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Interaction Through Technological Lenses: Computer-Mediated Communication and Language

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Abstract

In 2004, the second International Association of Language and Social Psychology Task Force focused on relationships involving language and emerging communication technology, culminating in a Special Issue of the *Journal of Language and Social Psychology* (Vol. 23, No. 4). The present article reviews the topics and conclusions of that work and traces the continuation of study on those topics as they have evolved and influenced language and social psychology research to the present. Communication technology research offers views on the central question of how individuals adapt language to communicative action in the presence or absence of various nonverbal cue systems. This question is reflected in topics such as the expression of affect and immediacy online, the virtual presentation of self and gender, the management of online conversations, adaptation via visual grounding in electronic collaboration, and the employment of online interaction technology to reduce intergroup prejudice. As communication systems have evolved, interfaces offer new cues and representations of users, which continue to propel inquiry into these central questions about language and its usage within various technological contexts.

Keywords

computer-mediated communication, Internet, language

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The development, diffusion, and diversification of communication technologies in society had advanced at a remarkable pace in the 10 years between the Internet's emergence and the 2004 publication of our Special Issue on communication and technology. It has continued to develop rapidly since then. Media of various kinds, and devices large and small with which to support them, have become ingrained in the transactions that define and sustain our 21st-century relationships. They sustain our globally interconnected professional collaborations, educate learners independently of campus, connect geographically dispersed families, and even facilitate the coordination of household affairs. They offer new capabilities to learn about, and interact at a distance, with members of other social groups and cultures who have traditionally been beyond our interpersonal reach. It is therefore no surprise that research focusing on communication and technology has accelerated exponentially. As I suggested in the 2004 Special Issue, however, as salient as communication technology's ubiquity and rapid change have become, these characteristics are not sufficient rationale for research to be done in this domain. Rather, as the introductory essay by Gasiorek, Giles, Holtgraves, and Robbins (2012) observes, it is because these technologies are deeply social that they compel our attention. Their uses raise numerous questions for language and social psychology research that can generate theoretical understanding of how humans communicate both with and without machines and, sometimes, help illuminate the nature of social life, in general, in ways we might not have seen without technological lenses.

There is a danger that technological evolution and ubiquity can actually make research less interesting: Without conceptual grounding, technology-based research has at best fleeting value, lasting only as long as the technology it describes resists extinction. Many of the MUDs, MOOs, and Usenet newsgroups we referred to in the 2004 special issue waned almost to the point of extinction. Second Life burst on the scene and then receded. For a time, MySpace claimed to have the largest number of registered users of any Internet application, only to become a ghost town in little time as users migrated to Facebook, Hyves, Cyworld or other social network sites, or simply lost interest (see Parks, 2010). Theoretical grounding helps us learn what changes with respect to technology and communication, or whether the more things change, the more they stay the same (see Parks, 2011).

In remarking on communication technology, social psychology, and language since the appearance of our special issue, I wish to frame certain observations in light of an issue that has remained central throughout the evolution and diffusion of this field: the influence of different communication systems on the restriction or provision of nonverbal cue systems that may accompany language in online interaction. Certainly there are other meta-constructs in the field of communication technology research. Yet some, if not most, of the field's most enduring issues have concerned the psychological and communication effects that occur on and through language when people do or do not see or hear one another, without the nonverbal elements of communication on which so much otherwise often relies. Research alternatively describes the restriction of technology-mediated communication to language as a constraint or a liberation. Some newer media such as Skype now replace specific nonverbal cues or cue systems,

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and others offer surrogate representations of users' physical behaviors or appearance through photos or avatars, as if doing so solves the age-old problems of mediated interaction. In sum, research tends to focus on how users adapt to a lack of nonverbal cues through language, or it presumes that users cannot or wish not to adapt, and focuses on interface designs that reintroduce nonverbal cues. Both foci suggest that cue systems remain a central concern in understanding new media. The major foci of this review, therefore, include what computer-mediated communication (CMC) research has taught us about how communicators adapt language to electronic text, how the reintroduction of certain visual cues in mediated communication helps ground collaborations and alter language, and finally, in one focal context, how the balance of cue systems provided by CMC may be affecting intergroup communication and prejudice.

