for participant's degree of *liking for their partner*, $F(1, 123) = 4.87, p = .02, \eta_p^2 = .03$. Participants who interacted face-to-face reported liking their partners more than participants who interacted over the computer.

Despite enjoying the FtF interaction more, participants reported it to be more difficult than interacting via CMC. Particularly, while interacting Face-to-Face, participants found it more difficult to come up with topics for discussion $F(1, 122) = 7.91, p = .006, \eta_p^2 = .06$, and felt that it was harder to keep the conversation going compared to those who interacted over the computer $F(1, 121) = 4.00, p = .04, \eta_p^2 = .03$.

With respect to self-centeredness, those interacting FtF felt their partners were less self-centered than when interacting with them via CMC, $F(1, 121) = 5.81, p = .01, \eta_p^2 = .04$. Finally, participants reported feeling less self-aware when interacting FtF than via CMC, $F(1, 123) = 3.57, p = .06, \eta_p^2 = .02$.

Thus, face-to-face interactions felt more effortful to maintain but were more enjoyable, resulted in more positive ratings of partner, and led to higher feelings of *oneness*. Perhaps the decreased level of self-awareness in FtF interactions was diagnostic of greater attention being paid to dyadic partners, which could have resulted in increased feelings of togetherness. While interacting FtF, participants viewed their partner more positively (i.e., less self-centered), which would have added to the overall positivity of the interaction experience. None of the three way interactions testing whether the effect of Communication Mode was moderated by gender were significant.

3.2. Interpersonal sensitivity

Interpersonal sensitivity was operationalized as the extent to which a participant's judgment of their partner's level of a trait matched their partner's self-report of that trait. This level of agreement was assessed by correlating a participant's judgment of a personality trait in their partner with their partner's self-report of that

Table 3

Person perception: Big-5 subscales by sequence.

	Big 5 subscale									
	Extraversion		Neuroticism		Openness		Agreeable		Conscientious	
Communication mode	CMC	FtF	CMC	FtF	CMC	FtF	CMC	FtF	CFC	FtF
Correlation	0.21	0.37	0.30	0.39	0.21	0.49	0.28	0.64	0.15	0.51
Z-Score of the difference	−0.74		−0.44		−1.36		−2.01*		−1.77	

Note. The above correlations represent the absolute value of participants self-reported personality correlated with their partners perceptions.

* $p < .05$.

trait (e.g., Bernieri, Zuckerman, Koestner, & Rosenthal, 1994). For each sample of dyads interacting within a communication mode single self-other agreement correlation was generated for each trait. The resulting correlations were converted to Z-scores allowing us to compare the relative levels of agreement across the two communication modes (Cohen, Cohen, West, & Aiken, 2003). This analysis was done only after the first interaction. Table 3 reports the level of agreement between judgments of partner and partner self-reports for each of the five traits measured by interaction communication mode.

Judgments of their partners' agreeableness were more similar to their partners' self-reported agreeableness when interacting FtF than via CMC ($Z = -2.01$, $p = .04$). Conscientiousness showed the same pattern ($Z = -1.77$) but failed to reach statistical significance, $p = .07$. In fact, although agreeableness was the only trait where the increased sensitivity in FtF was statistically significant, every trait assessed showed higher agreement within the FtF interaction.

4. Discussion

As individuals increasingly take advantage of new technologies for interpersonal communication, the need to fully understand the psychological impact of these new methods of communication becomes increasingly important. The present study was one of the first examinations of impression formation over the computer that employed an experimental design that allowed for both a comparison with, and control for, FtF interactions.

We began with a simple question: How does interacting over different communication mediums affect impression formation? We examined how interpersonal communication taking place via CMC or FtF affected individuals' perceptions of the interaction and their partner. The results are more in line with the predictions made by the functional model of interactive behavior (Patterson, 1991) than those made by hyperpersonal interaction theory (Walther, 1996), which predicts that CMC interactions would result in more favorable impressions.

