

Adolescents' online self-disclosure and self-presentation

Alexander Peter Schouten

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Introduction

Adolescents' Online Self-Disclosure and Self-Presentation

Internet has become an integral part of adolescent life, at an astonishing rate. In 1997, only 4% of Dutch adolescents had Internet access at home. In 2007, the percentage has risen to 98% (Duimel & De Haan, 2007). Over the course of these years, the primary use of the Internet has changed considerably. Whereas in the early years adolescents used the Internet primarily for information seeking and entertainment, today they predominantly use it for interpersonal communication (Valkenburg & Peter, 2007; Valkenburg & Soeters, 2001). Although many adolescents occasionally go online to chat with strangers, the vast majority of adolescents seem to use the Internet to maintain their existing network of friends (Gross, 2004; Peter, Valkenburg, & Schouten, 2006).

Most adolescents go online on a daily basis (87%). In the Netherlands, Instant Messaging (IM) is the most popular online activity, just above downloading and gaming (Duimel & De Haan, 2007). On average, adolescents use IM for about six hours a week, although 10% of adolescents indicate they use IM three hours per day (Schouten, Valkenburg, & Peter, 2007). For Dutch adolescents, IM is the most important way to communicate with friends (Duimel & De Haan, 2007). E-mail is hardly used anymore; adolescents consider it to be a technology for "old people" (Grinter & Palen, 2002; Lenhart, Madden, & Hitlin, 2005). Social networking sites, such as MySpace or Facebook, are other popular communication technologies. 58% of Dutch adolescents have created a profile on a social networking site. Finally, 3D graphic virtual communities, where adolescents can walk around and chat with each other, are becoming increasingly popular as well (e.g., Habbo Hotel, World of Warcraft).

This increased popularity of online communication raises questions about the possible consequences of online communication for adolescents' social development. Fueled by parental concerns, many experts point to possible hazards of online communication, such as online bullying, sexual harassment, or Internet addiction (Lenhart, 2005; Livingstone & Bober, 2005; Van der Eijnden & Vermulst, 2006). A quick search on Amazon reveals dozens of books on the topic, with titles such as "Generation MySpace: Helping your teen survive online adolescence" and "No child is safe from Internet crime." Similarly, in the Netherlands, there is increased interest in the topic. A number of educational books for parents and teachers have recently been published (e.g., Delver, 2006; Pardoën & Pijpers, 2005, 2006), and a number of websites to educate parents and teachers have sprung up, such as www.digibewust.nl or www.mijnkindonline.nl.

Scientific interest in the possible consequences of online communication for adolescents' social development is increasing as well. For example, studies have investigated the consequences of online communication for relationship development, self-esteem, and well-being (Cummings, Lee, & Kraut, 2006; Gross, Juvonen, & Gable, 2002; Subrahmanyam, Greenfield, Kraut, & Gross, 2002). Results, however, are mixed. Some studies have found negative consequences of online communication and Internet use (Beebe, Asche, Harrison, & Quinlan, 2004; Kraut et al., 1998), while others have found positive consequences of online communication (Hu, Wood, Smith, & Westbrook 2004; Kraut et al., 2002; Shaw & Gant, 2002). Unfortunately, this research has mainly focused on direct relationships between online communication and social development, and hardly on the underlying explanations for the results obtained. Therefore, research can neither explain why results differ among studies, nor why online communication may affect adolescents' social development.

Online Self-Disclosure and Self-Presentation

Two intervening processes in particular may be important in explaining the relation between online communication and its outcomes on adolescents' social development: self-disclosure and self-presentation. Self-disclosure is defined as revealing intimate information about one's self (Derlega, Metts, Petronio, & Margulis, 1993). Self-presentation refers to adolescents' control of how they are perceived by others by selectively presenting aspects of their selves (Leary, 1996). Self-disclosure and self-presentation are two closely related processes, but are not interchangeable (Schlenker, 1986). Self-disclosure applies primarily to relationship development and is an essential process in forming and maintaining relationships (Altman & Taylor, 1973). Self-presentation is more widely applicable; it applies to every strategic presentation of one's self, not necessarily in the context of relationships.

Self-disclosure and self-presentation fulfill several key social functions in adolescent development (Buhrmester & Prager, 1995; Leary & Kowalski, 1990; Steinberg, 2001). First, they are crucial in forming and maintaining relationships (Rubin & Shenker, 1978). Second, they play a role in adolescents' identity development. By trying out different identities and learning from other's responses to these identities, adolescents may decide to integrate these identities in their self-concept (Schlenker, 1986). Moreover, adolescents continually compare the ways they disclose and present themselves with their peer's behavior in order to validate their opinions, attitudes, and values. Finally, self-disclosure and self-presentation affect self-esteem and well-being. First, the feedback adolescents receive on their self-disclosures and self-presentations may affect self-esteem and well-being because adolescents use this feedback to validate their selves (Leary & Kowalski, 1990). Second, self-disclosure and self-presentation are

important prerequisites for relationship development, which is closely linked to adolescent self-esteem and well-being (Derlega et al., 1993).

Online communication offers adolescents unique opportunities for self-disclosure and self-presentation. Certain attributes of online communication, such as the reduced nonverbal cues, control over time and pace of the interaction, and sometimes anonymity, may influence adolescents' self-disclosure (e.g., McKenna & Bargh, 2000; Suler, 2004; Walther, 1996). Experimental research into Computer-Mediated Communication (CMC), for example, has shown that self-disclosure is higher in anonymous CMC interactions than in similar face-to-face interactions (Joinson, 2001; Schouten, Valkenburg, & Peter, 2006). Recent research suggests that even non-anonymous online interactions, such as IM interactions, may stimulate self-disclosure (Schouten et al., 2007).

Self-presentation may also change when adolescents are online. In online chat rooms and virtual communities adolescents have unlimited opportunities to present themselves, which allows them to experiment with new or marginalized identities (McKenna & Bargh, 1998; Turkle, 1995; Valkenburg, Schouten, & Peter, 2005). On personal web sites and social networking sites adolescents have great freedom over how they structure their self-presentations (Bortree, 2005; Huffaker & Calvert, 2005; Stern, 2004), and they are in control of the impression they make (Vazire & Gosling, 2004). The control over self-presentation and the impressions you make are important motivations for adolescents to have a personal web site (Papacharissi, 2002).

Overall, social interaction among adolescents has for a large part shifted from offline to online communication, and online communication offers adolescents unique opportunities to disclose and present themselves. Because self-disclosure and self-presentation are extremely important for adolescents' social development, it is essential to investigate how online communication may affect adolescents' self-disclosure and self-presentation. However, research that focuses on adolescents' online self-disclosure and self-presentation is still scarce. Moreover, there is little research investigating the more recent online communication technologies, such as IM and social networking sites, and how these online communication technologies affect self-disclosure and self-presentation. Therefore, the first aim of this dissertation is to investigate the role of online communication in adolescents' self-disclosure and self-presentation.

As a second goal, this dissertation focuses on the underlying processes that may explain *why* online communication influences self-disclosure and self-presentation. Up to now, most research has focused on main effects of online communication, for example on the direct relationship between online communication and self-disclosure (Hu et al., 2004; Leung, 2002), or between personality characteristics and certain forms of online self-disclosure (Birnie & Horvath, 2002). Less research attention is devoted to the more fundamental question of why

online communication affects self-disclosure and self-presentation. Explanations for effects found are often given in hindsight, yet hardly hypothesized and empirically tested. A research focus on main effects results in scattered results without comprehensive theory. Only research that investigates possible mechanisms underlying online self-disclosure and self-presentation can adequately inform theory on the possible outcomes of online communication (Bargh, 2002; Tyler, 2002).

Focusing on underlying mechanisms may have great practical relevance. If research only focuses on main effects, we can only make crude generalizations about the risks or opportunities of online communication, and will we not be able to appropriately inform the broader public. Knowledge of the mechanisms underlying outcomes of online communication may enable us to make better predictions about which online communication technologies affect which adolescents under which circumstances. Educational attempts, for example to increase computer and Internet literacy, need to be grounded in thorough knowledge of underlying processes. Only if we know how and why adolescents are affected by certain media and communication technologies can we adequately educate them and their parents (Ruggiero, 2000).

Finally, more thorough knowledge of the mechanisms underlying online self-disclosure and self-presentation makes results more widely applicable. Focusing on main effects of online communication technologies, without knowing what causes these effects, results in isolated research that cannot be applied in other settings. For example, research has repeatedly found that self-disclosure is higher in anonymous CMC settings than in face-to-face settings. However, why CMC stimulates self-disclosure is not well understood. Several attributes of CMC have been held responsible, for example the anonymity and the reduced nonverbal cues of CMC, but these claims are hardly ever empirically investigated. Therefore, results can not easily be applied to other online communication technologies, such as IM, of which the attributes only partly overlap with CMC. Therefore, only research on the underlying mechanisms responsible for online self-disclosure and self-presentation, will result in empirically grounded theory with which we can explain the use and effects of a wide range of communication technologies.

Dissertation Outline

This dissertation consists of four studies, which address the three most popular online communication technologies: online chat rooms, IM, and social networking sites. All papers are either published (studies 1, 2 & 4), or submitted (study 3). The content of the chapters in this dissertation are equal to the published or submitted papers. Therefore, each chapter has its own abstract, introduction, discussion, and references. A short overview of each chapter is given below.

Study 1

The first study focuses on chat rooms. A chat room is a synchronous online text-based communication technology where multiple users may participate in a conversation simultaneously. Chat rooms are used mainly to communicate with strangers. In recent years, use of text-based chat rooms has declined, for two reasons. First, chat rooms have decreased in popularity due to the rise of IM, which enables adolescents to communicate online with their existing social network. Second, graphic 3D virtual communities, such as Habbo Hotel, also allow users to chat with others, but their graphic environments offer far more possibilities for interaction. Still, many adolescents occasionally visit an online chat room and 57% of adolescents indicate they sometimes chat with strangers (Peter et al., 2006).

The aim of the study is to investigate (a) how often adolescents engage in Internet-based identity experiments, (b) with what motives they engage in such experiments, and (c) which self-presentational strategies they use while experimenting with their identity. Through identity experimentation adolescents can transform initially compartmentalized identities into a stable self-concept, which is an important developmental task in adolescence (Josselson, 1994). These different identities are expressed through self-presentation (Baumeister, 1998; Harter, 1999). Chat rooms, which are anonymous and characterized by reduced nonverbal cues, are especially good at providing adolescents tremendous freedom to experiment with their identities (Subrahmanyam, Greenfield, & Tynes, 2004; Valkenburg et al., 2005). This study investigates how often adolescents experiment with their identities, which self-presentational strategies they use, and their motives for engaging in these identity experiments. Furthermore, the study investigates if identity experiments, self-presentational strategies, and motives differ between younger and older adolescents, boys and girls, as well as introvert and extravert adolescents.

Study 2

The second study investigates the most widely used online communication technology among adolescents, Instant Messaging (IM). Virtually all Dutch teenagers use Microsoft's MSN messenger; in the Netherlands, IM is even referred to as "MSN'en." The goal of the study is to explain the precursors and underlying processes of self-disclosure in IM. Research has shown that certain attributes of CMC may stimulate self-disclosure (Joinson, 2001; Tidwell & Walther, 2002). According to Walther's hyperpersonal communication theory (Walther, 1996), two structural attributes of CMC are responsible for increased online self-disclosure in CMC: the reduced nonverbal cues and the controllability of CMC. First, reduced nonverbal cues refer to the absence of audiovisual and status cues (Kiesler, Siegel, & McGuire, 1984). Second, the controllability of CMC allows adolescents more time to determine what they want to say

and how they say it, because an immediate response is not expected (Walther & Parks, 2002). These two CMC attributes apply to IM as well and may explain increased self-disclosure in IM interactions. However, CMC theories see these characteristics as two structural, fixed aspects of CMC, and therefore cannot explain individual differences in online self-disclosure.

In the second study, an "Internet-attribute-perception" model is developed and tested that may explain increased online self-disclosure. The model poses that not the reduced nonverbal cues and controllability per se are responsible for increased self-disclosure in IM, but the perceptions adolescents have of the importance of these attributes. Furthermore, the model expects that these perceptions may explain the relationship between certain personality characteristics (private self-consciousness, public self-consciousness, and social anxiety) and online self-disclosure. In our model, attributes of CMC as derived from experimental CMC research are combined with perceptions research and research on online communication. This allows us to empirically test the processes underlying self-disclosure in IM instead of only theoretically supposing them.

Study 3

The third study experimentally investigates the processes underlying self-disclosure in CMC. As discussed, the second study hopes to show that adolescents' perceptions of CMC attributes will influence their online self-disclosure. The goal of the third study is to investigate why these CMC attributes, and most notably the reduced nonverbal cues, stimulate self-disclosure. Based on existing theories of CMC, four explanations for the relationship between CMC and self-disclosure are presented and subsequently tested in an experiment.

A first explanation is that the reduced nonverbal cues in CMC may allow adolescents more control over their self-presentations, resulting in increased self-disclosure (Bargh, McKenna, & Fitzsimons, 2002). A second explanation poses that CMC partners have less attention for interpersonal differences, thereby increasing similarity and self-disclosure (Coleman, Paternite, & Sherman, 1999). Third, the reduced nonverbal cues of CMC may lead to changes in self-awareness, causing communication partners to be more aware of themselves and less of what others think of them (Matheson & Zanna, 1988). These two processes may lead communication partners to open up more than they normally would (Joinson, 2001). The fourth and final explanation is based on uncertainty reduction theory (Berger & Calabrese, 1975). This theory assumes a basic human need to reduce uncertainty about others in social interactions, resulting in communication partners' urge to get to know one another as well as possible. In CMC, communication partners have relatively little information available to reduce uncertainty, and are therefore forced to ask more intimate questions in order to reduce

uncertainty. Asking more intimate questions results in more intimate self-disclosure (Tidwell & Walther, 2002).

These four possible explanations will be tested in an experiment in which 81 male-female pairs are divided among three conditions: a text-only CMC condition (text chat), a visual CMC condition (chat with webcam), and a face-to-face condition. We choose to compare a text-only CMC condition to both a visual CMC condition and a face-to-face condition in the experiment, because most CMC theories see visual cues as responsible for the increased self-disclosure in CMC (Joinson, 2001; Walther, Slovacek, & Tidwell, 2001). However, compared to face-to-face communication, visual CMC still lacks several important cues, such as clothing, gestures, body language, speech, and intonation, which may still affect self-disclosure. Because visual cues alone may not be entirely responsible for CMC outcomes, this experiment investigates how the visual CMC condition differs from the text-only CMC condition and the face-to-face condition with regard to self-disclosure and the mediating variables.

Study 4

The fourth and final study focuses on a relatively new phenomenon, social networking sites (also called friend networking sites). The study investigates possible effects of self-presentation on social networking sites on self-esteem and well-being. On social networking sites, adolescents present themselves by means of an online profile, which contains a self-description (e.g., a biography, lists of activities, or more intimate information) and one or more photos. An important feature of all social networking sites is giving feedback on each others profiles. This feedback is published alongside the profile and often publicly accessible. Social networking sites have become increasingly popular in the last few years. The most popular social networking site in the Netherlands, Sugababes/Superdudes, houses more than a million profiles. On CU2, the site with which we conducted our research, 450.000 profiles have been created. According to a recent study, 58% of Dutch teens between 13 and 18 years old, have created an online profile (Duimel & De Haan, 2007).

The study tests several mediating processes that may explain how use of a social networking site affects adolescents' self-esteem and well-being. Earlier studies investigating the effects of online communication on self-esteem and well-being only focus on direct effects (Beebe et al., 2004; Kraut et al., 2002). In this study, we do not expect that the use of a social networking site will affect self-esteem and well-being directly, but we expect that use of a social networking site may affect self-esteem and well-being through (a) the number of friends made through the site, (b) the number of reactions received on the profile, and (c) the tone of these reactions (i.e., positive vs. negative).

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Study 1

Adolescents' Identity Experiments on the Internet¹

Abstract

The aim of this paper was to investigate (a) how often adolescents engage in Internet-based identity experiments, (b) with what motives they engage in such experiments, and (c) which self-presentational strategies they use while experimenting with their identity. Six hundred 9- to 18-year-olds completed a questionnaire in their classroom. 50% of the adolescents who used the Internet for chat or Instant Messaging indicated that they had engaged in Internet-based identity experiments. The most important motive for such experiments was self-exploration (to investigate how others react), followed by social compensation (to overcome shyness), and social facilitation (to facilitate relationship formation). Age, gender, and introversion were significant predictors of the frequency with which adolescents engaged in Internet-based identity experiments, their motives for such experiments, and their self-presentational strategies.

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Introduction

There is general consensus among researchers that the Internet can offer its users tremendous opportunities to experiment with their identities (e.g., Katz & Rice, 2002; Rheingold, 1993; Smith & Kollock, 1999; Turkle, 1995; Wallace, 1999). Internet communication has several characteristics that may stimulate individuals to undertake identity experiments. First, it is characterized by reduced auditory and visual cues, which may encourage users to emphasize, change, or conceal certain features of their physical self. Second, Internet communication is anonymous, especially during the early stages of Internet-based relationships. This anonymity may trigger people to feel less inhibited to disclose certain aspects of the self because potential repercussions for real life are reduced (McKenna & Bargh, 2000; Spears, Lea, & Postmes, 2000). Finally, Internet communication often happens in social communities that are isolated from those in real life. Such remote communities, which often involve limited commitment, may encourage identity experiments (Turkle, 1995).

Many identity researchers (e.g., Brinthaup & Lipka, 2002; Harter, 1999; Hogg, Terry, & White, 1995) regard the self and identity as two different, yet related constructs. They assume that while individuals have only one self, they have many different identities. These identities vary across relational contexts, such as the family, peer group, and school (Harter, 1999; Hogg et al., 1995). To describe identity, we adopted a definition by Finkenauer, Engels, Meeus, and Oosterwegel (2002, p. 2): "Identity represents the aspect of the self that is accessible and salient in a particular context, and that interacts with the environment."

The self and its identities participate in social life through self-presentation. Self-presentation is defined as people's attempts to convey information about and images of the self and its identities to others (Baumeister, 1998). Jones and Pittman (1982) identified several different self-presentational strategies. The most ubiquitous one is ingratiation, which can be defined as a strategy to convince others about the attractiveness of one's qualities. According to Jones and Pittman (1982), an ingratiator wants to be liked and to be considered attractive. A second self-presentational strategy is intimidation. In Jones and Pittman's view, the intimidator does not want to be liked, but he or she wants to be feared and to be believed. A third self-presentational strategy is self-promotion. A self-promoter wishes to convince others of his or her competence and wants to be respected.

Both identity experiments and self-presentational strategies are most significant during adolescence. Adolescence is characterized by an increase of identities that vary as a function of the relational contexts in which the adolescent participates (Harter, 1999). A critical developmental task in adolescence is to transform these initially compartmentalized identities into an

integrated self (Marcia, 1993; Josselson, 1994). Identity experiments are important to synthesize the variety of identities that emerge during early adolescence (Brinthaupt & Lipka, 2002; Harter, 1999).

There is growing evidence that adolescents use the Internet to experiment with their identities (e.g., Calvert, 2002; Lenhart, Rainie, & Lewis, 2001; Maczewski, 1999; Turkle, 1995; Valentine & Holloway, 2002). For example, Lenhart et al. (2001) found that almost a quarter of online adolescents who used e-mail, Instant Messaging, or chat indicated that they had pretended to be someone else. However, there is as yet no research about how and why adolescents engage in Internet-based identity experiments. The main aim of our paper is to fill this gap. We not only investigate which percentage of adolescents uses the Internet to experiment with their identity, we also explore which self-presentational strategies they use and with which motives they engage in Internet-based identity experiments. In addition, we investigate how adolescents' Internet-based identity experiments, self-presentational strategies, and motives for Internet-based identity experiments differ for younger and older adolescents, boys and girls, and introverts and extraverts.

Age Differences

Adolescent theories generally assume that pre- and early adolescence is characterized by an unstable self (Brinthaupt & Lipka, 2002; Harter, 1999; Shaffer, 1996). In this period, dramatic developmental transitions take place, including pubertal changes, cognitive-developmental advances, and changing social expectations (Brinthaupt & Lipka, 2002; Harter, 1999). The combination of these changes makes pre- and early adolescence a critical time for the consideration of self and identities, and thereby, identity experiments (Harter, 1999). Therefore, we anticipate that Internet-based identity experiments will be more common in pre- and early adolescence than in middle and late adolescence.

We also expect that the need for self-presentation on the Internet will be most significant among pre- and early adolescents. Young adolescents often engage in imaginative audience behavior (Elkind & Bowen, 1979). They tend to overestimate the extent to which others are watching and evaluating, and can be extremely preoccupied with what they appear to be in the eyes of others (Erikson, 1963; Harter, 1999). Based on these considerations, we investigate the following research question:

- RQ1:* Do pre- and early adolescents tend to engage more often in (a) Internet-based identity experiments, and (b) various self-presentational strategies than middle and late adolescents?

Gender Differences

There is to date no research on gender differences in adolescents' Internet-based identity experiments. The more general literature on gender differences in identity development is only of limited use because it has yielded inconsistent results. Some studies suggest that the identities of girls are more strongly developed (e.g., Erikson, 1963), whereas other studies suggest that the identities of boys are more strongly developed (e.g., Archer, 1985; Grotevant, Thorbecke, & Meyer, 1982). Yet other studies have found that boys and girls do not differ with respect to their identity development (e.g., Allison & Schultz, 2001; Meeus, Iedema, Helsen, & Volleberg, 1999).

There is no research on gender differences in Internet-based identity experiments. However, earlier research on gender differences in (a) video and computer games and (b) communication technologies may inform the present study. When video games became popular among large groups of adolescents in the 1980s, a series of studies demonstrated that boys spend about three times as much time on playing video games than girls (e.g., Dominick, 1984; Kubey & Larson, 1990; Lin & Lepper, 1987). This was regarded as a serious problem in the 1980s by some educators, because it was feared that the differential use in video games between boys and girls would increase the gender gap in access to technology (e.g., Greenfield, 1984; Kinder, 1991).