In pursuing these topics, it is also valuable to review the articles that resulted from the Second International Association of Language and Social Psychology Task Force that populated the *Journal's* 2004 special issue. Each of those empirical studies reflected a different issue and approach related to the broad theme of communication technology. Each also raised implications that continue to reverberate in contemporary research, despite the appearance of newer systems and settings. These works focused on the production of irony online, conversation management in instant messaging, verbal immediacy on web pages, the deliberate performance of gender online, and conversational grounding in video-supported collaboration. Each of the specific technologies that was used in these studies has changed in prominence. Nevertheless, these studies provided principles that transcend the specific tools and have come to characterize contemporary thinking about the impacts of technology on communication.

Adaptations to Just Text

As suggested above and in so many reviews of the field, the study of CMC has focused to a large extent on communicators' reactions to changes in the cue systems available to them online in comparison to face-to-face interaction. The earliest formal positions on the matter claimed that most social and interpersonal functions of communication were absent in CMC because the nonverbal cues that typically convey them were unavailable online. A variety of alternative positions emerged, and although they presented different views and theoretical explanations, they held in common that communicators adapt to the alteration in available cues through various cognitive processes and language strategies (see for review Walther, 2011).

Irony and Immediacy in Language

One communication process that was strongly suspected to be hampered by the absence of nonverbal cues was the expression of affect and emotion. In that vein, Hancock's (2004) contribution to the Special Issue addressed how CMC users adapt to the absence of nonverbal communication to express irony in online dialogues. The work carefully

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articulated traditional theoretical assumptions arguing that certain affective attitudes such as irony could be communicated in no other way than through the juxtaposition of pragmatically opposing combinations of verbal and nonverbal expressions. Moreover, previous work suggested that this limitation should be widely and tacitly understood and, as a result, people should be less likely to attempt ironic expression through CMC. Through a simple, elegant, and quite amusing experimental treatment, Hancock established not only that communicators were more explicit in their ironic expression in online chat than in face-to-face encounters, he also found no deficit in chat partners' understanding of the sender's conveyance of irony online compared with face-to-face dyads.

Whereas Hancock's work on irony helped illuminate how online communicators express their attitudes about a topic, O'Sullivan, Hunt, and Lippert's (2004) article focused on how people signal their attitudes toward a presumed interaction partner. O'Sullivan et al. examined verbal immediacy as a code that encouraged affiliation via websites. They took their clue from Wiener and Mehrabian's (1968) assertions that verbal and nonverbal cue systems may be functionally interchangeable, an assertion that seems intuitive yet one that is rarely demonstrated (see Donohue, Diez, Stahle, & Burgoon, 1983). Going a step beyond *linguistic immediacy*, research subjects in O'Sullivan et al. (2004) also nominated a number of *presentational immediacy* cues germane to the appearance of instructional web pages, to which yet other subjects responded with attributions of significantly greater caring, trustworthiness, competence, and credibility for the web author's source. Beyond the application of immediacy cues in educational websites (see also LaRose & Whitten, 2000), the principles have been applied to consumers' responses to e-commerce websites, where source trustworthiness has direct economic implications (Lee & LaRose, 2011).

O'Sullivan et al.'s and Hancock's work, as well as that of other researchers, have advanced our understanding of the use of language in the performance of affective and attitudinal expression online. Research has explored both structural (Hancock, Landrigan, & Silver, 2007) and functional aspects (Hancock, Gee, Ciaccio, & Lin, 2008) of emotional expression online. Another issue of *JLSP* documented micro-level adaptations from face-to-face to computer-mediated affective expression by comparing the cues that communicators used in each setting to convey liking or disliking to a conversation partner (Walther, Loh, & Granka, 2005). This work established that face-to-face communicators, unsurprisingly, rely primarily on certain vocalic cues to express liking, and secondarily, on kinesic cues; verbal cues did not significantly account for variance in face-to-face partners' communication of (dis)liking. In contrast, a number of verbal behaviors (e.g., direct affective expressions and the manner in which disagreements were introduced) accounted for as much variance in affect within the computer-mediated dialogues as did the kinesic and vocalic cues in face-to-face discussion (see also Walther, Van Der Heide, Tong, Carr, & Atkin, 2010). Other research demonstrates how technological affordances of asynchronous discussion technology facilitate the enhancement of affectionate language online: The greater the number of keystrokes individuals devoted to editing a message before sending it, the more affectionate were