Participants who spoke with their partner FtF increased their reported oneness (i.e., self-other overlap) and liking for their partner. These results support the Functional model of interactive behavior and are incongruent with Walther's (1996) hyperpersonal interaction theory. To the extent that FtF, communication compared to CMC, is rich with social cues and reduces ambiguity, it stands to reason that the reduction in ambiguity may serve to increase feelings of oneness and likability. Participants who communicated FtF also reported greater difficulty sustaining the conversation and generating topics to discuss with their partner. Similarly, this is congruent with the Functional model of interactive behavior and incongruent with Walther's (1996) theory of hyperpersonal interaction. That is, participants reported more positive interactions when interacting FtF rather than when speaking over the computer. Participants interacting FtF may have found greater difficulty generating topics and sustaining the interaction due to the increase in cognitive load brought about by the in-

creased attention demanded by the stimulus (i.e., the immediacy of their dyadic partner). To the extent that participants focused attention on their dyadic partner they decreased self-directed attention resulting in decreased cognitive resources available to generate and sustain the interaction. However, by focusing attentional resources on their partner, rather than themselves, participants likely generated a more positive impression of their interaction partner.

Those interacting via CMC were more self-aware than those who interacted FtF. These findings are consistent with the idea that interacting via computer increases individuals' self-awareness (Matheson & Zanna, 1988; Matheson & Zanna, 1990). Moreover, those who interacted over the computer reported that their partners were more self-centered compared to those who interacted FtF. This is congruent with research suggesting that when interacting on the computer individuals often overestimate their clarity and total contributions during interactions (Kruger et al., 2005; Weisband & Atwater, 1999). Participants interacting FtF may increase focus on their interaction partner due to their immediacy. This external focus may be exacerbated as individuals may have engaging (i.e., high rapport interactions) FtF interactions leading to a state of both deindividuation and low self-awareness. Thus, the current results suggest that individuals interacting via CMC may be more self-focused and self-centered while those interacting FtF may be perceived as more likable and see more overlap with their interaction partners. In addition, we examined how different communication modes might inhibit or enhance individuals' ability to accurately perceive others. Participant impressions of their partners more closely resembled their partner's self-descriptions when interacting FtF than over the computer. These data support the idea that FtF interaction, and the abundance of social cues inherent in it, make it a better conduit by which individuals may gauge characteristics of others.

Finally, gender was considered because previous research has shown clear differences between homogenous and heterogenous dyads (Carli, 1989; Carli, 1990). Studies examining dyadic interactions that take place online most often pair participants in either homogenous or heterogeneous dyads (Boucher, Hancock, & Dunham, 2008; Guadagno & Cialdini, 2002; Guadagno & Cialdini, 2007; Tidwell & Walther, 2002), while fewer compare same versus mix-sex dyads (Bargh, McKenna, & Fitzsimons, 2002; Guadagno, Blascovich, Bailenson, & McCall, 2007; Muscanell & Guadagno, 2009). Although, none of the three way interactions testing whether the effect of Communication Mode was moderated by gender were significant, it is likely that gender does influence impression formation online and that a lack of statistical power prevented us from finding the expected moderation.

5. Implications and future directions

Up to this point in time, the literature on communication mode effects has implicitly considered and theorized about relationships

formed using CMC versus FtF as if they were orthogonal. In fact, many CMC initiated relationships evolve into FtF relationships and many CMC interactions are between individuals who are already in established FtF relationships. Much of the theorizing about the differences between CMC and FtF interactions has not taken into account the effect that a previous interaction or pre-existing relationship *within the other communication mode* might have occurred. Once you have seen somebody naked, there is no forgetting it subsequently while chatting online. Similarly, no matter how skillfully one manages their self-presentation via text, the vividness of meeting someone in person is bound to overpower the subsequent processing of interpersonal information (e.g., Nisbett & Ross, 1980). This may contribute to the disparate findings (and theories) in the literature. Future research should examine whether, interacting via CMC will produce more positive interactions when there is no anticipated future offline interaction or the CMC interaction does not follow a FtF interaction. That is, the attributes leading to hyperpersonal interactions such as selective self-presentation or anonymity will be attenuated if interactants anticipate a future interaction or have previously interacted FtF. However, if interactions are chronic and exclusively take place via CMC hyperpersonal interactions will likely follow.

Finally, it is important to note that there are variations in within CMC (e.g., synchronous or asynchronous communication, presence or absence of photos or video of interaction partner). Future research should examine which elements of CMC are most impactful and which are more likely to affect processes such as interpersonal sensitivity and overall perceptions of the quality of the interaction. That is, the relationship between interpersonal communication and the medium with which it takes place may be more nuanced and subtle than previously thought. Future research should continue exploring these subtleties.