However, in the past decades the initial worries about girls' moderate use of video games have increasingly been abandoned. Although boys still tend to play video games three to five times as much as girls, the total time that boys and girls spend on a computer does not differ significantly anymore (Roberts et al., 1999; Valkenburg, 2004). Recent studies also show that girls enjoy as much as boys playing web games on the Internet (Valkenburg & Buijzen, 2003; Valkenburg & Soeters, 2001). However, boys and girls still differ in the type of games they prefer to play. Whereas boys more often prefer fantasy games with violent and adventurous themes, girls tend to prefer games based on reality involving themes with realistic-familiar characters (Subrahmanyam & Greenfield, 1998; Subrahmanyam, Greenfield, Kraut, & Gross, 2001).

Adolescents' favorite web activities also differ significantly between boys and girls. Boys more often prefer to download games and video clips, whereas girls more often prefer to e-mail and to send digital cards on the Internet. Girls also have a clearer preference for chat and Instant Messaging (Valkenburg & Buijzen, 2003). This gender-specific preference for Internet-based communication technologies is not surprising. If one investigates the history of communication technologies, it has usually been females who first embraced such technologies. This began already when the telephone was introduced (Rakow, 1988), and one century later,

the mobile telephone seems to be following the same pattern. Market research has shown that it is again women, and particular teenage girls, who are the trendsetters of mobile phone use. In the past few years, Instant Messaging can be added to the list of technologies that satisfy preadolescent girls' relatively high need for communication and social interaction (see also Lenhart et al., 2001; Valkenburg, 2004).

Finally, research on gender differences in self-presentation on the Internet also clearly suggests gender-specific preferences. Most of these studies have focused on the analysis of personal homepages. According to a review of personal homepage studies by Döring (2002), the homepages of males and females display gender-specific self-presentational strategies. Whereas males seem to emphasize their status and competence, women tend to present themselves as nice and attractive. They often use floral designs and pastel colors, and more often opt for less sophisticated technology. Based on these results, we formulate the following research question:

RQ2: How do girls and boys differ in (a) their tendency to engage in Internet-based identity experiments, and (b) their self-presentational strategies on the Internet?

Differences between Introverts and Extraverts

Studies on the social consequences of the Internet have suggested opposing hypotheses on how introverts and extraverts may use the Internet (Gross, Juvonen, & Gable, 2002; Kraut et al., 2002). The rich-get-richer hypothesis states that the Internet will mainly be used by extravert and outgoing adolescents, who will use the Web to add more friends to their already impressive reservoir of friends (Kraut et al., 2002; Walther, 1996). The social compensation hypothesis, by contrast, proposes that the Internet will especially be used by introvert and socially anxious adolescents, who have difficulty developing friendships in their real-life environment. The reduced visual cues provided by the Internet may encourage these adolescents to overcome the shyness and inhibition that they typically experience in real-life settings (McKenna & Bargh, 2000).

Empirical studies on the impact of introversion on Internet use have provided support for either the rich-get-richer (Kraut et al., 2002) or the social compensation hypothesis (Gross et al., 2002). An explanation for these discrepant findings may lie in age differences in the samples of the two studies. Kraut et al. (2002) drew on a combined sample of adolescents and adults, in which adults predominated, whereas Gross et al.'s (2002) study was based on a sample of early adolescents. The discrepancy in the results suggests that age may moderate the relationship

between introversion and Internet use. Early adolescents may be more susceptible to social compensation effects than middle and late adolescents are because concerns about interpersonal identity and fear of social rejection peak in early adolescence (e.g., Schaffer, 1996). Based on these considerations, we investigate the following two research questions:

- RQ3: How is introversion related to (a) the tendency to engage in Internet-based identity experiments and (b) self-presentational strategies?
- RQ4: Does the effect of introversion on (a) the tendency to engage in Internet-based identity experiments and (b) self-presentation differ for younger and older adolescents?

Adolescents' Motives for Internet-Based Identity Experiments

The final aim of our paper is to explore adolescents' motives for engaging in Internet-based identity experiments. Research on people's motives for media use traditionally falls within the uses and gratifications paradigm. A small, but growing body of research has focused on people's motives for using the Internet (Ferguson & Perse, 2000; Papacharassi & Rubin, 2000; Perse & Dunn, 1998; Valkenburg & Soeters, 2001) and Instant Messaging (Leung, 2001). However, there is as yet no research on adolescents' motives for Internet-based identity experiments and on how these motives may vary by age, gender, and introversion. We, therefore, investigate the following broad research questions:

- RQ5: What are adolescents' motives for engaging in Internet-based identity experiments?
- RQ6: How do these motives differ for younger and older adolescents, boys and girls, and introverts and extraverts?

Method

Sample and Procedure

Six hundred 9- to 18-year-olds ($M = 13.37$, $SD = 1.98$), participated in a survey study. These adolescents were recruited from three elementary and three middle and high schools in an urban district (Haarlem) in the Netherlands. These schools consisted of primarily white, native speaking Dutch adolescents. The schools were chosen in such a way that they represented adolescents of all educational and socioeconomic levels. The sample consisted of 317 (52,8%) boys and 283 (47,2%) girls.

The questionnaire consisted of three parts. In the first part, the adolescents identified their age, grade, and gender, and completed a 10-item introversion scale (Feij, 1979; Feij & Kuiper, 1984). The adolescents were then asked if they had ever used chat or Instant Messaging on the Internet. Only the adolescents who had ever used chat or Instant Messaging completed the second part of the questionnaire, which included questions about online communication and a series of questions related to identity experiments. At the end of the second part, the adolescents were asked if they had ever pretended to be someone else while being online. Only those adolescents who answered positively to this question completed the third part of the questionnaire, which focused on their self-presentational strategies. Respondents were told that their responses to the questionnaire would be treated anonymously. Completing the questionnaire took about 15 minutes.

Measures

Introversion. We used the introversion subscale of the Adolescent Temperament List (Feij, 1979; Feij & Kuiper, 1984). This scale consists of 10 items, such as "I don't talk easily about my problems," and "I am shy around strangers." The response categories for each of the items ranged from 1 (*completely agree*) to 5 (*completely disagree*). The 10 items formed a one-dimensional scale, with a Cronbach's alpha of .77.

Internet-based identity experiments. Respondents were asked whether they had ever pretended to be somebody else while communicating on the Internet. The response categories were 1 (*never*), 2 (*sometimes*), and 3 (*often*). Because we are interested in whether adolescents experiment with their identity at all, this item was dichotomized.

Self-presentational strategies. We asked respondents to remember a specific situation when they had pretended to be someone else. This was followed by open-ended questions on who they had pretended to be, with whom they chatted on that specific event, and why they had pretended to be someone else. Adolescents' open-ended responses were coded according to the following categories: pretending to be (1) an older person; (2) a more macho person; (3) a more beautiful person; (4) a more flirtatious person; (5) the opposite gender; (6) a real-life acquaintance (i.e., a parent, friend or sibling); (7) an elaborated fantasy person; and (8) a residual category.

Because the open-ended questions allowed for multiple answers (e.g., older and more beautiful), for each respondent, each coding category was coded as being present (= 1) or absent (= 0) in the response. Two independent judges coded the responses. Intercoder reliabilities, as measured by Cohen's Kappa, ranged from .80 (residual category) to .96 (pretending to be an older person).

Most of the open-ended responses of adolescents related to the self-presentational strategies identified by Jones and Pittman (1982). Pretending to be more beautiful and more flirtatious falls under the ingratiation strategy. Pretending to be older falls under the self-promotional strategy, whereas pretending to be more macho falls under self-promotion as well as intimidation. The remaining categories (i.e., a person of the opposite gender, a real-life acquaintance, and elaborated fantasy person) could not be classified as any of the self-presentational strategies identified by Jones and Pittman.

Adolescents' motives for Internet-based identity experiments. We measured adolescents' motives for Internet-based identity experiments with 10 items that reflected different psychosocial motives for Internet-based identity experiments. Examples of these items include: "I pretend to be someone else on the Internet... to feel less shy," "...to explore how people react on me," or "...to make it easier to meet new people." The adolescents were asked to specify how much each of the statements reflected their own motives for Internet-based identity experiments. The response categories ranged from 1 (*never*) to 3 (*often*).

Data Analysis

The dependent variables 'Internet-based identity experiments' and the various self-presentational strategies are dichotomies. For these variables, we estimated logistic regressions with age, gender, and introversion as independent variables. The various motives for Internet-based identity experiments are metric variables that allowed for ordinary least square regressions. To test whether the interaction between age and introversion significantly contributed to the prediction of Internet-based identity experiments and the self-presentational strategies (as suggested in research question 4), we estimated hierarchical regressions with age, gender, and introversion in the first block and the age X introversion interaction in the second. If an interaction effect turned out to be significant, we post-hoc probed the resulting conditional effects for whether they significantly differed from zero. Post-hoc probing presents a rigorous testing of interaction effects, which results in a more thorough understanding of these effects (Aiken & West, 1991).

Results

Univariate Analyses

The first aim of our survey study was to investigate which percentage of adolescents experiment with their identity and which self-presentational strategies they use. Of the 600 adolescents surveyed, 82% indicated that they at least sometimes use chat or Instant Messaging on the Internet. Fifty percent of the adolescents who used chat or Instant Messaging ($n = 246$) reported that they at least sometimes experimented with their identity while being online. 9- to 12-year-olds significantly more frequently (72%) reported such experiments than 13- to 14-year-olds (53%), and 15- to 18-year-olds (28%) did, $\chi^2(1, N = 493) = 61.15, p < .001$. There were no significant differences in the percentages of boys and girls, and of introverts and extraverts who engaged in Internet-based identity experiments.

Table 1 lists the eight self-presentational strategies for younger and older adolescents, boys and girls, and introverts and extraverts. The most common self-presentational strategies mentioned by adolescents were pretending to be an older person; a real-life acquaintance; a more flirtatious person; and an elaborated fantasy person. Pretending to be a person of the opposite gender; a more beautiful person; and a macho persona were less frequently mentioned.

Table 1. Adolescents' Internet-Based Self-Presentational Strategies

Self-Presentational Strategy	Entire sample	9-13 year-olds	14-18 year-olds	Boys	Girls	Introverts	Extraverts
	%	%	%	%	%	%	%
Older Person	49.8	53.2	44.0	39.8	59.2	40.4	56.3
More Macho Person	2.9	-	-	4.2	0.8	5.1	0.7
More Beautiful Person	6.6	9.1	2.2	1.7	11.2	3.0	9.0
More Flirtatious Person	13.2	-	-	-	-	-	-
Opposite Gender	9.5	-	-	-	-	-	-
Real-life Acquaintance	17.7	-	-	22.0	13.6	-	-
Fantasy Person	12.8	-	-	16.9	8.8	-	-
Other	10.7	-	-	-	-	-	-

Note. Subgroup comparisons reported in this table are significant at least at $p < .10$.

Younger adolescents, girls, and extraverts significantly more frequently pretended to be an older person than did older adolescents, boys, and introverts. Boys and introverts more often presented themselves as a macho persona, whereas girls, younger adolescents, and extraverts more frequently presented themselves as a more beautiful person. Finally, boys more often than girls presented themselves as a real-life acquaintance and as an elaborated fantasy person.

Multivariate Analyses

Some self-presentational strategies (i.e., more macho person, more beautiful person, and opposite gender) were mentioned too infrequently to allow for meaningful logistic regression analyses. In the following multivariate analyses, we therefore concentrate on only the four most frequently mentioned self-presentational strategies.

Our first three research questions focused on the potential influence of age, gender, and introversion on Internet-based identity experiments and self-presentational strategies. Our fourth research question concentrated on a potential interaction effect of age and introversion on identity experiments and self-presentational techniques. To investigate these research questions, we performed five logistic regression analyses on the following dichotomous dependent variables: (1) Internet-based identity experiments, (2) an older person, (3) a more flirtatious person, (4) a real-life acquaintance, and (5) an elaborated fantasy person. The results of these analyses are presented in Table 2.

A strong influence of age on Internet-based identity experiments emerged ($b = -.50, p < .001$). Consistent with our expectations, younger adolescents were significantly more likely than older adolescents to experiment with their identity (research question 1a). Age did not affect any of the self-presentational strategies (research question 1b).

Boys and girls did not differ in their likelihood to experiment with their identities on the Internet (research question 2a). With respect to self-presentational techniques, however, we found a significant effect of gender on pretending to be an older person ($b = .79, p < .01$). Girls were more likely than boys to pretend to be an older person when experimenting with their identity. Gender did not affect any of the other self-presentational strategies (research question 2b).

Introversion had no main effect on identity experiments and self-presentational strategies (research question 3). However, for two of the four self-presentational strategies a significant interaction between age and introversion emerged (research question 4). Adding the interaction effect to the model significantly increased the explanatory power of the model as the changes in the -2 log likelihood indicate. Both for pretending to be an older person ($b = .31, p < .05$) and for pretending to be a more flirtatious person ($b = .61, p < .01$), the influence of introversion was conditional on age.

Table 2. Identity Experiments and Self-Presentational Strategies Predicted

	Internet identity experiments (n = 493)	Older person (n = 243)	Flirtatious person (n = 243)	Real-life acquaintance (n = 243)	Elaborated fantasy person (n = 243)
<i>First block</i>					
Age	-.50*** (.06)	-.09 (.07)	-.02 (.11)	-.10 (.10)	.17 (.11)
Female	.11 (.20)	.79** (.26)	-.05 (.38)	-.59 (.35)	-.76 (.41)
Introversion	-.17 (.16)	-.21 (.22)	-.31 (.33)	-.30 (.30)	.41 (.32)
-2 log likelihood	598.23	325.62	188.39	221.82	178.26
<i>Second block</i>					
Age	-.50*** (.06)	-.08 (.08)	.08 (.13)	-.12 (.10)	.18 (.11)
Female	.12 (.20)	.82** (.27)	-.01 (.39)	-.59 (.35)	-.78 (.41)
Introversion	-.18 (.16)	-.07 (.23)	-.08 (.34)	-.40 (.32)	.42 (.44)
Age X Introversion	.03 (.10)	.31* (.13)	.61** (.19)	-.13 (.15)	-.19 (.18)
log likelihood change	.08	6.36*	11.23**	.67	1.06
-2 log likelihood	598.15	319.26	177.16	221.15	177.21
Constant (full model)	.03	-.46	-1.92	-1.39	-1.53

Note. * $p < .05$, ** $p < .01$, *** $p < .001$ (z-test for regression coefficients, two-tailed; Chi-square test for log likelihood change). Cell entries are unstandardized logistic regression coefficients, standard errors in parentheses.

Post hoc probing of these interaction effects revealed that, among the 9- to 11-year-olds, introverts were significantly less likely than extraverts to pretend to be an older or a more flirtatious person. Among the 12- to 15-year-olds, introverts and extraverts did not significantly differ in their likelihood of employing these two self-presentational techniques. However, among the oldest adolescents, the introverts were significantly more likely to pretend to be an older or more flirtatious person. This interaction effect did not occur for the general tendency to engage in internet-based identity experiments.

Motives for Internet-Based Identity Experiments

Research question 5 focused on adolescents' motives for experimenting with their identity on the Internet. To investigate this research question, we factor analyzed the 10 items designed to measure adolescents' motives for Internet-based identity experiments. This factor analysis yielded three factors that explained 63% of the variance. The individual items and their factor loadings are listed in Table 3.

Based on the results of the factor analysis, three scales were created: social compensation (4 items, Cronbach's alpha = .85; $M = 1.60$; $SD = 0.64$), social facilitation (3 items, Cronbach's alpha = .67; $M = 1.38$; $SD = 0.46$), and self-exploration (3 items, Cronbach's alpha = .53; $M = 2.06$; $SD = 0.57$).

Table 3. *Factor Solution for Adolescents' Motives for Internet-Based Identity Experiments*

	Factor 1	Factor 2	Factor 3
<i>I pretend to be someone else on the Internet...</i>			
<i>Factor 1: Social compensation</i>			
.. to feel less shy	.81	.11	.14
.. because I dare to say more	.79	.12	.21
.. because I can talk more easily	.79	.27	.06
.. to talk more easily about certain topics	.78	.12	.25
<i>Factor 2: Social facilitation</i>			
.. to make new friends	.27	.79	-.09
.. to more easily get to know people	.34	.73	.09
.. to get a date or relationship	-.05	.71	.27
<i>Factor 3: Self-exploration</i>			
.. to explore how others react on me	.01	.07	.75
.. to try out how it is to be someone else	.25	-.02	.66
.. because I can think up how I will look	.28	.22	.62
Eigenvalue	3.87	1.28	1.14

Research question 6 focused on the influence of age, gender and introversion on the three motives. Table 4 shows that younger adolescents experimented more frequently than older adolescents with their identity to facilitate social interaction ($b = -.05$, $p < .05$). Girls more often than boys engaged in Internet-based identity experiments for self-exploration ($b = .32$, $p < .01$) and social compensation ($b = .24$, $p < .01$). Finally, introverts engaged more often than extraverts in identity experiments for social compensation ($b = .20$, $p < .01$).

For self-exploration, a significant interaction effect between age and introversion emerged ($b = .08, p < .01$). Again, this effect was not trivial, as the improvement of the model's explanatory power by 3% suggests. Post-hoc probing of the interaction effect indicated that, among the 9- to 12-year-olds, introverts experimented significantly less frequently than extraverts with their identity for self-exploration. Among the 13- to 17-year-olds, the influence of introversion on self-exploration gradually became stronger, indicating that older introverts were more likely to experiment with their identity. However, none of these influences for older adolescents approached conventional significance levels. For the remaining two motives, social compensation and social facilitation, no significant interaction effect between age and introversion occurred.

Table 4. Predictors of Motives for Internet-Based Identity Experiments

	Self exploration ($n = 246$)	Social compensation ($n = 246$)	Social facilitation ($n = 245$)
<i>First block</i>			
Age	-.03 (.02)	-.02 (.02)	-.05** (.02)
Female	.32*** (.07)	.24** (.08)	.11 (.06)
Introversion	-.07 (.06)	.20** (.07)	.06 (.05)
R square	.09***	.08***	.06**
<i>Second block</i>			
Age	-.02 (.02)	-.01 (.02)	-.05** (.02)
Female	.32** (.07)	.24** (.08)	.11 (.06)
Introversion	-.03 (.06)	.22** (.07)	-.04 (.05)
Age X Introversion	.08** (.03)	.03 (.04)	-.03 (.03)
R square change	.03**	<.01	<.01
R square	.12***	.08	.06**
Constant (full model)	1.88	1.50	1.30

Note. * $p < .05$, ** $p < .01$, *** $p < .001$ (t-test for regression coefficients, two-tailed; F-test for R square). Cell entries are unstandardized multiple regression coefficients, standard errors in parentheses.

Discussion

The main aim of our study was to investigate how often adolescents engage in Internet-based identity experiments. Our results showed that early adolescents significantly more often experimented with their identities than did older adolescents. This result is consistent with general adolescent identity theories, which assume that early adolescence is a critical time for the consideration of self and identity, and consequently, identity experiments. Our results are also in line with Livingstone and Bober (2003), who suggest that older teens more often use the Internet to communicate with their existing personal network, whereas younger adolescents more frequently use it to communicate with strangers and play with their identities.

Younger adolescents did not significantly differ from older adolescents in most of their self-presentational strategies. According to our univariate analyses, younger adolescents significantly more often presented themselves as an older person. However, this effect disappeared in the multivariate analyses, in which gender and introversion were controlled. However, younger adolescents did tend to present themselves more often as beautiful than older adolescents did. This result may be due to a general tendency of younger adolescents to play with their identity. It may also be attributed to commonly observed declines in self-esteem and perceptions of physical attractiveness in early adolescence (e.g., Kostanski & Gullone, 1998; Williams & Currie, 2000).

Our second research question involved possible gender differences in Internet-based identity experiments and self-presentational strategies. Our results showed that boys and girls did not differ in the frequency with which they experimented with their identities. However, boys and girls did differ in several self-presentational strategies. First, both the univariate and the multivariate analyses showed that girls more often than boys pretended to be older. An explanation may be that girls usually mature earlier than boys (Allison & Schultz, 2001), which may lead to a stronger need of girls to communicate with older persons.

Our univariate analyses showed some additional gender differences in self-presentational strategies. Whereas girls more often pretended to be beautiful, boys more frequently pretended to be macho. These findings are consistent with stereotypes of how boys and girls should behave in adolescence. Anonymous settings, such as chat rooms, often have strong norms towards gender-stereotyped behavior (Jacobson, 1999; Turkle, 1995). Gender-stereotypical self-presentational strategies may be particularly salient in such settings (Postmes & Spears, 2002).

We found no significant main effects of introversion on Internet-based identity experiments and self-presentational strategies. We also did not find any interaction effects of age and introversion on adolescents' Internet-based identity experiments. However, we did find that

among younger adolescents, the extraverts were more likely to present themselves as older and flirtatious, whereas among older adolescents, the introverts were more likely to present themselves as older and flirtatious. Obviously, extraverts, who are less shy and more sociable than introverts, start to use the Internet at an earlier age to present themselves as older and flirtatious. In later adolescence, when a real need for cross-sex relations and self-presentation emerges (Aboud & Mendelson, 1996), it is the introverts, who have difficulty with self-presentation and social interaction in real life, who start to use the Internet to present themselves as older and more flirtatious.

Adolescents' Motives for Internet-Based Identity Experiments

The most important motive to engage in Internet-based identity experiments was self-exploration (i.e., to explore how others react), followed by social compensation (i.e., to overcome shyness), and social facilitation (i.e., to facilitate relationship formation). The motive to engage in Internet-based identity experiments for self-exploration was predicted only by gender. Compared to boys, girls more often experimented with their identity to explore their selves and investigate how they appear to be in the eyes of others. Girls are more likely than boys to experience declines in self-esteem during adolescence. Compared to boys, they are generally unhappier with their body and more likely to worry and ruminate about their problems (Azmitia, 2001; Harter, 1999). This decrease in self-esteem could encourage girls to use the Internet more frequently than boys to explore and test certain aspects of their selves.

We also found an interaction effect of age and introversion for self-exploration. Both younger extraverts and older introverts particularly experimented with their identity for reasons of self-exploration. This interaction effect of age and introversion bears similarities to the age-introversion interaction found for pretending to be older and more flirtatious. It is possible that extraverts start to use the Internet at an earlier age to explore different aspects of their selves. In later adolescence, when the need for identity exploration and experimentation becomes more acute for all adolescents, especially introverts may take the opportunity to experiment with their identity for self-exploration.

The motive to experiment with one's identity for social compensation was predicted by gender and introversion. Girls and introverts more often experiment with their identity for reasons of social compensation than boys and extraverts. As discussed earlier, compared to boys, girls typically have a lower self-esteem and are more dissatisfied with their physical appearance. Girls also have a greater need for self-disclosure than boys (Buhrmester & Furman, 1987). Together, these factors could induce girls to turn to Internet-based identity experiments to overcome their shyness and to disclose themselves without any repercussions for real life.