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the initial messages to an online discussion (Walther, 2007). The convergence of online language forms leads to the formation of study groups among online students (Postmes, Spears, & Lea, 2000) and the emergence of coalitions in online multiparty negotiations (Huffaker, Swaab, & Diermeier, 2011). Findings such as these stand in marked contrast to prognostications that technologists might eventually find ways to replace missing nonverbal cues and that "a better understanding of how people integrate verbal and nonverbal cues in face-to-face settings would enable system designers to develop technologies to support emotional communication among remotely distributed partners" (Fussell, 2002, p. 9).

Sociolinguistics of Chat

In addition to the affective dimensions of online language, the structural features of online conversations are starkly clear, since interactions are strictly comprised of words and timing.

Baron's (2004) article drew on a deep tradition of sociolinguistic analyses to illuminate conversation management techniques that are present in dyadic conversations typed through Instant Messenger (IM). Baron's analysis helped address a gap in the literature examining the spontaneous linguistic structures that individuals exhibit in a semisynchronous online communication environment, that is, one in which the interchange takes the forms of units (and fully formed subunits) of messages that get sent in temporal proximity but not simultaneously. Unlike face-to-face openings, turn-taking, and closings, IM users must find ways to create these conversational structures without nonverbal accompaniments and without simultaneous interactions. The temporal structure and physical distribution of participants potentially problematizes the management of these sequences. Baron focused on how IM users employ language to accommodate these functions in online discourse and how gender rendered differences in these structures.

Baron continues to discover the ways in which online language resembles offline language, and in what ways it differs. Her ongoing work has examined how media users employ the nuances of keyboarding and transmission commands as conversation management strategies and how these become conventions among users. It is as though semisynchronous systems provide users a new syntax. For instance, she has documented how IM users break up a turn into segments in ways that their receivers recognize that the turn has not yet ended. By examining the manners in which these breaks mapped onto grammatical features, she has determined that male IM users' patterns were more similar to breaks in spoken language and that females' break patterns were more similar to breaks in written language (Baron, 2010). Other studies confirm that various language features, such as expressiveness, also differ between women and men in IM conversations (Fox, Bukatko, Hallahan, & Crawford, 2007), and less so in blogs (Huffaker & Calvert, 2005).

Although many users still employ IM as a convenient form of messaging when working at their computers, new forms of CMC also lead users to rely on language to

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meld the conversation management cues that language provides offline with novel linguistic forms that become the commonplaces of online messaging. Texting (or simple messaging service [SMS]) by mobile phones is the new ubiquitous form of text-based exchange. It typically involves short messages (for convenience, to reduce onerous typing on small keys, and to reduce per-bit charges) among dyads, calling for new conventions and customs by which users coordinate and convey meanings (see Grinter & Eldridge, 2001). Likewise, Twitter's micro-blogging broadcasts require users to craft 140-character messages, not only teaching users lessons in brevity and economy of language but instilling yet more conventional uses, abbreviations, and phrases.

Even as new technologies simplify and facilitate the exchange of graphics and pictures, new technologies also push the continued usage of text-based messaging, often in more stylized and conventionalized forms. Although Baron (2004) admonished:

> (W)e need to be aware that each type of CMC has its own usage conditions and therefore, each needs to be analyzed in its own right. These usage conditions may, in turn, influence the character of language produced in that medium (e.g., formal versus informal, collaborative versus aggressive, verbose versus terse, edited versus scattershot, informative versus whimsical). (p.398)

Baron would be the first to agree these variations are not random nor do they depend entirely on the interface. Rather, they emerge as adaptations of communicators' basic needs to signal meta-messages that coordinate content and conversational roles. The specifics of the medium matter less than the bigger lesson, that each technology brings new adaptations and conventionalizations of basic linguistic processes that communicators need.

