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978-0-521-85383-5 - Face-to-Face Communication over the Internet: Emotions in a Web of Culture, Language and Technology

Arvid Kappas and Nicole C. Kramer

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Introduction

Electronically mediated face-to-face communication: issues, questions, and challenges

Arvid Kappas and Nicole C. Krämer

In our globalized world, communication and interaction increasingly happen online and are mediated through computers and the internet. This is true not only for organizational settings and teams working together, but also for private contacts with family, friends, and even strangers (e.g., Bargh and McKenna, 2004). Theories on computer-mediated communication (CMC) that have described internet-based communication as deficit-laden compared to face-to-face communication (e.g., Kiesler, 1997; Kiesler *et al.*, 1984; Kiesler and Sproull, 1992; Short *et al.*, 1976; Siegel *et al.*, 1986; Sproull and Kiesler, 1986; Strauss and McGrath, 1994) might have difficulty to explain these current developments. On the other hand, these approaches have argued that the cues we rely on in everyday face-to-face interaction are filtered out in computer-mediated communication. While this was certainly true for mere text-based interactions, more recent forms of communication via the internet have adopted numerous additional features and incorporate several of these cues (Antonijevic, 2008; Fullwood and Orsolina, 2007). This is, on the one hand, due to technological advancements, but has, on the other hand, been fostered by creative efforts of the users, as had been predicted by Walther (1992, 1996) in his social information processing and hyperpersonal communication theory. In fact, recent developments in the field of the so-called Web 2.0 show that users themselves often developed several strategies and technologies to support at least partial surrogates for face-to-face interaction, which have led to a steady increase of immediate and increasingly multimodal communication (Ramirez *et al.*, 2002; Walther and Burgoon, 1992; Walther and Parks, 2002). Nowadays, when people either are forced to interact via a computer, or they wish to do so, they increasingly use new technologies that at least partly incorporate aspects of everyday face-to-face communication.

Table 0.1 Forms of text-based communication

Form	Synchronicity	Specific addressee	Enhancements
Blogs/microblogs (Twitter)	Partly	No	Photos
Social networking sites (Facebook, MySpace)	No	No (except when using mail function)	Photos, status messages
Email	No	Yes (mostly)	Emoticons
ICQ/chat	Yes	Yes (mostly)	Emoticons/smileys

In the following, an overview of current internet-based communication opportunities is presented, outlining the diversity of interaction forms and also demonstrating that, even within the realm of text-based communication, more and more enhancements are integrated to compensate for the lack of nonverbal cues (see Table 0.1). In this respect, the recent advent of so-called Web 2.0 platforms, revolutionizing text-based communication within cyberspace, deserves special attention. Although several elements of Web 2.0 (e.g., wikis) are not explicitly targeted at fostering direct communication between individuals, other platforms, such as blogs, microblogs, and social networking sites (Boyd and Ellison, 2007), render possible, if not encourage, detailed self-presentation and also enable interaction between friends and strangers. Although these platforms started out by permitting merely asynchronous messages, they continue to adapt toward more synchronous forms (e.g., microblogs such as Twitter) or include ability to display the current status and activity (e.g., via status messages in Facebook). The conventional forms of text-based internet communication, such as email and ICQ/chat, have long been enhanced by the opportunity to include emoticons and smileys (e.g., Antonijevic, 2008; Derks, 2007; Fullwood and Orsolina, 2006; Walther, 2006; Walther and D’Addario, 2001).

The ability to conduct voice interactions via the internet has also improved. People use numerous voice-over-IP (Internet Protocol) technologies and software such as Skype (see below) to talk to friends and family all over the world with low or no cost. While these options do not provide significant additional features compared to conventional telephone (apart from lower cost), other technologies considerably enhance the usual audio- and even face-to-face communication. Avatar technologies have developed such that elaborate human-like figures can be used to represent oneself in various cyberworlds and in the internet. Recently, people can, by means of so-called virtual

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presence software, convey that they are visiting a specific internet site. With the help of a small avatar, one can chat there with other users represented by a so-called weblin (<http://weblin.en.softonic.com>; www.clubcooe.com). Moreover, 3D online worlds populated by avatars that allow basic nonverbal communication, as well as either chat or voice over IP conversations, have gained popularity (see *Second Life* or *World of Warcraft*). In particular, nonverbal interaction is still very indirect and limited and does not yet reach the elaborateness of avatar research platforms (Bente *et al.*, 2008; Blasovich *et al.*, 2002).