References

- Amichai-Hamburger, Y., & McKenna, K. Y. A. (2006). The contact hypothesis reconsidered: Interacting via the Internet. *Journal of Computer-Mediated Communication*, 11, 7.
- Ambady, N., Bernieri, F. J., & Richeson, J. A. (2000). Toward a histology of social behavior: Judgmental accuracy from thin slices of the behavioral stream. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 32, pp. 201–271). San Diego, CA: Academic Press.
- Ambady, N., & Rosenthal, R. (1992). Thin slices of expressive behavior as predictors of interpersonal consequences: A meta-analysis. *Psychological Bulletin*, 111, 256–274.
- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, 63, 596–612.
- Bargh, J. A., McKenna, K. Y. A., & Fitzsimons, G. (2002). Can you see the real me? Activation and expression of the “true self” on the Internet. *Journal of Social Issues*, 58, 33–48.
- Bernieri, F. J. (2001). Toward a taxonomy of interpersonal sensitivity. In J. A. Hall & F. J. Bernieri (Eds.), *Interpersonal sensitivity: Theory and measurement, the LEA series in personality and clinical psychology* (pp. 3–20). Mahwah, NJ: Erlbaum.
- Bernieri, F., Zuckerman, M., Koestner, R., & Rosenthal, R. (1994). Measuring person perception accuracy: Another look at self-other agreement. *Personality and Social Psychology Bulletin*, 20, 367–378.
- Boucher, E. M., Hancock, J. T., & Dunham, P. J. (2008). Interpersonal sensitivity in computer-mediated and face-to-face conversations. *Media Psychology*, 11, 235–258.
- Burgoon, J. K., & Saine, T. (1978). *The unspoken dialogue: An introduction to nonverbal communication*. Boston: Houghton Mifflin.
- Carli, L. L. (1989). Gender differences in interaction style and influence. *Journal of Personality and Social Psychology*, 4, 565–576.
- Carli, L. L. (1990). Gender, language, and influence. *Journal of Personality and Social Psychology*, 5, 941–951.
- Cattell, R. B., & Dreger, R. M. (Eds.). (1978). *Handbook of modern personality theory*. New York: Wiley.
- Cialdini, R. B., Brown, S. L., Lewis, B. P., Luce, C., & Neuberg, S. L. (1997). Rethinking the empathy-altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology*, 73, 481–494.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences*. Mahwah, NJ: Erlbaum.
- Costa, P. T., Jr., & McCrae, R. R. (1985). *The NEO personality inventory manual*. Odessa, FL: Psychological Assessment Resources.
- Eagly, H., Ashmore, D., Makhijani, M., & Longo, C. (1991). What is beautiful is good: A meta-analytic review of research on the physical attractiveness stereotype. *Psychology Bulletin*, 110, 107–128.
- Funder, D. C. (1995). On the accuracy of personality judgment: A realistic approach. *Psychological Review*, 102, 653–670.
- Gosling, S. D., Gaddis, S., & Vazire, S. (2007). Personality impressions based on Facebook profiles. *Proceedings of the International Conference on Weblogs and Social Media*.
- Guadagno, R. E., Blascovich, J., Bailenson, J. N., & McCall, C. (2007). Virtual humans and persuasion: The effects of agency and behavioral realism. *Media Psychology*, 10, 1–22.
- Guadagno, R. E., & Cialdini, R. B. (2002). Online persuasion: An examination of gender differences in computer-mediated interpersonal influence. *Group Dynamics: Theory, Research, and Practice*, 1, 38–51.
- Guadagno, R. E., & Cialdini, R. B. (2007). Persuade him by email, but see her in person: Online persuasion revisited. *Computers In Human Behavior*, 23, 999–1015.
- Hancock, J. T., & Dunham, P. J. (2001). Impression formation in computer-mediated communication revisited: An analysis of the breadth and intensity of impressions. *Communication Research*, 28, 325–347.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm Shift to the Integrative Big-Five Trait Taxonomy: History, Measurement, and Conceptual Issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114–158). New York, NY: Guilford Press.
- Kenny, D. A., & West, T. V. (2010). Similarity and agreement in self-other perception: Meta-analysis. *Personality and Social Psychology Review*, 14, 196–213.
- Kruger, J., Epley, N., Parker, J., & Ng, Z. (2005). Egocentrism over email: Can we communicate as well as we think? *Journal of Personality and Social Psychology*, 6, 925–936.