Gender Performance and Online Language

In another article in the 2004 issue, Herring and Martinson examined the language that online communicators invoke to display gender online. The unique lens that this study brought to the subject of gender performance came through the context that users played a gender game online. As in many computer-mediated environments, observers could not see or hear participants. Given this, the game asked users to portray males or portray females, roles that were randomly assigned to the players. Some male players had to convince judges that they were women, whereas other male players had to convince judges that they were, in fact, men. Likewise, female also were randomly assigned to behave convincingly as women or as men.

This premise allowed for study at several levels. It facilitated examination of both the prevalence and the utility of gender-stereotyped topics, gendered names, and gender-linked microlinguistic structures. Analyses offered to reveal whether men made better men than women did, or vice versa. Theories of stereotyping and empirically based precedents about gender-linked language met a novel test in this research setting.

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Results showed a frequent yet useless reliance on screen names, a frequent and marginally effective use of gender-linked topics, and ironic revelations about the deployment and effects of gender-linked language. Men, it revealed, did slightly better at reflecting female microlinguistics when men portrayed females; males presenting as females reflected as much female language forms as they did male language. Females, on the other hand, exhibited less code-switching, as real females pretending to be male produced greater proportions of female-typical micro-language than they did male micro-language (even as they discussed male-stereotypical topics). However, judges did not attend to these micro-level language structures. Had judges done so, they would have been more accurate. Judges attended to the overt and deliberate topical choices more than they did to the more covert and less easily manipulated aspects of gendered language. Because contestants so easily manipulated topics, and judges were swayed by them, real men were not more convincing as men nor were real women more convincing as women.

The work by Herring and Martinson is an interesting example of how technology offers a sharper view of language and behavior than we might have without technological lenses. Past research has told us much not only about how men and women use language but also about how they do so in rather unconscious ways. How interesting to see gendered language stereotypes played out in action when it is discretionary and deliberate. The implications for accommodation and over-accommodation (see Coupland, Coupland, & Giles, 1991) are magnificent, although they have been relatively untouched in the CMC literature (see for exception Thomson, Murachver, & Green, 2001). Although there are contexts outside of cyberspace where people may portray gender in a manner that does not match their appearance, they are less often able to focus on language alone and evade detection by other means.

The Herring and Martinson (2004) research also offers implications for the growing research on online deception. Research in that area began, quite typically, by focusing on how online communication masked nonverbal cues, which, in the case of deception, are often presumed to signal dishonesty (Hollingshead, 2000). More sophisticated work has examined the visibility of verbal behaviors in online discourse that trigger judgments of deception and the simultaneous transmission of receivers' verbal correlates of suspiciousness (Hancock, Curry, Goorha, & Woodworth, 2008). Deception detection in online discourse has become a growing area of study, as recently seen in the application of computation linguistics to identify the characteristics of bogus online product reviews (e.g., Ott, Choi, Cardie, & Hancock, 2011). In traditional deception detection research, linguistic cues to deception have generally taken a back seat to nonverbal cues. Native online discourse makes the focus on language and lying a bona fide phenomenon and not a partial view of a larger multimodal phenomenon. As a result in this shift in focus, we may be seeing resurgence in attention to language and deception that ultimately has both online and offline implications (see Blair, Levine, & Shaw, 2010).

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Visual Grounding in Remote Collaboration

The 2004 article by Gergle, Kraut, and Fussell examined the use of video during collaboration. The dominant approach in years of videoconferencing research was for videoconferencing systems to show users one another's faces. In contrast, Gergle et al. examined how communication changes when video shows the physical object that users discuss rather than showing the users themselves (see also Kraut, Fussell, & Siegel, 2003). When it comes to a visually-based task, the researchers argue, partners' facial expressions may be uninformative and superfluous at best. An optimal level of information derives from a common view of the visual object plus the vocal streams of collaborators, since the vocal streams contains both verbal content via language as well as affective information via vocalics.