However, the option of video transmission via the internet has also improved dramatically in the past 10 years. Not only can we convey personal messages and engage in impression management via various video platforms (e.g., YouTube), but actual video-mediated interactions (in the sense of private or job-related videoconferences) have become easier since the launch of Skype. By means of this software and a small webcam, as integrated in conventional PCs or laptops, one can conduct video-mediated conversations with people all over the world who use the same technology.

Thus, recent developments demonstrate that if technology renders possible the convenient usage of face-to-face communication elements, and the cost of the required bandwidth is sufficiently low, a significant number of people will use it. This was not self-evident in the past and was discussed controversially within the last decade. However, although the massive use of technologies such as Skype suggests that, at least under some circumstances, people prefer the most direct and face-to-face-like communication form, still the heavy usage of *Second Life*, *World of Warcraft* or the status messages within the social networking sites has to be explained. The massive popularity of these apparently more indirect communication possibilities suggests that there might also be specific gratifications and perceived advantages related to the fact that not all information is conveyed, and, more importantly, that these forms provide additional aspects that are not available in usual face-to-face communication. For instance, within *Second Life* or *World of Warcraft*, additional options for creative self-presentation are given that might enhance the interaction experience and increase control over self-presentation. Against this background, the pros and cons, the chances and risks of face-to-face communication over the internet, on the one hand, and innovative forms of communication which might provide additional opportunities that are not present in face-to-face interaction, on the other hand, have to be considered carefully.

Besides the fact that face-to-face communication in CMC is becoming increasingly popular, the same seems to be true for

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human–computer interaction (HCI). Unlike 20 years ago, when merely text-based interaction with computers was possible (which, moreover, was basically derived from human language and had to be learned), nowadays human-like embodied agents are available that autonomously interact with the human user. In the future, these artificial agents should dramatically facilitate – by means of natural speech and multimodal nonverbal interaction – the handling of computers or the internet (Cassell *et al.*, 2000; Krämer, 2008a).

Common applications are the so-called chatbots, which are especially used in e-commerce (e.g., “Anna” by IKEA). While most of these industrial applications still rely on text-based interaction, simple dialogue structures, and merely basic nonverbal behavior, some research platforms demonstrate that speech input and output and more elaborate forms of nonverbal behavior are possible (Cassell *et al.*, 2000; Gratch *et al.*, 2007; Kopp *et al.*, 2005). Most interestingly, research using even the most basic human-like interface agents demonstrates that human reactions to virtual agents are remarkably similar to those to human interlocutors (Krämer, 2008a; Nass and Moon, 2000; Sproull *et al.*, 1996). It has been found that virtual, anthropomorphic agents interacting with users trigger impression management on the part of the human user (Krämer *et al.*, 2003; Sproull *et al.*, 1996), foster cooperation (Parise *et al.*, 1999), lead to social inhibition (Rickenberg and Reeves, 2000), or evoke communication behavior that is equivalent to that which would be expected in a human face-to-face conversation (Kopp *et al.*, 2005; Krämer, 2005). Additionally, several studies demonstrate the importance of carefully designing the nonverbal behavior of the agent: it has repeatedly been shown that the nonverbal behavior of the artificial agent matters and that human users’ reactions depend on the agents’ nonverbal signals – just as in human–human interaction (Bente *et al.*, 2001; Krämer *et al.*, 2007; von der Pütten *et al.*, 2008, 2009; Rickenberg and Reeves, 2000). It thus becomes increasingly important not only to focus on computer-mediated, face-to-face interactions but also to address issues of humans interacting in a face-to-face mode with virtual agents. Two chapters of the book will therefore comment on these aspects.

