

Computer-mediated communication (CMC) and social support: Testing the effects of using CMC on support outcomes

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Abstract

Despite the growth in research examining the use of computer-mediated communication (CMC) for exchanging social support, there remains much to learn about the support-related implications of CMC. An experiment was conducted to examine the influence of the reduced social cues associated with CMC on the outcomes of supportive interaction. Participants discussed a stressor with a confederate either face-to-face or via CMC and received informational or emotional support. Although they received the exact same support messages, participants in the CMC condition reported significantly greater worry and uncertainty discrepancy following the interaction than participants in the face-to-face condition. A main effect was also found for support message type. Consistent with the optimal matching model, informational support led to more beneficial outcomes than emotional support in response to the (controllable) stressor experienced by participants.

Keywords

Computer-mediated communication, hyperpersonal communication, Internet, online support, social support

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Social support is widely accepted to play an important role in one's ability to cope with a range of stressors from mundane aspects of everyday existence to significant life events (Goldsmith, 2004; Uchino, 2004). Although face-to-face communication continues to be a central context for supportive interaction, national surveys suggest that various forms of computer-mediated communication (CMC) are routinely used for acquiring and sharing support. A survey conducted by the National Cancer Institute (2012) indicated that almost 5% of all adult American Internet users—approximately 7.5 million people—visited a health-related online support community during 2012. Support related uses of CMC have been increasingly considered by scholars examining online communities (Malik & Coulson, 2008), blogs (Rains & Keating, 2011), social network sites (Wright, Rosenberg, Egbert, Ploeger, & Bernard, 2012), e-mail (Turner et al., 2013), and other technologies.

Despite the increased attention computer-mediated support has received from scholars, several important questions remain unanswered. One overarching set of questions involve the implications that the reduction in social cues associated with CMC have for support outcomes. Supportive interactions in CMC are unique in that they typically consist of text-based exchanges in which social cues often present in face-to-face conversations (e.g., facial expressions, eye contact, etc.) are reduced or absent. Walther and Parks (2002, p. 545) identified the reduction in social cues as one of two “structural aspects of social support” that are “fundamentally changed” by CMC. To date, however, relatively little research has been conducted to isolate the unique effects of this reduction in social cues on the outcomes of supportive interaction. Is a support message shared in CMC any more or less effective in ameliorating a stressor than when it is shared in face-to-face interaction? Are support providers perceived any differently in face-to-face and CMC interactions?

An experiment was conducted to examine the effects of the reduced social cues associated with CMC on support outcomes involving the degree to which support messages mitigate a stressor and influence perceptions of the support provider. The hyperpersonal communication model (Walther, 1996) and cues-filtered-out perspective (Culnan & Markus, 1987) were used to make and test competing predictions about CMC. Additionally, the optimal matching model (Cutrona, 1990) was incorporated to examine the implications of specific types of support messages. The results of this project contribute to research on social support and CMC by making it possible to better understand the implications of the reduction in social cues during supportive interactions and, as a result, advance efforts to explain and predict the uses and effects of CMC for social support.

CMC and social support

Social support is an umbrella term referring to several distinct but interrelated constructs (for a review, see MacGeorge, Feng, & Burleson, 2011). This project focused on enacted support (i.e., behaviors performed in communicating support; Goldsmith, 2004) and, in particular, the outcomes of supportive interactions. In this context, social support can be defined as communication that helps to manage uncertainty and foster a sense of control in one's life (Goldsmith & Albrecht, 2011). One way in which social support is thought

to function is by serving as a buffer between a stressor and stress response (Lakey & Cohen, 2000). Individuals facing a challenging situation may attempt to acquire advice or comfort in an effort to cope with the challenge or its consequences. Indeed, enacted support has been linked with several positive outcomes ranging from coping more effectively with uncertainty (Brashers, Neidig, & Goldsmith, 2004) or the affective consequences of a stressor (Jones, 2004) to greater perceptions of self-efficacy (Feeney & Collins, 2014). The quality of enacted support has also been shown to influence recipients' perceptions of support providers (Jones, 2004). Sex differences in provider perceptions and support outcomes have been observed in CMC (High & Solomon, 2014; Spottswood, Walther, Holmstrom, & Ellison, 2013).

Research examining computer-mediated support has largely focused on explaining why people choose to use CMC for exchanging support (Tanis, 2008; Walther & Boyd, 2002; Wright, 2002) and identifying the types of support messages shared online (Rains, Peterson, & Wright, 2015). Although less plentiful, there is also evidence to suggest that support received or available in computer-mediated contexts can be a valuable coping resource (Rains & Keating, 2011; Turner et al., 2013). Within this body of research, CMC is typically a constant in that a cross-section of users from one form of CMC is sampled at a single point (e.g., Rains & Keating, 2011) or multiple points (e.g., Turner et al., 2013) in time. Moreover, despite their value in addressing other issues, the few studies that have explicitly compared the outcomes of supportive interaction in CMC to face-to-face communication failed to effectively isolate the effects of CMC.