Moreover, the appearance of the object allows Clark and Brennan's (1991) language-based theory of grounding to exert its explanatory effects. Conversational grounding occurs when partners have a joint visual focus and they are also mutually aware of one another's similar focus. Conversations that are grounded by a visual referent are more efficient than those without grounding: Less deictic language (e.g., "there is a triangle above the square to the left of the circle") is required for partners to co-orient. Instead, when one partner can see what another partner manipulates, the first partner can affirm or correct matters with less conversation and more confidence (e.g., "no; no; yes that one"). Deictic language often requires numerous phrases and confirmatory feedback indicating that everyone is indeed looking at the same place on the same thing. When spoken conversations are grounded by video that reflects an object of common focus, as Gergle et al. (2004) found, communication requires less phrases and less time, and the quality of joint efforts is superior to those which are supported only by voice or when video focuses on collaborators instead of the task. This is especially true when visual objects are more difficult to describe verbally.

The implications of Gergle et al.'s (2004) research provided a strong counterpoint to the bulk of existing theory and research and raised profound questions about the effects of the relative lack of nonverbal cues in mediated communication. Study after study and review after review echo the claim that the occlusion of nonverbal cues in CMC thwarts the identifying or socioemotional dimensions of interaction, and this is why online collaborators tend to be impersonal, dissatisfied, and sometimes hostile toward one another. Gergle and colleagues' studies raise an interesting alternative: That the relative lack of nonverbal cues in online interaction makes it more difficult to perform *instrumental*, rather than *relational*, communication. Without nonverbal information to ground coordination, collaborators are relatively disoriented, repetitive, inefficient, and ineffective. Although this issue was not a part of Gergle et al.'s conclusions, their results raise the possibility that people have been relatively unhappy with the media, and by extension, with their mediated partners. It may be that the key to liking one another online is to provide communication support for getting work done rather than enhancing the identification or affect of the workers. This conjecture, of course, deserves empirical investigation, yet it offers a certain paradigm shift in the study of computer-mediated group work.

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The Gergle et al. study also provides a glimpse at a research question that will take center stage as communication technology continues to advance and develop along the lines of media systems that are emerging today. The question it addresses is how language changes when different cue systems are reintroduced into mediated communication channels. When Gergle et al. provided visual cues about the object under discussion and vocal support for affect, different deictic strategies changed the language that users exhibited. Might similar phenomena arise when different cues become available, and if so, how? For instance, one study found that increased proximity between avatars in virtual chat spaces leads to an increase in participants' perceived intimacy (see Krikorian, Lee, Chock, & Harms, 2000); does virtual proximity intensify text-based verbal immediacy, or inhibit it? Answers to questions like these may have important implications for professional and interpersonal processes as well as extend our understanding when we learn whether virtual proxemics and other substitutions accentuate or dampen expectancy violations versus equilibrium–theoretic responses (see, e.g., Burgoon et al., 2002).

With the exception of Gergle et al.'s video study, the Special Issue research in 2004 focused on an all-or-nothing approach to the presence or absence of nonverbal cues in communication. Things have changed as emerging media, particularly so-called social media, offer additional cues, or alternative nonverbal representations, to accompany mediated language. As a result, research questions need to focus on how interaction processes systematically differ as communicators move between unimodal, partly multimodal, and highly multimodal communication platforms.

Research has begun to explore how the strategies and impacts of language may be altered by the online display of visual representations of the users themselves. One study found that verbal strategies that work in text-only online interaction backfire when communicators' pictures appear (Walther, Slovacek, & Tidwell, 2001). In an experiment on international virtual groups, half of the group members saw photos of their partners immediately prior to an online, text-based discussion, while the other half of the groups conversed online without exposure to one another's photos. In posttest measures, participants indicated their own level of effort at making a good impression on their partners and the physical attractiveness of each member of their group. For members who communicated without photos, the more they tried to impress their colleagues, the more attractive their colleagues perceived them to be. For those whose pictures were showing, however, the opposite occurred: The more they tried to impress their partners, the less attractive their partners perceived them to be. It seems that having one's appearance grounded in photo-reality constrains the effectiveness of verbal strategies aimed at selective self-presentation online.