Understanding the usage of computer-mediated, face-to-face communication, as well as nonverbally rich HCI, is clearly not simply a matter of solving engineering problems. Similarly, the behavior of users and the acceptance of such technologies cannot be understood simply from questionnaires targeted on wishes and preferences. Instead, a variety of processes are involved, linked to communication processes, empathy, social self-presentation, group processes, and the like that

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require a dialogue between the social sciences and engineering. This book is intended to address such issues.

Structure and contents of this book

This book tries to address the issues mentioned above by contributions that address several psychological aspects of face-to-face interaction via the internet. The chapters are predominantly based on social psychological assumptions and considerations, but also personality psychology, clinical psychology, media psychology, and the psychology of emotions play a major role. The chapters partly discuss rather general aspects such as the promises and pitfalls of face-to-face communication over the internet while some chapters raise more specific research questions. For instance, the role of gender differences is discussed, the question of whether shy people benefit from more anonymous communication is tackled, and cultural aspects are taken into account.

The book is divided into three parts. In the first part, three chapters focus on general aspects of CMC and the effects of visual cues. In the second part, five chapters present specific forms of video- or avatar-based technologies and corresponding findings. The third part consists of two contributions that address some of the questions mentioned above with respect to HCI instead of computer-mediated communication forms.

General aspects of visual cues in CMC

More specifically, the book starts with a review by Joseph B. Walther, who discusses the promise and the pitfalls of visual cues in CMC. The first section reviews theories advocating the utility of visual cues in telecommunication. He states, however, that observational results indicate that visual cues often fail to enhance virtual groups' work. The second section targets the conditions of these effects and presents research that shows when and how visual cues detract from CMC social impressions and evaluations. In parallel, the author discusses why there is still a subjective preference for multimedia and visual cues.

In the second chapter, José-Miguel Fernández-Dols and Pilar Carrera combine general approaches from psychology and philosophy to discuss new, technology-enhanced ways of managing one's facial expression. Starting with an account of the usage of pictures, the authors discuss how telecommunications can give rise to new forms of "artificial" facial information and speculate on the effects of this potential development.

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The third chapter, written by Agneta Fischer, is also concerned with general aspects of visual cues in CMC but, in addition, relates the effects to gender issues. She discusses three hypotheses with regard to the importance of gender in social interactions in face-to-face interaction and CMC: (1) due to the fact that gender is less salient in chat-based CMC, equalization and less sex-stereotypic behavior is observed; (2) in line with SIDE theory, it is assumed that social categories are emphasized, leading to larger gender differences; (3) gender differences will emerge depending on context. Empirical evidence largely seems to support the third hypothesis.

Video- and avatar-based communication

Chapter 4 by Pio Enrico Ricci Bitti and Pier Luigi Garotti focuses on videoconferences and their implications for intercultural aspects. Based on an account of communication forms on the internet, the authors summarize the functions of nonverbal behavior in face-to-face communication. They discuss the pros and cons of videoconferences via the internet and, referring to these considerations, present an account of the intercultural implications of the usage of videoconferences via the internet.

In Chapter 5, Brian Parkinson and Martin Lea investigate the factors that impact the transmission of emotions in videoconferencing (e.g., restriction of movement and orientation, sensory information, temporal parameters). In their own study, they especially focused on the delay of the transmission. They demonstrated that in high-delay situations, more difficulties arose. However, if friends were conversing, they were not negatively affected by delays.

In Chapter 6, Pierre Philippot and Céline Douilliez examine the relationship between social anxiety and internet communication. They discuss different hypotheses with regard to the relationship between internet use and social adjustment (social anxiety and loneliness). They present evidence that socially anxious and lonely individuals show specific patterns of communication on the internet that differ from those people who do not suffer from social anxiety. The authors conclude that the introduction of a video channel might constitute a difficulty for socially anxious people.

In Chapter 7 by Antony S. R. Manstead, Martin Lea, and Jeannine Goh, the issue of co-presence is considered as the most profound difference between normal face-to-face interaction and video-mediated face-to-face interaction. The authors discuss the implications of co-presence, or its absence, in the communication of emotion, self-disclosure, and relationship rapport. In order to achieve this, they refer

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to some recent studies that have examined the effect of presence on the facial communication of emotion. In an attempt to decompose presence further into its different social psychological aspects, they describe a study that investigated how these various aspects impact upon self-disclosure and rapport independently. The authors conclude that the absence of co-presence in video-mediated interaction can liberate the communicators from some of the social constraints normally associated with face-to-face interaction while maintaining others and introducing new constraints specific to the medium.