For example, Lewandowski, Rosenberg, Parks, and Siegel (2011) conducted a cross-sectional study and found that military personnel who reported primarily using CMC for acquiring social support about a disruptive life event indicated feeling greater levels of disruption relative to personnel who indicated primarily communicating face-to-face. High and Solomon (2014) found that, 3 weeks after completing an experiment in which they discussed one of several possible stressors with a confederate, women who received low person-centered support in the CMC condition reported significantly less improvement in their stressor than did women receiving low person-centered support face-to-face. In another cross-sectional study, Cook and Doyle (2002) found that patients who used CMC to communicate with their counselor reported more effective interactions than patients communicating face-to-face. Yet, because the discussion topics and support messages varied within the CMC and face-to-face conditions in all of the preceding projects, it is impossible to isolate the effects of using CMC on support outcomes. The (lack of) improvement in the CMC conditions relative to face-to-face may be an artifact of participants' greater willingness to discuss significant stressors via CMC (Caplan & Turner, 2007; Wright & Bell, 2003). Nonetheless, the results from these three studies underscore the importance of examining the role of CMC in supportive interactions.

The influence of CMC on support outcomes

One factor that makes CMC unique is the reduction in social cues relative to face-to-face interaction (Caplan & Turner, 2007; Rains & Young, 2009; Tanis, 2008; Walther &

Parks, 2002; Wright & Bell, 2003). This reduction in social cues is particularly critical, given the setting in which several popular forms of CMC are used for support. Although it is possible to routinely communicate with well-known others (e.g., Turner et al., 2013), one-time interactions often take place in online discussion communities and blogs among individuals who have never met and will not interact in the future. Informal social support communities, for example, typically have open membership in which an unlimited number of individuals can come and go as they please (Rains & Young, 2009). Indeed, several studies have shown that online communities are marked by a large volume of individuals who participate infrequently or only a single time (Jones, Ravid, & Rafaeli, 2004; Joyce & Kraut, 2006).

There is widespread agreement that the reduction in social cues *could have* important implications for supportive interactions in CMC (Caplan & Turner, 2007; Rains & Young, 2009; Tanis, 2008; Walther & Parks, 2002; Wright & Bell, 2003). Yet, advancing research on this topic requires conducting empirical tests to answer basic questions about what effects the reduced social cues associated with using CMC *actually have* on support processes and outcomes. One critical question, which is pursued in this project, involves whether support messages shared in CMC have the same effects on recipients' perceptions of a support provider and responses to a stressor as in face-to-face interaction. The existing literature on CMC and supportive communication suggests two distinct possibilities.

First, there is reason to believe that the reduced social cues associated with CMC might benefit supportive interactions—particularly those that are infrequent or one-time. The hyperpersonal communication model (Walther, 1996), which has been considered in the context of supportive interaction (Caplan & Turner, 2007; Walther & Boyd, 2002; Wright & Bell, 2003), outlines a process resulting in communication “that is more socially desirable than we tend to experience in parallel [face-to-face] interactions” (Walther, 1996, p. 17). Two components of the hyperpersonal model are particularly germane to explaining the influence of using CMC on the outcomes of supportive interaction. The reduced social cues associated with CMC create opportunities for selective self-presentation that may serve to mitigate self-presentation concerns and allow individuals to give greater attention to message construction (Walther & Boyd, 2002; Wright & Bell, 2003). Support seekers may feel less self-conscious and more comfortable sharing as “CMC may be more effective than [face-to-face] communication at fostering [a] comfortable and non-threatening conversational environment” (Caplan & Turner, 2007, p. 991). This more comfortable communication environment could facilitate individuals' efforts to cope with their stressor and, as a result, allow them to better manage their uncertainty as well as feel less worry and greater self-efficacy relative to a face-to-face interaction.

CMC may also lead support seekers to construct idealized perceptions of support providers (Walther & Boyd, 2002; Wright & Bell, 2003). The hyperpersonal model (Walther, 1996) proposes that individuals respond to the reduced social cues in CMC by making idealized inferences about their interaction partners. Given the nature of supportive interactions in which support providers are attempting to be empathetic and offering encouragement and advice, receivers may develop inflated perceptions of the degree to which providers are caring or knowledgeable. The reduced social cues

associated with CMC may ultimately result in receivers developing an exaggerated sense of being supported by providers (Wright & Bell, 2003).

A second set of support outcomes stemming from the reduced social cues associated with CMC are also possible. The reduced social cues may undermine the benefits of supportive interactions, particularly those that are one-time or occur infrequently. The cues-filtered-out perspective (Culnan & Markus, 1987) is rooted in the idea that the reduction in social cues stemming from CMC inhibits socio-emotional messages and the development of personal relationships (Kiesler, Siegel, & McGuire, 1984). In the context of social support, the cues-filtered-out perspective suggests that the reduction in social cues could serve to encourage more impersonal interactions (White & Dorman, 2001) and make the process of exchanging support more difficult (Lewandowski et al., 2011; Wright & Bell, 2003). In at least three studies inquiring about the limitations of CMC from the perspective of online support community members, the reduced social cues were identified as a prominent limitation because they were perceived to foster misunderstandings and/or a sense of interpersonal distance (Colvin, Chenoweth, Bold, & Harding, 2004; Malik & Coulson, 2008; Wright, 2002). Not being able to hear the tone of support providers' voices or see their facial expressions may make attempts at support provision appear more ambiguous or less heartfelt and, ultimately, could impact recipients' perceptions that support providers are caring and knowledgeable.

