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ABSTRACT

Numerous studies address the ability of the computer-mediated communication (CMC) medium to carry social cues, e.g., social presence. This paper proposes to expand the study of social cues to include interpersonality measures directed toward messages within the CMC medium. Interpersonality is conceptualized as the joint measure of anticipated feedback and message coherence, factors that distinguish interpersonal messages from broadcast (mass) messages. Results from an online exercise indicate that anticipated feedback and message coherence are distinct constructs from social presence and that these measures jointly predict behavioral intention to comply with a message request.

Keywords

Interpersonal communication, broadcast communication, mass communication, email, instant messaging.

INTRODUCTION

The concept of interpersonality derives from distinctions between interpersonal and broadcast (mass) modes of communication. Both communication modes entail transmission of verbal and nonverbal information, but interpersonal communication is distinguished by presence of personal feedback and message coherence (i.e., relevance of remarks and actions) between communication participants (Reardon, 1991). Interpersonality is defined in this paper as *the joint perception of (anticipated) personal feedback and message coherence by message recipients.* There are several reasons to anticipate that interpersonality will become an important concept for computer-mediated communication CMC practice and research.

Users of email and instant messaging CMC applications are confronted daily with unsolicited, disruptive messages, known respectively as SPAM and SPIM. Deciding whether to read or discard a message is increasingly predicated on whether the message is perceived as being interpersonal or broadcast. A recent Information Week article observes, "A lot of people have [thought] that they were talking to a person about a date or buying a car, and the next think they know, a whole lot of URLs are being pushed toward them, which when clicked lead to a porno site or gambling site or something like that" (Claburn, 2004, online). Studying the structure and effects of interpersonality will increase our understanding of how people approach decisions regarding CMC messages and may help in developing guidelines to make unsolicited CMC messages less disruptive.

Researchers have studied topics related to interpersonality for decades, but success has been mixed. An extensive literature addresses the role that media carrying capacity for social cues plays in determining media choice and media effects. These studies typically compare two or more media, including face-to-face (FTF), video, audio, telephone, voicemail, and CMC applications. Many evaluate social presence, a construct that assesses the degree to which people form warm and personal attachments to one another through communication (Short, Williams, and Christie, 1976). Other approaches to social cues include studies based on media richness (Daft and Lengel, 1986) and social context cues (Sproull and Kiesler, 1986). However, empirical studies frequently fail to support the proposition that social cues inherent to the medium are important predictors of media choice (e.g., El-Shinnawy and Markus, 1997) or media effects (e.g., Dennis and Kinney, 1998).

The equivocal findings of the CMC social cues literature are more likely to be explained by studying processes that occur within CMC than by focusing on differences between CMC and other media (Tanis and Postmes, 2003). One process that has not received significant study is the confounding of media and message characteristics in CMC. It is difficult, in general, to completely separate the effects of medium and message (McLuhan, 1964), but these are intertwined to an exceptional degree in CMC. Because of its programmable nature, CMC can present a wide variety of features to its users, and system features can have strong effects on message characteristics, such as response latency (Moon, 1999) and visual cues (Wilson, Forthcoming). Given the high level of interdependence in CMC between medium and message, it may be beneficial for CMC researchers to study social cues as they relate to the messages within the CMC medium rather than the medium *per se.* This

message-within-medium approach can address effects of CMC message characteristics as well as characteristics that are exclusive to the medium.

This paper describes a study of message interpersonality within the CMC medium. The following sections present the background and research hypotheses relating to interpersonality, research methods, and results of the research. This is followed by discussion of the findings and future research directions.