Our finding that introverts experiment with their identity for reasons of social compensation is consistent with earlier evidence that the reduced visual and auditory cues provided by the Internet may encourage introvert adolescents to overcome the shyness that they typically experience in real-life settings (Amichai-Hamburger, Wainapel & Fox, 2002; Gross, Juvonen, & Gable, 2002; Hamburger & Ben-Artzi, 2000; Kraut et.al., 2002).

Finally, the tendency to engage in Internet-based identity experiments to facilitate relationship formation was negatively predicted by age. Early adolescents more often engage in identity experiments for social facilitation than older adolescents. This result is in line with research on adolescents' friendships, which has shown that during early adolescence, the number of friends increases rapidly. This emerging need to make new friends declines somewhat in later adolescence, when the quality of existing friendships increases (Aboud & Mendelson, 1996; Berndt & Hoyle, 1985; Schaffer, 1996).

Our study has demonstrated that the Internet can play an important role in adolescents' identity explorations. Most of our results are in line with adolescent identity and friendship theories. We focused our study on the question of how and why adolescents engage in Internet-based identity experiments. We did not investigate the consequences of Internet-based identity experiments. Future research should address both the short- and longer-term consequences of Internet-based identity experiments for adolescents' sense of self, their emotional well-being, and their social adjustment.

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Study 2

Precursors and Underlying Processes of Adolescents' Online Self-Disclosure: Developing and Testing an "Internet-Attribute-Perception" Model¹

Abstract

This study developed and tested an "Internet-attribute-perception" model that explains how self-disclosure develops in Instant Messaging (IM) interactions. Following hyperpersonal communication theory, two attributes of computer-mediated communication (i.e., reduced nonverbal cues and controllability) were assumed to be responsible for increased online self-disclosure in IM. However, our model posed that any actual effects of these attributes would depend on users' perceptions of the relevance of these attributes. Furthermore, our model posed that these perceptions would mediate the relationship between personality characteristics (i.e., private and public self-consciousness, and social anxiety) and online self-disclosure. Using structural equation modeling on a sample of 1,203 Dutch adolescents, we found that adolescents' perceptions of the relevance of reduced nonverbal cues and controllability encouraged their feelings of disinhibition, which in turn increased their online self-disclosure. As expected, private and public self-consciousness and social anxiety stimulated adolescents' perceptions of the relevance of reduced nonverbal cues and controllability, but did not directly influence online self-disclosure. The study shows the vital role of users' perceptions of CMC attributes in Internet-effects research.

¹Schouten, A. P., Valkenburg, P. M., & Peter, J. (2007). Precursors and underlying processes of adolescents' online self-disclosure: Testing an "Internet-Attribute-Perception" model. *Media Psychology, 10*, 292-315.

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Introduction

Instant Messaging (IM) has become a pervasive phenomenon in the past few years, especially among adolescents. IM is a synchronous, largely text-based communication tool that allows Internet users to exchange messages. Although some adolescents use IM to talk with strangers, IM typically involves non-anonymous communication with one's existing network of friends (Grinter & Palen, 2002; Gross, 2004). In the US, 75% of online adolescents use IM, and for most adolescents IM has become more important than e-mail (Hu, Wood, Smith, & Westbrook 2004; Lenhart, Madden, & Hitlin, 2005).

Both survey research into the uses and effects of IM (Hu et al., 2004; Leung, 2002; Schiano et al., 2002; Valkenburg & Peter, 2007) and experimental studies on the effects of Computer-Mediated Communication (CMC; Bargh, McKenna, & Fitzsimons, 2002; Joinson, 2001; Tidwell & Walther, 2002) have repeatedly demonstrated that CMC stimulates self-disclosure. Self-disclosure may be defined as disclosing intimate information about the self (Derlega, Metts, Petro, & Margulis, 1993). The enhanced self-disclosure in CMC is often explained with Walther's (1996) hyperpersonal communication theory (e.g., Gibbs, Ellison, & Heino, 2006; McKenna & Bargh, 2000; Peter & Valkenburg, 2006). This theory poses that CMC facilitates "hyperpersonal" communication, that is, communication that is more intimate than face-to-face communication.

According to hyperpersonal communication theory, two structural attributes of CMC encourage interactants to engage in more intimate exchanges in CMC settings than in face-to-face settings (Tidwell & Walther, 2002; Walther, 1996). The first attribute is CMC's reduced nonverbal cues. CMC is typically characterized by reduced visual, auditory, and context cues, such as social status cues (Kiesler, Siegel, & McGuire, 1984). The second structural attribute assumed to enhance online self-disclosure is the controllability of CMC. The controllability of CMC allows users the time to review and edit their messages and to consider responses (Walther & Parks, 2002). Although controllability seems more important in asynchronous CMC, such as e-mail, it also applies to synchronous CMC, such as IM (cf., Tidwell & Walther, 2002). In IM, messages are only sent upon pressing "Enter" and responses do not necessarily have to be immediate. Walther (1996) posits that, because of CMC's reduced nonverbal cues and controllability, interactants get absorbed in the communication task. Reduced nonverbal cues and controllability reduce people's inhibitions when interacting through CMC. This disinhibitive effect of CMC may in turn result in increased online self-disclosure (Jessup, Connolly, & Tansik, 1990; Kiesler et al., 1984; Walther, 1996).

² Walther refers to this attribute as "asynchronous communication" (1996, p. 29). However, we found the term controllability to be more appropriate because even synchronous CMC allows more time and control to construct messages than face-to-face communication.

Reduced nonverbal cues and controllability may be central in explaining the enhanced online self-disclosure. However, in most CMC research based on hyperpersonal theory, these attributes are usually seen as structural, fixed aspects of CMC that are only implicitly assumed (e.g., Bargh et al., 2002; Tidwell & Walther, 2002). Nevertheless, recent survey research on online communication has shown that Internet users can differ greatly in their perceptions of the relevance of CMC attributes (Peter & Valkenburg, 2006; Tsai, 2004; Tsai & Lin, 2004). Furthermore, in contemporary media effects research, it is widely acknowledged that users' perceptions of a medium may intervene with effects of that medium (e.g., Rubin, 2002). Therefore, it is not only important to operationalize user perceptions about CMC attributes, but also to investigate how potential differences in these perceptions may affect CMC outcomes. A first aim of our study is to investigate (a) how users differ in their perceptions of the relevance of CMC attributes and (b) how these perceptions influence differences in online disinhibition and self-disclosure.

Hyperpersonal communication theory offers a valid explanation of how CMC may stimulate disinhibition and self-disclosure. However, the theory has paid little attention to user factors that may play a role in shaping online communication and its outcomes. In the past years, Internet research has increasingly focused on the influence of personality factors on the uses and outcomes of the Internet (Gross, Juvonen, & Gable, 2002; Kraut et al., 2002; McKenna & Bargh, 2000). It has been shown, for example, that socially-anxious adolescents use the Internet differently and experience different outcomes from the Internet than non-socially anxious adolescents (Gross et al., 2002; Valkenburg & Peter, 2007). Furthermore, personality characteristics significantly predict adolescents' perceptions of the attributes of online communication (Peter & Valkenburg, 2006).

Several media theories, such as the uses and gratifications approach, have tried to explain the predictive value of personality characteristics for media perceptions (e.g., Rosengren, 1974; Rubin, 2002; Sherry, 2001). Personality characteristics are usually seen as relatively stable patterns of an individual's thoughts, emotions, and behavior (e.g., Funder, 2001; Oliver, Kim, & Sanders, 2006). These stable patterns of thoughts, emotions, and behavior are significant determinants of an individual's wants and needs (Katz, Blumler, & Gurevitch, 1974; Rosengren, 1974). For example, people high in private self-consciousness generally have a higher need for self-disclosure (Franzoi & Davis, 1985). In some cases, media can be used to fulfill these personality-induced needs. For example, CMC is often used to fulfill one's need for self-disclosure (Leung, 2002; McKenna & Bargh, 2000). If an individual perceives that a certain medium is appropriate to fulfill a particular need (e.g., self-disclosure), he or she will attach more relevance to this medium and the attributes of that medium that fulfill these needs (Katz, Blumler, & Gurevitch, 1974).

From this reasoning it follows that personality characteristics may shape perceptions of the relevance of media and media attributes. This has been confirmed for media in general (Finn, 1997; Sherry, 2001; Weaver, 2003) and CMC attributes in particular (Peter & Valkenburg, 2006). Moreover, research has shown that perceptions of the relevance of CMC attributes may affect the outcomes of CMC (Valkenburg & Peter, 2007; also more generally see Carlson & Zmud, 1999; Trevino & Webster, 1992). If, then, personality characteristics predict adolescents' perceptions of CMC attributes and these perceptions, in turn, predict the effects of CMC, it is plausible that adolescents' perceptions of CMC attributes mediate the effect of personality characteristics on online self-disclosure. It is the second aim of our study to investigate this assumption.

We focus on three personality factors that are (a) critical in adolescence (Elkind & Bowen, 1979) and (b) crucial precursors of adolescents' online and/or offline self-disclosure (Cheek & Buss, 1981; Franzoi & Davis, 1985; Gross et al., 2002; La Greca & Lopez, 1998): social anxiety, private self-consciousness, and public self-consciousness. We hypothesize that these three personality characteristics will influence adolescents' perceptions of the relevance of reduced nonverbal cues and controllability. These perceptions, in turn, may influence adolescents' disinhibition and online self-disclosure. To investigate these assumptions, we introduce and test an "Internet-attribute-perception" model that explains how self-disclosure develops during IM. Our model assumes that adolescents' perceptions of CMC mediate the relation between personality and online self-disclosure. Our model, which will be discussed more fully in the next sections, is graphically presented in Figure 1.

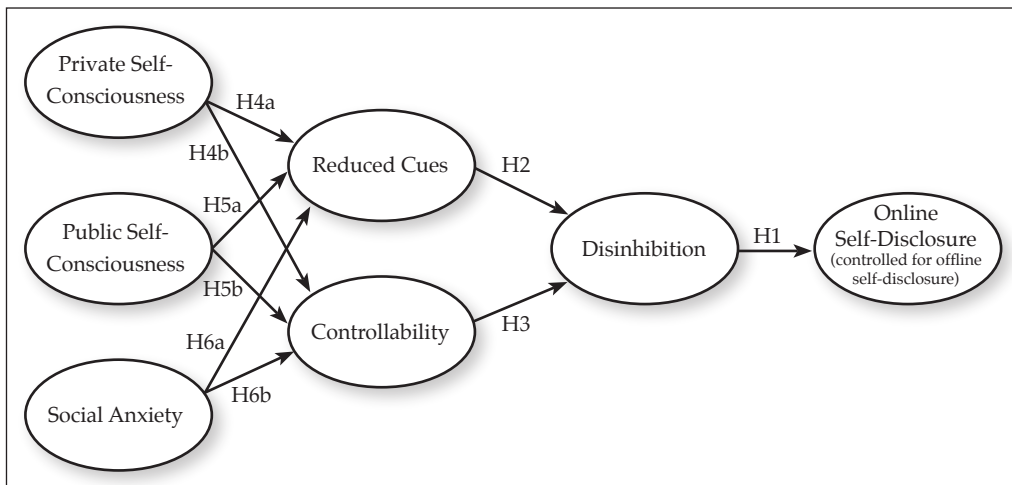


Figure 1. Hypothesized "Internet-attribute-perception" model underlying adolescents' online self-disclosure.

Our study focuses on adolescents for two reasons. First, not only do adolescents use IM more often than adults, but they also have integrated IM more fully into their lives (Grinter & Palen, 2002; Lenhart et al., 2005). Second, the ability to self-disclose is an important developmental task during adolescence (Harter, 1999; Steinberg, 2001). Through self-disclosure, adolescents form and maintain friendships and romantic relationships (Buhrmester & Furman, 1987). Adolescents who are unable to self-disclose are usually lonely and have lower levels of self-esteem and well-being than their peers who are more apt at self-disclosure (Collins & Miller, 1994). Therefore, adolescents are a very suitable group to investigate the role of IM in the development of self-disclosure.

Developing an “Internet-Attribute-Perception” Model

Disinhibition and Online Self-Disclosure

Interpersonal outcomes of online communication, including online self-disclosure, are usually attributed to online disinhibition (Jessup et al., 1990; Walther, 1996). Disinhibition refers to the loss of constraints that a person experiences when behavior is no longer controlled by concerns about self-presentation or judgments by others (Joinson, 1998). Disinhibition is a psychological state in which a person feels less inhibited to exhibit certain behavior (Jessup et al. 1990; Joinson, 2001; Kiesler et al., 1984; Matheson & Zanna, 1988). In CMC research, disinhibition is often considered a precursor of online self-disclosure (Coleman, Paternite, & Sherman, 1999; Joinson, 1998; Kayany, 1998; McKenna & Bargh, 1998; Walther, 1996). However, the concept has usually only been implicitly assumed in CMC research and has never been empirically tested. This study presents a first step to fill this research gap by investigating the relationship between online disinhibition and online self-disclosure. Our first hypothesis, which is visualized by path H1 in Figure 1, states that:

- H1:* The more disinhibited adolescents feel in IM interactions, the higher their levels of online self-disclosure.

Perceptions of CMC Attributes

Both the reduced nonverbal cues and the controllability of CMC may facilitate online disinhibition and self-disclosure (Walther, 1996). Reduced nonverbal cues may diminish inner constraints and evaluation by others, leading to disinhibited behavior (Jessup et al., 1990). Controllability may allow adolescents greater control over their self-presentation (McKenna & Bargh, 2000; O'Sullivan, 2000; Walther, 1996). As a consequence, it may stimulate adolescents to feel more at ease to discuss intimate topics that they usually would not disclose in real life

(Bargh et al., 2002). Our Internet-attribute-perception model assumes that adolescents who attach more relevance to the reduced nonverbal cues and controllability of IM will feel more disinhibited and, subsequently, will self-disclose more online than adolescents who attach less relevance to these attributes. These assumptions lead to the following hypotheses, visualized by paths H2 and H3 in Figure 1:

- H2: Adolescents who perceive the reduced nonverbal cues of IM interactions as more relevant will feel more disinhibited when using IM, and will subsequently self-disclose more easily.
- H3: Adolescents who perceive the controllability of IM interactions as more relevant will feel more disinhibited when using IM, and will subsequently self-disclose more easily.

Personality Characteristics Affecting Perceptions of IM Attributes

In our model, the effects of private self-consciousness, public self-consciousness, and social anxiety on online disinhibition are mediated by adolescents' perceptions of the reduced nonverbal cues and controllability of IM. We selected these three personality factors for three reasons. First, they are particularly important in adolescence (Harter, 1999; Steinberg, 2001). Second, they are related to adolescents' online and/or offline self-disclosure (Cheek & Buss, 1981; Franzoi & Davis, 1985; Gross et al., 2002; La Greca & Lopez, 1998). Third, it has recently been found that specific personality characteristics are more relevant to media perceptions than more general characteristics such as extraversion. These general traits are often too broad to yield significant results (Hall, 2005).

We expect private self-consciousness to increase both the perceived relevance of reduced nonverbal cues and controllability. Private self-consciousness refers to the "dispositional tendency to focus attention on the more private and covert aspects of oneself" (Franzoi & Davis, 1985, p. 769). Adolescents high in private self-consciousness are typically more aware of their inner feelings, attitudes, and thoughts than those low in private self-consciousness, and are therefore better able and more motivated to disclose themselves. In face-to-face interactions, impressions are usually based on easily observed aspects of the self, such as nonverbal cues, and not on the more intimate aspects of the self (Hancock & Dunham, 2001; McKenna, Green, & Gleason, 2002; Riggio & Friedman, 1996). Therefore, adolescents high in private self-consciousness may judge the reduced nonverbal cues and controllability of IM as more relevant because they feel that the impressions they make will be based on their self-disclosures and not on cues that are unintentionally given off. These adolescents may also judge the controllability

of IM as more relevant because it gives them more time to reflect upon their inner feelings and how to communicate these feelings. Furthermore, self-disclosure to peers is sometimes risky (Buhrmester & Prager, 1995). The reduced nonverbal cues and controllability of IM may create some psychological distance that facilitates communication (e.g., Kiesler et al., 1984). This will especially appeal to those high in private self-consciousness because they are more motivated to disclose themselves. We therefore hypothesize:

H4: Private self-consciousness is positively related to the perceived relevance of the reduced nonverbal cues (H4a) and the controllability (H4b) of IM interactions.

We also expect public self-consciousness to be positively related to both the perceived relevance of reduced nonverbal cues and the controllability of IM. While private self-consciousness refers to the inner aspects of self, public self-consciousness is the awareness of how one appears in the eyes of others (Fenigstein, Scheier, & Buss, 1975). Because the reduced nonverbal cues may lower concern about evaluation of others (Matheson & Zanna, 1988), adolescents high in public self-consciousness may consider IM's reduced nonverbal cues to be more relevant than those low in public self-consciousness. Furthermore, adolescents high in public self-consciousness are usually more sensitive to the impressions they make on others, and the controllability allows them more time and opportunity to optimize their self-presentation (Fenigstein et al., 1975; Tobey & Tunnell, 1981). We therefore hypothesize:

H5: Public self-consciousness is positively related to the perceived relevance of the reduced nonverbal cues (H5a) and the controllability (H5b) of IM interactions.

Social anxiety resembles public self-consciousness, but while public self-consciousness only refers to the awareness of how one appears to others, social anxiety also implies that one is worried about it and, consequently, inhibited in social interactions (La Greca & Lopez, 1998). In studies of self-consciousness, private self-consciousness, public self-consciousness, and social anxiety consequently emerge as three separate factors (e.g., Cramer, 2000; Fenigstein et al., 1975; Mittal & Balasubramanian, 1987).

We expect a positive relationship between social anxiety and the perceived relevance of the reduced nonverbal cues and the controllability of IM interactions. Because the socially anxious are inhibited in social interactions, they self-disclose less than those who are lower

in social anxiety (Meleshko & Alden, 1993). The reduced nonverbal cues in IM may diminish these constraints because socially anxious people may feel less scrutinized by others during IM. Indeed, it has been found that those high in social anxiety prefer online self-disclosure over self-disclosure in face-to-face communication (McKenna et al., 2002; Stritzke, Nguyen, & Durkin, 2004). Furthermore, the socially anxious are less assertive and prefer settings in which their interactions can be prepared ahead of time (Arkin & Grove, 1990). Therefore, they may find the control over message construction in IM more relevant than those low in social anxiety. Our last hypothesis, depicted as H6a and H6b in Figure 1, is:

H6: Social anxiety is positively related to adolescents' perceived relevance of the reduced nonverbal cues (H6a) and the controllability (H6b) of IM interactions.

Online versus Offline Self-Disclosure

Online self-disclosure can only be studied adequately when one's tendency for self-disclosure in offline interactions is taken into account. After all, adolescents who more easily disclose in face-to-face-interactions may also do so more frequently on the Internet. In this case, our model would explain adolescents' general tendency to self-disclose and not their specific tendency to self-disclose online. To avoid this possible confound, our dependent variable –online self-disclosure– will be controlled for offline self-disclosure.

Taking adolescents' offline disclosure into account also provides us with the opportunity to compare the relative frequency of online and offline self-disclosure. Our study can provide a first insight into the ratio of online and offline self-disclosure within different subgroups. For example, female adolescents generally self-disclose more than male adolescents (Dindia & Allen, 1992; Miller, Berg, & Archer, 1983). In addition, self-disclosure in same-sex adolescent interactions (i.e., males to males and females to females) is usually higher than self-disclosure in cross-sex adolescent interactions (i.e., female to male; Hacker, 1981). However, it is as yet unknown how males versus females and same-sex versus cross-sex self-disclosure compare when considering online self-disclosure. Therefore, we pose two final research questions:

RQ1: How do adolescents' levels of online self-disclosure relate to their levels of offline self-disclosure?

RQ2: To what extent do levels of online self-disclosure differ for boys and girls and for cross-sex and same-sex self-disclosure?

Method

Sample and Procedure

We conducted a survey among 1,340 adolescents between 10 and 18 years of age ($M = 14.10$, $SD = 2.06$, 49% girls). Ninety percent reported using IM. The analyses in this paper are based on these adolescents ($N = 1,203$). The adolescents were recruited from six schools in urban areas in the Netherlands. Three of these schools were elementary schools; the 10- to 12-year-olds were sampled there. The three remaining schools were secondary schools. Two of these schools represented lower secondary professional education, and provided 48% of the secondary-school respondents. One school represented higher general secondary education. The schools thus covered all educational levels in the Netherlands.

After we had obtained parental consent, a research assistant administered paper-and-pencil questionnaires in the classroom. We ensured that adolescents had sufficient privacy to fill in the questionnaires. The 10% of respondents who had indicated that they had never used IM were asked only to provide their age and gender. Completing the questionnaire took about 30 minutes.

Measures

Online self-disclosure. Our measure of self-disclosure was based on earlier scales that measure intimate self-disclosure (Jourard, 1971; Miller et al., 1983). Cross-sex and same-sex self-disclosure was measured separately by asking respondents to indicate their level of self-disclosure to boys and girls, and then recoding these scores based on the respondents' gender.

Respondents were first asked to think of a boy with whom they regularly communicated via IM. Next, they were asked to indicate how much they disclosed to this boy about the following seven topics: "My personal feelings," "the things I am worried about," "my secrets," "being in love," "sex," "moments in my life I am ashamed of," and "moments in my life I feel guilty about." Items were measured on a 5-point scale ranging from 1 (*I tell nothing about this*) to 5 (*I tell everything about this*).

Respondents were subsequently asked to think of a girl with whom they regularly communicated via IM. They were asked to fill in the aforementioned seven items with this girl in mind. Cronbach's alpha for online self-disclosure to both boys and to girls was .93. Both scales were then recoded to cross-sex and same-sex self-disclosure scales based on the respondent's gender. For female respondents, self-disclosure to girls was recoded into same-sex self-disclosure and self-disclosure to boys was recoded into cross-sex self-disclosure. For male respondents, self-disclosure to girls was recoded into cross-sex self-disclosure, and self-disclosure to boys was recoded into same-sex self-disclosure.

Offline self-disclosure. The above-described procedure was also used to measure offline self-disclosure. Cronbach's alphas were .92 for offline disclosure to girls and .93 for offline disclosure to boys. Based on respondent's gender, offline self-disclosure to boys and offline self-disclosure to girls were then recoded into cross-sex and same-sex offline self-disclosure, following the same procedure we used for online self-disclosure.

