From Perception to Behavior: Disclosure Reciprocity and the Intensification of Intimacy in Computer-Mediated Communication

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Abstract

This study proposes and tests a novel theoretical mechanism to explain increased self-disclosure intimacy in text-based computer-mediated communication (CMC) versus face-to-face (FtF) interactions. On the basis of joint effects of perception intensification processes in CMC and the disclosure reciprocity norm, the authors predict a perception-behavior intensification effect, according to which people perceive partners' initial disclosures as more intimate in CMC than FtF and, consequently, reciprocate with more intimate disclosures of their own. An experiment compares disclosure reciprocity in text-based CMC and FtF conversations, in which participants interacted with a confederate who made either intimate or nonintimate disclosures across the two communication media. The utterances generated by the participants are coded for disclosure frequency and intimacy. Consistent with the proposed perception-behavior intensification effect, CMC participants perceive the confederate's disclosures as more intimate, and, importantly, reciprocate with more intimate disclosures than FtF participants do.

Keywords

self-disclosure, reciprocity, intimacy, intensification, computer-mediated communication

Communicating in different media influences the extent to which people disclose information about themselves, with text-based computer-mediated communication (CMC) characterized by higher levels of self-disclosures compared to face-to-face (FtF) interactions (Joinson, 2001;

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Parks & Floyd, 1996; Schouten, Valkenburg, & Peter, 2009). People frequently reveal private thoughts, experiences, and emotions in weblogs, social network sites, and online diaries (Chesney, 2005; Papacharissi, 2007) and disclose more information in computer-mediated than FtF conversations (Schouten et al., 2009; Tidwell & Walther, 2002). The heightened self-disclosure in CMC has been linked to greater relationship quality (Turner, Grube, & Meyers, 2001; Valkenburg & Peter, 2009) and more successful online self-presentation in online dating (Gibbs, Ellison, & Heino, 2006).

Whereas previous research has focused primarily on direct media effects on self-disclosure production, such as anonymity and reduced social presence (Joinson & Paine, 2007; McKenna & Bargh, 2000), few studies have considered the interpersonal dynamics that influence people's willingness to disclose in online interactions. The interpersonal aspect of self-disclosure deserves more empirical investigation given that self-disclosure is conceptualized as a situated practice in an ongoing social exchange (Antaki, Barnes, & Leudar, 2005; Hill & Stull, 1982). People do not disclose automatically in online environments. Instead, the motives behind online conversations, relationships among partners, and partners' self-disclosures are important factors in the exchange of self-disclosures. Examining these dynamics has the potential not only to identify interpersonal influences on self-disclosure exchange, but also illuminate processes of relationship development and maintenance in CMC more generally.

The present study focuses on perhaps the most prevalent interpersonal dynamic for regulating self-disclosure, *reciprocity* (Hosman, 1987). Whereas previous research has focused primarily on how features of CMC affect self-disclosure frequency (e.g., Joinson, 2001; McKenna & Bargh, 2000), this research considers both frequency and intimacy of disclosures as independent dimensions of self-disclosure (Derlega & Chaikin, 1977). Furthermore, we propose a novel perception-behavior intensification mechanism leading to more intimate self-disclosures in CMC. According to this mechanism, intensified perceptions of a partner's disclosure in CMC (Walther, 1996) combine with the disclosure reciprocity norm to lead partners to reciprocate with more intimate disclosures of their own, creating a perception-behavior intensification effect. Whereas the effects of technology on intensified interpersonal perceptions have been documented by previous research (e.g., Boucher, Hancock, & Dunham, 2008; Hancock & Dunham, 2001; Peña, Walther, & Hancock, 2007), no study to date has examined the communication consequences of intensified perceptions in CMC. The proposed perception-behavior intensification effect bridges the gap between perceptions and behaviors, shedding new light on how intensified disclosure perceptions may trigger communication behavior in CMC.

The Nature of Self-Disclosure

Self-disclosure is verbal communication of personally relevant information, thoughts, and feelings (Derlega, Metts, Petronio, & Margulis, 1993). An abundance of research shows that self-disclosure facilitates the establishment and maintenance of interpersonal relationships by generating liking and intimate feelings (Dindia, 2002). In general, people like those who

self-disclose to them tend to disclose more to those they like and increase liking for partners after having disclosed to them (Collins & Miller, 1994).

One of the earliest perspectives on self-disclosure, social penetration theory (SPT; Altman & Taylor, 1973), argues that self-disclosure develops along the dimensions of breadth (frequency) and intimacy. The breadth dimension refers to the quantity of information disclosed, reflected by the range of topics and frequency of disclosures. The intimacy dimension refers to how personal or private the disclosed information is. According to the SPT framework, disclosure breadth and intimacy covary because disclosing frequently on a wide range of topics usually reveals personal information. However, other perspectives differentiate between these two dimensions. For instance, people may substitute disclosure intimacy for disclosure breadth by talking about many nonintimate topics, which allows them to maintain interpersonal distance without giving an aloof appearance (Derlega & Chaikin, 1977).

Indeed, disclosure intimacy is considered more critical for relational intimacy than disclosure frequency (Chelune, Robinson, & Kommor, 1984; Derlega & Chaikin, 1977; Derlega et al., 1993). A meta-analysis conducted by Collins and Miller (1994) revealed that studies that varied the intimacy level of disclosure obtained stronger attraction effects than those that varied the amount of information disclosed. Therefore, it is important to distinguish between the frequency and intimacy dimensions in considering the effects of communication technology on self-disclosure.