In Chapter 8 by Gary Bente and Nicole C. Krämer, various avatar-based interaction approaches are discussed. Based on a functional model of nonverbal behavior they comment on the psychological factors determining the effects of different systems. By this, they aim to achieve a deeper understanding of the function of nonverbal cues in CMC. Additionally, an avatar-based communication platform is introduced that allows real-time transmission of gaze, head movements, and gestures in net communication. By means of this platform, various studies in various research paradigms can be conducted.

Emotions and visual cues in HCI

Chapter 9 by Veikko Surakka and Toni Vanhala starts with the observation that people show strong emotional reactions when interacting with computers. In consequence, they investigate how synthesized emotional information might affect human behavior in the context of information technology. They assume a (supposedly positive) effect of utilizing any kind of emotional cues or messages in human–technology interaction. After presenting several possibilities to have a computer analyze human emotion-related processes (physiological measures, technologies to measure the computer users' behavior), they present studies that show the potential of emotionally expressive intelligence and demonstrate how perceptual and expressive intelligence can be merged to create functional loops. The overarching goal of their research and their chapter is to provide a basis for a new generation of emotionally intelligent systems and to provide a theoretical and empirical basis for integrating emotions into the study of HCI.

Against the background of evolutionary approaches, Elisabeth Oberzaucher, Karl Grammer, and Susanne Schmehl, in Chapter 10, suggest that even in communication with and by machines, humans tend to react socially and use communication mechanisms, which are primarily social and embodied. Therefore, it is seen as important that human-like agents are able to use human-like communication on their part. The authors thus present an approach to producing communicative

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feedback which is based on a pleasure-arousal-dominance space. Using a “reverse engineering” approach, the authors implement FACS on a 3D computer face. By producing a large number of random faces and subsequent evaluations, they were able to identify relevant emotional feedback that can be implemented in future systems. Similarly, they analyzed body postures.

Where do we go from here?

The future will see increasing integration of different levels and types of reality. Already there are various applications in the context of mixed and augmented reality that blend computer-generated imagery with video-based textures. While most efforts in this area have probably been put into the development of user interfaces (e.g., in military aircraft or in cars), there are now attempts to use such paradigms in the context of face-to-face interaction, such as videoconferencing (e.g., Regenbrecht *et al.*, 2003). For example, it is possible to have virtual boardrooms or other meeting places that mix agents tracking actual nonverbal behavior of interactants that are transmitted from various remote locations, avatars that represent artificial systems, and integrated video streams.

As the quality of computer-generated imagery increases, a point will come at which *authenticity* will become more of a concern to users – this applies not only to avatar representations of interactants but also to advanced videoconferencing software that allows augmentation in the sense of modification and addition of synthetic material. In this context, authenticity refers to the authenticity of the *identity* of people (am I talking to the person I think I am talking to?), the authenticity of the *attributes* of the person I am interacting with (age, gender, looks . . .), and the *dynamic authenticity of behavior* (did the interaction partner really smile – did the interaction partner smile in a particular way?). The latter is likely, as it is plausible that the intensity of particular expressions could be modified on the fly. For example, desired expressions could be amplified, and undesired expressions could be inhibited. In addition, expressions could be augmented – for example, wrinkles around the eyes could be added to increase an impression of genuine smiles on the fly. This would correspond to an implementation of emotion-expression rules such as Ekman and Friesen’s display rules (1969) in *socially intelligent mixed-reality environments*.