It is also possible that the reduced social cues might encourage support seekers to become more attuned to the stressor they are experiencing. Unlike in a face-to-face interaction where affect can be communicated nonverbally, it must be documented in CMC in order to acquire support. The necessity of translating the whole of one's experience related to a stressor into written discourse might serve to increase the salience of the stressor. Moreover, the opportunity to dedicate greater resources to message construction afforded by CMC (Caplan & Turner, 2007; Walther & Boyd, 2002; Wright & Bell, 2003) might similarly encourage support seekers to become more immersed in the stressor. Prior research suggests that CMC can increase one's private self-awareness (Matheson & Zanna, 1988; Sassenberg, Boos, & Rabung, 2005), which has been linked with both a greater awareness of one's internal states (Scheier, Carver, & Gibbons, 1979) and increased self-focused behavior such as self-disclosure (Joinson, 2001). This greater attention to the stressor may serve to increase support seekers' worry about it and undermine their ability to effectively manage uncertainty as well as their perceptions of self-efficacy to cope with the stressor.

Taken as a whole, the existing literature on social support and CMC suggests that the reduced social cues associated with CMC could have two dramatically different effects on the outcomes of supportive interaction. Whereas the hyperpersonal model (Walther, 1996) suggests that support shared in CMC would produce more positive outcomes than when communicated face-to-face, the cues-filtered-out perspective (Culnan & Markus, 1987) implies that support communicated in CMC will be less effective. Given these competing perspectives and the relative lack of experimental research examining the effects of CMC on supportive interactions, two competing hypotheses are proposed. Two sets of outcomes are considered in this project involving perceptions of a support provider as well as the impact of a stressor. To evaluate the perceptions of a support provider, we assessed the degree to which the support provider was perceived to be

competent, caring, and liked. The former two variables represent underlying qualities of an effective resource for informational and emotional support (MacGeorge, Feng, & Thompson, 2008; Samter, Burleson, & Murphy, 1987) and the latter variable offers a more global evaluation of the support provider. Three variables were used to examine the effects of the supportive interaction on responses to the stressor being experienced, including the support recipient's self-efficacy, worry, and uncertainty discrepancy (i.e., degree to which one's actual uncertainty exceeds one's desired level of uncertainty) regarding the stressor. Because supportive communication involves exchanges that help to manage uncertainty and foster control in one's life (Goldsmith & Albrecht, 2011), these three variables offer useful indicators of the degree to which support messages ameliorate a stressor.

Hypothesis 1 (hyperpersonal perspective): Social support messages communicated using CMC will lead to more positive (a) perceptions of a support provider and (b) responses to a stressor than support messages communicated face-to-face.

Hypothesis 2 (cues-filtered-out perspective): Social support messages communicated using CMC will lead to more negative (a) perceptions of a support provider and (b) responses to a stressor than support messages communicated face-to-face.

Support message type and optimal matching

In examining the influence of using CMC on the outcomes of supportive interaction, it is also important to consider the nature of support messages and when specific types of support may be more or less beneficial. The optimal matching model (Cutrona, 1990; Cutrona & Russell, 1990) is founded on the assumption that social support is a multidimensional construct. Several different types of support exist, and the effectiveness of any particular type of support message depends upon the nature of the stressor one faces. One important characteristic of stressors is their controllability. Events are controllable when they can be prevented or their negative consequences can be reduced or completely mitigated.

For controllable events, which served as the focus of this study, informational support can be particularly beneficial (Cutrona, 1990; Cutrona & Russell, 1990). This type of support includes advice and feedback regarding one's situation or behavior (Cutrona & Suhr, 1992). Informational support is valuable in situations that are controllable because it is action facilitating in that it helps foster problem-focused coping. Emotional support, which takes the form of empathy and encouragement, is less optimal in controllable situations (Cutrona, 1990; Cutrona & Russell, 1990)—though it still can have some benefits. Emotional support is proposed to be relatively more helpful in situations in which a stressor is less controllable. Although the optimal matching model has been critiqued (MacGeorge et al., 2011), several recent studies have reported evidence that matching the type of support with the nature of a stressor can influence one's ability to cope with the stressor and perceptions of the support provider (Cutrona, Shaffer, Wesner,

& Gardner, 2007; Seawell, Cutrona, & Russell, 2014). Additionally, there is evidence to suggest that support matching occurs in CMC (Rains et al., 2015).