Self-disclosure is also regulated by a complex set of situated norms with regard to disclosure intimacy, timing, and appropriateness (Hosman, 1987; Petronio, 2002). As noted earlier, one of the most frequently observed norms in the self-disclosure literature is the reciprocity norm: Individuals reciprocate with disclosures of their own in response to a partner's self-disclosure. This norm emerges from the imbalance between partners created by the self-disclosure, in which the discloser becomes vulnerable and the partner gains possession of more information than the discloser. From a social exchange perspective, this imbalance must be rectified, and one way to accomplish this is for the partner to reveal some information of the same perceived value (Archer, 1979; Gouldner, 1960). Reciprocating the initial disclosure equalizes both rewards and risks associated with self-disclosure, and the equity of social exchange is maintained. Rubin's (1975) theory of reciprocity supplements the norm explanation by arguing that reciprocity is a function of modeling. When norms of appropriate behaviors are not clearly defined in initial encounters, people look to one another for cues about what type of response is called for. When people are uncertain about the appropriate responses, they use their partners' behaviors as a guide.

Disclosure reciprocity broadly means that two partners' self-disclosures are equivalent on some dimension, such as disclosure frequency or intimacy (Hill & Stull, 1982). In the self-disclosure literature, the norm of reciprocity usually dictates equivalence in the exchange of intimacy rather than frequency: One person's intimate disclosure elicits intimate disclosure by the listener, and superficial disclosure elicits superficial disclosure in return (Altman & Taylor, 1973; Chaikin & Derlega, 1974); that is, the best predictor of the intimacy level one will use in responses is the intimacy level of the partner's initial

disclosures (Altman, 1973; Derlega & Chaikin, 1977). For example, if one partner of a dyad increases the intimacy of his or her disclosure, the other partner tends to increase the intimacy of the reciprocal disclosure accordingly (e.g., Derlega, Wilson, & Chaikin, 1976). Responding to a disclosure perceived as highly intimate with a low-intimacy disclosure, or vice versa, is viewed as inappropriate (Hosman, 1987).

Notably, partners try to match the level of intimacy in their self-disclosures with the *perceived* level of intimacy in partners' disclosures (Derlega et al., 1993, p. 33). A disclosure may be a genuine attempt to increase intimacy, but it may not be perceived as such. As we shall see, it is important to emphasize that reciprocity operates on the perceptual level when we consider the operation of reciprocity in CMC contexts. The extent to which a disclosure is reciprocated largely depends on how intimate it is perceived in the first place, and perceptions can be biased in mediated forms of communication (Walther, 1996). The role of perceptions is sufficiently important that Dindia (2002) suggests that self-disclosure reciprocity is more appropriately called "perceived reciprocity" or "intrasubjective reciprocity." This view includes *both* the perception of being disclosed to and the perception that one's own disclosure is equivalent to the disclosure one receives, and we argue in what follows that partners in CMC operate on biased perceptions to produce more intimate disclosure relative to FtF communication.

Disclosure Frequency in CMC

As noted earlier, previous CMC research has focused primarily on the frequency of disclosure and found a robust tendency for people to self-disclose more frequently in text-based computer-mediated compared to FtF interactions (for review, see Hancock, 2007). Several explanations, mostly focusing on the effects of visual anonymity and lack of nonverbal cues, have been proposed to account for the frequency effect (see for review, Joinson & Paine, 2007). From a psychological account, McKenna and Bargh (2000) have argued that the increased anonymity and control over self-presentation in text-based CMC make it easier to disclose personal aspects of the inner self than in FtF. Joinson (2001) related self-disclosure to psychological states of attentiveness to either one's inner self (private self-awareness) or one's public image (public self-awareness). According to Joinson, the absence of nonverbal cues in CMC encourages higher levels of self-disclosures by activating more private self-awareness while reducing concerns about one's public image. From a communication perspective, explanations have focused on CMC users' behavioral adaptation to compensate for the lack of nonverbal cues. Drawing on the uncertainty reduction theory, Tidwell and Walther (2002) showed that people use more interactive uncertainty reduction strategies, such as increased use of direct questioning, in CMC than FtF to compensate for the lack of passive uncertainty reduction strategies in CMC, such as nonverbal cues.

A recent experimental test of the above theoretical perspectives as competing mechanisms underlying increased disclosure in CMC relative to FtF confirmed only the mediating effect of direct questioning on increased self-disclosure in CMC (Schouten et al., 2009). Consistent with the application of uncertainty reduction theory to CMC contexts (Tidwell & Walther, 20002), CMC encourages more direct and more intimate questioning than in FtF interactions, which

in turn stimulates more intimate self-disclosures. Thus, drawing on the uncertainty reduction mechanism and previous research findings of greater self-disclosure frequency in CMC than FtF, we expect to see more self-disclosures in CMC than in FtF:

Hypothesis 1: Participants will self-disclose more frequently in CMC than in FtF.