How language-based strategies complement or compete with visual representations has also been explored in social media systems such as Facebook (DeAndrea & Walther, 2011) and online date-finding systems such as eHarmony, where static photos play an important role in conveying information about a communicator. For instance, Toma and Hancock (2010) discovered that among users of online dating sites (who face grounding others' perceptions of them via the photos they post online), relatively unattractive

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individuals offer more positive verbal and numerical distortions and embellishments about their physical appearance in the textual fields of the dating profile than more attractive users do. Research involving online avatars has also raised questions about the nonverbal characteristics that these visual representations convey and the impact of their appearance on language and communication. Palomares and Lee (2010) examined whether individuals' online language would be affected by the gender representation of a static on-screen avatar to which they were randomly assigned. The findings indicated that users' language did change in the direction suggested by the avatar's apparent gender, especially among female users. These findings seem to suggest that an avatar has a greater effect on gendered language than does a gender-oriented performance goal in a strictly text-based chat environment, as seen in the work by Herring and Martinson (2004).

Antheunis, Valkenburg, and Peter's (2010) recent examination of uncertainty reduction processes (Berger, Gardner, Parks, Schulman, & Miller, 1976) via social network sites indicates that, as Parks (2011) suggested, perhaps the more things change, the more they stay the same: Photos and biographies in social network sites are apparently no substitute for interactive online discourse. Antheunis et al. (2010) argued that social network sites like Facebook or Hyves provide an abundance of pictorial, biographical, and sociometric information about other people. They predicted that these newer displays of social information should be the primary sources of uncertainty reduction about others, without the need for interactive communication via text. Should this be correct, it may have rendered the social information processing theory of CMC (Walther, 1992) partially obsolete. The social information processing theory originally focused on how CMC users develop impressions and relations online over time using text-based discourse and the social information with which it is imbued. With pictures and biographies now apparent in social network sites, Antheunis et al. argued, users might garner similar impressions using these data prior to or instead of interactive discussion. Results of Antheunis et al.'s research showed that, despite users' attraction and attention to these newer forms of information, interactive online communication contributed the most to uncertainty reduction about another individual.

The future requires more research into the effects of multimediated technology on language strategies, uses, and outcomes. Nowhere will the issues of visibility be more important than in addressing issues foreshadowed in the Special Issue on communication and technology, which considered whether CMC might offer special utility for intergroup contact and the reduction of prejudice.

Technology and Intergroup Prejudice

Our 2004 Special Issue asked if the research pertaining to online accommodation and the development of hyperpersonal relations among strangers might be expanded to focus on "communication between members of hostile ethnic or national constituencies. . . . In CMC, when the turban and the yarmulke need not be visible during interactions, can commonalities be made more salient than differences?"

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(Walther, 2004, p. 393). We were not alone in considering the question. A number of researchers have asked whether online communication offers particular advantages over face-to-face communication for the reduction of intergroup prejudice. One aspect of this question is that, unlike face-to-face interaction, the necessity or the timing of seeing other participants' appearance cues become real options in online interaction. There are other potential benefits of CMC as well. Although numerous efforts to build bridges between antagonistic groups' members have been made face-to-face, their success has been mixed; the most successful of such efforts have been conducted as laboratory studies that lack important contextual features which frequently impede their application to real geopolitical or religion-based conflicts (see for review Maoz, 2000).