In the context of a relatively controllable stressor, the optimal matching model (Cutrona, 1990; Cutrona & Russell, 1990) predicts that informational support should be more effective than emotional support in ameliorating the effects of the stressor and fostering more positive perceptions of the support provider. Relative to providing consolation and understanding as may occur in emotional support messages, the action-facilitating nature of informational support messages should have a more beneficial impact (Cutrona, 1990; Cutrona & Russell, 1990). Accordingly, receiving informational support is hypothesized to foster a less negative reaction to a stressor and result in more positive perceptions of a support provider than receiving emotional support. The dependent measures used for the previous hypotheses were again employed in testing this hypothesis.

Hypothesis 3: Informational support messages result in (a) more positive perceptions of a support provider and (b) less negative reactions to a stressor than emotional support messages.

Finally, the specific support messages shared are important to consider because a joint effect is possible between support message type and communication medium for support outcomes (e.g., High & Solomon, 2014). It is possible that the effects of using CMC on the outcomes of a supportive interaction may depend on the match between a supportive message and stressor. When the type of support message matches the nature of the stressor, CMC might serve to intensify the positive outcomes of matching. In matching the needs of a support seeker facing a controllable stressor (which was examined in this study), informational support shared via CMC may fuel the hyperpersonal process by offering evidence to allow receivers to make exceedingly idealized attributions about the provider and support that ultimately lead to more positive outcomes relative to matching during face-to-face interaction. Similarly, when there is a mismatch between the nature of the stressor and support message, CMC should exacerbate the negative outcomes compared to face-to-face interaction. The cues-filtered-out perspective may dominate as the relative inefficacy of emotional support in response to a controllable stressor is magnified in CMC. Support recipients may feel particularly misunderstood by the support provider and the support could fail to help ameliorate the stressor. The following research question is proposed to examine this possibility.

Research Question 1: Does support message type (informational/emotional) moderate the effect of the communication medium (CMC/face-to-face) on (a) perceptions of a support provider and (b) responses to a stressor?

Method

An experiment was conducted to test the effects of support type and communication medium on the outcomes of a supportive interaction. Because social support is thought to buffer the effects of a stressor (Lahey & Cohen, 2000), the experiment involved making a

relevant stressor salient to participants and then providing them with one of the two types of support either face-to-face or via CMC. This project followed the form of previous experimental research examining the effects of supportive communication by holding constant the stressor and support messages received by participants (e.g., Collins & Feeney, 2004). Such an approach was critical to isolate potential differences in the outcomes of receiving support in CMC and face-to-face interaction. The topic selected for the experiment involved finding a full-time job after graduation. A pilot study offered evidence that this topic was perceived by undergraduate students to be a reasonably controllable stressor. Two hundred and nine undergraduate students from the same population as the sample for the experiment rated the degree to which they felt at least some control over whether or not they acquired a full-time job after graduation on a 7-point scale (1 = *strongly disagree* and 7 = *strongly agree*). The mean score ($M = 5.96$; $SD = 1.16$) was significantly greater than the scale midpoint, $t(208) = 24.44$, $p < .001$, indicating that finding a full-time job was at least a somewhat controllable stressor among this group.

Participants

Of the 82 participants who completed the experiment, 59% ($n = 48$) were female and the mean age was 21.61 years ($SD = 3.22$). Participants reported a mean of 1.96 semesters ($SD = 1.21$) remaining until their graduation. Approximately 60% of the participants were within two semesters of their expected graduation date, and 95% were within three semesters of graduation.

Design

A 2×2 between-participants design was used in the experiment. Communication medium (face-to-face/CMC) and social support message type (emotional/information) served as the independent variables. Participants were randomly assigned to one of the four conditions.

Procedure and materials

Participants were greeted at the lab by a research assistant (RA1) and informed that they would be completing an interview so that the researchers could learn more about undergraduate students' preparation for acquiring a full-time job after graduation. This approach was used as a means to (a) make the stressor salient by asking participants to discuss aspects of acquiring a job about which they felt uncertain and a lack of control and (b) create a situation where social support would be appropriate. A RA2 conducted the interview. Given sex differences observed in research examining support outcomes and perceptions of providers in CMC (High & Solomon, 2014; Spottswood, et al., 2013), sex was held constant in this study. In all conditions, RA2 was the same sex as the participant. RA2 was presented as an undergraduate student who was very close to graduation and working as an RA for the lead author of this manuscript. In order to account for the greater amount of time it takes to type than to speak, no time limit was placed on the interviews.

Communication medium was manipulated by conducting the interviews face-to-face or via CMC using instant messaging. In CMC condition, participants were seated at a computer terminal with an instant messaging program open and informed that they would be using it to interact with RA2. To ensure that participants were aware that RA2 was their same sex, the messages sent by RA2 were explicitly labeled as being from “Michael/Michelle” (depending on the sex of participants). In the face-to-face condition, participants were seated at small table across from RA2 in the lab. RA2 was introduced as Michael/Michelle (and, as previously noted, was the same sex as participants).