Although Schouten et al.'s (2009) findings emphasize the importance of interpersonal dynamics on self-disclosure, previous CMC research has not considered one of the most important interpersonal mechanisms for regulating self-disclosure, namely, the reciprocity norm (Hosman, 1987). CMC studies focusing on self-disclosure in a conversational exchange (e.g., Joinson, 2001; Tidwell & Walther, 2002) have examined spontaneously produced self-disclosures by both partners in the dyad (Joinson, 2001; Tidwell & Walther, 2002). Because both partners were free to disclose information, it is difficult to determine how reciprocity played a role in the self-disclosure increase observed in CMC. For instance, both partners could have independently engaged in uncertainty reduction strategies rather than responding to one another's self-disclosure. As such, with an experimental design that allows both partners to disclose freely it is impossible to tease apart the role of reciprocity from other interpersonal processes, such as uncertainty reduction. Testing reciprocity dynamics requires a trained confederate to follow a script with either intimate or nonintimate disclosures (e.g., Weisel & King, 2007). A participant is assigned to one of the disclosure conditions, and his or her self-disclosure in response to the confederate's disclosures indicates reciprocity. If self-disclosure is also reciprocal in CMC, as we expect, then partners will make more self-disclosures in response to a confederate's intimate disclosure than to a confederate's nonintimate disclosure, regardless of medium. Therefore, on the basis of reciprocity principle, we predict that

Hypothesis 2: Participants make more self-disclosures after encountering the confederate's intimate disclosures than nonintimate disclosures, regardless of medium.

Disclosure Intimacy in CMC

With regard to the intimacy dimension of self-disclosure, a far more important factor than disclosure frequency for relational processes (Collins & Miller, 1994; Derlega & Chaikin, 1977), there is surprisingly little conclusive evidence about how the medium affects self-disclosure intimacy. One study that has taken up this question is by Tidwell and Walther (2002), who used Altman and Taylor's (1973) three-layer categorization scheme to classify disclosures into peripheral (least intimate), intermediate, and core (most intimate) layers. Their findings show that FtF partners had higher proportions of both peripheral and intermediate self-disclosures than did CMC partners, whereas there were very low proportions of core disclosures in FtF and no core disclosures at all in CMC.

Although this study is often cited as showing support for increased disclosure intimacy in CMC, the evidence is less than clear. Because core disclosures, assumed to be the most intimate, were infrequent overall (and only observed in the FtF condition) and the

proportions of *both* peripheral and intermediate self-disclosures increased in FtF, it is difficult to conclude that disclosures in CMC were more intimate than in FtF. Another important issue is the limitation of the disclosure intimacy coding scheme used by Tidwell and Walther (2002) that confounds the type of a disclosure (factual, cognitive, and emotional) with its intimacy level (see Morton, 1978); that is, according to this scheme, factual disclosures are considered to be least intimate, cognitive disclosures are considered to be intermediate in intimacy, and emotional disclosures are considered to be most intimate. Because disclosures of various types can range in the depth of emotion or opinions expressed by the discloser or the privacy of facts revealed about oneself (e.g., from relatively public to highly private facts), more recent coding schemes assess disclosure type and intimacy separately (e.g., Mitchell et al., 2008).

If we focus on the intimacy dimension of self-disclosure, how might the reciprocity norm operate in CMC? Recall that the perceptions of an initial disclosure, especially its perceived intimacy, should determine how intimate the reciprocated self-disclosure is. If an individual perceives a partner's self-disclosure as highly intimate, then he or she should reciprocate with a similarly intimate self-disclosure, an effect that has been demonstrated empirically in FtF contexts (Hosman, 1987). Interpersonal perceptions in CMC, however, are often biased. Walther's hyperpersonal model (1996) suggests a biased perception mechanism, in which there is a tendency to overinterpret socioemotional information or social identity cues available in text-based interaction. In initial interactions among strangers taking place in text-based CMC, people do not have access to physical, social, and situational cues about one another. Therefore, they attach substantial value to the subtle socioemotional information or social identity cues that are present. This overreliance on minimal cues generates intensified perceptions in initial interactions. For example, CMC users idealize their partners when the messages suggest minimal similarity or desirability and stereotype them when the messages reveal identity cues.

Empirically, a number of studies have demonstrated that a variety of interpersonal perceptions are frequently intensified in CMC, including perceptions of personal qualities, behaviors, and relationship estimation (Boucher et al., 2008; Hancock & Dunham, 2001; Lea & Spears, 1991; Peña et al., 2007). For instance, Hancock and Dunham found that CMC partners formed more extreme impressions of each other's personality traits (openness and consciousness) than did FtF partners. Other studies have found that perceptions of a partner's dominance in the conversation are also exaggerated relative to FtF (Boucher et al., 2008; Peña et al., 2007).

The observation that interpersonal perceptions are often intensified in CMC has potentially important implications for disclosure reciprocity, though the hyperpersonal model does not explicitly consider any behavioral outcomes of intensification effects. If perceptions of a partner's disclosure intimacy are intensified in CMC relative to FtF, as is often the case with other types of interpersonal perceptions, then partners should reciprocate with more intimate disclosures in CMC than in FtF conversations. We refer to this dynamic in CMC as a perception-behavior intensification effect and propose two hypotheses. First, on the basis of exaggeration of interpersonal perceptions described earlier, CMC partners should perceive intimate disclosures by the confederate as more intimate than FtF partners.

Hypothesis 3: Relative to FtF partners, CMC partners will perceive the confederate's intimate disclosures to be more intimate.

Next, if the perceptions of disclosure intimacy are intensified in CMC relative to FtF, and the reciprocity norm relies on these perceptions, then CMC partners should reciprocate with more intimate self-disclosures relative to FtF partners; that is, in an effort to match a CMC partner's disclosure intimacy, which is intensified in CMC relative to FtF as hypothesized in Hypothesis 3, a CMC partner will produce more intimate self-disclosures than an FtF partner.