The most thorough treatment of the potential of Internet communication to intercede in these conflicts, in conceptual terms, appears in Amichai-Hamburger and McKenna's (2006) article, "The Contact Hypothesis Reconsidered: Interacting via the Internet." The authors reviewed Allport's (1954) contact hypothesis and its extensions and proposed how attributes and affordances of CMC systems facilitate it in unique ways. The contact hypothesis itself proposes that members of majority and minority groups may reduce prejudice about the other group as a by-product of developing a positive personal relationship with a member of the other group. The original framework and research-based extensions to it suggest that the benefits of intergroup contact are most likely to accrue when participants have equal status, a common goal, institutional support, a lack of anxiety when in the presence of an out-group member, and the cognizance that an out-group partner is truly a member of the out-group rather than being atypical.

Amichai-Hamburger and McKenna (2006) argued that the Internet—particularly Internet communication in virtual groups or teams of members from different social groups—facilitates a number of these conditions in ways that face-to-face contact does not offer. First, Internet communication can help communication take place where face-to-face communication is unlikely to occur. Distance between participants is one such barrier, as are checkpoints and other barriers to free passage (Shonfeld, Ganayam, & Hoter, 2006). Second, being able to communicate online from one's own locale should reduce the intergroup anxiety that may otherwise accompany face-to-face encounters and inhibit effective contact. Third, virtual groups who perform some task benefit from a shared goal. Although the prospects for online communication to mitigate status differences is a matter of some debate (Wiesband, Schneider, & Connolly, 1995), there is, nevertheless, general agreement that the visual anonymity of plain-text CMC occludes the physical appearance cues in physiognomy and manners of dress that connote membership in one or another racial or cultural group. Amichai-Hamburger and McKenna (2006) also suggest that online communication promotes attraction to the virtual group while it simultaneously reduces cognizance of members' outgroup memberships (based on Lea, Spears, & de Groot, 2001); however this application has been challenged in other appraisals of CMC's contributions to effective contact dynamics (Walther, 2009; see also Harwood, 2010).

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A number of empirically based projects have been carried out among populations in conflict using CMC. For instance, the "Dissolving Boundaries" project brought students from Northern Ireland and the Republic of Ireland together online for joint study projects (Austin, 2006). Results indicated that extended contact involving both curricular and social interactions positively affected children's perceptions of each other and the schools on each side of the border. In Israel, efforts to use online interactions among Palestinians and Jewish Israelis have met with inconsistent results. In Mollov and Lavie's (2001) efforts, Israeli and Palestinian schoolchildren participated in online discussions about Jewish and Islamic religious practices through email. The exchanges surfaced commonalities and built understanding. In contrast, online group discussions among Jewish and Palestinian adults that focused on political issues remained highly conflicted, which seemed to result in large part due to the divergent culturally based argumentation styles the participants manifested via CMC (Ellis & Maoz, 2007; Maoz & Ellis, 2001).

It may be that long-term interdependence versus short-term engagements makes a difference in the likelihood of multicultural groups to form positive relations online. A recent effort involved multicultural virtual groups of six students, composed of two students from religious Jewish, secular Jewish, and Arab colleges in Israel, who worked together for an academic year on collaborative educational technology projects (Ganayem, Shonfeld, Hoter, & Walther, 2011). Aspects that made this unusual in comparison to other online contact projects were the duration of the project and the time participants had to develop impressions and relations, and the use of three rather than two salient cultural groups. Pretest/posttest comparisons of prejudicial attitudes toward the most polarized out-groups (e.g., religious Jews toward Arabs and Arabs toward religious Jews) demonstrated positive change over time, and attitudes were in most cases significantly more positive at the project's completion than were those of randomly selected control students from the same colleges. Ongoing analyses are focusing on participants' evaluations of the messages they exchanged, and their correspondence with changes in interpersonal attraction versus group attraction, in order to provide more definitive conclusions about the underlying mechanisms of the contact hypothesis in online form.