In all conditions, the interviews followed the same format. The interview consisted of a series of eight questions that were designed to make the stressor of acquiring a full-time job after graduation salient and to ensure that virtually all participants would discuss a similar aspect of the stressor. This approach made it possible to construct support messages that would be reasonable responses to almost any issue raised by participants in answering a particular question. Social support message type was manipulated in RA2’s responses to participants’ interview question answers. After participants responded to an interview question, RA2 then offered informational or emotional support (depending on the condition). Each interview question was accompanied by a specific response from RA2 containing emotional or informational support. All RAs had memorized the script and received training to ensure that they delivered it naturally.

Following Goldsmith and Albrecht’s (2011) conceptual definition of social support, the support messages shared in this study served in an effort to help participants manage their uncertainty and feel a greater sense of control over their preparation and ability to acquire a job after graduation. The emotional and informational support messages were developed using Cutrona and Suhr’s (1992) social support behavior code (SSBC) framework. The SSBC identifies objective features of different types of support messages and, thus, offers a template for constructing informational and emotional support. Emotional support messages consisted of statements expressing empathy, encouragement, and understanding, whereas informational support included advice and recommendations. The informational and emotional support messages were designed to be flexible in that they would be applicable to almost any response participants might give to a particular question.

The emotional support script totaled 109 words and the informational support script totaled 114 words. The full interview scripts are available by contacting the lead author. Sample questions and supportive feedback from the interview include the following:

Question: Let’s start by talking about job-seeking broadly. Although the economy is recovering, unemployment is still an issue in our country and the number of jobs available is still relatively low. How do these broader uncertainties in the job market make you feel about finding a *career*—and not just any old job—after graduation?

Emotional support: I completely get where you’re coming from on this issue.

Informational support: I think that trying to be flexible can be really helpful.

Question: Other than any prior work experience, what makes you a better candidate than other job seekers competing for these same limited opportunities?

Emotional support: That sounds like an encouraging start. I would feel good having that foundation.

Informational support: There are also online assessment tools to help further isolate your unique strengths.

Once participants in all conditions finished the interview, RA1 returned and guided them to a (second) computer station where they were asked to complete an online questionnaire containing measures of the dependent variables.

Measures

Three measures were used to evaluate participants' responses to the stressor (i.e., self-efficacy, worry, and uncertainty discrepancy) and three measures were used to evaluate their perceptions of the support provider (i.e., caring, knowledgeability, and liking). Unless otherwise noted, all items were rated on 7-point scales with larger values indicating more of a variable. The means and standard deviations for the dependent measures across the four experimental conditions are reported in Table 1.

Self-efficacy. Participants' perceptions of self-efficacy in regard to acquiring a full-time job after graduation were evaluated using 8 items from Solberg et al.'s (1994) career search self-efficacy measure. Two items were selected from each of the four dimensions representing one's efficacy for interviewing, networking, searching for job opportunities, and engaging in personal exploration ($\alpha = .84$).

Worry. Participants' amount of worry about the stressor was measured using 4 items originally developed by Folkman and Lazarus (1985). Participants were asked to rate the degree to which they felt the following emotions when they thought about the process of trying to find a full-time job after graduation: worried, fearful, anxious, and nervous. These 4 items were rated on an 8-point scale; larger values indicate more worry ($\alpha = .90$).

Uncertainty discrepancy. Participants' uncertainty discrepancy was measured using 2 items (Afifi & Weiner, 2006). Participants rated how uncertain they currently felt (i.e., actual uncertainty) about trying to find a full-time job after graduation and how uncertain they would prefer to have felt (i.e., desired uncertainty). Actual uncertainty was subtracted from desired uncertainty to create an uncertainty discrepancy score; negative values indicate that participants felt more uncertain than they desired about acquiring a job.

Caring. The measure of caring was created for this study and included 2 items. Participants rated the degree to which they perceived that the interviewer cared about them and was interested in their wellbeing ($\alpha = .78$).

Table 1. Means (and standard deviations) for the dependent variables across all conditions.

	Informational support				Emotional support			
	CMC <i>n</i> = 19		Face-to-face <i>n</i> = 20		CMC <i>n</i> = 22		Face-to-face <i>n</i> = 20	
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)
Responses to the stressor								
Worry	5.45	(1.65)	4.63	(2.00)	5.73	(1.24)	5.74	(1.66)
Uncertainty discrepancy	-1.84	(2.59)	-0.80	(1.70)	-2.73	(2.16)	-2.10	(2.15)
Self-efficacy	4.96	(0.97)	5.21	(1.09)	5.32	(0.84)	5.24	(0.87)
Perceptions of the support provider								
Caring	4.34	(0.91)	3.83	(1.08)	4.14	(1.26)	4.35	(1.08)
Knowledgeable	4.95	(0.91)	5.33	(0.91)	4.89	(0.84)	5.23	(1.25)
Liking	3.58	(1.17)	3.35	(0.93)	3.55	(0.96)	3.90	(1.13)

Knowledgeable. Participants' perceptions of the degree to which the interviewer was knowledgeable also consisted of 2 items that were developed for this study. Participants rated the degree to which they felt that, relative to all other college students who were about to graduate, the interviewer would find full-time work and was knowledgeable about finding full-time work after graduation ($\alpha = .81$).