We specifically asked adolescents to think of a girl or boy with whom they regularly communicated online or offline. We posed the question in this way because we did not want to adolescents only to think of a best friend. Because self-disclosure with best friends is typically high, there would not be enough variance in the two self-disclosure scales. Likewise, if we would have specifically prompted adolescents to think of the same boy and girl twice, for online and offline self-disclosure, there also might not be enough variance in the two self-disclosure scales. To control for the closeness of the girl or boy our respondents thought of, we asked them to indicate how close they felt to the girl or boy they had in mind, on a scale from 1 (*very close*) to 5 (*not close at all*). For all four disclosure measures, over 90% of respondents scored 1 (*very close*), 2 (*close*), or 3 (*somewhat close*). The percentages were roughly evenly divided among these three categories. In other words, not every adolescent thought of a best friend, but most thought of someone who was close to them.

Online disinhibition. Disinhibition refers to the experience of feeling less constrained to exhibit certain behavior (Joinson, 1998). Based on this definition, we operationalized online disinhibition with three items: (1) "During IM, I feel less constrained to use certain words than in a face-to-face meeting," (2) "During IM, I feel less restricted to talk about certain things than in a face-to-face meeting," and (3) "During IM, I feel more free to talk about things than in a face-to-face meeting." Online disinhibition was measured on a 5-point scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). The three items formed a one-dimensional scale, with a Cronbach's alpha of .77.

Perceived relevance of reduced nonverbal cues. Reduced nonverbal cues refer to the absence of visual, auditory, and social context cues, such as status cues (Kiesler et al., 1984; Walther, 1996). Three items measured the perceived relevance of these cues. Respondents were asked to indicate to what extent they considered it important that during IM: (1) "...others cannot see what I look like," (2) "...others cannot hear how my voice sounds," and (3) "...others cannot see what clothes I wear." The response categories for these items ranged from 1 (*very unimportant*) to 5 (*very important*). The first two items relate to the absence of visual and auditory cues. We included the third item to represent status cues because in adolescence, clothing is an important reflection of social status and is a cue that is easily observed face-to-face (De Bruyn, 2005; Shook, 1997). Cronbach's alpha of the scale was .72.

Perceived relevance of controllability. We measured controllability with two items. The first item reflected the increased time and control users have over message construction in CMC and the second item reflected the possibility to consider responses (Walther & Parks, 2002). We asked respondents to what extent they considered it important that, during IM: (1) "...I have more time to think about what I want to say," and (2) "...I have time to think about how I say something." The response categories ranged from 1 (*very unimportant*) to 5 (*very important*). Cronbach's alpha of the scale was .87.

Private and public self-consciousness. The Fenigstein Self-Consciousness Scale (Fenigstein et al., 1975) was used to assess private and public self-consciousness. The scale has successfully been employed to measure private and public self-consciousness among adolescents (Rankin, Lane, Gibbons, & Gerrard, 2004). Based on research regarding the factor structure of the scales (Cramer, 2000; Dillard & Hunter, 1989), we left out 4 items (1, 3, 9, 22) from the original private self-consciousness scale and 2 items from the public self-consciousness scale (17, 21). Examples of items from the private self-consciousness scale include: "I reflect about myself a lot," and "I am generally attentive to my inner feelings." Examples of items from the public self-consciousness scale are: "I usually worry about making a good impression," and "I am concerned about the way I present myself." Response categories for the items ranged from 1 (*completely disagree*) to 5 (*completely agree*). A factor analysis with varimax rotation yielded two independent factors with an explained variance of 55%. Cronbach's alpha was .80 for the private self-consciousness scale and .83 for the public self-consciousness scale.

Social Anxiety. We measured social anxiety with four items from the "Social avoidance and distress – new people subscale" of the Social Anxiety Scale for Adolescents (La Greca & Lopez, 1998). From the original 18-item scale, we selected the four items with the highest factor loadings. The items were: "I get nervous when I meet new people," "I feel shy around people I don't know," "I get nervous when I talk to peers I don't know very well," and "I feel nervous when I'm around certain people." The response categories for the items ranged from 1 (*completely disagree*) to 5 (*completely agree*). The items formed a one-dimensional scale, with a Cronbach's alpha of .77.

Results

Zero-Order Correlations between Variables Included in the Model

Table 1 provides the zero-order correlation matrix of the variables included in the model. In the table, the variable online self-disclosure is the average of online cross-sex self-disclosure and online same-sex self-disclosure. Offline self-disclosure is the average of offline cross-sex self-disclosure and offline same-sex self-disclosure.

Table 1. *Pearson Product-Moment Correlations of Independent and Dependent Variables*

	1	2	3	4	5	6	7	8	M	SD
1. Online self-disclosure									2.27	0.94
2. Disinhibition	.22*								2.95	1.02
3. Reduced nonverbal cues	.05	.24*							2.03	0.82
4. Controllability	.13*	.28*	.38*						3.01	1.19
5. Private self-consciousness	.23*	.19*	.21*	.28*					2.88	0.80
6. Public self-consciousness	.12*	.26*	.27*	.29*	.46*				2.38	0.86
7. Social anxiety	.00	.19*	.21*	.28*	.28*	.47*			2.13	0.80
8. Offline self-disclosure	.71*	.06	.03	.10*	.26*	.10*	.03		2.51	0.94
9. Gender (boys = 0)	.19*	-.04	.10*	.11*	.15*	.14*	.16*	.27*	1.51	0.50
10. Age	.26*	-.02	-.01	.10*	.08*	.01	.04	.40*	14.22	1.99

Note. * $p < .01$.

Testing the Model

The hypothesized model (Figure 1) was tested with Structural Equation Modeling (SEM) using AMOS 5.0 (Arbuckle, 2003). SEM allows for testing theory-based causal models with correlational data, and combines this with the possibility to correct for measurement error by estimating latent variables from manifest indicators (Byrne, 2001). All variables in our model in Figure 1 represented latent variables, which were estimated from two manifest indicators. For each latent variable, except for online and offline self-disclosure, item parcels served as indicators. These item parcels were created using a procedure suggested by Russell et al. (1998). First, we factor analyzed the items meant to measure each variable. Based on the sizes of the factor loadings, we alternately assigned each item to the first or second item parcel. For example, for social anxiety, the four items yielded one factor with factor loadings being .66, .62, .59, and .50. The items ranked 1 and 3 (i.e., .66 and .59) on the factor formed the first item parcel, and the items ranked 2 and 4 (i.e., .62 and .50) formed the second item parcel.

It is advised to use item parcels rather than individual items to estimate latent constructs, because (a) item parcels lead to more parsimonious models and (b) individual items usually violate the assumption of multivariate normality. Creating item parcels is allowed only

when the underlying construct is unidimensional, that is, when all items load on one factor (Kishton & Widaman, 1994; Russell et al., 1998).

The latent construct online self-disclosure was estimated from two indicators: One indicator was the 7-item scale measuring online cross-sex self-disclosure, and the other was the 7-item scale measuring online same-sex self-disclosure. The latent construct offline self-disclosure was measured similarly: One indicator represented offline cross-sex self-disclosure to girls and one represented offline same-sex self-disclosure. Please note that, for reasons of visual clarity, the measurement models (i.e., the factor analytic models) are not shown in Figure 2. However, all measurement models adequately represented the data; the factor loadings for all constructs were above .57.

In our hypothesized model and analyses, the dependent variable online self-disclosure was controlled for offline self-disclosure by including the latter as a predictor of online self-disclosure³. The beta coefficient of the path from offline to online self-disclosure was .74, $p < .001$. In addition, the error terms of online and offline cross-sex self-disclosure were allowed to co-vary, as were the error terms of online and offline same-sex disclosure (not shown in Figure 2). Because the items used to measure online and offline self-disclosure are very similar in content, not correlating the error terms may inflate the relation between the latent constructs (see Reddy, 1992; Russell et al., 1998 for an explanation of why correlating errors is desirable in such cases).

³ We also ran our model without controlling for offline self-disclosure. This model also yielded an acceptable fit, $\chi^2(63, N = 1203) = 183.39, p < .001$, CFI = .98, RMSEA = .040 (90% CI: .033, .047), $\chi^2/df = 2.91$. None of the structural parameters in our model changed (e.g., the relationship between disinhibition and self-disclosure was still $\beta = .25, p < .001$). The explained variance of self-disclosure was 10%. However, this model could be significantly improved by adding a relationship ($\beta = .27, p < .001$) between private self-consciousness and online self-disclosure, $\chi^2_{\text{change}}(1, N = 1203) = 48.06, p < .001$, $TLI_{\text{change}} = .011$. This model yielded a better fit, $\chi^2(62, N = 1203) = 135.32, p < .001$, CFI = .99, RMSEA = .031 (90% CI: .024, .039), $\chi^2/df = 2.19$. The relationship between private self-consciousness and online self-disclosure provides a good example of why we controlled for offline self-disclosure. If we would not have included offline self-disclosure in our model, we could have mistakenly concluded that there is a relationship between private self-consciousness and *online* self-disclosure, while there is actually a relationship between private self-consciousness and *general* self-disclosure (Franzoi & Davis, 1985).

In our hypothesized model we expected reduced nonverbal cues and controllability to be correlated, as both attributes allow users greater control over the cues they communicate. However, because in SEM it is impossible to model covariation among endogenous variables, we allowed the disturbance terms of reduced nonverbal cues and controllability (Z_1 and Z_2) to co-vary. The correlation between the disturbance terms was .36, $p < .001$.

We used two indices to evaluate the fit of our models: the root mean square error of approximation (RMSEA) and the comparative fit index (CFI). Particularly in the case of large samples, these indices are considered as informative criteria in SEM. A good model fit is expressed in an RMSEA value less than .06 and a CFI value greater than .95 (Byrne, 2001). In addition, we also report the chi square index. However, a widely recognized problem with this index is that the model fit is seriously underestimated in analyses with larger samples (see Byrne, 2001, for a review of methodological references). To address this problem, the relative chi-square (χ^2/df ratio) has been recommended. A χ^2/df ratio of less than 3.0 is considered an acceptable fit (Kline, 2005).

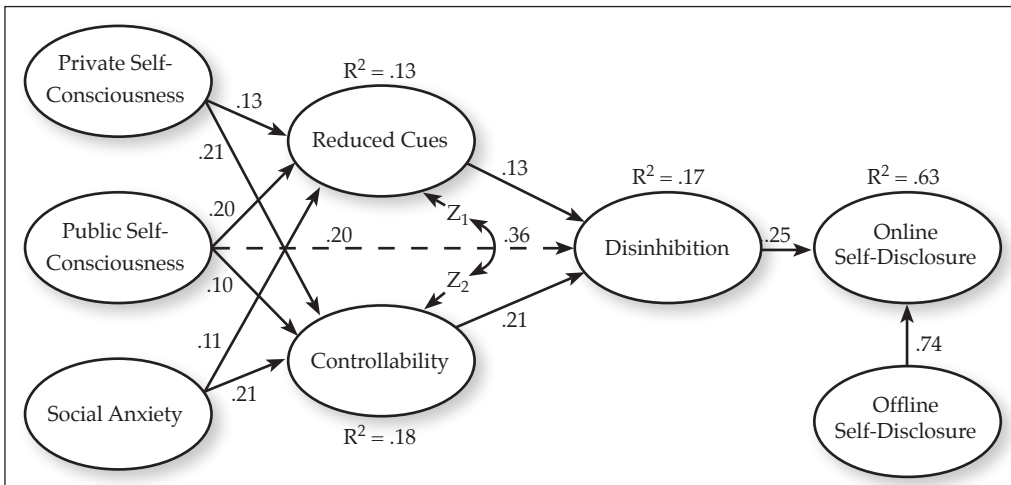


Figure 2. Structural equation model of our hypothesized “Internet-attribute-perception” model underlying adolescents’ online self-disclosure. Ellipses represent latent constructs estimated from two indicators each; coefficients are standardized betas or correlations and are significant at least at $p < .05$. The measurement models are not shown.

The initial model fit the data well, $\chi^2(86, N = 1203) = 198.15, p < .001, CFI = .986, RMSEA = .033$ (90% CI: .027, .039), $\chi^2 / df = 2.30$. However, the modification indices and the values of the expected parameter changes showed that the model could be improved significantly by adding a path from public-self-consciousness to disinhibition, $\chi^2_{\text{change}}(1, N = 1203) = 30.46, p < .001, TLI_{\text{change}} = .005$. Because such a relationship is theoretically plausible, we decided to include this path in our final model. After all, adolescents who do not care about how they appear to others may also be uninhibited to say certain things. Therefore, it is reasonable to assume a relation between public self-consciousness and disinhibition, regardless of whether nonverbal cues and controllability are judged important (Ryan & Kuczkowski, 1994). The final model fit the data even better, $\chi^2(85, N = 1203) = 167.69, p < .001, CFI = .990, RMSEA = .028$ (90% CI: .022, .035), $\chi^2 / df = 1.97$. We could not make any further meaningful modifications to the model, and we accepted this model as our final model. Figure 2 shows the final model, including the explained variance of each dependent variable⁴. All parameters in the model are either correlations or standardized betas.

Our first hypothesis predicted that disinhibition would positively influence online self-disclosure. This hypothesis was confirmed, $\beta = .25, p < .001$ (see Figure 2). Adolescents who felt less disinhibited in IM interactions had higher levels of online self-disclosure. Hypothesis 2 predicted a positive effect of perceived relevance of reduced nonverbal cues on feelings of disinhibition. Hypothesis 3 predicted a positive effect of perceived relevance of controllability on feelings of disinhibition. Both hypotheses were confirmed ($\beta = .13, p = .002$ and $\beta = .21, p < .001$, respectively). Adolescents who perceived the reduced nonverbal cues and the control over time during IM to be more relevant, were more likely to feel disinhibited when using IM.

Hypotheses 4a and 4b predicted positive relationships between private self-consciousness and perceived relevance of reduced nonverbal cues and perceived relevance of controllability. Both hypotheses were confirmed ($\beta = .13, p = .004$, for Hypothesis 4a and $\beta = .21, p < .001$ for Hypothesis 4b). Hypotheses 5a and 5b were also confirmed: There was a positive effect of public self-consciousness on reduced nonverbal cues, $\beta = .20, p < .001$, and controllability, $\beta = .10, p = .04$. As predicted in Hypothesis 6a and 6b, there were positive paths from social anxiety to both reduced nonverbal cues, $\beta = .11, p = .02$, and controllability, $\beta = .21, p < .001$. Finally, there were two significant correlations that are not depicted in the model: one from private self-consciousness to offline self-disclosure, $r = .37, p < .001$, and another from public self-consciousness to offline self-disclosure, $r = .14, p < .001$.

⁴ Note that the high explained variance of online self-disclosure of 63% is due to the relationship between offline self-disclosure and online self-disclosure.

Does our Model Hold for Boys and Girls and Younger and Older Adolescents?

Because gender and age turned out to be significantly related to most of the variables in our model (see Table 1) and are generally important in research with adolescents, we decided to test whether our model held for boys and girls and younger (10- to 12-year-olds), middle (13- to 14-year-olds), and older (15- to 18-year-olds) adolescents. We performed two multiple group analyses with gender and age as grouping variables. The unconstrained model for girls and boys fit the data well, $\chi^2(170, N = 1203) = 276.38, p < .001, CFI = .986, RMSEA = .023$ (90% CI: .018, .028), $\chi^2/df = 1.63$. Imposing the cross-group constraints for the measurement and the structural models did not lead to a significant increase in chi-square, $\chi^2_{\text{change}}(19, N = 1203) = 22.45, p = .26, TLI_{\text{change}} = -.001$, indicating that the model fit equally well for boys and girls.

The unconstrained models for the three age groups also yielded a good fit, $\chi^2(255, N = 1203) = 389.74, p < .001, CFI = .983, RMSEA = .021$ (90% CI: .017, .025), $\chi^2/df = 1.53$. The model in which both measurement weights and structural weights were constrained also yielded a good fit, $\chi^2(293, N = 1203) = 443.74, p < .001, CFI = .981, RMSEA = .021$ (90% CI: .017, .025), $\chi^2/df = 1.51$. The increase in chi-square was low but significant, $\chi^2_{\text{change}}(38, N = 1203) = 54.00, p = .045, TLI_{\text{change}} = -.001$. A specific analysis on the structural model showed that only the relationship between offline and online self-disclosure was somewhat lower for the 15- to 18-year-olds than for the younger and middle adolescents. However, all betas were positive and significantly greater than 0.

Online and Offline Self-Disclosure Compared

RQ1 and RQ2 asked how adolescents' online self-disclosure compares to their offline self-disclosure, and whether this would differ for boys and girls and for same-sex and cross-sex interactions. A mean comparison showed that, on average, adolescents tended to self-disclose less online ($M = 2.39, SD = 1.14$) than they do offline ($M = 2.81, SD = 1.13$) in same-sex interactions, $F(1,1201) = 257.92, p < .001, \eta^2 = .18$. This also held for cross-sex self-disclosure, where adolescents also disclosed slightly more offline ($M = 2.21, SD = 1.08$) than online ($M = 2.16, SD = 1.07$), $F(1,1201) = 5.76, p = .02, \eta^2 = .005$. The difference between online and offline self-disclosure was far greater for same-sex self-disclosure than for cross-sex self-disclosure, $t(1202) = 13.01, p < .001$.

A more interesting picture emerges when we compare *how many* adolescents disclose themselves more online than offline in same-sex and cross-sex interactions. We created a new variable indicating the discrepancy between online and offline self-disclosure. This variable revealed that a considerable percentage of adolescents self-disclosed more online than offline, and that this particularly held for cross-sex interactions, $\chi^2(1, N = 1203) = 34.68, p < .001$.

More specifically, in cross-sex interactions, 32% of adolescents self-disclosed more online than offline. In same-sex interactions, 22% of adolescents self-disclosed more online than offline (see Table 2). There were significant gender differences. The percentage of boys (35%) who preferred online self-disclosure in cross-sex interactions is higher than the percentage of girls (28%). In same-sex interactions, boys (21%) and girls (23%) did not differ in their preference for online self-disclosure.

Table 2. Percentage of Boys and Girls who Self-Disclose More Online or More Offline in Cross-Sex and Same-Sex Interactions

		Total <i>n</i> = 1203	Girls <i>n</i> = 608	Boys <i>n</i> = 595
		%	%	%
Cross-sex	More online	32	28 ^a	35 ^b
	More offline	35	34	35
Same-sex	More online	22	23	21
	More offline	55	61 ^a	49 ^b

Note. Subgroup comparisons with different superscripts are significantly different at least at $p < .01$ (tested with χ^2 test).

Discussion

In this paper, we developed and tested an Internet-attribute-perception model that may initially explain how IM stimulates online self-disclosure. The model was based on hyperpersonal communication theory in that the reduced nonverbal cues and controllability of IM would predict online self-disclosure. However, we posed that users' perceived relevance of these attributes (i.e., reduced nonverbal cues and controllability) would play a central role in explaining online self-disclosure. Second, we assumed users' perceptions of reduced nonverbal cues and controllability to mediate the effects of personality characteristics (i.e., private self-consciousness, public self-consciousness, and social anxiety) on online self-disclosure.

All of our hypotheses were confirmed. Disinhibition predicted online self-disclosure, and all other variables were only indirectly related to online self-disclosure. Adolescents who perceived the reduced nonverbal cues and controllability of IM as more relevant were more disinhibited when using IM and subsequently self-disclosed more easily. These perceptions also explained individual differences in online self-disclosure. We found no direct relationships between the three personality characteristics and online self-disclosure. All effects of private self-consciousness, public self-consciousness and social anxiety on online disinhibition and online self-disclosure were mediated by adolescents' perceptions of IM attributes and disinhibition.

These results are an important first indication of the validity of our Internet-attribute-perception model. Perceptions of CMC attributes –thus not the attributes per se– determine CMC outcomes. After all, if the reduced nonverbal cues and controllability would have had homogeneous effects on online disinhibition and self-disclosure, we would not have found any significant effects of these perceptions on disinhibition and self-disclosure in IM. User perceptions may add to our understanding of the processes that underlie Internet use and its outcomes (Bargh, 2002). A recent study by Kalyanaraman and Sundar (2006) also demonstrated the important role of user perceptions in explaining the relation between customized Internet content and attitudes towards the content.

Our research showed that hyperpersonal communication theory may be applied to everyday Internet research. The theory predicts that hyperpersonal effects such as self-disclosure are based on the reduced nonverbal cues and controllability of CMC. These attributes may also be applied to new CMC technologies such as IM by focusing on users' perceptions of these attributes. Future research may explain other hyperpersonal outcomes of online communication, such as flaming or cybersex. Other online communication technologies may also be classified in terms of reduced nonverbal cues and controllability. For example, controllability and reduced nonverbal cues also characterize e-mail. As a result, perceptions of these attributes may also predict outcomes of e-mail interaction.

Although perceptions of reduced nonverbal cues and controllability were found to predict online self-disclosure, other attributes of CMC may play a role. One such attribute may be the ability to structure self-presentation (McKenna & Bargh, 2000; Walther & Parks, 2002). Reduced nonverbal cues and controllability both imply a greater control and flexibility over the cues adolescents communicate, as indicated by the correlation between disturbance terms of the two attributes. To develop the ability to present one's self is crucial in adolescence (Leary, 1996; Steinberg, 2001), and self-presentation is an important aspect of IM and other popular Internet technologies, such as MySpace (Lenhart et al., 2005). The ability to control self-presentation may therefore be an important attribute to take into account in future research.

Future research may also want to consider examining potential dimensions of reduced nonverbal cues. In line with hyperpersonal communication theory, in our study the reduction of visual, auditory and social context cues was treated as one construct. In earlier text-based CMC technologies, such as Internet Relay Chat (IRC), this was less of an issue, because the absence of one cue implied the absence of the other cues. However, with the rise of modern technology, such as webcams and microphones, all cues can be manipulated separately. IM is still mainly text-based, but video, audio and other cues are increasingly included in IM interactions (Peter, Valkenburg, & Schouten, 2007). With a webcam, IM interactants can add audio,

video, or both. Future research should investigate the effect of the different cues that can be manipulated in new CMC technologies such as IM.

