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Rapid Communication

Computer-Mediated Communication and Interpersonal Attraction: An Experimental Test of Two Explanatory Hypotheses

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ABSTRACT

The aims of this study were (a) to investigate the influence of computer-mediated communication (CMC) on interpersonal attraction and (b) to examine two underlying processes in the CMC–interpersonal attraction relationship. We identified two variables that may mediate the influence of CMC on interpersonal attraction: self-disclosure and direct questioning. Focusing on these potential mediating variables, we tested two explanatory hypotheses: the CMC-induced direct questioning hypothesis and the CMC-induced self-disclosure hypothesis. Eighty-one cross-sex dyads were randomly assigned to one of three experimental conditions: text-only CMC, visual CMC, and face-to-face communication. We did not find a direct effect of CMC on interpersonal attraction. However, we did find two positive indirect effects of text-only CMC on interpersonal attraction: text-only CMC stimulated both self-disclosure and direct questioning, both of which in turn enhanced interpersonal attraction. Results are discussed in light of uncertainty reduction theory and CMC theories.

INTRODUCTION

THE OPPORTUNITIES to form relationships on the Internet have multiplied in the past decade. The growing popularity of the Internet as a setting for relationship formation is hardly surprising. Online communication or, more generally, computer-mediated communication (CMC) has some characteristics that may stimulate interpersonal attraction and thereby relationship formation. The reduced visual and auditory cues of CMC and the resulting visual anonymity, in particular, are assumed to stimulate interpersonal attraction.¹

Several studies have investigated the effect of reduced auditory and visual (i.e., nonverbal) cues in CMC on interpersonal attraction. Most of these studies focused on the socioemotional part of interpersonal attraction commonly called “liking.”² These studies have yielded inconsistent results. Some studies found positive effects of CMC on interpersonal attraction.^{3,4} However, other studies demonstrated no effects⁵ or even negative effects.⁶

An important factor that may contribute to the mixed findings of earlier CMC–interpersonal attraction studies is that many of these studies did not specify *how* CMC is related to interpersonal attrac-

tion. Although many CMC studies implicitly assume that certain mechanisms, such as intimate self-disclosure, may explain CMC effects on interpersonal attraction, the mediating influence of these mechanisms has never been tested. In addition, there is no CMC research in which alternative explanatory hypotheses have been pitted against each other.

The first aim of our study is to fill these gaps in earlier research by investigating the validity of two potential mediators that may account for the effects of CMC on interpersonal attraction. On the basis of these mediators, we formulate two hypotheses that explain the effect of CMC on interpersonal attraction. Each of these hypotheses attributes the effect of CMC to a different underlying process. By empirically contrasting the validity of the underlying mechanisms, we hope to improve theory formation and contribute to a more profound understanding of CMC effects on interpersonal attraction.

The second aim of our study is to compare two types of CMC that have become very popular in recent years and, therefore, have high ecological validity: instant messaging (IM) with and without a webcam. Until now, CMC research has been largely based on the assumption that CMC involves text-only communication. However, a considerable proportion of young people now add visual or auditory information to their CMC. In our view, these recent developments may provide many new challenges for CMC theories that are based on the assumption that CMC necessarily involves reduced nonverbal cues.

The CMC-induced direct questioning hypothesis

Our first hypothesis is inspired by Berger and Calabrese's uncertainty reduction theory (URT). URT assumes that when strangers meet, their primary concern is to reduce uncertainty and increase the predictability of the behavior of the interaction partner.⁷ Berger identified three types of uncertainty reduction strategies: passive (e.g., reactivity search, social comparison), active (e.g., asking others about the target individual), and interactive (e.g., direct questioning, self-disclosure).⁷

The CMC-induced direct questioning hypothesis states that CMC stimulates interpersonal attraction because CMC participants are forced to use interactive uncertainty reduction strategies, such as direct questioning. Tidwell and Walther⁸ argue that many passive and active uncertainty reduction strategies common in face-to-face settings are impossible to deploy in CMC settings. As a result, CMC users are forced to use interactive uncertainty

reduction strategies, such as direct questioning. A possible result of the enhanced use of direct questioning in CMC could be that communication partners feel privileged by this candid interest in different aspects of their self, which may stimulate their liking of this partner. Our first hypothesis therefore states:

Hypothesis 1: CMC leads to more direct questioning, which in turn enhances the levels of interpersonal attraction.

The CMC-induced self-disclosure hypothesis

Our second hypothesis attributes the positive effect of CMC on interpersonal attraction to enhanced self-disclosure. There are two conceptually related explanations for why CMC leads to more self-disclosure. The first follows from URT. As discussed, self-disclosure is, just as direct questioning, an interactive uncertainty reduction strategy.⁷ Therefore, it is possible that, given the lack of alternative strategies, CMC partners are forced to use the self-disclosure strategy more often than are face-to-face partners.