Liking. Two items from Rubin's (1970) measure of liking were used to evaluate liking. Participants rated the degree to which they felt that the interviewer was one of the most likeable people they know and was the sort of person whom they would like to be ($\alpha = .65$).

Manipulation checks. Two, 2-item measures were constructed for this study to evaluate the effectiveness of the communication medium and support message manipulations. Participants reported their agreement that they completed the interview using instant messaging or face-to-face. Responses to the latter item were reverse scored and the mean of the 2 items was computed and used as the communication medium manipulation check measure ($\alpha = .99$). Participants also reported their agreement with statements indicating that the interviewer's feedback was mostly specific advice for getting a job or contained some specific things participants could do in terms of finding a job. The mean was computed for the two items to create the support type manipulation check measure ($\alpha = .92$).

Control variable. As previously noted, sex differences have been observed in research examining support outcomes and perceptions of support providers in CMC (High & Solomon, 2014; Spottswood et al., 2013). Accordingly, participants in all conditions were assigned to complete the experimental interaction with a confederate who was their same sex. In order to account for any potential effects stemming from the sex of the dyad that might serve to unduly influence the results, this factor was included as a control variable in the analyses (male/male $n = 34$; female/female $n = 48$).

Results

Preliminary analyses

Manipulation checks were conducted to evaluate the communication medium and social support type manipulations. A two-way analysis of variance showed that participants in the CMC condition were more likely to report completing the interview via instant messaging ($M = 6.77$, $SD = 0.63$) than participants in the face-to-face condition ($M = 1.17$, $SD = 0.55$), $F(1, 78) = 1778.67$, $p < .01$, $\eta^2 = .96$. Participants in the informational support condition were more likely to report that the interviewer's feedback consisted of informational support ($M = 5.77$, $SD = 0.81$) than participants in the emotional support condition ($M = 2.70$, $SD = 1.53$), $F(1, 78) = 122.53$, $p < .01$, $\eta^2 = .61$. There were no other main or interaction effects for either of the two manipulation check measures.

Several additional analyses were conducted to further demonstrate that the manipulations were effective. There were no significant differences between the communication medium conditions or support message conditions (nor any two-way interactions) for participants' ratings of their motivation or ability to receive social support or their self-esteem. On average, participants spoke or wrote 440 words during the interaction. The difference in the number of words uttered by participants in the face-to-face ($M = 484.88$, $SD = 205.54$) and CMC ($M = 395.66$, $SD = 200.06$) conditions was not statistically significant. Moreover, there was no main effect for support message type on words uttered by participants nor an interaction between communication medium and support type. These results, along with the manipulation checks, indicate that the communication medium and support type manipulations were effective.

Main analyses

Two-way analyses of covariance (ANCOVAs) were used to test the hypotheses and answer the research question. Communication medium and support type were the independent variables and dyad sex served as the covariate. As previously noted, means and standard deviations for all dependent measures across the four conditions are reported in Table 1.

The effects of CMC and face-to-face interaction. Hypotheses 1 and 2 made competing predictions about differences between CMC and face-to-face supportive interactions in participants' perceptions of a support provider and responses to a stressor. The results of the ANCOVAs were largely consistent with Hypothesis 2b and indicated that social support was less effective in ameliorating the stressor during CMC. Participants in the CMC condition reported a significantly greater uncertainty discrepancy than participants in the face-to-face condition, $F(1,80) = 4.60$, $p = .04$, $\eta^2 = .05$. Additionally, participants in the CMC condition were more worried about finding a job at the conclusion of the interaction than participants in the face-to-face condition, $F(1,80) = 4.18$, $p = .04$, $\eta^2 = .05$. There was no difference between the two conditions in participants' self-efficacy, $F(1,80) = 2.38$, $p = .13$, $\eta^2 = .03$.

The communication medium did not influence participants' perceptions of the support provider. There were no differences between the CMC and face-to-face conditions

in participants' perceptions that the support provider was caring, $F(1,80) = 0.25, p = .62, \eta^2 < .01$, or knowledgeable, $F(1,80) = 1.73, p = .19, \eta^2 = .02$, nor the degree to which they liked the provider, $F(1,80) = 0.11, p = .75, \eta^2 < .01$. Neither Hypothesis 1a nor Hypothesis 2a was supported.