In our study, private self-consciousness, public self-consciousness, and social anxiety all proved to be relevant in explaining online self-disclosure via perceptions. We focused on these three personality characteristics because of their relevance to offline self-disclosure and because we thought it likely that they would be related to the perceptions of reduced nonverbal cues and controllability. However, other personality characteristics may play a role in explaining users' perceptions. Loneliness, for example, is often taken into account in Internet research (e.g., Leung, 2002), and may also affect online self-disclosure.

We predicted that disinhibition would be responsible for online self-disclosure, which is often hypothesized in CMC theories but hardly studied (Jessup et al., 1990; Walther, 1996). Our model showed that online disinhibition predicted online self-disclosure and that the remaining variables in our model (i.e., the personality characteristics and perceptions of IM attributes) were only indirectly related to online self-disclosure. Online disinhibition thus acts as a precursor to online self-disclosure. Further research should explore the role of disinhibition as an explanatory mechanism of other hyperpersonal effects that are implicitly associated with disinhibition, such as flaming and cybersex (Walther & Parks, 2002).

Our study has implications for those studying adolescent online behavior. Based on adolescents' personality characteristics, we may be able to explain which adolescents are attracted to online communication for self-disclosure. Furthermore, we may be able to explain the specific attributes of an online communication technology to which an adolescent is attracted. For example, socially anxious adolescents may find the nonverbal cues of text-only IM attractive, and may thus be less inclined to incorporate audio and video in their IM conversations.

Furthermore, about one in three adolescents indicated that he or she was better able to self-disclose online than offline. This held more strongly for self-disclosure in cross-sex interactions (32%) than in same-sex interactions (22%). The ability to disclose intimate information about the self is a fundamental determinant of friendships and romantic relationship formation (Buhrmester & Furman, 1987). However, especially in early and middle adolescence, adolescents seem to be inhibited in disclosing themselves to the opposite gender (Hacker, 1981). The fact that a considerable group of adolescents self-disclosed more online than offline, especially when interacting with the opposite sex, suggests that for many adolescents, IM may be particularly helpful in their cross-sex self-disclosures. This seems to be even more so for boys (35%) than for girls (28%). Because boys generally have more difficulty self-disclosing than girls, they may especially benefit from IM's controllability and reduced nonverbal cues to stimulate their self-disclosure.

An important direction for further research is to investigate the long-term consequences of online self-disclosure for adolescents. We found that certain personality characteristics are positively related to perceptions of IM attributes, which, in turn, encourage adolescents' online self-disclosure. As discussed, the ability to self-disclose is a necessary condition for intimate relationship formation and a healthy development (Jourard, 1971). Future, preferably longitudinal, research should investigate the effects of IM-induced self-disclosure on relationship formation and well-being in adolescence.

Another important avenue for further studies lies in cross-cultural comparative research. The Netherlands is at present at the forefront of Internet-based communication technologies, and is therefore a unique spot to start investigating the social consequences of technologies such as IM. However, results may be different for other countries in which such technologies are not as pervasive as in the Netherlands. For example, the familiarity of Dutch adolescents with IM may have positively influenced their online self-disclosure.

Our Internet-attribute-perception model showed that adolescents differ in their perceptions of CMC attributes, and that these perceptions mediated the effects of personality characteristics on online self-disclosure in IM. Our model may be applied to other online communication technologies and may explain other hyperpersonal effects, such as flaming and friendship formation. More work is needed to distinguish the exact cues and attributes that determine a communication technology and classify them accordingly. However, perceptions are an important factor in explaining Internet outcomes such as self-disclosure. In our opinion, future research may benefit in studying Internet outcomes by combining structural attributes of CMC technologies with the perceptions of these attributes.

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Study 3

An Experimental Test of Processes Underlying Self-Disclosure in Computer-Mediated Communication¹

Abstract

A consistent finding in Computer-Mediated Communication (CMC) and Internet research is that, compared to face-to-face communication, CMC results in higher levels of self-disclosure. We identified four possible mediators that may carry the influence of CMC on self-disclosure: self-presentation, similarity, self-awareness, and direct questioning. The validity of these mediators was tested in an experiment in which 81 cross-sex dyads were randomly assigned to three experimental conditions: a text-only CMC condition, a visual CMC condition, and a face-to-face condition. Self-disclosure was lower in the face-to-face condition than in the text-only CMC condition and the visual CMC condition. Between the two CMC conditions, no differences in self-disclosure were found. Of the four possible mediators, only direct questioning mediated the effect of CMC on self-disclosure. CMC dyads engaged in more direct questioning and therefore displayed higher levels of self-disclosure.

¹Schouten, A. P., Valkenburg, P. M., & Peter, J. (2006). *An Experimental Test of Processes Underlying Self-Disclosure in Computer-Mediated Communication*. Manuscript Submitted for Publication.

Introduction

Online social interaction has become a pervasive phenomenon. More than 80% of U.S. adults under 40 have Internet access, and communication is the most important online activity (Fox & Madden, 2006). Many Internet users, especially the young, progressively form social relationships online (Boase, Horrigan, Wellman, & Rainie, 2006; Gibbs, Ellison, & Heino, 2006; McKenna & Bargh, 2000). For example, a recent study found that 35% of adolescents had established one or more online friends via social networking sites, and 8% reported having formed a romantic relationship (Valkenburg, Peter, & Schouten, 2006). These rapidly changing developments in Internet use for social interaction have been accompanied by increased attention to the outcomes of Computer-Mediated Communication (CMC) for relationship formation.

One important outcome of CMC that has received much consideration is its effect on self-disclosure. Self-disclosure is defined as revealing intimate information about oneself (Derlega, Metts, Petronio, & Margulis, 1993). This research focus on self-disclosure has had two motivations. First, self-disclosure is an important factor in the initial stages of relationship formation (Altman & Taylor, 1973; Derlega et al., 1993). Self-disclosure fosters intimacy and creates interdependence between communication partners. Furthermore, self-disclosure is an important strategy to form initial impressions of each other and these impressions are vital for the development of the relationship (Anderson, 1965; Berger & Calabrese, 1975). Because more and more relationships develop online, studying the possible effects of CMC on self-disclosure becomes increasingly relevant.

Second, ever since the onset of CMC research, the effects of CMC on self-disclosure have been controversial. Initially, CMC theories assumed that CMC was unsuitable to convey the warmth and intimacy of face-to-face interactions (Short, 1974; Siegel, Dubrovsky, Kiesler, & McGuire, 1986). However, these early theories were unable to explain the intimate social relationships that *did* develop online, which sparked a large body of subsequent research aimed at demonstrating that CMC-relationships can be at least as intimate as face-to-face communication (Rice & Love, 1987; Spears & Lea, 1992; Walther, 1996).

Four experimental studies have compared self-disclosure among unacquainted individuals in CMC settings and face-to-face settings (Bargh, McKenna, & Fitzsimons, 2002; Coleman, Paternite, & Sherman, 1999; Joinson, 2001; Tidwell & Walther, 2002). All four studies found self-disclosure to be higher in CMC than in face-to-face settings. These results have been confirmed by several correlational studies on online social interaction, which also showed the Internet as promoting self-disclosure (Henderson & Gilding, 2004; Hu, Wood, Smith, & Westbrook 2004; McKenna & Bargh, 1998; Schouten, Valkenburg, & Peter, 2007).

Research on self-disclosure in CMC agrees that the reduced auditory and visual cues (i.e., nonverbal cues) of CMC are responsible for the higher levels of self-disclosure in CMC compared to face-to-face communication (Bargh et al., 2002; Joinson, 1998). However, most studies have only focused on the direct effects of CMC on self-disclosure and did not test the underlying, theoretically assumed processes. Furthermore, each of these studies explained the relationship between CMC and self-disclosure from a different theoretical perspective. As a result, the process of how these reduced nonverbal cues may enhance self-disclosure is not well understood.

The goal of our study is to initially test the processes that underlie self-disclosure in CMC. Based on the theoretical assumptions of the four earlier mentioned experimental studies, we have identified four hypotheses that may explain why CMC results in higher levels of self-disclosure. First, our *CMC-encouraged self-presentation hypothesis* assumes that the reduced nonverbal cues of CMC allow more control over self-presentation, which in turn stimulates self-disclosure (Bargh et al., 2002). Our second hypothesis, the *CMC-encouraged similarity hypothesis*, is deduced from Coleman et al. (1999) and poses that participants in a CMC setting see each other as more similar, which in turn increases self-disclosure. Third, our *CMC-influenced self-awareness hypothesis* has been put forward by Joinson (2001) and states that reduced nonverbal cues raise private and lower public self-awareness, which in turn enhance self-disclosure. Finally, our *CMC-encouraged direct questioning hypothesis* argues that the reduced nonverbal cues of CMC stimulate the use of more interactive uncertainty reduction strategies (i.e., direct questioning), which in turn enhances self-disclosure (Tidwell & Walther, 2002).

These hypotheses will be tested in an experiment in which we compare face-to-face communication and two types of CMC that have become very popular in recent years: Instant Messaging with a webcam (visual CMC) and without a webcam (text-only CMC). Most CMC theories were developed at a time when CMC interaction was mainly based on text. However, nowadays CMC is not necessarily based on text alone. In fact, a considerable proportion of young people now add visual or auditory information to CMC (Lenhart, Madden, & Hitlin, 2005; Peter, Valkenburg, & Schouten, 2007). These developments provide new opportunities for CMC theorists to more specifically investigate the exact nonverbal cues that may affect self-disclosure in CMC.

The CMC-Encouraged Self-Presentation Hypothesis

Our first hypothesis poses that the reduced nonverbal cues of CMC allow more control over self-presentation. This, in turn, may stimulate self-disclosure. We thus expect a mediated effect of CMC on self-disclosure through self-presentation. The reduced nonverbal cues of

CMC allow individuals more control over their self-presentation, because in CMC individuals are not hindered by cues unintentionally presented, such as physical appearance, facial expressions or gestures (Walther, 1996). There is ample evidence that CMC allows for self-presentation in ways not possible in face-to-face settings (McKenna & Bargh, 1998, 2000). Because individuals feel more in control of their self-presentations, they are more likely to disclose their “true self”, which refers to those aspects of the inner self that not easily expressed or disclosed in real life (Bargh et. al., 2002; McKenna, Green, & Gleason, 2002). Our first hypothesis, which is modeled in paths 1a and 1b in Figure 1, therefore is:

H1: (a) CMC allows more control over self-presentation, which (b) in turn increases self-disclosure.

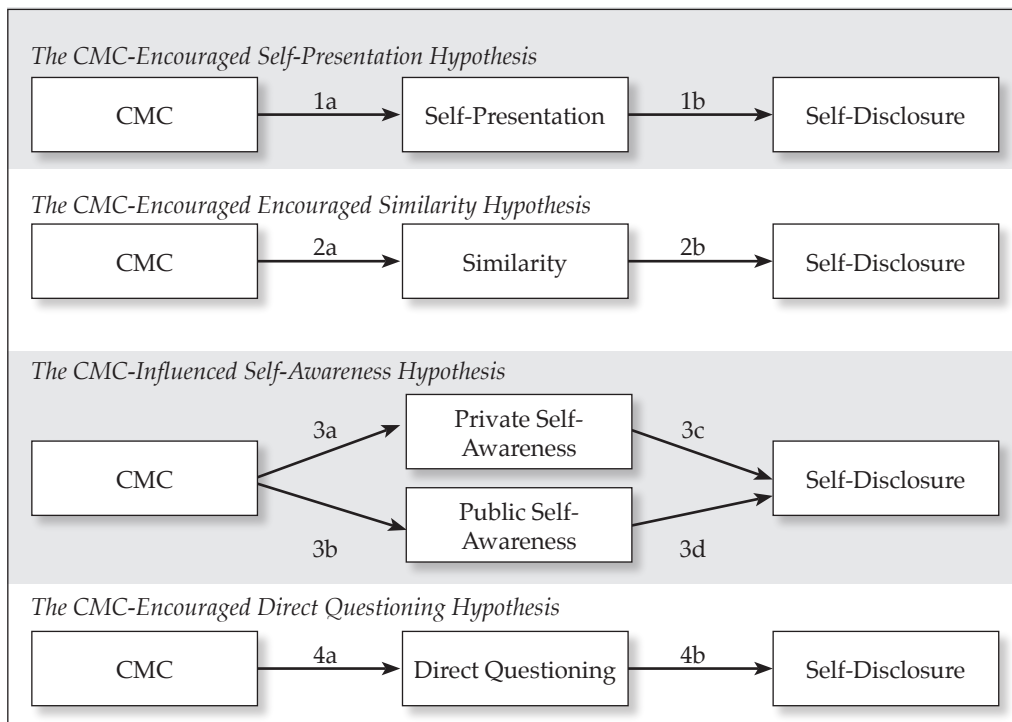


Figure 1. The four explanatory hypotheses visualized.

The CMC-Encouraged Similarity Hypothesis

Our second hypothesis states that the reduced nonverbal cues of CMC stimulate feelings of similarity, and thereby self-disclosure. In this hypothesis perceived similarity mediates the relationship between CMC and self-disclosure. In comparison to face-to-face partners, CMC partners have less access to nonverbal cues such as clothing, accent, and physical appearance, which often uncover interpersonal differences in face-to-face settings. This forces CMC partners to focus on whatever minimal cues are available, which may result in an over-reliance on available cues (Spears & Lea, 1992; Walther, 1996). As a result, CMC partners may feel more similar to their communication partner than face-to-face partners do (Coleman et al., 1999; Dubrovsky, Kiesler, & Sethna, 1991; Spears, Postmes, Lea, & Wolbert, 2002; Walther & Parks, 2002). In addition, perceived similarity with CMC partners may increase self-disclosure (Brockner & Swap, 1976; Byrne, London, & Reeves, 1968). Therefore, it is possible that perceived feelings of similarity will mediate the effect of CMC on self-disclosure. Our second hypothesis, visualized as paths 2a and 2b in Figure 1 is:

- H2: (a) CMC stimulates perceived feelings of similarity, which (b) in turn increase self-disclosure.

The CMC-Influenced Self-Awareness Hypothesis

The CMC-influenced self-awareness hypothesis assumes that CMC increases private self-awareness and decreases public self-awareness, which positively influences self-disclosure (Joinson, 2001). Private and public self-awareness are cognitive states that may be activated by the reduced nonverbal cues of CMC. Individuals who are in a state of high private self-awareness are more attentive to inner aspects of themselves, such as feelings, values and beliefs. Individuals who are more public self-aware are more attentive to how they are perceived and assessed by others (Fenigstein, Scheier, & Buss, 1975).

Matheson and Zanna (1988) assume that CMC enhances private self-awareness because CMC partners generally communicate in a reduced-cue setting. The reduced cues of a CMC setting allow them to pay more attention to the private aspects of their selves than they would do in a face-to-face setting. Matheson and Zanna also assume that CMC lowers public self-awareness because the reduction in nonverbal cues of CMC makes partners feel less accountable, and less concerned about the others' opinions (Joinson, 1998; Schouten, Valkenburg, & Peter, 2007). In Matheson and Zanna's study, both assumptions were experimentally supported: participants in CMC settings felt more private self-aware and less public self-aware than participants in face-to-face settings.

There is evidence that higher private self-awareness and lower public self-awareness lead to higher levels of self-disclosure. Those who are high in private self-awareness are more attentive to their inner feelings, making self-disclosures more readily available (Franzoi & Davis, 1985; Joinson, 2001). Moreover, those low in public self-awareness are less attentive to how others perceive them, and thus feel fewer inhibitions in disclosing themselves (Joinson, 2001). However, although there is evidence for the relationship between CMC and private and public self-awareness, and for the relationship between both types of self-awareness and self-disclosure, no study has tested the CMC-influenced self-awareness hypothesis as a whole. Therefore, we tested the following hypothesis, which is modeled in paths 3a to 3d in Figure 1:

- H3: CMC leads to (a) a higher private self-awareness and (b) a lower public self-awareness, which (c & d) in turn increase self-disclosure.

The CMC-Encouraged Direct Questioning Hypothesis

The fourth hypothesis assumes direct questioning to mediate the relationship between CMC and self-disclosure. The hypothesis is derived from Tidwell and Walther (2002), who based their study on uncertainty reduction theory (Berger & Calabrese, 1975). Uncertainty reduction theory argues that when strangers meet, they have a basic need to form impressions of one another and to reduce uncertainty about the behavior of the other (Berger & Calabrese, 1975). Berger (1979) identified three types of uncertainty reduction strategies: passive (e.g., passive observation), active (e.g., inquiring about the other person), and interactive (e.g., direct questioning). Tidwell and Walther have argued that face-to-face communication allows for a wider range of uncertainty reduction strategies than CMC. In CMC, one cannot rely on passive and active uncertainty reduction strategies and is thus forced to turn to interactive strategies, such as direct questioning.

According to Tidwell and Walther (2002), direct questioning, which is often seen as impolite in face-to-face settings, may be more acceptable in a CMC setting, because of the lack of alternative strategies. In their experiment, Tidwell and Walther found that dyads interacting via CMC used a greater proportion of direct intimate questions. CMC dyads that posed more direct intimate questions also displayed a greater proportion of intimate self-disclosures. It is plausible to assume that CMC partners who pose more direct intimate questions also receive more intimate answers. Therefore, our fourth hypothesis, which is modeled in path 4a and 4b in Figure 1, is:

- H4: (a) CMC leads to more direct questioning, which (b) in turn increases self-disclosure.

The Role of Visual Cues

All theories of CMC consider the lack of nonverbal cues the cause of enhanced self-disclosure in CMC (Walther & Parks, 2002). In recent years, CMC less often involves text-only communication. A considerable proportion of young people now use audio or video devices while communicating online, such as webcams (Lenhart et al., 2005). These developments pose important challenges for CMC researchers because they create a need to more specifically test which nonverbal cues affect the outcomes of CMC.

Most studies that investigated the relationship between CMC and self-disclosure compared face-to-face communication with text-only CMC. Only Joinson (2001) compared self-disclosure in a text-only CMC condition with a visual CMC condition in which the faces of the interactants were visible through a video system. Self-disclosure was higher in the text-only CMC condition. Furthermore, the level of self-disclosure in the visual CMC condition in Joinson's second study was equal to that in the face-to-face condition in his first study. This suggests that the absence of visual cues about the face alone suffices to stimulate self-disclosure. Other research also shows that adding visual cues to text-only CMC has significant effects, for example on interpersonal attraction (Walther, Slovacek, & Tidwell, 2001) or group identification (Lea, Spears, & De Groot, 2001).

Compared to face-to-face communication, however, visual CMC still lacks several cues, such as clothes, gestures, body language, speech, and intonation, which still may foster self-disclosure. Based on the hyperpersonal approach (Walther, 1996), we could argue that self-disclosure will gradually increase as cues become scarcer. The lowest level of self-disclosure should therefore occur in face-to-face communication and the highest in text-only CMC, with visual CMC being in between. Because this assumption has never been investigated, in addition to a text-only CMC condition and a face-to-face condition we also included a visual CMC condition, supported by a webcam, in our experiment. We therefore investigate the following research question:

- RQ1:* How does the visual CMC condition differ from the text-only CMC condition and the face-to-face condition regarding its effect on control over self-presentation, perceived similarity, private and public self-awareness, question asking (the mediating variables), and self-disclosure (the dependent variable)?

Method

Sample

A total of 168 university students, between 17 and 31 years of age ($M = 21.07$, $SD = 2.61$), participated in the experiment. 70% of the respondents were recruited from a first-year introductory course in communication science in which a total of 350 students took part, divided over 15 separate classes. 30% of respondents were recruited from a database with first and second year students from the University of Amsterdam who had agreed to participate in research projects. To form cross-sex dyads, participants were asked to sign up for a one-hour time slot. Only one male and one female could sign up in one slot. Students were specifically asked not to sign up with someone they already knew. Wherever possible, we paired students from different classes and communication science students with students from other departments. This reduced the likelihood that communication partners would already know each other. After the experiment, none of the participants stated that they knew their conversation partner beforehand. It is important to note that CMC theories are not addressed in the first two years of the curriculum, so knowledge of these theories could not have influenced our experimental outcomes.

We formed cross-sex dyads in our experiment, because self-disclosure varies depending on gender composition of the group (Dindia & Allen, 1992; Hacker, 1981). Due to possible power problems, we did not want to include gender composition (i.e., male-male, female-female, and male-female groups) in our experiment. The individual scores of the dyad's male and female participants were collapsed because the scores of the individuals in a dyad are not independent of each other. The scores are likely to correlate, which can lead to biased results, such as inflated p values (e.g., Kenny, 1996). Therefore, we used the dyad as the unit of analysis. The dyads were randomly assigned to one of the three experimental conditions (i.e., text-only CMC, visual CMC, and face-to-face). Three dyads were excluded because of technical difficulties during the experiment. Hence, the analyses of this paper are based on 81 cross-sex dyads (27 dyads per condition).

Procedure

For the experimental task, we used a get-acquainted exercise (Frank & Gilovich, 1989). Participants were instructed to get to know each other during the conversation. They were free to talk about anything they wanted. To prevent the participants from encountering each other before the experiment, one member of the dyad was invited to the lab and the other to an office room from where he/she was led to the lab. The subjects received the instructions for the experimental task separately.

The face-to-face condition took place in an observation room that resembled a living room and was equipped with two comfortable couches where the participants were seated. After 12 minutes, the experimenter re-entered the room. Both participants were then guided to separate computer cubicles, where they were asked to fill in an online questionnaire.

In the text-only CMC condition and visual CMC condition, participants communicated with each other in two separate cubicles. Both participants logged on to a synchronous online java-based Instant Messaging application, especially programmed for the experiment. The visual CMC condition was similar to the text-only condition, but similar to Instant Messaging software such as Yahoo! and MSN messenger, participants saw each other's face on a screen at the upper right side of the monitor. The webcam screen was a high quality 320x240 pixel full-color screen running at 30 frames per second. After 24 minutes the chat automatically stopped and participants were redirected to an online questionnaire.

Different time periods were allocated for the face-to-face condition and the CMC conditions because CMC is relatively slow in comparison with face-to-face communication (Tidwell & Walther, 2002; Walther et al., 2001). Therefore, in the text-only CMC and the visual CMC condition, dyads interacted for 24 minutes. In the face-to-face condition, dyads interacted for 12 minutes.

The CMC conversations were logged and the face-to-face conversations were recorded (audio only). Participants were asked permission to use the conversations for possible analysis. None of the participants refused. Finally, the participants were paid a small fee and were asked not to discuss the experiment with anyone else. The participants were debriefed orally right after the experiment and via e-mail one week later.