Hypothesis 4: When perceiving intimate self-disclosures, CMC partners are more likely to reciprocate with more intimate self-disclosures than do FtF partners.

Method

Participants

A total of 85 undergraduate students at a northeastern university participated in the study in exchange for extra credit or US$5 dollars. Each participant was paired with a confederate to work on a discussion task. Five participants (3 in the CMC/intimate disclosure condition, 1 in the CMC/nonintimate disclosure condition, and 1 in the FtF/nonintimate disclosure condition) expressed suspicions about the confederate's role and 1 participant failed to complete the postinteraction questionnaire, so their data were subsequently removed from the analysis. Participants' age ranged from 17 to 27 years ($M = 20.29$, $SD = 1.64$). About half (56%) of the participants were women. The sample had a diversified ethnic background (47 % Caucasians, 33% Asian Americans, 10% African Americans, 3% Hispanics, 1% Native Americana, and 6% identified themselves as others or did not indicate ethnicity).

Experimental Procedure

The study used a completely randomized factorial design (Intimate vs. Nonintimate Disclosure x Text-Based CMC vs. FtF), with conditions balanced across the two female confederates. Participants were informed that the purpose of this study was to examine how people communicated via different media. They were also told that they would be having a discussion with another participant about college life either face to face or through a computer chat and that FtF discussion would be videotaped and CMC messages would be archived. Unknown to participants, their partner was a study confederate who made either intimate or nonintimate disclosures, according to the randomly assigned experimental condition. In the FtF condition, the confederate and participant talked in a moderately sized meeting room with a one-way mirror. In the computer-mediated condition, the participant and confederate interacted from two individual rooms using a text-based synchronous chat program—AOL Instant Messenger.

During the discussion the naïve participant and the confederate worked together to propose 10 college survival tips for the incoming freshmen. The discussion was structured in such a way that participant and the confederate took turns sharing the tips, with the confederate starting first. Each had to contribute five tips along with their supporting arguments for each tip. At the end of the discussion they had to agree on the two most important tips for the freshman college experience.

Once they finished the conversation, the participant was asked to complete a series of questionnaires about their conversation, which measured attributions, disclosure perceptions, and intimacy perceptions. The data from the questionnaires regarding attributions and relational intimacy are reported in (Jiang, Bazarova, & Hancock, 2011).

Self-Disclosure Manipulation

The disclosure manipulation was patterned after previous studies manipulating self-disclosure (e.g., Weisel & King, 2007), in which a confederate disclosed either intimate or nonintimate intimacy information. The manipulation of self-disclosure was embedded in the task discussion. Although all of the confederate's tips were identical across intimate and nonintimate conditions, the supporting arguments for two of the tips (third and fourth) included more intimate personal experiences in the intimate than the nonintimate disclosure condition (see Appendix A for a script of the tips and supporting arguments for the intimate and nonintimate disclosure conditions). Specifically, the supporting arguments in the intimate condition referred to personal problems (parents' divorce and weight problems) and used more self-references than those in the nonintimate condition did. The supporting arguments for the other three tips were identical across the two disclosure conditions.

The tips and supporting arguments were pretested for intimacy level by a different group of judges ($N = 30$) who rated the intimate disclosure arguments ($M = 4.74$, $SD = 0.70$) as more intimate than the nonintimate arguments ($M = 1.80$, $SD = 0.55$), $t(29) = 14.97$, $p < .001$. The confederates used the same wording for intimate and nonintimate disclosures (i.e., the same tips) in FtF and CMC conditions. As expected, CMC conversations took more time ($M = 21.5$, $SD = 5.31$) than FtF conversations did ($M = 9.53$, $SD = 1.87$), $t(47) = 13.24$, $p < .001$. However, there was no difference in the number of words spoken by the confederates in FtF ($M = 379.15$, $SE = 30.38$) and CMC ($M = 358.00$, $SE = 19.64$), $t(66) = 0.58$, $p = .56$, indicating that approximately the same amount of information was exchanged in the two conditions.

The confederates received 20 hr of training on self-disclosure manipulation to ensure behavioral consistency across the two confederates. They were also trained for nonverbal behaviors, such as maintaining neutral facial expression, using natural gestures, and making eye contact in FtF. In CMC they were instructed to deliver the scripts in a conversational pace and follow the same wording as FtF for intimate and nonintimate disclosure manipulations. During the study, one of the authors monitored the conversations and confirmed the delivery of the tips. The post hoc analyses showed that there were no significant differences between the two confederates on any of the coded or self-reported measures.

Measures

Perceived disclosure intimacy was measured by three original items: "My partner used his or her experience to support his or her points," "My partner talked about very personal stuff in the discussion," and "My partner referred to himself or herself a lot in the discussion" (Cronbach's alpha = .82). Exploratory factor analysis with varimax rotation revealed a one-factor solution with eigenvalue = 2.25 (75% variance explained), with each item loading at 0.65 or higher. We thus created a single scale comprised of the average of the three items (M = 3.87, SE = 0.19).