The effect of informational and emotional support. Hypothesis 3 predicted that informational support would produce (a) more positive perceptions of a support provider and (b) less negative reactions to a stressor than emotional support. The results of the ANCOVAs offer some evidence consistent with Hypothesis 3b. Participants who received informational support experienced a significantly smaller uncertainty discrepancy after the interview than did participants who received emotional support, $F(1,80) = 5.08, p = .03, \eta^2 = .06$. Relative to participants receiving emotional support, those who received informational support reported being more comfortable with their level of uncertainty about acquiring a job after graduation. The means were in the predicted direction for participants' level of worry about finding a full-time job, but the difference between the two groups did not reach the conventional criterion for statistical significance, $F(1,80) = 3.72, p = .057, \eta^2 = .04$. There was no difference in participants' perceptions of self-efficacy, $F(1,80) = 1.11, p = .30, \eta^2 = .01$. Support message type also did not influence participants' perceptions that the provider was caring, $F(1,80) = 0.43, p = .51, \eta^2 = .01$, or knowledgeable, $F(1,80) = 0.14, p = .71, \eta^2 < .01$, nor the degree to which they liked the provider, $F(1,80) = 1.22, p = .27, \eta^2 = .02$. Hypothesis 3a was not supported.

The joint effects of support type and communication medium. Research Question 1 asked whether support message type moderates the influence of the communication medium on (a) perceptions of a support provider and (b) responses to a stressor. The interaction between communication medium and support message type was not significant for participants' feelings of worry, $F(1,80) = 0.35, p = .56, \eta^2 < .01$, uncertainty discrepancy, $F(1,80) = 0.02, p = .90, \eta^2 < .01$, self-efficacy, $F(1,80) = 0.01, p = .92, \eta^2 < .01$, nor the degree to which they liked the support provider, $F(1,80) = 1.59, p = .21, \eta^2 = .02$, or perceived the provider to be caring, $F(1,80) = 2.29, p = .13, \eta^2 = .03$, or knowledgeable, $F(1,80) = 0.05, p = .82, \eta^2 < .01$.

Discussion

Despite the millions of adults who are estimated to rely on computer-mediated support from peers (National Cancer Institute, 2012) and claims about the unique implications of CMC for supportive interaction (Caplan & Turner, 2007; Tanis, 2008; Walther & Parks, 2002; Wright & Bell, 2003), relatively little research has been conducted to examine the effects of CMC relative to face-to-face interaction. As such, this project was driven by basic questions about how the reduced social cues associated with CMC impact support outcomes—involving perceptions of the support provider and the degree to which a stressor is ameliorated. Relative to the face-to-face condition, there was some evidence that participants in the CMC condition benefitted less from the supportive interaction. Participants who received support via CMC reported significantly greater worry and were more uncomfortable with their uncertainty about finding a full-time job after

graduation. These differences, however, did not extend to participants' feelings of self-efficacy nor their perceptions of the support provider.

The results of this study were generally more consistent with the cues-filtered-out perspective than what might be predicted by the hyperpersonal model. Social support was less beneficial in helping participants cope with the worry and uncertainty about their stressor in the CMC condition than face-to-face. These findings match the results of two prior studies that compared the use of CMC and face-to-face for supportive interactions (High & Solomon, 2014; Lewandowski et al., 2011). However, the present study is the only one that made it possible to isolate the effects of CMC. Because the nature of the stressor and the support messages were constants (within the face-to-face and CMC conditions), the results of this study cannot be an artifact of these factors. Despite being exactly the same, the support messages were less effective in ameliorating some aspects of the stressor when communicated using CMC than face-to-face.

The results of this project also advance research by suggesting a possible explanation about why CMC was less effective. It appears that the effects of CMC did not result from participants' perceptions of the intentions or abilities of the support provider. There were no differences in perceptions of the support provider between the face-to-face and CMC conditions. Instead, the results suggest that the differences between CMC and face-to-face may stem from the interaction context. It is possible that the reduced social cues in CMC may have allowed the stressor to become more salient to participants. Researchers have argued and shown that using CMC can encourage greater private self-awareness (Matheson & Zanna, 1988; Sassenberg et al., 2005), which is one factor that can lead people to become more attuned to their internal states (Scheier et al., 1979). Using CMC may have served to heighten participants' private self-awareness and thereby their attention to the stressor discussed during the interaction. Participants could have considered more extensively the significant challenges they faced in acquiring a full-time job after graduation, the consequences of not acquiring a job, their feelings about job seeking, as well as several other issues. This heightened focus on the stressor could be responsible for participants in the CMC condition reporting greater levels of worry and being less comfortable with their uncertainty about the stressor. Another possibility is that the reduction in social cues in CMC may have allowed participants to engage in greater levels of rumination about finding employment than in the face-to-face condition. Rumination has been linked with both uncertainty (Ward, Lyubomirsky, Sousa, & Nolen-Hoeksema, 2003) and worry (Fresco, Frankel, Mennin, Turk, & Heimberg, 2002) in prior research. Both of these possibilities could make more immediate participants' concerns related to finding a full-time job. Because their concerns with the stressor were intensified, the support received by participants in the CMC condition—despite being exactly the same messages as in the face-to-face condition—could have been less effective in ameliorating their worry and uncertainty about the stressor.

Considering the volume of individuals who venture online in search of social support (National Cancer Institute, 2012), the findings from this study have meaningful practical implications. Given the likelihood—particularly in the context of informal online support communities—that support seekers routinely engage in one-time interactions with specific others (Jones et al., 2004; Joyce & Kraut, 2006), the results of this project raise the possibility that supportive interactions under such conditions could be suboptimal.