Although the features of the Internet seem to support contact dynamics and the prospect of reducing intergroup prejudice, its use requires careful management, and its potential to backfire cannot be ignored. van Driel and Chyrikins (2008) documented the benefits as well as deleterious effects on attitudes that seemed to result from technology-related problems in the Global Teenager Project: "Simply putting students from different countries, nations, cultures, etc. in touch with each other by means of the internet will not necessarily lead to more understanding" (p. 398). They admonish:

> When misunderstandings occur (this is to be expected in all type of communication, and especially in communication with individuals from different cultures with very different life experiences) students can quickly make inappropriate attributions due to cultural biases. . . . If teachers do not guide the

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> interaction process carefully and if they themselves are not culturally sensitive, students run the risk of having their cultural, ethnic and racial stereotypes confirmed. (p. 399)

Indeed, misattributions and scapegoating seem especially common in virtual groups, when members come from different cultures, schools, or other social categories (Vignovic & Thompson, 2010; see also Bazarova & Walther, 2009).

A number of issues remain to be explored with respect to online communication and intergroup prejudice reduction. Several of these questions are more general. Should virtual groups begin by looking at members' Facebook profiles? With a text-based "get-to-know" session? Or should they just begin their tasks together? Those who approach online communication from a cues-filtered-out perspective might suggest that Facebook is critical, to see what partners look like and what they have to say about themselves. As the Antheunis et al. (2010) study described above indicates, without interactive text-based exchanges, Facebook will be insufficient to reduce uncertainty. And as those who have speculated about online intercultural groups suggest, the visual cues to out-group membership may provide destructive anchors to otherwise potentially salutary online interactions. As far as a verbal getting-acquainted period goes, such a process may catalyze the acquaintanceship process. Yet there is also a good chance that initial disclosures in a salient intergroup setting might focus on divisive experiences and attacks rather than merely personal ones (as occurred when students at rival American schools went online in virtual arrangements intended to foster collaboration; Polman & D'Amico, 1994; Schneider, 2011). It is likely that personal information will emerge alongside task-related discussions, when partners share perspectives on projects or when one discloses that she may be late on a project because she has to visit her 9-year-old's school. Although such an exchange might disrupt group-based, depersonalized social identification among partners, it may enhance interpersonal relations when they add depth and commonality to their interactions. It should be clear that these alternative strategies to online groups arouse different theoretical frameworks, each of which may favor a different approach. The effectiveness of any of these approaches awaits empirical study, the outcomes of which will have important theoretical as well as practical implications.

Conclusion

The advancement and ubiquity of communication technology has, it seems, raised as many questions as answers. Some of these questions remain quite central to the field of language and social psychology more generally, in terms of the trade-offs that communicators may or may not deploy when mode-switching. More and more new technologies change the equations, from the all-or-nothing world of nonverbal/verbal cue combinations of the past, to the myriad combinations of dynamic or static visual cues and narrative information of social network sites, the co-constructed profiles of other Web 2.0 systems, and new forms for text-only messages that cellphones and Twitter

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impart. The tenability of even recent theories such as social information processing, social identification/deindividuation, and hyperpersonal models of CMC are subject to debate as social media change the attributes of CMC and the nature of the adaptations and exploitations of media that users make (see for review Walther, 2011). How the dynamics of uncertainty reduction and communication accommodation take shape using emerging technologies also bears continued questioning.

Rather than assume that "new communication technologies, or new media, will operate as a wholly new, unique, and monolithic force," according to Yzer and Southwell (2008, p. 13), we stand to gain greater insight when research is guided by the premise that

> new media provide the contextual regulations under which human interaction occurs, and it is ultimately something about this human interaction—engagement, however mediated, between living, breathing beings—that will demonstrate old patterns or will suggest new possibilities. . . . New media do not alter the essence of social interaction that stems from basic human tendencies, then, but they might condition the expression of such human interaction. (p. 14)

Our globally connected technologically-enabled society is also not a monolithic force. It is composed of dyads, small groups, intergroup contact, and broadcasts, which rely on various forms of CMC to exchange the content that sustains or challenges them. New knowledge is most useful that identifies and focuses on the basic, sometimes elemental processes of human interaction, as well as the attributes of technological systems that stimulate communicative adaptation and/or guide the design of technological interventions. Ultimately, the most interesting lessons from technology will be to learn what it is that communication itself needs in order to function.

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