Measures

Self-disclosure. Participants were asked to indicate how much they told their partner during the conversation about six relatively intimate self-disclosure topics (Altman & Taylor, 1973; Jourard, 1971), measured on a scale from 1 (*nothing*) to 7 (*everything*): "relationships," "love," "how you feel about your physical appearance," "sex," "secrets," and "dating." We took the mean of the six items as a measure of participants' overall self-disclosure.

Self-presentation. We measured the extent to which the participants felt they could control their self-presentation during the conversation with five items based on the Revised Self-Monitoring Scale (Lennox & Wolfe, 1984), and its adapted version for adolescents (Pledger, 1992). The five items were: "During the conversation, I could adapt my behavior to every situation," "During the conversation, I had control over what I said," "During the conversation, I could act the way I wanted," "During the conversation I could control how my conversation

partner perceived me," and "During the conversation I could control how I presented myself." Response categories ranged from 1 (*completely disagree*) to 5 (*completely agree*). Cronbach's alpha of the scale was .71.

Similarity. To measure similarity we used four items of the Perceived Homophily Measure (McCroskey, Richmond, & Daly, 1975): "My conversation partner thinks like me," "My conversation partner behaves like me," "My conversation partner is similar to me," and "My conversation partner looks like me." The response categories for each of the items ranged from 1 (*completely disagree*) to 5 (*completely agree*). Cronbach's alpha was .85.

Private and public self-awareness. As in earlier CMC research (Sassenberg, Boos, & Rabung, 2005), items from the Fenigstein Self-Consciousness Scale (Fenigstein et al., 1975) were adapted to measure both private and public self-awareness. Four items measured private self-awareness: "During the conversation I reflected about myself," "During the conversation I thought about what I said," "During the conversation I was attentive to my inner feelings," and "During the conversation I constantly examined my motives." Another four items measured public self-awareness: "During the conversation I was concerned about the way I presented myself," "During the conversation I was self-consciousness about how I came across," "During the conversation I was worried about making a good impression," and "During the conversation I was concerned about what my conversation partner thought of me." Both scales were measured on a five-point scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Private self-awareness had a Cronbach's alpha of .70 and public self-awareness of .88.

Direct questioning. To measure direct questioning, participants were asked how much they asked their conversation partner about four intimate topics: "relationships," "sex," "dating," and "secrets." The response categories varied from 1 (*nothing*) to 7 (*very much*). As with the self-disclosure measure, we took the mean of the four items as a measure of participants' overall question asking.

Results

Conversation Output of Face-to-Face Versus CMC Conditions

Following earlier CMC studies (e.g., Tidwell & Walther, 2002), we allowed CMC partners twice as much time (24 min) as face-to-face partners (12 min) to converse. To check for differences in the quantity of output in the face-to-face and CMC conditions, we counted the total number of words and the total number of turns in each dyad. A turn is the contribution of one partner in the dyad to which the other partner subsequently reacted.

The two CMC conditions and the face-to-face condition did not differ in the number of turns, $F(2, 78) = .03, p = .97, \eta^2 = .01$ (text-only CMC: $M = 194.63, SD = 76.77$; visual CMC:

$M = 198.70$, $SD = 54.01$; face-to-face: $M = 195.93$, $SD = 50.68$). However, there was a significant difference in the total number of words between the two CMC conditions (text-only CMC: $M = 1113.19$, $SD = 261.33$; visual CMC: $M = 1124.74$, $SD = 231.55$) and the face-to-face condition ($M = 2117.74$, $SD = 410.33$), with $F(2, 78) = 92.80$, $p < .001$, $\eta^2 = .70$. These results suggest that although CMC and face-to-face partners did not differ in the number of turns, CMC partners produced shorter sentences than face-to-face partners to express their thoughts.

Mediation Analyses

We largely followed the three-step procedure described by Baron & Kenny (1986) to test the mediated relationships proposed in our hypotheses. In the first step, we investigated whether a direct relationship existed between the independent (condition) and dependent variables (self-disclosure). In the second step, we investigated whether the independent variable (experimental condition) is related to the five mediating variables identified in our hypotheses (i.e., control over self-presentation, perceived similarity, private self-awareness, public self-awareness, and direct questioning). In the third and fourth step, we investigated whether the relationship between the five mediating variables and self-disclosure held when the independent variable condition was controlled. To establish mediation, all relationships tested in the three preceding steps must be significant (Kenny, 2006). For complete mediation, the direct effect of the independent variable (condition) on the dependent variable (self-disclosure) should no longer be significant, but this step is considered to be overly strict (Kenny, 2006).

Step 1: Direct Effect of Experimental Conditions on Self-Disclosure

To test the direct effect of experimental conditions on self-disclosure, we conducted an ANOVA with the three experimental conditions (text-only CMC, visual CMC, and face-to-face) as the independent variable and self-disclosure as the dependent variable. Table 1 shows the means and standard deviations for self-disclosure in each condition.

An ANOVA on the three conditions yielded a nonsignificant overall difference in self-disclosure between the three conditions, $F(2, 78) = 2.75$, $p = .07$, $\eta^2 = .07$. However, direct comparisons between the conditions showed that both the text-only CMC condition, $t(52) = 2.17$, $p = .03$, and the visual CMC condition, $t(52) = 2.06$, $p = .04$, produced significantly higher levels of self-disclosure than the face-to-face condition.

Table 1. Mean Comparison of the Dependent and Mediating Variables for the Conditions

	Text-Only CMC <i>n</i> = 27	Webcam <i>n</i> = 27	Face-to-Face <i>n</i> = 27
Intimate Self-Disclosure	2.20 ^a (0.87)	2.15 ^a (0.78)	1.76 ^b (0.62)
Self-Presentation	3.60 (0.31)	3.66 (0.38)	3.76 (0.20)
Similarity	2.57 (0.51)	2.52 (0.52)	2.67 (0.38)
Private Self-Awareness	2.65 (0.54)	2.61 (0.51)	2.67 (0.47)
Public Self-Awareness	2.10 (0.60)	2.20 (0.55)	2.12 (0.45)
Direct Questioning	2.23 ^a (0.82)	2.21 ^a (0.63)	1.68 ^b (0.57)

Note. Standard deviations in parentheses. Subgroup comparisons with different superscripts are significantly different at least at $p < .05$.

Step 2: Effect of Experimental Condition on Mediating Variables

The second step involved a test of the influence of experimental condition on the five mediating variables. Table 1 shows the means and standard deviations of the mediating variables in each of the three experimental conditions. For control over self-presentation, no effect of condition was found, $F(2, 78) = 1.95$, $p = .15$, $\eta^2 = .05$. For perceived similarity, private self-awareness and public self-awareness, no significant differences were found between experimental conditions (all F 's < 1). Finally, direct questioning did significantly differ between conditions, $F(2, 78) = 5.84$, $p < .01$, $\eta^2 = .13$, in that it was lower in the face-to-face condition than in both the text-only and visual CMC condition, with $t(52) = 2.89$, $p < .01$, and $t(52) = 3.33$, $p < .01$, respectively. These results indicate that our first three hypotheses, in which control over self-presentation, perceived similarity, and private and public self-awareness were assumed to act as mediators, were not confirmed.

Step 3: Effects of Condition and Mediators on Self-Disclosure

The third step required a regression of the mediating variables on self-disclosure, while controlling for experimental condition. Because step 2 is a necessary condition for mediation, we only tested the mediator that was significant in step 2: direct questioning. To test the difference between the experimental conditions in a regression analysis, three dummy variables were created: one to investigate the difference between text-only CMC (coded as 1) and face-to-face communication (coded as 0); one to test the difference between text-only CMC

(coded as 1) and visual CMC (coded as 0); and one to test the difference between visual CMC (coded as 1) and face-to-face communication (coded as 0). When controlled for experimental condition, there was a significant positive effect of direct questioning on self-disclosure. This result held for all three experimental comparisons (see step 3 in Table 2), yielding support for our CMC-encouraged direct questioning hypothesis.

Table 2. Mediation Analyses

	b	SE	β
<i>Step 1. DV: Self-Disclosure</i>			
IV: Face-to-Face (0) vs. Text-Only CMC (1)	.44	.21	.29*
IV: Visual CMC (0) vs. Text-Only CMC (1)	.05	.23	.03
IV: Face-to-Face (0) vs. Visual CMC (1)	.40	.19	.28*
<i>Step 2. DV: Direct Questioning</i>			
IV: Face-to-Face (0) vs. Text-Only CMC (1)	.56	.19	.36*
IV: Visual CMC (0) vs. Text-Only CMC (1)	.01	.20	.01
IV: Face-to-Face (0) vs. Visual CMC (1)	.54	.16	.42*
<i>Step 3. DV: Self-Disclosure; MV: Direct Questioning</i>			
Controlled for Face-to-Face (0) vs. Text-Only CMC (1)	.95	.07	.92**
Controlled for Visual CMC (0) vs. Text-Only CMC (1)	.99	.08	.87**
Controlled for Face-to-Face (0) vs. Visual CMC (1)	1.03	.08	.92**

Note. DV = Dependent Variable; MV = Mediating Variable; IV = Independent Variable. * $p < .05$; ** $p < .001$.

Although the significant regression coefficients in Table 2 indicate that the effect of CMC on self-disclosure is mediated by direct questioning, these coefficients do not provide a statistical test for the size and strength of the indirect effects (Preacher & Leonardelli, 2005). Therefore, we tested the significance of the indirect effects with the following formula developed by Sobel (1982):

$$Z = \frac{\alpha\beta}{\sqrt{a^2\sigma_\beta^2 + \beta^2\sigma_\alpha^2}} \quad (1)$$

In this formula, α is the unstandardized regression coefficient for the relationship between independent variable and the mediator, σ_{α} is the standard error of α , β is the unstandardized regression coefficient for the relationship between the mediator and the dependent variable when controlled for the independent variable, and σ_{β} is the standard error of β (Kenny, 1996, 2006). When comparing the text-only CMC condition and the face-to-face condition, the Sobel test for the mediated relationship between condition and self-disclosure through question asking was significant ($z = 2.88, p < .01$). Comparing the visual CMC condition and the face-to-face condition, the Sobel test was also significant ($z = 3.26, p < .01$). These test results demonstrate that the CMC-encouraged direct questioning hypothesis is a valid hypothesis to explain differences in self-disclosure between the CMC and face-to-face conditions.

Discussion

The goal of this study was to examine the underlying processes that may explain how the reduced cues of CMC result in higher levels of self-disclosure. In line with previous research, we found a direct positive effect of CMC on self-disclosure (Bargh et al., 2002; Coleman et al., 1999; Joinson, 2001; Tidwell & Walther, 2002). We identified four mediating variables that could carry the influence of CMC on self-disclosure: control over self-presentation, perceived similarity, private and public self-awareness, and direct questioning. Based on these mediating variables, we identified four hypotheses that could explain the CMC-self-disclosure relationship. By testing these hypotheses in one study, we were able to identify which hypothesis is the most valid and the best guide for future research.

The CMC-Encouraged Self-Presentation Hypothesis

Our first hypothesis predicted that CMC partners would feel more in control over their self-presentation and, as a result, disclose more intimate information. This CMC-encouraged self-presentation hypothesis was not confirmed. Neither text-only nor visual CMC enhanced control over self-presentation. As a result, self-presentation did not qualify as a mediator in the CMC-self-disclosure relationship. Although Bargh et al. (2002) argued that the cue-reduced setting of CMC allows individuals to express themselves without risks or constraints, our results showed that enhanced self-disclosure in CMC cannot be attributed to control over self-presentation.

The CMC-Encouraged Similarity Hypothesis

The CMC-encouraged similarity hypothesis was not confirmed. CMC partners did not feel more similar to each other than face-to-face partners. Increased feelings of similarity can

therefore not account for the increased self-disclosure in CMC. Although it is often hypothesized that CMC enhances feelings of similarity (Spears et al., 2002; Walther, 1996), this presupposition has rarely been empirically tested (Dubrovsky et al., 1991).

A possible explanation for the rejection of the CMC-encouraged similarity hypothesis could be that our sample consisted mainly of communication science students. Our participants might already feel so similar that this distorted the effect of our experimental conditions on similarity. Similarity, however, had a mean score of 2.59 (below the scale midpoint of 3) and standard deviation of .47, which precludes possible ceiling effects.

Our finding that CMC does not result in perceived feelings of similarity is in line with a recent study by Lee (2004), who found that the absence of visual cues per se is not enough to simulate perceptions of similarity. According to Lee, perceived similarity during CMC can only be accomplished when specific cues that enhance similarity are included in the CMC setting. An interesting question for future research is whether this “cue-triggered similarity” results in greater or less self-disclosure between CMC partners than between face-to-face partners. On the one hand, the cue-triggered similarity could lead to increased self-disclosure, because feelings of similarity between interaction partners enhance self-disclosure (Brockner & Swap, 1976). On the other hand, participants might form an impression of each other based on the cues that triggered similarity. As a consequence, there will be less need for direct questioning and self-disclosure to reduce uncertainty (cf., Spears et al., 2002). For example, the cue that triggers similarity might be that both participants are member of the same student organization, which may cause them to see each other as typical members of that organization. Therefore, they will already have formed a relatively good impression of each other and, subsequently, have less need for self-disclosure in order to reduce uncertainty.

The CMC-Influenced Self-Awareness Hypothesis

The CMC-influenced self-awareness hypothesis stated that CMC would raise private self-awareness and reduce public self-awareness. This hypothesis was also not confirmed: Both private and public self-awareness did not differ between the CMC and face-to-face conditions. Although it is commonly assumed that CMC affects self-awareness (Joinson, 2001; Kiesler, Siegel, & McGuire, 1984), this presupposition has hardly been tested. An exception is the study by Matheson and Zanna (1988), who found that text-only CMC results in higher private and lower public self-awareness. A possible explanation for the discrepancy between these findings and ours could lie in the type of conversation assignment used in the two studies. In Matheson and Zanna’s study, a task-oriented assignment was used. Participants had to discuss a problem in a small group in order to arrive at a solution. In our study, we used a socially-oriented

task in which participants received the assignment to get to know an opposite-sex partner. It is possible that, in comparison to a task-oriented assignment, basic levels of private and public self-awareness are already high when partners are informally talking to an opposite-sex partner. Future research should further investigate the circumstances surrounding the relationship between CMC and self-awareness, for example by including the CMC-assignment as a factor in the experiment.

The CMC-Encouraged Direct Questioning Hypothesis

Our fourth hypothesis was confirmed. Both text-only and visual CMC resulted in more direct questioning than the face-to-face condition. In addition, direct questioning was significantly related to self-disclosure. A simple explanation for this finding would be that CMC dyads asked more questions about cues not available to them, such as looks or clothing. However, our measures of self-disclosure and direct questioning consisted of rather intimate topics. Therefore, our results indeed suggest that CMC dyads used more direct intimate questioning to form impressions and reduce uncertainty than face-to-face dyads, resulting in more intimate self-disclosure. One of the CMC conversations gave a good example of direct question asking and the resulting self-disclosure:

Male respondent: "In my last class, 80% were women."

Female respondent: "You wouldn't mind having only women in class, would you?"

Female respondent: "Or are you gay?"

Male respondent: "No man, not gay."

Female respondent: "I developed a gay phobia since I fell in love with a homosexual."

Male respondent: "hahahahahaha"

Male respondent: "When did you notice?"

Female respondent: "He turned me down a few times, long story. At a certain moment, I heard some rumors, and he said he was confused and all."

Male respondent: "You have a boyfriend now?"

Female respondent: "No. I always fall in love with gays. Do you have a girlfriend?"

Male respondent: "No, my last relationship was 4 years ago ;-)"

These results could explain other outcomes of CMC research. For example, the CMC-encouraged direct questioning hypothesis could explain the higher interpersonal attraction in CMC compared to face-to-face communication, as is hypothesized in the hyperpersonal approach (Walther, 1996). The process of question asking and reciprocal self-disclosure in initial interactions is strongly related to interpersonal attraction

(Albada, Knapp, & Theune, 2002; Collins & Miller, 1994; McKenna et al., 2002). Since both question asking and self-disclosure in CMC are higher in CMC than in face-to-face communication, it follows that interpersonal attraction in CMC should be higher than in face-to-face settings.

Differences between Text-Only CMC and Visual CMC

Finally, our research question asked how the visual CMC condition would differ from the text-only CMC condition and the face-to-face condition. Our study found no differences in self-disclosure between the text-only CMC condition and the visual CMC condition. However, both CMC conditions resulted in significantly higher self-disclosure than the face-to-face condition. The same result was found for direct questioning: In both the text-only and visual CMC conditions, more direct questions were asked than in the face-to-face condition, whereas the number of direct questions did not differ between the two CMC conditions.

Our results imply that the absence of visual cues per se does not explain the higher levels of self-disclosure in CMC. After all, if reduced visual cues had been a valid explanation for heightened direct questioning and self-disclosure, the text-only and visual CMC condition would have led to different levels of direct questioning and self-disclosure. An explanation for the similar outcomes between the two CMC conditions is that direct questioning and self-disclosure, which are less appropriate in face-to-face settings, are more accepted in CMC settings, irrespective of whether visual information is added to the CMC setting. Especially among the young who have grown up with CMC technologies, direct questioning and self-disclosure could be seen as acceptable and even normative uncertainty reduction strategies in CMC (Walther et al., 2001). The addition of a webcam to text-only CMC apparently does not change this norm.

Another explanation could be that in our study, the inclusion of a webcam video of the partners' faces did not reduce uncertainty enough to affect self-disclosure. Three reasons are conceivable. First, an important piece of information provided by facial features is a person's gender. In our study, participants in all conditions knew that their interaction partner would be of the opposite sex, so this information had no additional value for uncertainty reduction. Second, most of the time participants in the visual CMC condition were typing messages and were facing the keyboard. Therefore, they paid less attention to the video screen, and may have missed important uncertainty reducing visual information. Third, cues other than facial features could be responsible for uncertainty reduction and impression formation (cf., Walther et al., 2001; Whittaker & O'Conaill, 1997). For example, impressions about an individuals' lifestyle are largely based on clothing (Keenan, 2001).

Implications for Further Research

An implication of our study is that reduced visual cues per se do not necessarily explain the increased self-disclosure in CMC. CMC theories have always been somewhat ambiguous about which nonverbal cues are precisely responsible for CMC outcomes. Our results show that visual cues about the facial features of a CMC partner do not decrease self-disclosure in CMC. Future research should elaborate on our findings and investigate which nonverbal cues explain the effects of CMC effects on self-disclosure as well as wider CMC outcomes.

Another implication of our study is that future research should employ more sophisticated effects models. This study investigated four underlying processes that could explain the increased self-disclosure in CMC compared to face-to-face communication. Our CMC-encouraged direct questioning hypothesis proved to be the only viable explanation. This result suggests that other mediating variables that are implicitly assumed in CMC theories, such as perceived feelings of similarity and private and public self-awareness, may appear not be valid in explaining the enhanced self-disclosure in CMC. Future research should investigate the role of these and other mediating variables in examining CMC outcomes, for example effects of CMC on relationship formation, group identification, and task outcomes.

Our study found that, compared to face-to-face settings, CMC elicits more direct questioning resulting in more intimate self-disclosure among unacquainted individuals. Our results concur with research conducted in more natural settings, which has also shown that direct questioning and self-disclosure is frequently used to reduce uncertainty about other CMC partners (Gibbs et al., 2006; Subrahmanyam, Smahel, & Greenfield, 2006). This need to reduce uncertainty about a partner is a general need in the initial stages of relationship formation (Berger & Calabrese, 1975). However, uncertainty reduction processes seem to develop at another pace in CMC interactions than in face-to-face interactions. In face-to-face settings, uncertainty reduction is usually based on observable aspects of self, such as physical attraction or nonverbal behavior (e.g., Byrne et al, 1968). Online, uncertainty reduction is more likely to be reduced on the basis of information that is willingly disclosed (McKenna & Bargh, 2000). Whereas in face-to-face settings, you are used to meet people, and then get to know them, "in cyberspace you can get to know people and then choose to meet them" (Rheingold, 1993, p. 27).

This differential uncertainty reduction in CMC and face-to-face communication may have several consequences for how relationships develop. First, relationships that started online may be more intimate at earlier stages than relationships that started offline, and online partners may have a greater degree of interdependence. Therefore, these relationships may be better able to survive setbacks later on in the relationship. Gibbs et. al. (2006), for example, found that self-disclosure on dating sites is an important predictor of perceived relational

success. Second, the possibility to form relationships online on the basis of question asking and self-disclosure may be especially helpful for those who are less able to form a relationship offline, for example those who are lonely, socially anxious, or physically unattractive. An interesting question for future research may be how relationships that started online further develop, for example by following and comparing romantic partners who met each other online and offline over a longer time period.

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Study 4

Friend Networking Sites and their Relationship to Adolescents' Well-being and Social Self-Esteem¹

Abstract

The aim of this study was to investigate the consequences of friend networking sites (e.g., MySpace) for adolescents' self-esteem and well-being. We conducted a survey among 881 adolescents (10- to 19-year-olds) who had an online profile on a Dutch friend networking site. Using structural equation modeling, we found that the frequency with which adolescents used the site had an indirect effect on their social self-esteem and well-being. The use of the friend networking site stimulated the number of relationships formed on the site, the frequency with which adolescents received feedback on their profiles, and the tone (i.e., positive vs. negative) of this feedback. Positive feedback on the profiles enhanced adolescents' social self-esteem and well-being, whereas negative feedback decreased their self-esteem and well-being.

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Introduction

The opportunities for adolescents to form and maintain relationships on the Internet have multiplied in the past few years. Particularly social networking sites have rapidly gained prominence as venues to relationship formation. Social networking sites vary in the types of relationships they focus on. There are dating sites, such as Match.com, whose primary aim is to help people find a partner. There are common interest networking sites, such as Bookcrossing.com, whose aim is to bring people with similar interests together. And there are friend networking sites, such as MySpace, whose primary aim is to encourage members to establish and maintain a network of friends.

The goal of this study is to investigate the consequences of friend networking sites for adolescents' social self-esteem and well-being. Given the recent worldwide proliferation of such sites and the ever-expanding numbers of adolescents joining up, these sites presumably play an integral role in adolescent life. Friend networking sites are usually open or semi-open systems. Everyone is welcome to join, but new members have to register, and sometimes the sites only allow members if they are invited by existing members. Members of the sites present themselves to others through an online profile, which contains self-descriptions (e.g., demographics, interests) and one or more pictures. Members organize their contacts by giving and receiving feedback on one another's profiles. This feedback is often publicly accessible and published along with the profiles.