BACKGROUND AND HYPOTHESES

Most media primarily support a single communication mode. For example, FTF and telephone media primarily support interpersonal communication, and television, radio, and print media primarily support broadcast communication. CMC is unique in the ubiquitous support it offers for both interpersonal communication, such as corresponding with a friend via instant messaging, and broadcast communication, such as reading an online newsletter (Reardon and Rogers, 1988). Hoffman and Novak (1996, p. 53) refer to this capability of CMC as "many-to-many communication" and observe that it places CMC media midway between broadcast communication and interpersonal communication media on an objective scale of impersonal-person characteristics. Researchers using subjective measures of social presence also find that CMC media are perceived to be intermediate to broadcast media and interpersonal media (Rice, 1992, 1993). Unfortunately, the findings of these studies cannot directly inform the issue of interpersonality in CMC. Because CMC provides ubiquitous support for both broadcast and interpersonal modes of communication, interpersonality cannot be conceptualized as an exclusive characteristic of the medium. Thus, it is important to conduct a new test with measures that can assess interpersonality of the message as constrained by the CMC medium. Hypothesis 1 presents this test.

> H1: Interpersonality of a CMC message will be perceived as intermediate to broadcast and interpersonal messages.

In order to be a useful research construct, interpersonality should predict important aspects of CMC use and/or outcomes. Social presence and related constructs have been applied to predict two major aspects of CMC: media choice and evaluation (e.g., El-Shinnawy and Markus, 1997; Keil and Johnson, 2002; King and Xia, 1999; Rice, 1993) and media effects and performance outcomes of use (e.g., Dennis and Kinney, 1998; Sia, Tan, and Wei, 2002; Straub and Karahanna, 1998). Higher levels of interpersonality are anticipated to increase the availability of social cues to message recipients or at least the expectation that more social cues will become available, e.g., through future personal feedback. Greater availability of social cues is theorized to improve media evaluation (Short et al., 1976) and performance outcomes (Daft and Lengel, 1986). It is anticipated that greater interpersonality will also increase evaluation and outcomes of CMC messages. Hypotheses 2a and 2b test effects of interpersonality within these theorized relationships, as illustrated by the research model shown in Figure 1.

> H2a: Interpersonality will predict evaluation of a CMC message by recipients.

> H2b: Interpersonality will predict effects of a CMC message on recipients.
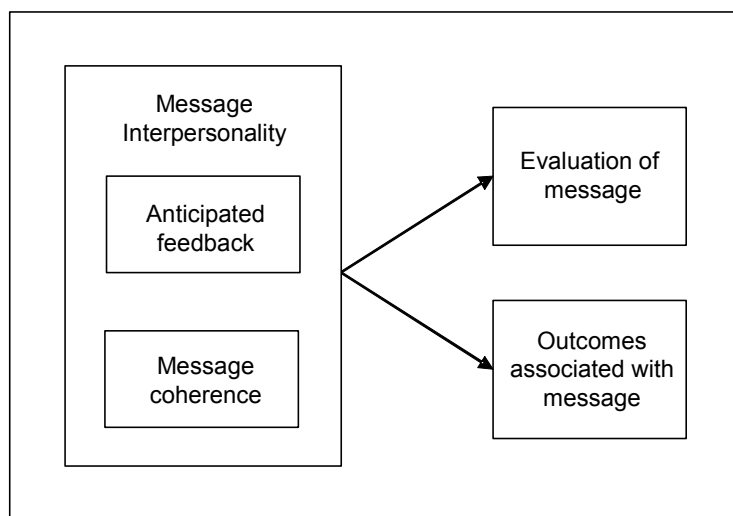

Figure 1. Research model.

Finally, it is important to assess the potency of predictions based on interpersonality in contrast to existing measures of social cues. Hypothesis 3a and 3b conduct a test between interpersonality and social presence.

> H3a: Interpersonality will predict evaluation of a CMC message by recipients better than social presence.

> H3b: Interpersonality will predict effects of a CMC message on recipients better than social presence.

RESEARCH METHOD

An online exercise was conducted using a database-connected web application that asks subjects to evaluate three messages, two of which they recalled from messages they had received personally and one that was presented to them as part of the exercise. Subjects were 78 students attending business communications and information systems courses at a large university in the Midwest U.S. Gender distribution of subjects is 42 male and 36 female, with average age of 23 years. By participating in the study, subjects earned extra course credit.