A second explanation is provided by Walther's hyperpersonal communication theory.⁹ This theory assumes that the reduced nonverbal cues of CMC encourage people to feel less inhibited and to disclose their inner feelings at an earlier stage. Although it is still unknown which of the aforementioned theories more validly explains positive CMC effects on self-disclosure, empirical research has consistently demonstrated that CMC stimulates intimate self-disclosure.^{8,10} However, because self-disclosure is a main determinant of interpersonal attraction,³ CMC-induced self-disclosure may act as a mediating variable in the CMC-interpersonal attraction relationship. Therefore, our second hypothesis states:

Hypothesis 2: CMC leads to higher levels of intimate self-disclosure, which in turn results in higher levels of interpersonal attraction.

Comparing text-only CMC and visual CMC

Our study investigated to what extent our hypotheses hold for text-only CMC and visual CMC. URT and hyperpersonal communication theory have different expectations about the addition of visual information to text-only CMC. URT predicts that interpersonal attraction will be lower in the text-only CMC condition than in the visual CMC and the face-to-face conditions because these latter conditions provide more information about the communication partner. In contrast, Walther's

TABLE 1. MEDIATED EFFECT OF CMC ON INTERPERSONAL ATTRACTION

<i>Predicting effects of CMC on mediators</i>	β	<i>Predicting effects of mediators on interpersonal attraction</i>	β
<i>Model 1a, MV: Direct questioning</i>		<i>Model 2a: FtF vs. text-only CMC</i>	
IV: FtF vs. text-only CMC	0.40*	MV: Direct questioning	0.32*
IV: visual CMC vs. text-only CMC	0.07	MV: Self-disclosure	0.33*
IV: FtF vs. visual CMC	0.39*		
<i>Model 1b, MV: Self-disclosure</i>		<i>Model 2b: visual CMC vs. text-only CMC</i>	
IV: FtF vs. text-only CMC	0.33*	MV: Direct questioning	0.16
IV: visual CMC vs. text-only CMC	0.05	MV: Self-disclosure	0.25
IV: FtF vs. visual CMC	0.39*		
		<i>Model 2c: FtF vs. visual CMC</i>	
		MV: Direct questioning	0.11
		MV: Self-disclosure	0.10

DV, dependent variable; MV, mediating variable; IV, independent variable; FtF, face-to-face communication; CMC, computer-mediated communication; IVs are based on dummy variables to compare FtF versus text-only CMC versus visual CMC.

* $p < 0.01$.

hyperpersonal communication framework predicts that interpersonal attraction will be highest in the text-only CMC condition because this condition leaves more room for idealized impressions.⁹ Because earlier research is too inconsistent to guide the formulation of a hypothesis on the effects of our experimental conditions, we investigate the following research question:

RQ1: How does the visual CMC condition differ from the text-only CMC condition and the face-to-face condition regarding its effects on direct questioning, self-disclosure, and interpersonal attraction?

METHOD

Sample and procedure

One hundred sixty-two university students (81 females and 81 males) between 17 and 31 years of age ($M = 21.07$; $SD = 2.61$) participated in cross-sex dyads in an experiment. The 81 dyads were randomly assigned to one of three experimental conditions. In the text-only CMC condition, participants interacted via IM software especially designed for the experiment. In the visual CMC condition, participants interacted through the same IM software, but they saw their conversation partner in a window on their computer screen. In the face-to-face (FtF) condition, the participants inter-

acted in a laboratory living room provided with hidden recording equipment. We asked each participant to get to know his or her communication partner as well as possible during the conversation. None of the participants had known the conversation partner beforehand. The conversation partners were able to discuss any topic they wanted. In both CMC conditions, participants interacted for 24 minutes. In the FtF condition, they interacted for 12 minutes. After the conversations, participants completed a questionnaire about their own and their partner's behavior. Participants were then debriefed and paid a participation fee of fifteen euros.

Measures

Interpersonal attraction was measured with three items of McCroskey and McCain.² These items formed a one-dimensional scale ($\alpha = 0.68$). To measure self-disclosure, participants were asked to indicate how much their conversation partner told them about five relatively intimate self-disclosure topics: relationships, love, physical appearance, secrets, and going out. To measure direct questioning, participants were asked to indicate to what extent their conversation partner asked them about going out, relationships, secrets, and sex. The exact question was: "How much did your conversation partner ask you about . . . ?" The response categories for the self-disclosure and question-asking items varied from 1 (nothing) to 7 (everything).

Mediation analysis

To test the differences between the text-only CMC condition and the two other conditions in a regression analysis, we created three dummy variables: one to investigate the difference between FtF communication (coded as 0) and text-only CMC (coded as 1); one to test the difference between visual CMC (coded as 0) and text-only CMC (coded as 1); and one to test the difference between FtF communication (coded as 0) and visual CMC (coded as 1).