Coding Procedure

Unitization. We unitized both FtF and CMC transcripts into utterances using Holsti's (1969, p. 116) definition of an utterance as "a single assertion about some subject" (the detailed unitization guide and coding schemes are available upon request). The first 20 transcripts were unitized by 2 coders, with an intercoder agreement of 93%, and the rest of the transcripts were unitized by one coder. A total of 2,142 utterances were identified from a total of 79 conversations (M = 27.57, SD = 13. 06). The number of utterances did not differ between intimate and nonintimate disclosure conditions, $t(77)$ = 1.54, p = .13; M_{Intimate} = 29.89, SD_{Intimate} = 12.12; $M_{\text{Nonintimate}}$ = 25.41, $SD_{\text{Nonintimate}}$ = 13.67.

Coding. Two raters independently coded participants' utterances following the confederate's presentation of disclosure manipulation, that is, after the third tip. The coding scheme was adapted from the Couples' Intimate Behavior Rating System (Mitchell et al., 2008), which classifies each utterance into (a) disclosure versus nondisclosure, (b) disclosure type[1], and (c) disclosure intimacy. Following a decision-tree approach, the coders identified whether a statement was a self-disclosure or not, its position in the discussion, type, and its intimacy level. The coding of disclosure/nondisclosure was based on whether the utterance revealed personal information about the discloser (e.g., personal experience, attitudes, thoughts, emotions, etc.), with intercoder reliability (kappa) measuring .70. The intercoder reliability (kappa) for an utterance position (after the third, fourth, fifth tip, or in the final discussion part) was .93. Finally, each disclosure was coded for intimacy on a 5-point scale (1 = *the disclosed facts/opinions/emotions were relatively public or impersonal* to 5 = *the disclosed facts/opinions/emotions were very private or personal*), with the intercoder reliability measuring (Cronbach's alpha).95. Where necessary, the differences were reconciled by one of the authors. Because of the skewed distribution of disclosure intimacy, self-disclosures were then dichotomized into less intimate and more intimate (see more details in the Results section and Appendix B for specific examples).

Results

First, we probed for any differences on the dependent variables associated with the two confederates and the participants' gender. There were no differences between the two

Table 1. Means and Standard Errors for Variables of Interests by Conditions

	FtF		CMC	
	Nonintimate	Intimate	Nonintimate	Intimate
Disclosure frequency	2.57[a] (0.19)	3.13[b] (0.20)	3.28[b] (0.20)	4.23[c] (0.23)
Perceived disclosure intimacy	2.74[a] (0.15)	5.10[b] (0.24)	2.34[a] (0.20)	5.72[c] (0.21)
Produced disclosure intimacy	0.07[a,b] (0.02)	0.07[b] (0.01)	0.03[a] (0.01)	0.16[c] (0.04)

Note: Means with different superscripts within a row indicate significant difference ($p < .05$ for two-tailed t tests and $p < .10$ for one-tailed t tests). Means of disclosure intimacy stand for the probability of observing a relatively more intimate disclosure in each condition when a disclosure was observed.

confederates, suggesting good confederate control. No gender differences were identified, and as such, gender was not included in the analyses reported in the following.

The first two hypotheses were concerned with the frequency of participants' self-disclosures. Self-disclosures overall were frequent, comprising approximately half of the 2,142 utterances ($N = 1,072$). Both Hypothesis 1 and Hypothesis 2 were tested with a Poisson log-linear regression model on the frequency of disclosive utterances for each participant, with the disclosure manipulation condition (intimate vs. nonintimate) and medium as predictors, and the log-transformed count of total utterances as an offset (to control for verbosity). Both main effects were significant (see Table 1 for means and standard errors by conditions).

Consistent with Hypothesis 1, CMC participants ($M = 3.72$, $SE = 0.15$) made more self-disclosures than FtF participants did ($M = 2.84$, $SE = 0.14$), $\chi^2(1) = 18.60$, $p < .001$. Pairwise comparisons showed that this effect held for both nonintimate ($p < .05$) and intimate ($p < .01$) disclosure conditions. The interaction effect of medium and disclosure (intimate vs. nonintimate) condition was not significant, $\chi^2(1) = 0.23$, $p = .63$. These results support previous research on the effect of text-based CMC facilitating more self-disclosures compared to FtF interactions.

Consistent with the reciprocity prediction in Hypothesis 2, when participants encountered intimate disclosures ($M = 3.64$, $SE = 0.15$) they more frequently reciprocated with a self-disclosure than after encountering nonintimate disclosures ($M = 2.90$, $SE = 0.14$), $\chi^2(1) = 12.94$, $p < .001$. Pairwise comparisons revealed that this effect held for both FtF ($M_{Intimate} = 3.13$, $SE = 0.20$; $M_{Nonintimate} = 2.57$, $SE = 0.19$; $p < .05$) and CMC ($M_{Intimate} = 4.23$, $SE = 0.23$; $M_{Nonintimate} = 3.28$, $SE = 0.19$; $p < .01$). As expected, the reciprocity norm operates on the frequency of self-disclosure both in FtF and CMC interactions. More important, both Hypothesis 1 and Hypothesis 2 were supported when examined on participants' responses to the confederate's third tip and fourth tip separately, suggesting generalizability across the two tip manipulations.

The results from the first two hypotheses were consistent with our predictions about CMC's impact on increased disclosure frequency (Hypothesis 1) and the reciprocity norm (Hypothesis 2). Our central concern, however, was with the intimacy of the disclosures, for which we proposed a novel mechanism based on the perception-behavior intensification

effect, according to which intensified perceptions of a partner's disclosure in CMC should prompt more intimate reciprocated self-disclosures. Hypothesis 3 focused on the first part of this mechanism and predicted intensified perceptions of disclosure intimacy in CMC relative to FtF, leading us to expect an interaction effect between media condition and disclosure manipulation condition. In other words, participants were expected to rate the confederate's intimate disclosures in CMC as more intimate than the same disclosures in FtF.