Procedure

After each subject logs in to the web application, he/she is presented with the interpersonal message treatment. In this treatment, a definition is given of an interpersonal message as "relevant to your interests and sent by someone who is responsive to what you have to say." The subject then is asked to recall and describe a specific interpersonal message that had made a request of him/her. Subjects are not restricted in any way as to who sent them this message or the medium by which it was sent. After the subject describes the topic and source of the message, he/she is asked to rate the message on items representing a variety of measures.

Each subject is next presented with the broadcast message treatment. This involves the same sequence of activities as the interpersonal message treatment, but in this treatment the instructions are directed toward a broadcast message, which is defined as "not necessarily relevant to your interests or responsive to what you have to say."

In the final part of the exercise, the CMC message treatment is presented. In this treatment, the subject is told that he/she has received a new email message. The message asks the student to consider volunteering his/her time to help raise money to fund equipment purchases for the University men's and women's basketball teams by selling university logo attire. This message is designed to be relevant to subjects' personal experiences as university students, but does not represent itself as being from any person known to subjects. After the subject views the message, he/she then rates it on the same scales as the previous messages along with several additional items that assess evaluation of interpersonality and behavioral intention to comply with the message request.

Measures

The online exercise measures several constructs across all three treatments and some constructs only in the CMC message treatment. Some of the items are drawn from prior research. Social presence is measured using a scale initially developed by Short et al. (1976) and subsequently validated in numerous studies. Involvement with the message is measured to provide a check of subjects' involvement using an instrument developed and validated by Zaichkowsky (1985, 1994). Several constructs had not been assessed previously within the intended research context, and new items were developed for these constructs. Interpersonality is tested through two measures, anticipated feedback and perceived coherence, using a set of items created from the conceptual definitions of these constructs (Reardon, 1991). Measures of message evaluation and message effects in the study focused respectively on the receiver's conceptual placement of the CMC message along a dimension anchored by interpersonal and broadcast message types (hereafter, evaluation of interpersonality) and on the receiver's behavioral intention to comply with the message request (hereafter, behavioral intention). Evaluation of interpersonality is represented by items that ask subjects to relate the CMC message to receivers' concepts of interpersonal and broadcast messages. Items measuring behavioral intention ask subjects to rate the likelihood of volunteering their time, as requested by the CMC message. All scale items are measured on seven-point scales.

RESULTS

Data were collected via an online questionnaire in which subjects were prompted to make entries to all items. No data were missing for any of the subjects.

Construct Validation of Independent Variables

Alpha reliabilities were calculated for items in each construct, and items that did not contribute to the construct were removed. The anticipated feedback and coherence constructs were further reduced to four items in each scale. The two items used to assess evaluation of interpersonality did not show adequate reliability to assure convergent validity (α = .58), so these items were analyzed separately in hypothesis tests. Alpha reliabilities for the other constructs were .82 or above. An unconstrained factor analysis was performed using all items applied as independent variables in hypothesis testing as part of anticipated feedback, perceived coherence, and social presence constructs (see Table 1). Results indicate that these hypothesized constructs form distinct factors.

Construct / Item	1	2	3
Social Presence			
My feeling is that this message is: (Impersonal/Personal)	.692		
My feeling is that this message is: (Hot/Cold)	.699		.361
My feeling is that this message is: (Dehumanizing/Humanizing)	.803		
My feeling is that this message is: (Insensitive/Sensitive)	.832		
Anticipated Feedback			
If I replied to this message, my reply would be read.	.328	.790	
If I replied to this message, the person who sent it would read my reply.		.863	
If I replied to this message to ask a question, someone would respond to answer my question.		.877	
If I replied to this message to ask for a small change in the terms, my request would be met.		.692	
Message Coherence			
For me, this message is: (A misfit/A good fit)			.824
For me, this message is: (Applicable/Not applicable)			.827
this message has personal relevance to me.			.851
This message fits with my interests.			.863

Principal component extraction and varimax rotation with Kaiser normalization; KMO statistic = .80; for clarity, factor loadings less than .30 are not shown.