Although friend networking sites have become tremendously popular among adolescents, there is as yet no research that specifically focuses on the uses and consequences of such sites. This is remarkable because friend networking sites lend themselves exceptionally well to the investigation of the social consequences of Internet communication. After all, peer acceptance and interpersonal feedback on the self, both important features of friend network sites, are vital predictors of social self-esteem and well-being in adolescence (e.g., Armsden & Greenberg, 1987; Harter, 1999; Hartup, 1996). Therefore, if the Internet has the potential to influence adolescents' social self-esteem and well-being, it is likely to occur via their use of friend networking sites.

There is no period in which evaluations regarding the self are so likely to affect self-esteem and well-being as in adolescence (Harter, 1999). Especially early and middle adolescence is characterized by an increased focus on the self. Adolescents often engage in what has been referred to as imaginative audience behavior (Elkind & Bowen, 1979): They tend to overestimate the extent to which others are watching and evaluating, and, as a result, can be extremely preoccupied with how they appear in the eyes of others. On friend networking sites, interpersonal feedback is often publicly available to all other members of the site. Such public

evaluations are particularly likely to affect the development of adolescents' social self-esteem (Harter & Whitesell, 2003). In this study, social self-esteem is defined as adolescents' evaluation of their self-worth or satisfaction with three dimensions of their selves: physical appearance, romantic attractiveness, and the ability to form and maintain close friendships. Well-being refers to a judgment of one's satisfaction with life as a whole (Diener, 2001; Diener, Emmons, Larsen, & Griffin, 1985).

Our study is conducted in the Netherlands where, since April 2000, a friend networking site exists that is primarily used by adolescents. Originally, the site started out as a place for gay men to get in touch with each other. However, without any active interference of the Web administrators, soon after its launch, the website became occupied by adolescents. In May 2006, this website, named CU2 ("See You Too"), contained 415,000 profiles of 10- to 19-year-olds. Considering that the Netherlands counts about 1.9 million adolescents in this age group, approximately 22% of Dutch adolescents use this website to form and maintain their social network.

Internet Use, Well-Being, and Self-Esteem

Ever since Internet use became common as a leisure activity, researchers have been interested in investigating its consequences for well-being and self-esteem. For both well-being and self-esteem, the literature has yielded mixed results: Some studies reported negative relationships with various types of Internet use (Beebe, Asche, Harrison, & Quinlan, 2004; Kraut et al., 1998; Rohall & Cotten, 2002; Weiser, 2001), other studies found positive relationships (Kraut et al., 2002; Shaw & Gant, 2002), and yet other studies found no significant relationships (Gross, Juvonen, & Gable, 2002; Harman, Hansen, Cochran, & Lindsey, 2005; Sanders, Field, Diego, & Kaplan, 2000).

Two reasons may account for the inconsistent findings on the relationships between Internet use, self-esteem, and well-being. First, many studies have treated the independent variable 'Internet use' as a one-dimensional construct. Some studies did investigate the differential effects of types of Internet use, but the selection of these types usually did not follow from a theoretical anticipation of their consequences for self-esteem and well-being. In our view, at least a distinction between social and non-social Internet use is required to adequately investigate Internet effects on self-esteem and well-being. We believe that social self-esteem and well-being are more likely to be affected if the Internet is used for communication than for information seeking. After all, feedback on the self and peer involvement, both important precursors of self-esteem and well-being, are more likely to occur during online communication than during online information seeking.

A second shortcoming in earlier studies is that many authors did not specify how Internet use could be related to self-esteem and well-being. Most research has focused on main effects of Internet use on either self-esteem or well-being. None of these studies have considered models in which the influence of Internet use on self-esteem and well-being is considered simultaneously. By modeling the relationships of Internet use with both self-esteem and well-being, a more comprehensive set of hypotheses can be evaluated, which may clarify some of the contradictory findings in previous studies.

Our Research Hypotheses Modeled

It has repeatedly been shown that adolescents' self-esteem is strongly related to their well-being. Although the literature has not clearly established causation, most self-esteem theorists believe that self-esteem is the cause and well-being the effect (Baumeister, Campbell, Krueger, & Vohs, 2003; Cheng & Furnham, 2003; Paradise & Kernis, 2002). Based on these theories, we hypothesize that social self-esteem will predict well-being, and by doing so, it may act as a mediator between the use of friend networking sites and well-being. After all, if the goal of friend networking sites is to encourage participants to form relationships and to comment on one another's appearance and personality, it is likely that the use of such sites will affect the dimensions of self-esteem that are related to these activities. The hypothesis that adolescents' social self-esteem predicts their well-being is modeled in Figure 1 by means of path H1.

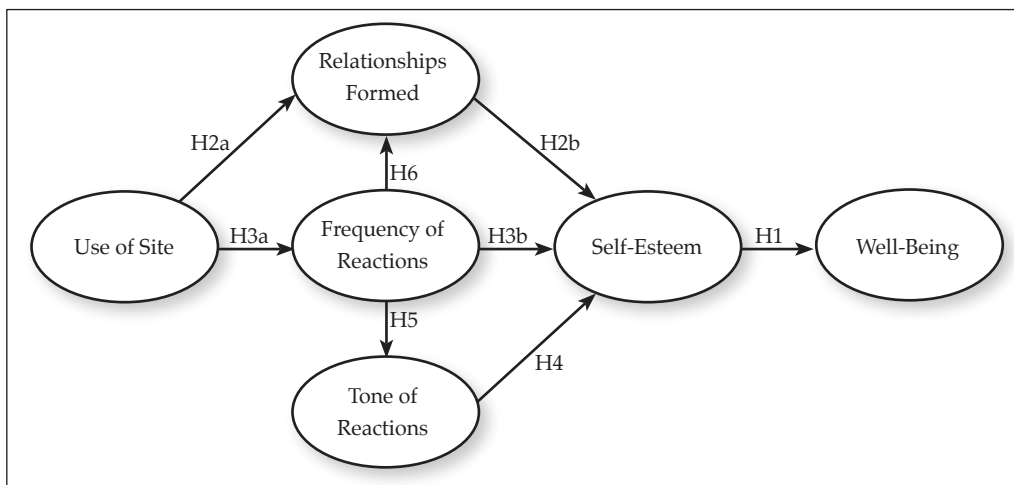


Figure 1. Hypothesized model on the relationships among use of friend networking site, social self-esteem, and well-being.

We also hypothesize that the use of friend networking sites will increase the chance that adolescents (a) form relationships on this site (path H2a), and (b) receive reactions on their profiles (path H3a). After all, if the aim of using friend networking sites is to meet new people and to give and receive feedback, it is plausible that the more these sites are used, the more friends and feedback a member gets. As Figure 1 shows, we do not hypothesize that the use of friend networking sites will directly influence the tone of reactions to the profiles because the mere use of such a site cannot be assumed to influence the tone of reactions to the profiles. However, we do hypothesize an indirect relationship between use of friend network sites and the tone of the reactions via the *frequency* of reactions that adolescents receive (path H3a and H5). Members of dating sites often modified their profile based on the feedback they received. By means of a process of trial and error, they were able to optimize their profile, and, by doing so, optimize the feedback they received (Ellison, Heino, & Gibbs, 2004). We therefore assume that the more reactions adolescents receive to their profiles, the more positive these reactions will become (path H5). We also assume that the more reactions adolescents receive the more relationships they will form (path H6).

We not only assume that adolescents' social self-esteem mediates the relationship between the use of friend networking sites and their well-being; we also hypothesize that the relationships between the use of friend networking sites and adolescents' social self-esteem will be mediated by three types of reinforcement processes that are common on friend network sites and that have been shown to affect adolescents' social self-esteem (Bukowski, 2001; Harter, 1999; Larson, Core, & Wood, 1999). These reinforcement processes are: (a) the number of relationships formed through the friend network site, (b) the frequency of feedback that adolescents receive on their profiles (e.g., on their appearance and self-descriptions), and (c) the tone (i.e., positive vs. negative) of this feedback. Our hypotheses about these mediated influences are modeled by means of path H2a-b, H3a-b, and H4 in figure 1.

We expect that for most adolescents the use of friend networking sites will be positively related to their social self-esteem. We base this view on theories on self-esteem, which assume that human beings have a universal desire to protect and enhance their self-esteem (Baumeister, 1998; Leary, 1996; Rosenberg, 1989). Following these theories, we believe that adolescents would avoid friend networking sites if these sites were to negatively impact their social self-esteem. Friend networking sites provide adolescents with more opportunities than face-to-face situations to enhance their social self-esteem. These sites provide a great deal of freedom to choose interactions. In comparison to face-to face situations, participants can usually more easily eliminate undesirable encounters or feedback and focus entirely on the positive experiences, thereby enhancing their social self-esteem.

However, if, by contrast, an adolescent for any reason is mostly involved in negative interactions on these sites, an adverse influence on his or her social self-esteem seems plausible. Especially because reactions to the profiles are made public to other members of the site, negative reactions are likely to have a negative influence on adolescents' social self-esteem. We therefore hypothesize that a positive tone of reactions will positively predict social self-esteem, whereas a negative tone will negatively predict social self-esteem.

Method

Sample and Procedure

We conducted an online survey among 881 Dutch adolescents between 10 and 19 years of age who had a profile on the friend networking site CU2 ("See You Too"). A profile on CU2 includes demographic information, a description of the user and his or her interests, and one or more pictures. Reactions of other CU2 users to the profiles are listed at the bottom of each profile (for more information, see www.cu2.nl).

Upon accessing their profile, members of the site received a pop-up screen with an invitation to participate in an online survey. The pop-up screen stated that the University of Amsterdam conducted the survey in collaboration with CU2. The adolescents were informed that their participation would be voluntary, that they could stop with the questionnaire whenever they wished, and that their responses would be anonymous.

Of the 1,345 adolescents who started with the questionnaire, 881 (66%) completed the survey, 45% boys and 55% girls (M age = 14.8; SD = 2.7). Because the age, gender, and friend listings of the adolescents who started the questionnaire were available, we could check whether the adolescents who completed the questionnaire differed from those who did not do so. Adolescents who completed the questionnaire were slightly older than those who did not (M age = 14.4; SD = 2.7). We did not find any significant differences between the two groups for gender and friend listings.

Measures

Use of friend networking site. We used three items measuring the frequency, rate, and intensity of the use of the friend networking site: (a) "How many days per week do you usually visit the CU2 site?" (b) "On a typical day, how many times do you visit the CU2 site?" and (c) "If you visit CU2, how long do you usually stay on the site?" The first two items required open-ended responses. Response categories for the third item ranged from 1 (about 10 min) to 7 (more than an hour). Responses to the three items were standardized. The standardized items resulted in a Cronbach's alpha of .61.

Frequency of reactions to profiles. The number of reactions to the profiles was measured by two items: "How often do you get reactions to your profile from unknown persons?" and "How often do you get reactions to your profile from people you only know through the Internet?" Response categories to the items ranged from 1 (*never*) to 5 (*very often*). Responses to these two items were averaged, and resulted in a Cronbach's alpha of .72.

Tone of reactions to profiles. The tone of the reactions to the profiles was measured with the following two questions: "The reactions that I receive on my profile are..." and "The reactions that I receive on what I tell about my friends are ..." Response categories ranged from 1 (*always negative*) to 5 (*always positive*). Because some CU2 users do not get reactions to their profile, we included a response option 'I do not get such reactions'. The no-reactions/not applicable responses were coded as missings. Adolescents' responses to the two items were averaged. Cronbach's alpha was .87.

Relationships established through CU2. We asked respondents how often they had established (a) a friendship and (b) a romantic relationship through CU2. Response options were 0 (*never*), 1 (*once*), and 2 (*more than once*). The correlation between the two items was $r = .34$.

Social self-esteem. We used three subscales of Harters' self-perception profile for adolescents (Harter, 1988): the physical appearance subscale, the close friendship subscale, and the romantic appeal subscale. The physical appearance subscale measures the degree to which adolescents are happy with the way they look. The close friendship subscale measures adolescents' ability to make close friends with whom they can share personal thoughts. The romantic appeal subscale taps adolescents' perceptions of whether they are romantically attractive to those in whom they are interested. From each subscale we selected the four items with the highest factor loadings. Response categories for the items ranged from 1 (*agree entirely*) to 5 (*disagree entirely*). Cronbach's alpha values were .91 for physical appearance scale, .85 for the close friendship scale, and .81 for the romantic appeal scale.

Well-being. We used the five-item satisfaction with life scale developed by Diener et al. (1985). Examples of items of this scale are "I am satisfied with my life," and "In most ways my life is close to my ideal." Response categories ranged from 1 (*agree entirely*) to 5 (*disagree entirely*). The five items loaded on one factor that explained 69% of the variance. Cronbach's alpha for the scale was .89, which is comparable to the alpha of .87 reported by Diener et al.

Results

Descriptive Statistics

Adolescents visited the friend networking site on average three days a week ($M = 3.09$, $SD = 2.07$). When they visited the website, they stayed on the site for approximately a half hour. The average number of reactions that adolescents had received on their profiles was 25.31 ($SD = 50.00$), with a range from 0 to 350 reactions. The tone of the reactions varied significantly among adolescents. Of the adolescent who reported having received reactions to their profiles ($n = 592$), 5.6% indicated that these reactions had always been negative; 1.6% that they had predominantly been negative; 10.1% that they had sometimes been negative and sometimes positive; 49.3% that they had been predominantly positive; and 28.4% that they had always been positive. Thirty-five percent of the adolescents reported having established a friendship, and 8.4% reported having formed a romantic relationship through the friend networking site.

Table 1. *Pearson Product-Moment Correlations*

	1	2	3	4	5	6	7	8	9
1. Use of friend networking site									
2. Frequency of reactions to profiles	.16*								
3. Tone of reactions to profiles	.10†	.24*							
4. Close friends established via site	.18*	.31*	.01						
5. Romantic relations established via site	.12*	.12*	-.13*	.34*					
6. Physical appearance self-esteem	.04	.05	.29*	-.00	-.00				
7. Close friendship self-esteem	.12*	.13*	.40*	.06	-.05	.61*			
8. Romantic appeal self-esteem	.06	.16*	.38*	.08†	-.00	.68*	.72*		
9. Well-being	.06	.07†	.37*	-.03	-.01	.59*	.54*	.45*	
10. Age	-.18*	.19*	.19*	.11*	.01	.08†	.02	.11*	-.01
11. Gender (boys = 0)	.08†	-.02	.07	-.11*	-.15*	-.15*	-.08†	-.09*	.01

Note. † $p < .05$; * $p < .01$.

Zero-order Correlations

Before testing our hypothesized model, we present a matrix showing the Pearson product-moment correlations between the variables included in the model (see Table 1). We also report the correlations of age and gender with the variables in the model, because age and gender are important predictors of both relationship formation and self-esteem (Harter, 1999). Table 1 depicts many significant relationships among the independent, mediating, and dependent variables. As expected, age and gender were significantly related to many independent, mediating, and dependent variables in our study.

Testing the Hypothesized Model

The hypotheses in our study were investigated with the Structural Equation Modeling software AMOS 5.0 (Arbuckle, 2003). The variables in our model were all modeled as latent constructs. The construct reflecting the use of the friend networking site was measured by 3 items, and well-being by 5 items. The frequency of reactions to profiles, the tone of the reactions to profiles, and the number of relationships established by the site were each measured by 2 items. The latent construct social self-esteem was formed by the three subscales measuring physical appearance self-esteem, close friendship self-esteem, and romantic appeal self-esteem. For reasons of clarity, we do not present the measurement model (i.e., the factor-analytic models) in our graphical presentation of the results. However, all factor-analytic models led to adequate descriptions of the data. The factor loadings were all above .44.

To investigate our hypotheses, we proceeded in two steps. First, we tested whether the hypothesized model in Figure 1 fit the data. Then, we checked whether we could improve the model's fit by adding or removing theoretically meaningful paths from the hypothesized model. We used two indices to evaluate the fit of our models, the root mean square error of approximation (RMSEA) and the comparative fit index (CFI). Particularly in the case of large samples these indices are considered as informative criteria in structural equation modeling (Byrne, 2001). A good model fit is expressed in an RMSEA value less than .06 and a CFI value greater than .95. In addition to these statistics, we also reported the chi-square test, because this goodness-of-fit statistic is still commonly reported. However, a widely recognized problem with the chi-square index is that the model fit is seriously underestimated in analyses with larger samples (Byrne, 2001). To address this problem, for large samples the relative chi-square (χ^2/df ratio) has been recommended. A χ^2/df ratio of less than 1.5 is considered to be a very good fit and a χ^2/df ratio of less than 3.0 is considered an acceptable fit (Kline, 2005).

Our hypothesized model fit the data satisfactorily well, $\chi^2(111, N = 592) = 279.34$, $p < .001$; χ^2/df ratio = 2.5; CFI = .96; RMSEA = .05. However, the results indicated that two paths assumed in our hypothesized model were not significant: path H2b from the number of relationships formed on the friend networking site to self-esteem, and path H3b from the frequency of reactions to the profile to self-esteem.

After removal of the two nonsignificant paths, we subjected our model to a final test. The modified model fit the data well, $\chi^2(113, N = 592) = 280.07$, $p < .001$; χ^2/df ratio = 2.5; CFI = .98, RMSEA = .05. We therefore accepted the model as an adequate description of the data. Our final model indicates that all of our research hypotheses (i.e., those visualized by paths H1, H2a, H3a, H4, H5, and H6) were confirmed by the data. Figure 2 visualizes the observed final model. The reported coefficients are standardized betas.

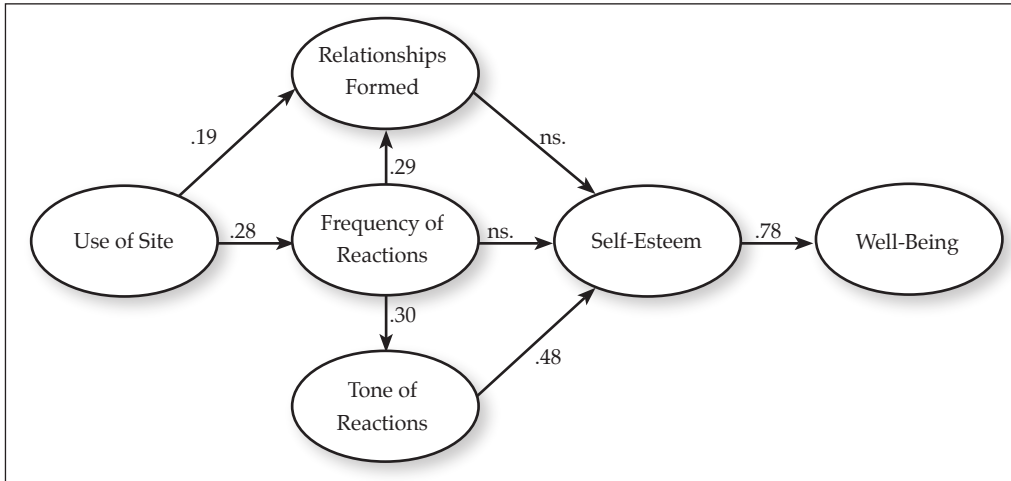


Figure 2. Structural equation model of the relationships among use of friend networking site, social self-esteem, and well-being. The ellipses represent latent constructs estimated from at least two observed variables; coefficients represent standardized betas significant at least at $p < .01$.

The Model Controlled for Age and Gender

As Table 1 shows, age and gender were significantly related to several independent and dependent variables in our structural model. To test whether our final model also holds when age and gender are controlled for, we tested a model in which we allowed paths between age and gender and all of the remaining independent, mediating, and dependent variables in the model. This model again led to a satisfactory fit, $\chi^2(134, N = 592) = 342.61, p < .001$; χ^2/df ratio = 2.6; CFI = .95; RMSEA = .05. However, more importantly for the present purpose, all the coefficients of the structural paths between the constructs in Figure 2 remained equal, that is, either significant or non-significant. The highest deviation was the path from the use of friend networking sites to the frequency of reactions to the profile (path H2a), which was $\beta = .28$ in the uncontrolled model and $\beta = .35$ in the controlled model.

Discussion

Our study was the first to show the consequences of adolescents' use of friend networking sites for their social self-esteem and well-being. We identified three potential reinforcement processes that are common on friend network sites and likely to affect adolescents' self-esteem and well-being: (a) the number of relationships formed on the sites, (b) the frequency of feedback on the online profiles, and (c) the tone of this feedback (i.e., positive or negative). We did not expect that the use of friend networking sites *per se* would influence adolescents'

self-esteem or well-being. However, we did hypothesize that each of these three reinforcement processes would affect adolescents' self-esteem, and thereby, their well-being.

Adolescents' self-esteem was affected solely by the tone of the feedback that adolescents received on their profiles: Positive feedback enhanced adolescents' self-esteem, and negative feedback decreased their self-esteem. Most adolescents (78%) always or predominantly received positive feedback on their profiles. For these adolescents, the use of friend networking sites may be an effective vehicle for enhancing their self-esteem. However, a small percentage of adolescents (7%) did predominantly or always receive negative feedback on their profiles. For those adolescents, the use of friend networking sites resulted in aversive effects on their self-esteem. Our study did not include variables to identify which adolescents in particular received negative feedback. Follow-up research should attempt to profile these adolescents.

There is growing acceptance that, due to several features such as reduced nonverbal cues, Internet communication is often more disinhibited than offline communication (Joinson, 1998). These disinhibition effects are most likely to occur among adolescents, who are testing their limits and who seem to need rebellious and thrill-seeking behavior in their search for independence (Gullone & Moore, 2000). Although our results suggest that most adolescents are able to cope well with feedback on their self-presentation, there is still a considerable group who are not so skilled on the Internet, and who are especially vulnerable to its harmful effects on their developing selves. Earlier research suggests that users of social networking sites are quite able to learn how to optimize their self-presentation through their profiles (Ellison et al., 2004). Adolescents who predominantly receive negative feedback on their profiles may especially be in need of mediation on how to optimize their online self-presentation.

Forming relationships proved to be a common phenomenon on the friend networking site. No less than 35% of the respondents reported having established one or more friendships through the site, and 8% one or more romantic relationships. However, as discussed, the number of friendships and romantic relationship formed via the site did not affect adolescents' social self-esteem. Obviously, it is not the sheer number of relationships formed on the site that affect adolescents' social self-esteem. Research on adolescent friendships suggests that the quality of friendships and romantic relationships may be a stronger predictor of social adjustment than the sheer number of such relationships (Berndt, Hawkins, & Jiao, 1999; Larson et al., 1999). Therefore, future research on friend networking sites should include measures on the quality of the relationships formed through friend networking sites.