A two-way ANOVA (Medium × Disclosure Condition) on perceived disclosure intimacy revealed a significant interaction effect, $F(1, 74) = 5.76$, $p < .05$, $\eta^2 = 0.07$. Because the prediction of intensified perceptions of disclosure intimacy in CMC relative to FtF is a directional hypothesis, Hypothesis 3 was further tested by way of one-tailed t tests in the pairwise comparisons (see Table 1). As expected, though all the participants in the intimate conditions heard the same confederate's disclosures, CMC participants ($M = 5.72$, $SE = 0.21$) perceived them as more intimate than did FtF participants ($M = 5.10$, $SE = 0.24$), $t(35) = 1.82$, $p = .07$. But for the participants who heard the same nonintimate disclosures, their perceptions of disclosure intimacy did not differ across media ($M_{FtF} = 2.74$, $SE = 0.15$; $M_{CMC} = 2.34$, $SE = 0.20$), $t(39) = 1.52$, $p = .14$. Therefore, consistent with Hypothesis 3, the perceptions of intimate disclosures were intensified in CMC relative to FtF.

Given this intensification of perceived intimacy, our next question was whether these intensified perceptions affected the intimacy level of the participant's reciprocated self-disclosures. Although disclosure intimacy was coded on a 5-point scale, the data were not normally distributed ($M = 1.07$, $SD = 0.27$, Shapiro-Wilk statistics = 0.28, $p < .001$), with far fewer observations on the higher end than on the lower end. Therefore, self-disclosure intimacy was dichotomized by performing a median split (median = 1) with the ratings no greater than 1 coded as nonintimate self-disclosures and the ratings greater than 1 coded as intimate self-disclosures. Specifically, 91% of the disclosure utterances were classified as nonintimate self-disclosures ($N = 980$) and 9% were classified as intimate self-disclosures ($N = 92$).

Recall that the principle of reciprocity holds that reciprocated self-disclosures should match the perceived intimacy level of the confederate's disclosures. Given that perceptions of intimacy were elevated in CMC, Hypothesis 4 predicted that CMC participants would produce more intimate self-disclosures than FtF participants did. Given that this analysis involved both utterance- and subject-level variables because the utterances were nested within participants, we used the generalized estimation equation procedure (GEE) in SPSS software, which fits a generalized linear model with random effects to multilevel variables and accounts for potential nonindependence arising from multiple utterances produced by the same participant (Hanley, Negassa, Edwardes, & Forreste, 2003). Using this procedure, we performed a logistic regression on the dichotomized disclosure intimacy, with medium and disclosure conditions as predictors.[2]

As predicted in Hypothesis 4, we found an intensification effect of medium on disclosure reciprocity for self-disclosures, revealed by a significant medium by disclosure interaction, $\chi^2(1) = 10.87$, $p < .01$ (see Table 1). In response to the confederate's intimate disclosures, CMC partners ($M = 0.16$, $SE = 0.04$) were significantly more likely to reciprocate with relatively more intimate self-disclosures than their FtF counterparts ($M = 0.07$, $SE = 0.01$),

$p = .03$. In contrast, when CMC participants encountered the confederate's nonintimate disclosures, their disclosure intimacy ($M = 0.03$, $SE = 0.01$) did not differ from the self-disclosures made by their FtF counterparts ($M = 0.07$, $SE = 0.02$), $p = .07$. Thus, communicating in CMC did not uniformly stimulate more intimate self-disclosures than communicating in FtF. This interaction effect held when self-disclosure intimacy was examined for the two disclosure manipulations (third tip and fourth tip) separately.

The main effect of disclosure manipulation on self-disclosure intimacy was also significant ($M_{\text{Intimate}} = 0.11$, $SE = 0.02$; $M_{\text{Nonintimate}} = 0.04$, $SE = 0.01$), $\chi^2(1) = 9.68$, $p < .01$, but this effect was qualified by the significant interaction discussed above. The main effect of medium was not significant ($M_{\text{CMC}} = 0.07$, $SE = 0.02$; $M_{\text{FtF}} = 0.07$, $SE = 0.01$), $\chi^2(1) = 0.02$, $p = .90$, suggesting that CMC by itself does not always lead to more intimate self-disclosures than FtF does. As seen earlier, when the confederate was not being intimate, conversational intimacy in CMC did not exceed that of FtF interactions.

Finally, we tested how the intensified intimacy of reciprocated self-disclosures in the CMC intimate disclosure condition was related to the intensified perceptions of the confederates' disclosure intimacy. We performed another logistic regression on the dichotomized intimacy of participants' self-disclosures, with medium and perceived intimacy of the confederate's disclosures as predictors. Perceived intimacy of the confederate's disclosure was positively related to the participant's disclosure intimacy, $B = .37$, $SE = .10$, $\chi^2(1) = 14.02$, $p < .001$, suggesting that the intensified disclosure reciprocity was indeed driven by intensified perceptions of the confederates' disclosure intimacy. Overall, these results support the perception-behavior intensification effect suggesting that elevated perceptions of partner's intimacy interact with the reciprocity norm to produce increased behavior intimacy in CMC interactions.