Table 1. Factor analysis of independent variables in CMC message treatment.

Check of Subjects' Involvement

Subjects volunteered to participate in this research, so it is important to assess whether the exercise was adequately involving to them. Involvement was measured using a validated instrument (Zaichkowsky, 1986, 1994). Subjects' involvement with the CMC message averaged 4.08 (s.d. = 1.13), slightly above the scale midpoint. This was lower than involvement with interpersonal messages that subjects recalled (mean = 5.39, s.d. = .76, paired t = 8.47, p < .0001) but was higher than involvement with broadcast messages (mean = 3.30, s.d. = 1.30, paired t = 4.123, p < .0001). These results suggest subjects became involved to a reasonable degree in the CMC message treatment component of the exercise.

Scale Calculations

Scales were calculated for anticipated feedback, message coherence, and social presence in each of the three treatments (see Table 2). For the CMC message treatment only, a scale was calculated from items representing behavioral intention. Because of low reliability, the evaluation of interpersonality items were not combined into a single scale, but are reported separately in Table 2. Several of the scales and items showed mild or moderate positive skew. Transforms were applied to these measures as recommended by Tabachnick and Fidell (1989), reducing skewness and kurtosis to nonsignificant levels. Square-root transforms were applied to broadcast feedback, interpersonal feedback, and the two CMC evaluation of interpersonality items, and log transforms were applied to interpersonal coherence and CMC behavioral intention scales. Hypothesis testing was performed using the transformed measures.

Scale	Interpersonal message treatment	CMC message treatment	Broadcast message treatment
Anticipated feedback	6.29 (0.80)	4.74 (1.41)	2.66 (1.32)
Message coherence	6.02 (0.95)	3.49 (1.61)	3.26 (1.66)
Social presence	4.89 (0.94)	4.04 (1.13)	3.12 (1.12)
Evaluation item 1: Message is completely broadcast/interpersonal		2.81 (1.53)	
Evaluation item 2: Message is more like my broadcast/interpersonal message example		2.85 (1.82)	
Behavioral intention (to comply with message request)		2.32 (1.47)	

Table 2. Means (std. deviations) of constructs across treatments.

Hypothesis Tests

Hypothesis 1 tests that interpersonality of the CMC message will be perceived as intermediate to broadcast and interpersonal messages. A repeated-measures ANOVA was conducted to test this proposition. Overall, interpersonality measures were significantly lower for the CMC message than the interpersonal message ($F_{1,77} = 148.82$, $p < .0001$) and significantly higher than the broadcast message ($F_{1,77} = 32.67$, $p < .0001$). This finding supports Hypothesis 1, however, a strong interaction appeared between the CMC and broadcast messages ($F_{1,77} = 360.80$, $p < .0001$) in which coherence was very similar between the two (see Figure 2).
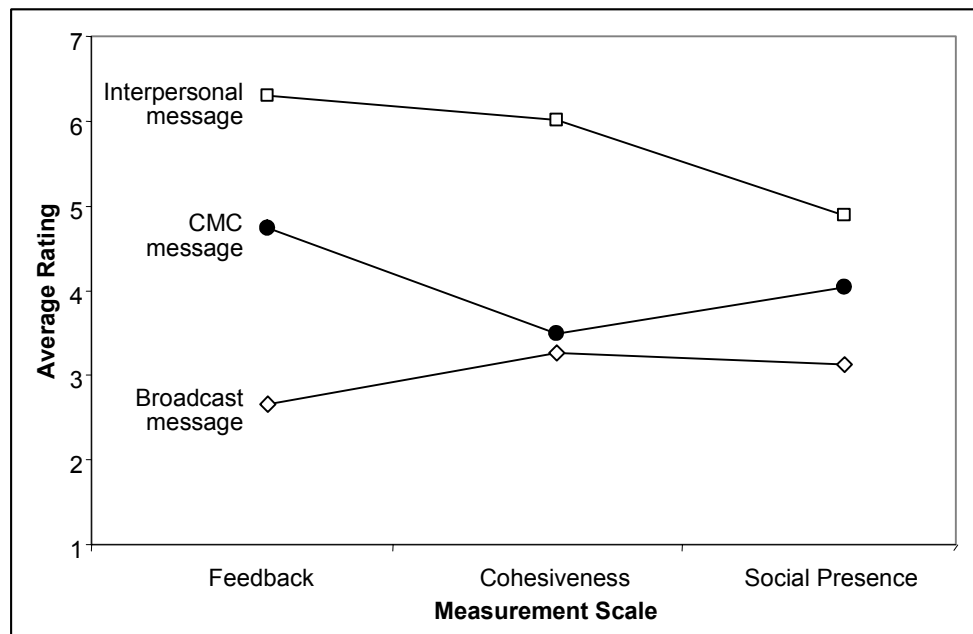