We used the intervening variable approach of MacKinnon et al. to investigate our mediated hypotheses.¹¹ The first step in this approach is to run a regression analysis with the independent variable predicting the mediator. The second step is to estimate the effect of the mediator on the dependent variable after controlling for the independent variable. The two mediators direct questioning and self-disclosure were separately analyzed. Table 1 presents the results for the different regression analyses. We tested the significance of the indirect effects with the Sobel test. However, in recent years several methodologists have recognized that the critical z -value of 1.96 in the Sobel test is too conservative. According to MacKinnon et al., "(T)he empirical critical value is 0.97 for the 0.05 significance level rather than 1.96 for the standard normal test of $A \times B = 0$."¹¹

RESULTS

To test the direct effects of each condition on interpersonal attraction, we conducted an ANOVA with the three experimental conditions (text-only CMC vs. visual CMC vs. FtF communication) as the independent variable and interpersonal attraction as the dependent variable. We did not find a significant main effect of experimental condition on interpersonal attraction, $F(1, 78) = 0.98, p = 0.37, \eta^2 = 0.03$.

The CMC-induced direct questioning hypothesis was supported only when we compared text-only CMC with FtF communication. As model 1a in Table 1 shows, there was a significant effect of text-only CMC on direct questioning ($\beta = 0.40, p < 0.01$). As model 2a shows, there was a significant effect of direct questioning on interpersonal attraction when text-only CMC was compared with FtF communication ($\beta = 0.32, p < 0.01$). The Sobel test yielded a z -value of 1.81. The CMC-induced direct questioning hypothesis was not supported when we compared text-only CMC with visual CMC (see model 1a: $\beta = 0.07, ns$). However, when we com-

pared visual CMC with FtF communication, we did find a significant effect of visual CMC on question asking (see model 1a: $\beta = 0.39, p < 0.01$). In turn, when visual CMC was compared with FtF communication, direct questioning did not predict interpersonal attraction (model 2c: $\beta = 0.11, ns$).

As Table 1 (models 1b, 2a, 2b, and 2c) shows, for the CMC-induced self-disclosure hypothesis, the same patterns of results were obtained in the different experimental conditions. Again, this hypothesis was supported only when we compared text-only CMC with FtF communication. The Sobel test for this mediated effect produced a z -value of 1.70.

DISCUSSION

Both our CMC-induced direct questioning hypothesis and our CMC-induced self-disclosure hypotheses were supported by our results, albeit only in the case of text-only CMC. As for the first steps of the hypotheses, we found that in comparison to the FtF condition, participants in *both* the text-only CMC and the visual CMC condition asked their conversation partners more direct questions and self-disclosed more to their partners. As for the second steps of the hypotheses, we found that direct questioning and self-disclosure did enhance interpersonal attraction, but solely in the text-only CMC condition and not in the visual CMC condition. These results suggest that although both text-only and visual CMC have the potential to enhance direct questioning and self-disclosure, the CMC conditions do differ in their potential to enhance interpersonal attraction via this mediator. Probably, when information about the physical appearance of the partner is available in a CMC condition, the mediated effects of direct questioning and self-disclosure on interpersonal attraction is overshadowed by cues about a partner's physical appearance.

Our study has important implications for CMC-based uncertainty reduction. We found that the addition of visuals to text-only CMC had differential effects on the mediating and dependent variables. In fact, direct questioning and self-disclosure did not differ for text-only and visual CMC. URT would predict that, in comparison to text-only CMC, the visual CMC condition would enhance interpersonal attraction.⁷ This prediction did not receive support. The increased information in visual CMC did not stimulate interpersonal attraction. This result suggests that the quality of information rather than the quantity of information increases interpersonal attraction in CMC.

Our study also has implications for Walther's⁹

hyperpersonal communication theory, which predicts that visual anonymity in CMC stimulates self-disclosure *and* interpersonal attraction. Our study demonstrated that visual anonymity has differential effects on self-disclosure and interpersonal attraction. In agreement with Walther's hyperpersonal theory, visual anonymity does lead to interpersonal attraction, albeit only indirectly. However, in contradiction to this theory, the addition of visuals to text-only CMC does not decrease levels of self-disclosure. In fact, the level of self-disclosure in the visual CMC condition was just as high as in the text-only CMC condition. This finding suggests that it is not visual anonymity per se that enhances self-disclosure; more precisely, there must be other factors that account for the enhanced self-disclosure. Walther et al.¹ provide the most plausible explanation: CMC users are forced to rely on self-disclosure because they lack other, more subtle uncertainty reduction strategies that are commonly used in FtF settings. Future research should elaborate on our findings, for example by testing whether it is indeed a forced use of reduction strategies in different types of CMC that accounts for changes in the level of self-disclosure.

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