Discussion

The present study contributes to our understanding of self-disclosure online in several important ways. First, by pairing the reciprocation norm framework (Dindia, 2002) with the perception intensification effect in CMC (Walther, 1996), this study proposed and found support for the perception-behavior intensification effect. According to this effect, CMC interactions intensify disclosure intimacy perceptions, which in turn stimulate perceivers' own more intimate disclosures in CMC than in FtF.

Second, this study shows that communication media have different effects on disclosure frequency and intimacy, suggesting distinct underlying theoretical mechanisms for these two disclosure dimensions. The medium had an overall effect on disclosure frequency, with more disclosures in CMC than FtF, but contrary to what previous research has suggested, there was no overall effect of medium on disclosure intimacy. On average disclosures in CMC were no more intimate than disclosures in FtF. The theoretical mechanisms and their implications are discussed in the following section.

Theoretical Contributions

The perception-behavior intensification effect has two components: intensified perceptions of disclosure intimacy and intensified disclosure intimacy responses in CMC. The intensified

perception of disclosure intimacy is consistent with other interpersonal intensification effects observed in zero-history, text-based CMC. These include intensified impression formation (e.g., Hancock & Dunham, 2001), status judgment (e.g., Boucher et al., 2008), and dominance characteristics (e.g., Peña et al., 2007). All of these effects suggest overinterpretation of limited socioemotional and social identity cues in CMC relative to FtF, as proposed by hyperpersonal theory (Walther, 1996).

The present study, however, takes the perceptual intensification effect a step further by demonstrating a link between intensified perceptions of disclosure intimacy and the perceivers' own behaviors. According to the perception-behavior intensification effect, intensified assessments of a partner's disclosure lead the perceiver to respond with more intimate disclosures on his or her own. As the present data demonstrate, CMC participants overinterpreted the intimacy of the confederate's self-disclosure and reciprocated with more intimate disclosures compared to FtF partners.

The link between intensified disclosure perceptions and behaviors in CMC has implications for relationship intimacy development in CMC. The perception-behavior intensification effect is likely to operate as a cyclical process, in which partners jointly form intensified perceptions of disclosure intimacy; this effect escalates intimacy of their reciprocated self-disclosures, which further escalates their intimacy perceptions and so on. Due to the constraints of the experimental design that required the use of a confederate, we could not fully test the cyclical nature of these processes, but this cycle could potentially explain hyperpersonal effect often observed in CMC (Walther, 1996). Whereas the hyperpersonal model specifies how different processes, including the receiver's overattributions about the sender's behavior, contribute to intensified interpersonal intimacy online, it does not tie the intensified perceptions with the perceiver's communication behaviors. Therefore, the present study extends our understanding of intimacy escalation in CMC by showing how perceivers move from intensified assessments of a partner's intimacy to intensified behaviors as a result of the perception-behavior intensification effect. In other words, people not only form intensified perceptions of their partners' disclosures in CMC but also try to match them with their own more intimate disclosures via the reciprocity mechanism.

Second, the present data reveal that self-disclosure intimacy and frequency, which are sometimes confounded in prior CMC research, operate very differently in CMC. As noted earlier, there was a main effect of medium on self-disclosure frequency, which is consistent with the application of uncertainty reduction theory proposed by Tidwell and Walther. Both in nonintimate and intimate disclosure conditions participants made more disclosures in CMC than in FtF. In contrast, medium didn't have an overall effect on disclosure intimacy, suggesting that on average CMC disclosures were no more intimate than FtF disclosures, and the medium alone did not always stimulate more intimate self-disclosures. In particular, when the confederate's disclosures were nonintimate, partners' self-disclosures in CMC were no more intimate than those in FtF. Only when the confederate made intimate disclosures did CMC partners' self-disclosures exceed the intimacy of FtF partners' self-disclosures. This important result provides evidence against a deterministic understanding of CMC on disclosure intimacy in previous research. We reason that the CMC affordances in text-based interactions may foster the inclination to talk about the self, as predicted by the uncertainty

reduction theory application to CMC (Tidwell & Walther, 2002), but they do not directly determine what aspects of the self people disclose in the messages. As illustrated in the present study, whether CMC partners made more or less intimate self-disclosures depended on their partner's behavior. This observation is consistent with the notion of self-disclosure as a motivated act (Joinson & Paine, 2007). CMC users do not self-disclose just because they are online; they self-disclose for a reason (e.g., to obey the reciprocity norm), albeit perhaps subconsciously.

This study further argues against the deterministic understandings of CMC on disclosure by reinforcing the importance of interpersonal dynamics for understanding online self-disclosure. The joint effects of reciprocity and perception intensification established here align with Schouten et al.'s (2009) observations that of four possible mediators (selective self-presentation, similarity, self-awareness, direct questioning) only the interpersonal dynamic of direct questioning mediated the relationship between CMC and self-disclosure. The present study builds on this work by describing how an initial disclosure operates as a situated input that produces dyadic interdependency and intimate relationships. Together, these data stand in contrast to deterministic understandings of media effects on disclosure, such as anonymity-based explanations, which argue for the effects of medium on disclosure intimacy without considering interpersonal processes that support self-disclosure online.