Figure 2. Evaluations of the CMC message relative to interpersonal and mass messages..

Hypothesis 2a and 2b test predictiveness of interpersonality, and Hypotheses 3a and 3b compare predictions of interpersonality and social presence. In order to test these hypotheses, multiple regressions were run between the independent variables (anticipated feedback, message coherence, and social presence) and each of the dependent variables (evaluation of interpersonality items and the behavioral intention scale). In preparation for regression analysis, additional data screening was undertaken to test for violations of regression assumptions regarding normality, linearity, equality of variance, collinearity, and independence of error and to test for outliers using procedures in SPSS 10.1 as outlined by Norusis (1993). Examination of normality histograms and scatterplots of standardized residuals graphed against predicted residuals revealed no excessive

departures from normality, linearity, or equality of variance assumptions. Tolerance statistics were examined for each model, and none showed high levels of multicollinearity among the variables. Casewise diagnostics run in SPSS found no outliers beyond the .001 significance level. Thus, with the exception of transforms that were previously applied to the data, no cases were dropped from the regression analysis, and no other changes were made to the data.

Regressions were run using the simultaneous model, in which all independent variables are entered into the regression equation at once and each is evaluated in terms of what it adds to prediction of the dependent variable over the predictions of the other independent variables (Tabachnick and Fidell, 1989). Results of regression analyses are reported in Table 3.

Dependent Variable	Independent Variable	Std. Beta	t	Sig.
Evaluation item 1: Message is completely broadcast/interpersonal Model adj. R^2 = .12	Anticipated feedback	.254	2.09	.040
	Message coherence	.159	1.26	.214
	Social presence	.080	0.60	.549
Evaluation item 2: Message is more like my broadcast/interpersonal message example Model adj. R^2 = .25	Anticipated feedback	.082	0.72	.469
	Message coherence	.380	3.23	.002
	Social presence	.162	1.31	.194
Behavioral intention scale Model adj. R^2 = .36	Anticipated feedback	-.092	-0.89	.376
	Message coherence	.509	4.69	<.0001
	Social presence	.220	1.93	.057

Table 3. Multiple regression analyses.

Evaluation items 1 and 2 were both predicted significantly by one aspect of interpersonality. Item 1, "In my view, this message is: (Completely a Broadcast Message / Completely an Interpersonal Message)," was predicted by anticipated feedback (t = 2.09, p = .040). Item 2, "When I think about the two request message examples I described earlier, this message is: (More like my Broadcast example / More like my Interpersonal example)," was predicted by message coherence (t = 3.23, p = .002). These findings support Hypothesis 2a. Behavioral intention was predicted by message coherence (t = 4.69, p < .0001), supporting Hypothesis 2b.

Social presence did not predict any of the dependent variables at the .05 alpha level. This finding supports Hypotheses 3a and 3b and suggests that interpersonality is a potent predictor of message evaluation and message effects relative to social presence.

DISCUSSION AND CONCLUSION

The findings generally support the decision to study interpersonality using a message-within-medium approach. The interpersonality scales of anticipated feedback and message coherence that were created are distinct from one another and from the social presence scale. The interpersonality scales provided significant predictions of evaluation and effects of the CMC message, and these predictions outweigh those of social presence. Researchers will benefit both from the availability of new measurement scales and the alternative message-within-medium approach that was applied in this study.