To be clear, the findings do not offer evidence that the support messages were wholly ineffective in CMC, and the effect sizes for the main effect of CMC were modest. Over time, however, such suboptimal interactions could lead individuals to discontinue their efforts to acquire support using CMC. The findings also raise questions that might be explored in future research about if and how people adapt to the reduced social cues in CMC during supportive interactions. One possibility is through matching the language style of specific support seekers (Rains, 2015). Emoticons or other paralinguistic cues could be additional means for communicating support in CMC (Ledbetter, 2009).

Support messages and optimal matching

The results of this study also offer some evidence consistent with the optimal matching model (Cutrona, 1990; Cutrona & Russell, 1990). Participants who received informational support reported a significantly smaller uncertainty discrepancy than participants who received emotional support. Although they still felt greater uncertainty than they desired about finding a job after graduation, informational support resulted in a smaller amount of discrepancy than did emotional support. The results for worry followed the same trend but did not meet the conventional criterion for statistical significance ($p = .057$). Moreover, these effects of support matching were not impacted by the communication medium; matching in CMC did not produce any different results than matching face-to-face. Taken together, the findings related to support message type were generally consistent with the central tenet of the optimal matching model (Cutrona, 1990). In facing a reasonably controllable stressor such as acquiring a job after graduation, informational support may be particularly beneficial.

Although support matching approaches have been critiqued (MacGeorge et al., 2011), the results of this study demonstrate their potential utility. Under certain conditions, some forms of social support may be more useful than others. Yet, the effect sizes for support message type were modest and support type did not influence participants' perceptions of self-efficacy nor the support provider. Moreover, it should be noted that the results do not imply that emotional support is detrimental or even unbeneficial. Emotional support—as well as other types of support (Holmstrom, Russell, & Clare, 2013)—may be important in coping with the challenges of seeking employment. The results suggest that support matching has small but meaningful implications for supportive interactions. Along with work aimed at better understanding how to develop more effective messages focused on specific types of support like comforting (Burleson, 2008) and advice (MacGeorge et al., 2008), there is value in continuing to consider the conditions under which these types of support are more and less helpful. Such efforts have the potential to complement one another and advance our understanding of supportive communication.

Limitations

In discussing the results of this project, it is also important to consider its limitations. One limitation was that the support messages shared during the interaction were scripted.

A great deal of structure was implied in the script for the interview to ensure that discussions would remain focused on the stressor of finding a job after graduation. However, care was taken to ensure that the questions and support messages were appropriate and effective. The support messages were given in response to participants' experiences with the stressor and were developed using Cutrona and Suhr's (1992) SSBC framework. Additionally, holding constant the support messages (and discussion topic) was essential to ensure that these two factors did not have an undue influence on the results. Allowing the discussion topic or messages within the informational and emotional support conditions to vary would have made it impossible to isolate the effects of CMC on the outcomes of supportive interaction.

A related limitation to consider involves the volume of interaction between participants and the confederates. Following social information processing theory (Walther, 1992), it might be argued that the results were an artifact of too little interaction time between participants and the confederates. Yet, there are several reasons for ruling out this possibility. First, the results were inconsistent with what would be expected by social information processing theory. Although the relational processes addressed in the theory are not directly relevant to support outcomes involving participants' ability to cope with the stressor (e.g., worry), they should be consequential for participants' perceptions of the support provider. Social information processing theory is rooted in the assumption that impressions require more time to develop in CMC than face-to-face (Walther, 1992). If interaction time was insufficient, then social information processing theory would predict that participants in the CMC condition should have formed less positive perceptions of the support provider than participants in the face-to-face condition. However, there were no differences between participants in the CMC and face-to-face conditions for any of the three provider evaluation measures. The specific pattern of findings observed in this study was inconsistent with what would be expected by social information processing theory. Second, we evaluated the influence of interaction volume by reconducting the analyses and controlling for the amount words spoken by participants. The results were principally the same. Taken together, this evidence suggests that the volume of interaction between participants and the confederate was not problematic.

Another limitation involves the relatively small sample for the study. Although a larger sample would be desirable, it is worth noting that several significant effects were detected and the findings were largely consistent with the results of prior research. Nonetheless, efforts to replicate the results of this study would be valuable. Finally, as has been observed in other research on employment seeking and social support (Holmstrom et al., 2013), it is possible that some participants may not have felt a great deal of control about their prospects of acquiring a job after graduation. Yet, the pilot test conducted for this project should provide some assurance that the stressor was at least somewhat controllable for participants.

Conclusion

Widespread use of CMC to acquire social support among the lay public makes it essential to better understand the implications of using CMC for supportive interaction. This study

examined the influence of the reduced social cues associated with CMC on support outcomes. The results show that the exact same support messages were less beneficial in mitigating the effects of a stressor when communicated via CMC compared to face-to-face. The findings from this study raise questions about the proposed benefits of CMC for supportive interaction and underscore the need for additional research on this topic.

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