- Kruglanski, A. W. (1989). The psychology of being “right”: The problem of accuracy in social perception and cognition. *Psychological Bulletin*, 106, 395–409.
- Lakin, J. L., & Chartrand, T. L. (2003). Using nonconscious behavioral mimicry to create affiliation and rapport. *Psychological Science*, 14, 334–339.
- Matheson, K., & Zanna, M. P. (1988). The impact of computer-mediated communication on self-awareness. *Computers and Human Behavior*, 4, 221–233.
- Matheson, K., & Zanna, M. P. (1990). Computer-mediated communications: The focus is on me. *Social Science Computer Review*, 8, 1–12.
- McKenna, K. Y. A., & Bargh, J. A. (1998). Coming out in the age of the Internet: Identity “demarginalization” through virtual group participation. *Journal of Personality and Social Psychology*, 75, 681–694.
- McKenna, K. Y. A., & Bargh, J. A. (2000). Plan 9 from cyberspace. The implications of the internet for personality and social psychology. *Personality and Social Psychology Review*, 4, 57–75.
- McKenna, K. Y. A., Green, A. S., & Gleason, M. E. J. (2002). Relationship formation on the Internet: What’s the big attraction? *Journal of Social Issues*, 1, 9–31.
- McLarney-Vesotski, A. R., Bernieri, F., & Rempala, D. (2006). Personality perception: A developmental study. *Journal of Research in Personality*, 40, 652–674.
- McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality*, 60, 175–215.
- Microsoft (1997). NetMeeting [computer software]. Microsoft Corporation.
- Morton, F. S., Zettermeyer, F., & Silvia-Risso, J. (2003). Consumer Information and Discrimination: Does the Internet Affect the Pricing of New Cars to Women and Minorities? *Quantitative Marketing In Economics*, 1, 65–92.
- Muscanel, N. L., & Guadagno, R. E. (2009). Computer-Mediated Persuasion: An examination of same-sex vs. mixed-sex dyads in face-to-face and email interactions. *Poster presented at the annual meeting for the Society for Personality and Social Psychology*, Tampa, FL.
- Nisbett, R. E., & Ross, L. (1980). *Human inference. Strategies and shortcomings of social judgment*. Englewood Cliffs, NJ: Prentice-Hall.
- Nowak, K., Watt, J. H., & Walther, J. (2005). The influence of synchrony and sensory modality on the person perception process in computer mediated groups. *Journal of Computer-Mediated Communication*, 10, article 3.
- Patterson, M. L. (1991). A functional approach to nonverbal exchange. In R. S. Feldman & B. Rime (Eds.), *Fundamentals of nonverbal behavior* (pp. 458–495). Cambridge: Cambridge University Press.
- Pennebaker, J. W. (1990). *Opening up: The healing power of confiding in others*. New York: Morrow.
- Pew Internet and American Life Project. (2004). How Americans use instant messaging. Retrieved http://www.pewinternet.org/~media/Files/Reports/2004/IP_Instantmessage_Report.pdf.
- Rosenthal, R., & Rosnow, R. L. (2008). *Essentials of behavioral research: Methods and data analysis (3rd Ed.)*. Boston: McGraw-Hill (pp. 192–193).
- Sassenberg, K., Boos, M., & Rabung, S. (2005). Attitude change in face-to-face and computer-mediated communication: Private self-awareness as mediator and moderator. *European Journal of Social Psychology*, 36(1), 374.
- Shannon, M. L., & Stark, P. C. (2003). The influence of physical appearance on personnel selection. *Social Behavior and Personality*, 31, 613–624.
- Sproull, L., & Kiesler, S. (1985). Reducing social context cues. *Management Science*, 32, 1492–1512.
- Tanis, M., & Postmes, T. (2003). Social cues and impression formation in CMC. *Journal of Communication*, 53, 673–696.
- Tidwell, L. C., & Walther, J. B. (2002). Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations. *Human Communication Research*, 3, 317–348.

- Vazire, S., & Gosling, S. D. (2004). E-Perceptions: Personality impressions based on personal web sites. *Personality Processes and Individual Differences*, 87, 123–132.
- Walther, J. B. (1995). Relational aspects of computer-mediated communication: Experimental observations over time. *Organizational Science*, 6, 186–203.
- Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research*, 23, 1–43.
- Weisband, S., & Atwater, L. (1999). Evaluating self and others in electronic and face-to-face groups. *Journal of Applied Psychology*, 84, 632–639.