The findings also raise several questions which can provide directions for future research. First, anticipated feedback and message coherence vary substantially in assessing the CMC message relative to interpersonal and broadcast messages (see Figure 2). Potentially this is a strength of using two scales, as both provided significant predictions of dependent variables in the study. In order to test this proposition, however, it will be necessary to conduct new research with multiple CMC message treatments that can assess how these scales range in their predictions.

Second, anticipated feedback and message coherence predict different aspects of evaluation, and only message coherence directly predicts behavioral intention. Anticipated feedback significantly predicts evaluation of the CMC message using *conceptual* standards, i.e. "completely a broadcast message" vs. "completely an interpersonal message." Message coherence predicts the comparison of the CMC message using *personal* standards, i.e. "more like my broadcast example" vs. "more like my interpersonal example." Although anticipated feedback is predictive of conceptual standards, it does not directly predict behavioral intention. This suggests that a possible mediating relationship exists in which conceptual standards are mediated by personal standards. As a follow-up test for such a relationship, AMOS 4 software (Arbuckle and Wothke, 1999) was used to develop and test structural equation models representing all possible mediated and direct relationships of anticipated feedback and message coherence on behavioral intention. Satisfactory model fit was found only for the model shown in

Figure 3. In this mediated model of interpersonality, effects of anticipated feedback are mediated by message coherence. While this modeling is logically consistent, in that anticipation of future feedback may be expected to increase perceptions of a message's relevance and personal fit, additional research with new data will be necessary to test the model rigorously.

Third, only a very limited set of dependent variables were addressed by this research. It is possible that the message-within-medium approach will be useful in predicting media choice and media effects beyond compliance. However, it will be necessary to develop an expanded research design to include these additional measures.
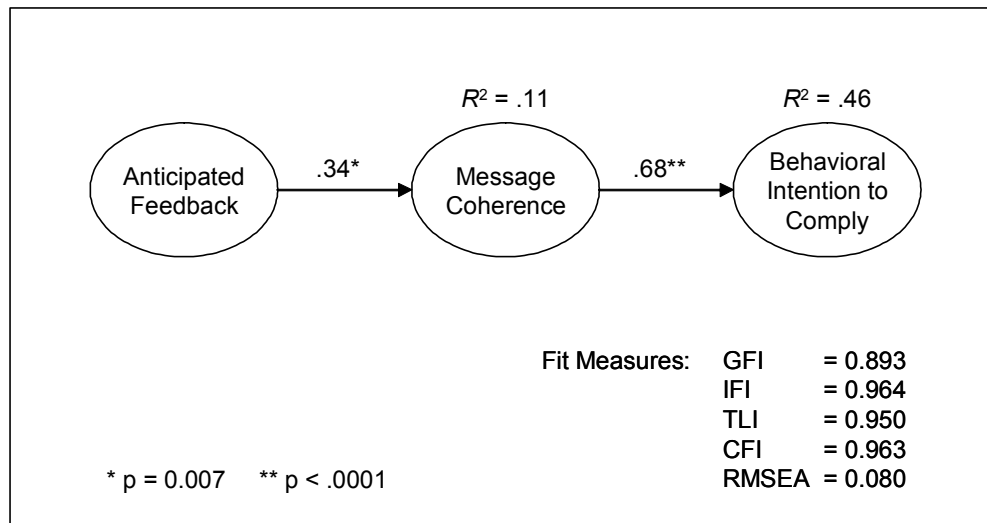

Figure 3. A mediated model of interpersonality.

Conclusion

This initial study of interpersonality in CMC messages produced several interesting findings, including a mediated model of interpersonality that could prove instrumental in understanding compliance behavior in CMC. Yet it is clear that further research in this area must be undertaken to ensure that the findings from this study are not artifacts of the limited research design and to develop products, such as guidelines to help practitioners manage CMC more effectively.

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