However, whether such automatic corrections are likely to be implemented in the near future is only partially an engineering problem. At present, it appears that the theoretical knowledge regarding what expression would be appropriate and in which context is not available

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and will not be available in the near future (see Kappas, 2003). However, despite all the criticisms that have been raised in this respect, it is possible that in highly domain-specific applications proper rules can be defined – for example, in a service environment, such as remote e-commerce. In this case, there are certain levels of politeness required that could be defined today given present theories – even taking cultural variations into account. Thus, it is not implausible that mediated interactions with members of other cultures could be improved by slight modifications of the intensity of smiles and related movements, such as nodding or variations of gaze. Similarly, the feedback of a therapist could be filtered according to clearly defined rules. These are examples where technology is not used to recover the information “lost in translation” from offline to online communication, but instead to augment and improve interaction. There is much potential here for the reduction of conflict by reducing misunderstanding. Of course, there is always the possibility of abuse and notions such as a “charisma amplifier” that might transform a lacklustre politician into the next voter magnet linger potentially at the horizon.

The impact of such developments is difficult to predict. On the one hand, one could imagine that knowledge of “tampering” with reality would change the perception of the interaction partner. However, this need not be the case. The perception of nonverbal indices is not primarily driven by conscious evaluation, but by a parallel series of largely automatic processes (Burgoon *et al.*, 2000; Choi *et al.*, 2005; Krämer, 2008b), some of which might be biologically prepared, and others learned at an early age and automatized beyond conscious access (see also Kappas and Descôteaux, 2003). In particular, researchers focusing on an evolutionary framework of communication pointed out long ago (e.g., Leyhausen, 1967) that expression and impression have most likely not co-evolved. Instead, according to them, impression processes are based on phylogenetically later developments. In consequence, we should consider the contemporary developments in augmented face-to-face interaction as a hyperrapid evolution of expression processes that is not matched by biological processes in our impression apparatus – in our social brains. Just as we are likely to “adopt” simple artificial entities, such as dolls or robots (Kappas, 2005), and react socially to all kinds of artificial objects (Reeves and Nass, 1996), so are we likely to be “fooled” by augmented face-to-face interaction displays. Once such systems have gained sufficient acceptance, this is a likely consequence.

Is it possible that technology would be used for countermeasures to increase authenticity in interaction? Yes, to a certain degree. However, then it is likely to be integrated also into nonmediated interaction as

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well. For example, there have been numerous attempts to identify deception in the voice – in some cases, displays next to a telephone that are supposed to indicate speaker stress as symptoms of lying. Although there is, at present, not a single, well-controlled, scientifically sound study that would show such systems to be valid and reliable, there seems to be, unfortunately, a ready market for such gadgets. It is thus conceivable that in real face-to-face interactions augmented displays might come into play; for example, separating glass panels in banks or at customs, or even eyeglasses that overlay the actual face with markers that might highlight “suspicious” twitches, tics, or other signs. At this point the boundary between making mediated face-to-face communication more real and making real interaction benefit from augmentation becomes moot.

Lastly, one wonders how offline communication and interaction is affected in the long run by the changes in behaviors, patterns, and networks. This is an interesting question and the brief experience with present-day mediated communication technology is not sufficient to make any predictions. Apparently, when confronted with the first attempts of the brothers Lumière, the audience in the cinema jumped out of their seats in panic when a (shaky black-and-white!) film of a train heading toward the camera was presented. These effects seem unbelievable in hindsight. Surely, some of the early reactions to the affordances and possibilities of cyberspace will look equally silly after one generation. We should not assume that the perception of these media, and their use and acceptance, will remain constant as they permeate the fabric of everyday life of users for whom a world that is not constantly blending online and offline work would be just as hard to imagine as a world without cars, airplanes, telephones, or readily available electricity would be to the readers of this book.

None of the contributions in this chapter touch the frontiers evoked in the last few paragraphs. However, some of the developments suggested in this last, speculative, section are near. It is specifically the interaction of social and behavioral sciences with engineering and computer science that is needed to develop human and human-machine interactions, to study the effects on humans, and perhaps, to a certain degree, to point to a responsible use of such technologies. There are issues that have ethical ramifications, just as there are issues that might cause harm to humans. A naive embrace of all technological progress is obviously highly misplaced. However, a Luddite rejection is neither appropriate nor realistic. New forms of interaction in the guise of Web 2.0 are already permeating every sphere of life. Often media come and go in ways that were not predicted. The success of SMS (Short Message Service) was not anticipated, just as the success