This study also extends traditional frameworks of self-disclosure, such as social penetration theory. As noted earlier, the breadth and depth of reciprocity did not always align, in contrast to social penetration theory's proposition about covariation of disclosure frequency and intimacy. Specifically, we found that disclosure reciprocity for perceived intimacy was a stricter rule than for frequency. When a disclosure was perceived as more intimate, the partners reciprocated with more intimate self-disclosures of their own. This finding is consistent with the self-disclosure regulation perspective, which states that the regulation of disclosure breadth or frequency is more related to subjective utility associated with the disclosure (perceived value of the desired outcome resulting from the disclosure, such as personal bonding and emotional support), whereas the regulation of disclosure intimacy is more related to subjective risk (e.g., embarrassment among partners, reduction of autonomy, and disapproval or sanctions; Omarzu, 2000). Individuals tend to minimize the subjective risk associated with the disclosure; therefore, they are more careful in regulating disclosure intimacy than frequency.

Limitations and Future Research

The findings we present in this study provide clear support for disclosure reciprocity in CMC and offer some initial insights about the role of interpersonal intensification predicted by the hyperpersonal model on subsequent communication behaviors. However, it is important to note that this study is constrained by some important limitations. The interaction was structured and relied on the role of scripted confederates; thus, the manipulated disclosure scenario may limit the generalizability of the results to natural conversations. Although this design was necessary to establish the effects of reciprocity independently

from other psychological factors affecting disclosure production, examination of more disclosure situations and contexts should be addressed in future study.

This investigation proposed a perception-behavior intensification cycle, according to which people make more intimate reciprocation as a result of intensified perceptions of their partners' disclosures in CMC than in FtF, and their intimate self-disclosures may potentially trigger an escalated reciprocity for their partners. Whereas the experiment is unable to offer support for the proposed cyclical reciprocity because of the use of confederates, future investigation may consider using longitudinal analyses to observe how self-disclosures are patterned between CMC partners over time.

Finally, the focus on interactions among strangers in this study may have affected the study results in several ways. For example, the data demonstrated a skewed disclosure intimacy distribution with 91% of self-disclosure utterances coded as nonintimate self-disclosures, which is typical for initial interactions with a stranger. Future research needs to consider the effects of reciprocation on disclosure in other types of relationships. As reviewed earlier, tit-for-tat reciprocation usually occurs in initial interactions, whereas in more intimate relationships partners have an extended time frame for reciprocation (Dindia, 2002). Furthermore, this study may present a boundary condition in zero-history interactions so that communicators tend to rely on limited cues for impressions. Past history and partner knowledge may temper overinterpretation of limited cues and reduce the interpersonal intensification effect, compared to interactions among strangers. The unacquainted partners in this study also did not expect to interact with each other again; thus, the results may not be generalizable to other relational processes motivated by future interaction expectations. Future research also needs to examine the overinterpretation of disclosure intimacy in other types of CMC interactions in which participants have access to richer social cues than text-based conversations with a stranger.

Conclusion

Increased levels of self-disclosure in online communication have inspired a great deal of CMC research exploring the underlying mechanisms of this phenomenon. Although previous explanations have focused on individual-level factors (e.g., anonymity), the present study approaches online self-disclosure by taking into account an important interpersonal dynamic, namely, the reciprocity norm. The study shows that the interplay between disclosure reciprocity norm and perceptual intensification processes in CMC produces a perception-behavior intensification effect. Relative to FtF participants, CMC participants perceive partners' disclosures as more intimate and, consequently, reciprocate with more intimate disclosures of their own following the norm of reciprocity. This study raises questions about media-only explanations of the increase of self-disclosure online and, instead, argues that understanding self-disclosure online requires considering both the reciprocity norm and media effects. Ultimately, the perception-behavior intensification effect on self-disclosure emphasizes the importance of interpersonal dynamics for understanding self-disclosure and intimacy development online.

Appendix A

Disclosure Manipulation Protocol

Tips	Nonintimate disclosure	Intimate disclosure
3	Eat right	Eat right
	Do you know the "freshman 15"? Freshmen gains 15 pounds in the first year because they don't have family there to serve balanced meals.	It's very important to stick to a balanced diet. I gained 20 pounds eating crappy dorm food in my first year and someone asked me if I was pregnant.
4	Do regular exercises	Do regular exercises
	Doing some exercises helps relieve the stress. It improves physical health, and also brings mental benefits—help people deal with problems in a positive way.	When I was freshman my life was a big mess. My parents were getting divorced and I was sick for a week....At that time I started to go to Yoga class. It really helps me relax and take the stress out.

Appendix B

Examples of Dichotomized Disclosure Intimacy Coding by Disclosure Types

	1	2
Disclosure intimacy	NonIntimate	Intimate
Factual self-disclosure	I have a cat	I bankrupted my checking account in my freshman year
	I'm taking the cooking class now	My parents got divorced two years ago
Cognitive self-disclosure	I think it's fun to take the cooking class	I always think my roommate to be very distant kind of person
	Being involved in class is important	I'm thinking of breaking up with my boyfriend
Emotional self-disclosure	I was so happy after I got my friend's message	It feels so terrible when I'm away from home and hear everything by phone
	The weather just sucked	I was completely humiliated in front of my peers

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Notes

1. Disclosure type included three categories: (1) factual disclosure (revealing events in one's life or facts about the self), (2) cognitive disclosure (revealing one's attitudes, thoughts, and opinions about people, events, and experience in one's life), and (3) emotional disclosure (revealing one's emotions towards certain events and experience); kappa = .92. Disclosure type had no effect on the hypothesized intensification effect, so we collapsed the data across all the disclosure types for the analyses.
2. Disclosure type was included as a covariate in the regression model, but controlling for disclosure type did not change the result patterns, so it was removed from the final model.

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