Although our data are cross-sectional and therefore do not allow for causal conclusions, there are some clear indications for the directionality of our model. Using structural equation modeling, we showed that there are no indications whatsoever that any of our

independent variables were directly related to well-being. This applied to (a) the frequency with which the friend networking site was used, (b) the number of relationships formed on the site, and (c) the frequency and (d) tone of the feedback on the profiles. Although the literature is still somewhat inconclusive on whether self-esteem precedes well-being in adolescence or vice versa (e.g., Harter, 1999), our study clearly suggests that if friend networking sites are to influence adolescents self-esteem and well-being, the causal direction is from self-esteem to well-being and not the other way around.

Our results advocate the need for theoretical anticipation on the role of possible indirect effects in Internet research. In fact, if we had excluded self-esteem from our hypothesized model, we would have found a null-effect on well-being. In this case our results had been consistent with most earlier studies investigating direct Internet effects on well-being (e.g., Gross et al., 2002; Kraut et al., 2002, study 2; Sanders et al., 2000; Waestlund, Norlander, & Archer, 2001). Our results suggest that there may not exist any direct effect of Internet communication on well-being, at least not in the case of the use of friend networking sites. This means that earlier Internet research that focused on simple main effects of Internet use on well-being may have yielded spurious results.

Several scholars have pointed out that there is no such thing as a direct impact of Internet use (Bargh, 2002; Tyler, 2002). Instead, we need to specify the mechanisms that may underlie relationships between Internet use and well-being. The aim of our study was to investigate some potential underlying processes in the relationship between Internet, self-esteem, and well-being. Future research should elaborate on our approach by exploring the role of other potential mediators and moderators of Internet effects.

Our study focused on a new and pervasive phenomenon among adolescents: friend networking sites. In the Netherlands, about one quarter of adolescents is currently a member of one or more of such sites. The Netherlands is at present at the forefront of Internet-based communication technologies (e.g., 98% of Dutch 10- to 19-year-olds have home access to the Internet, and all of them use Instant Messaging). Therefore, it is a unique spot to start investigating the social consequences of such technologies. However, friend networking sites are a worldwide phenomenon that attracts ever younger adolescents. Such sites can no longer be ignored, neither by communication researchers nor by educators.

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General Discussion

Adolescents' Online Self-Disclosure and Self-Presentation

The past ten years have seen an enormous change in how adolescents communicate with each other. This change is characterized by a shift from offline to online communication. Most adolescents are online on a daily basis and during this time, communication is their primary activity (Duimel & De Haan, 2007). Online communication technologies, such as Instant Messaging (IM) and social networking sites, have become an integral part of youth culture. Moreover, these online communication technologies are very different from the communication technologies available to earlier generations. As a consequence, most parents are not completely abreast of their children's online activities and many are slightly concerned about their child's online behavior. However, for many adolescents, these new online communication technologies provide a world of opportunity (Duimel & De Haan, 2007; Gross, 2004).

Online communication technologies offer adolescents unique opportunities to disclose and present themselves. IM stimulates self-disclosure: many adolescents feel more at ease discussing intimate topics online than offline. Social networking sites allow adolescents much more freedom and control over how they present themselves. Self-disclosure and self-presentation are two important processes in adolescent social development. Therefore, the increased opportunities that online communication offers for self-disclosure and self-presentation may also influence adolescents' social development. However, up to now research investigating adolescents' online self-disclosure and self-presentation has been rather scarce. Moreover, little research has specifically investigated how online communication technologies such as IM and social networking sites affect self-disclosure and self-presentation. Therefore, the first aim of this dissertation was to investigate the role of online communication in adolescents' self-disclosure and self-presentation.

A second goal of this dissertation was to investigate the processes underlying online self-disclosure and self-presentation. Most research on online communication only investigates main effects of online communication. Therefore, hardly anything is known about why online communication may affect self-disclosure and self-presentation. Although research into main effects is valuable in a new research field, only research investigating the processes underlying these effects helps further theory development. Investigating underlying processes of online communication allows for the development of more sophisticated research models that may be used to explain a wide range of outcomes. Furthermore, focusing on underlying mechanisms may also explain individual differences in the uses and effects of online communication technologies (Bargh, 2002).

Summary of Studies

The four studies in this dissertation all concentrated on the role of online communication in adolescents' self-disclosure and self-presentation. All the studies focused on online communication technologies that are popular among adolescents: IM, social networking sites, and chat rooms. Two studies investigated self-presentation (studies 1 and 4) and two studies investigated self-disclosure (studies 2 and 3). All studies aimed to explain the precursors or underlying processes that may explain online self-disclosure and self-presentation.

The goal of the first study was to investigate (a) how often adolescents engage in Internet-based identity experiments, (b) with what motives they engage in such experiments, and (c) which self-presentational strategies they use while experimenting with their identity. Of the adolescents who used the Internet for chat or IM, 50% indicated that they had engaged in Internet-based identity experiments. Most of these adolescents pretended to be older, but they also pretended to be a real-life acquaintance, a fantasy person, or someone of the opposite sex. Finally, some also presented themselves as more flirtatious, more beautiful, or more macho. The most important motive for such experiments was self-exploration (to investigate how others react), followed by social compensation (to overcome shyness), and social facilitation (to facilitate relationship formation).

The study uncovered a number of differences in self-presentation strategies and motives between girls and boys, younger and older adolescents, and introvert and extravert adolescents. These differences correspond with certain developmental stages in adolescence. For example, younger adolescents experimented far more often with their identities than older adolescents. This result is consistent with general theories of adolescent development, which assume that the need to experiment with identity is especially high during early adolescence (Harter, 1999). Girls more often pretended to be older than boys, probably because girls mature earlier than boys, resulting in a higher need for girls to communicate with older adolescents (Allison & Schultz, 2001). Finally, introvert adolescents more often experimented with their identity to overcome shyness and to meet new people than extravert adolescents.

The goal of the second study was to explain the precursors and underlying processes of self-disclosure in IM. Many adolescents disclosed themselves as much or even better online than offline, especially in interactions with members of the opposite sex. Our expectations concerning the processes underlying self-disclosure in IM were confirmed. Adolescents' perceptions of the relevance of reduced nonverbal cues and controllability of IM encouraged their feelings of disinhibition, which in turn increased their online self-disclosure. As expected, private and public self-consciousness and social anxiety stimulated adolescents' perceptions of the relevance of reduced nonverbal cues and controllability, but did not directly influence online self-disclosure.

The third study investigated the processes underlying self-disclosure in Computer-Mediated Communication (CMC) in an experiment in which 81 male-female pairs were divided into three conditions: a text-only CMC condition (text chat), a visual CMC condition (chat with webcam), and a face-to-face condition. Self-disclosure was higher in the text-only CMC condition and the visual CMC condition than in the face-to-face condition. Of the four possible mediators, only direct questioning mediated the effect of CMC on self-disclosure. CMC dyads engaged in more direct questioning and therefore displayed higher levels of self-disclosure. Apparently, the reduced nonverbal cues forced communication partners to engage in more interactive uncertainty reduction strategies.

A remarkable result was that there was no difference in direct questioning and self-disclosure between the text-only CMC condition and the visual CMC condition. Visual cues have always been considered to be an important factor in explaining CMC outcomes (Joinson, 2001; Walther, Slovacek, & Tidwell, 2001), but apparently the absence of visual cues alone was not enough to explain the effect of CMC on self-disclosure. A possible explanation is that asking direct questions and self-disclosure are more acceptable strategies in CMC to get to know others, regardless of whether visual cues are added. Especially among adolescents, who grew up with online communication technologies such as IM, asking direct intimate questions and self-disclosure may be acceptable strategies to reduce uncertainty (Walther et al., 2001).

The fourth and final study investigated possible effects of self-presentation on social networking sites on self-esteem and well-being. We expected that the use of a social networking site would affect adolescents' self-esteem and well-being through (a) the number of friends made through the site, (b) the number of reactions received on their profile, and (c) the tone of these reactions. Only the tone of reactions received on the profile had a strong effect on adolescents' self-esteem and well-being. Furthermore, the more reactions adolescents received on their profile, the more positive these reactions became. Apparently, adolescents learn how to best adjust their profiles based on the reactions they receive, resulting in more positive reactions. This last study showed that online communication technologies not only influence self-disclosure and self-presentation, but may also affect adolescent social development.

Consequences for Online Communication Research

The dissertation contributes to theory formation in online communication research in several ways. First, the dissertation showed that traditional CMC theories can be used to explain the outcomes of online communication. A basic premise of all CMC theories is that CMC possesses certain attributes, such as the reduced nonverbal cues and the control over time and pace of the interaction, that are responsible for any CMC outcomes (e.g., Walther, 1996).

The studies in this dissertation have shown that online communication may also be classified according to these attributes. These attributes, in turn, may explain the outcomes of online communication, such as increased self-disclosure. Classifying online communication technologies according to certain CMC attributes is an important contribution to online communication research. First, it provides a theoretical explanation of the processes that underlie the effects of online communication. Second, it also allows these processes to be empirically investigated.

A second theoretical contribution of this dissertation is the integration of CMC theories and perceptions research. Most CMC theories are grounded in experimental research and consider CMC attributes, such as the reduced nonverbal cues, as fixed, structural aspects. As a consequence, they have paid little attention to how individual differences may shape the outcomes of online communication (Schouten, Valkenburg, & Peter, 2007). Perceptions research argues that individuals may differ in their perceptions of the attributes of a certain medium, and that these perceptions determine any media effects (A. M. Rubin, 2002). This dissertation showed that individuals differed greatly in their perceptions of certain online communication attributes (cf., Peter & Valkenburg, 2006), and that these perceptions determined the effects of online communication. This combination of perceptions research and CMC theories is a valuable contribution to online communication research. CMC theories provide a theoretical explanation for the outcomes of online communication, and perceptions research can explain individual differences in the outcomes of online communication.

A third contribution of this dissertation to online communication research concerns the relationship between personality characteristics and the outcomes of online communication. Research has shown that adolescents with certain personality characteristics experience different outcomes of online communication (Amichai-Hamburger, Wainapel, & Fox, 2002; Gross, Juvonen, & Gable, 2002; Wolak, Mitchell, & Finkelhor, 2003). This dissertation showed that certain personality characteristics are related to adolescents' perceptions of the importance of CMC attributes, and that these perceptions explain individual differences in outcomes (Peter, Valkenburg, & Schouten, 2005). For example, socially anxious adolescents will judge the reduced nonverbal cues and controllability of IM to be very important for their social interactions because these attributes diminish the social constraints they experience in face-to-face interaction.

Consequences for Online Self-Disclosure and Self-Presentation

All studies in this dissertation emphasize the important role of online communication in adolescents' self-disclosure and self-presentation. Chat rooms and social networking sites offer adolescents great freedom and control to present themselves the way they want. This allows

them to try out different identities and receive feedback on their self-presentations (Bortree, 2005; Stern, 1999). Adolescents themselves are aware of these opportunities: The main reason adolescents gave for experimenting with their identity in chat rooms was self-exploration, defined as finding out how others react to you. Furthermore, online communication seems to stimulate self-disclosure. The third, experimental study showed self-disclosure to be higher in the CMC conditions than in the face-to-face condition. The second study revealed that more than half of all adolescents were able to disclose themselves online just as well or better than offline. Apparently, even non-anonymous online communication technologies such as IM may stimulate self-disclosure. For many adolescents, the reduced nonverbal cues and controllability of online communication are beneficial, because these attributes allow adolescents to feel more at ease in disclosing themselves.

This dissertation provides a new outlook on the function of self-disclosure in online communication. The function of self-disclosure may be to reduce uncertainty about one's communication partners in online interactions. Uncertainty reduction theory assumes a basic human need to reduce uncertainty about others in social interactions, resulting in communication partners' urge to get to know one another as well as possible (Berger & Calabrese, 1975). When strangers meet face-to-face, they have many available options to reduce uncertainty, for example by observing nonverbal behavior, or by making inferences about the other based on appearance. In CMC, communication partners have relatively little information available to reduce uncertainty, and are therefore forced to ask more intimate questions and engage in reciprocal self-disclosure in order to reduce uncertainty (Tidwell & Walther, 2002).

The third study tested a number of hypotheses that could explain why certain attributes of CMC stimulate self-disclosure. Only the hypothesis based on uncertainty reduction theory was confirmed: In the CMC condition, communication partners asked each other more direct questions, resulting in more intimate self-disclosure. Although uncertainty reduction theory was developed over thirty years ago, this theory has hardly ever been applied to CMC and online communication research (Tidwell & Walther, 2002). However, the theory may provide a good explanation for certain outcomes of online communication. Therefore, the role of uncertainty reduction strategies in online communication warrants more investigation. The popularity of social networking sites, for example, may be explained by the extra opportunities these sites offer to reduce uncertainty about others. Further research could investigate what uncertainty reducing strategies adolescents use on social networking sites, and how this information shapes the impressions they form of others.

Consequences for CMC Theories

The findings of this dissertation tentatively shed some light on two central assumptions of CMC theories: the role of nonverbal cues and the role of anonymity in explaining CMC outcomes. Many CMC theories assume that nonverbal cues, particularly visual cues, are central to explaining the effects of CMC, such as increased self-disclosure (Joinson, 2001; Spears & Lea, 1992). A remarkable result of the third study was that no differences were found in self-disclosure between text-only CMC and CMC in which visual information about one's communication partner was added. In the text-only CMC condition as well as in the visual CMC condition, more direct questions were asked and more intimate information was disclosed than in the face-to-face condition. Adding visual cues to the CMC interactions did not lead to a reduction in self-disclosure.

Apparently the absence of visual cues alone is not sufficient to explain certain CMC outcomes. Earlier studies, however, have found the absence of visual cues to affect online self-disclosure (Joinson, 2001). An explanation for the similar outcomes between the two CMC conditions in the third study is that direct questioning and self-disclosure, which are less appropriate in face-to-face settings, are more accepted as uncertainty reduction strategies in CMC settings, irrespective of whether visual information is added. Especially among the young, who have grown up with CMC technologies, direct questioning and self-disclosure could be seen as acceptable and even normative uncertainty reduction strategies in online communication (Baym, 1995; Hu, Wood, Smith, & Westbrook 2004; Walther et al., 2001). The addition of visual cues to text-only CMC apparently does not change this norm. Further research should explicitly test these assumptions among adolescents and replicate earlier CMC experiments with adolescent samples.

The role of nonverbal cues in explaining CMC outcomes also deserves further research attention. This dissertation showed that besides the absence of nonverbal cues, controllability also may explain CMC outcomes. Other research also suggests that control over online interaction is an important attribute of online communication technologies (Madell & Muncer, 2007). Furthermore, more research is needed into exactly *which* nonverbal cues shape the effects of CMC. CMC theories have never been very specific about what exactly constitutes nonverbal cues. This was never a problem, because the absence of one cue, for example visual information, implied the absence of other nonverbal cues, for example audio. Nowadays, however, adolescents may freely choose which cues they want to convey, for example by adding a microphone or webcam to their IM interactions (Peter, Valkenburg, & Schouten, 2007). Social networking sites and 3D graphic environments such as Habbo Hotel also provide adolescents great control over the cues they want to include in their interactions. More research is needed

to uncover which attributes of CMC are responsible for what effects. Furthermore, nonverbal cues no longer have to be seen as a unidimensional construct, but different nonverbal cues need to be investigated separately.

A second assumption of many CMC theories that this dissertation calls into question is the role of anonymity. Anonymity has long been considered an important attribute of CMC (e.g., Jessup, Connolly, & Tansik, 1990). Based on phenomena such as the “stranger-on-the-train” effect (Thibaut & Kelly, 1959), where people disclose themselves to complete strangers, CMC theories have assumed that anonymity was responsible for many CMC outcomes, such as increased self-disclosure. However, this dissertation has shown that increased self-disclosure also occurs in non-anonymous online communication technologies, such as IM (Schouten et al., 2007). Other CMC attributes, namely reduced nonverbal cues and controllability, were found to be responsible for the increased online self-disclosure. Earlier CMC research did not clearly distinguish between anonymity and other attributes of CMC. For example, the absence of nonverbal cues has been called visual anonymity (Joinson, 2001; Spears, Postmes, Lea, & Wolbert, 2002). Further research should more clearly distinguish between effects that may be attributed to anonymity of CMC interactions, and effects that are caused by other attributes of CMC.

Consequences for Research on Adolescents’ Online Communication

A tentative conclusion that may be inferred from the results of this dissertation is that online communication seems to be beneficial for adolescents. Self-presentation on social networking sites and the feedback adolescents receive on their self-presentations had a positive effect on their self-esteem and well-being. Chat rooms allow adolescents a relatively safe way to try out different identities, for example, to experiment with sexual identity (Subrahmanyam, Greenfield, & Tynes, 2004). Online communication is an easy way to meet new people, and offers a safe environment. Experimenting with sexual identity in chat rooms may be safer than experimenting with sexual identity in real life. Moreover, online communication may act as a social buffer. Before teens decide they want to meet someone in person, they can gain information about that person through social networking sites. Moreover, IM is a safer way get to know others. If a newly met acquaintance turns out to be of questionable nature, adolescents only have to block that person from their friend list.

An important reason for the popularity of these online communication technologies among adolescents is that they fulfill certain social developmental needs. In no period of life is the need for social interaction as great as during adolescence (Harter, 1999). The possibilities that online communication offers for social interaction fulfill these needs, especially IM. Moreover, adolescents are very preoccupied with how they come across to others, which is

accompanied by a need to show who they are and to which peer groups they belong (Steinberg, 2001; Thibaut & Kelly, 1959). The self-presentational opportunities provided by social networking sites may fit in with these needs. Finally, online communication makes it easier for adolescents to try out different identities, which may be beneficial to the developmental goal of forming a coherent personal identity (Harter, 1999).

Furthermore, online communication may help adolescents in their self-disclosures. Many adolescents indicated they could better disclose themselves in IM interactions than in face-to-face interactions. The ability to disclose intimate information about the self is fundamental to the development of friendships and romantic relationships (Buhrmester & Furman, 1987). However, disclosing one's self to others, especially to members of the opposite sex, is extremely arousing for many adolescents (Hacker, 1981). The results in the second study showed that IM may be particularly helpful in adolescents' self-disclosure to the other sex, possibly because self-disclosure is more generally accepted online. Boys seem to especially benefit from IM's controllability and reduced nonverbal cues in their self-disclosure to girls, probably because boys generally have more difficulty self-disclosing than girls.

The goal of this dissertation was to investigate the role of online communication in adolescents' self-disclosure and self-presentation. An important step for further research is to investigate if and how online self-disclosure and self-presentation affect adolescents' social development. The last study showed that self-presentation on social networking sites may indeed affect adolescents' self-esteem and well-being. Further research should investigate long-term effects of online self-presentation on the social development of adolescents. On the one hand, online self-presentation may teach adolescents how to adapt themselves to different social situations because of the experience they have presenting certain aspects of themselves and trying out identities. On the other hand, feedback on adolescents' online self-presentations is often publicly available, which may have severe consequences for adolescents' self-esteem, especially when this feedback is negative. A related question is whether adolescents are always fully aware of the public availability of their online self-presentations.

Research should also focus on possible outcomes of online self-disclosure. Self-disclosure is of great importance to the development and maintenance of friendships and relationships (Buhrmester & Furman, 1987). Online communication seems to stimulate self-disclosure. An interesting question for further research would be how increased self-disclosure in the first stages of relationship formation affects further relationship development. For example, because these relationships start out on a more intimate level, they may be more resistant to future setbacks. On the other hand, online expectations might not match real-life experience. A related question is how adolescents use information gained through social networking sites and IM

conversations to decide with whom they want to get acquainted.

One important conclusion of this dissertation is that online communication has no uniform effects on adolescents. Often, public attention focuses on the –often negative– consequences of online communication, without specifying which adolescents experience these outcomes. This dissertation shows that there is no such thing as the effects of online communication. For decades, uses and gratifications research has argued that perceptions of a medium and motives for the use of that medium determine the outcomes of that medium (A. M. Rubin, 2002; R. B. Rubin, Perse, & Barbato, 1988). This dissertation showed that perceptions and motives also determine outcomes of online communication. Certain personality characteristics, in turn, affect these perceptions and motivations. Therefore, adolescents with different personality characteristics experience different outcomes of online communication. More research is needed to uncover the exact personality characteristics that influence these perceptions of and motives for online communication, how these perceptions and motives lead to different uses of online communication technologies, and how this eventually affects adolescents' social development.

A practical implication is that education about online communication technologies should not only be aimed at adolescents, but especially at parents. Online communication is not inherently bad, and has no uniform effects on adolescents. If any inferences may be drawn from this dissertation, it is that online communication seems to offer adolescents many advantages. Parents and adults in general should understand that online communication has become an important part of youth culture. They should be primarily interested in, and not routinely worried about, what their teens do online. The role of parents should lie in explaining the advantages and possible hazards of online communication, and parents should be able to help adolescents if necessary.

Having said so, more research is also needed to identify certain risk groups. For example, the last study found a positive relationship between feedback adolescents received on their profiles on social networking sites, and their self-esteem and well-being. A small group of adolescents predominantly or always received negative feedback on their profiles. For those adolescents, the use of friend networking sites resulted in adverse effects on their self-esteem. An interesting question for further research is which adolescents are unable to present themselves favorably on social networking sites, and why they are unable to. Further research should specifically focus on those adolescents that are, to a large extent, dependent on online communication for their self-disclosure and self-presentation, and how these adolescents are affected by online communication.

Conclusion

This dissertation made a contribution to research on online self-presentation and online self-disclosure. In this dissertation, CMC theories have been empirically applied to online communication technologies, such as IM and social networking sites. The dissertation criticized certain assumptions made by CMC research, most notably the role of nonverbal cues and anonymity in explaining CMC outcomes. This dissertation showed that uncertainty reduction theory may be an important theory to take into account when explaining CMC effects such as self-disclosure. Finally, this dissertation showed that online communication may affect adolescents' self-esteem and well-being through self-disclosure and self-presentation. Therefore, more research into the possible consequences of online self-disclosure and self-presentation for social development is needed.

Online communication research should aim to develop a theoretical framework linking attributes of online communication, perceptions of these attributes, and the outcomes of online communication. This dissertation has made an initial contribution to developing such a framework, but research has only just begun. First, research needs to uncover the exact attributes of online communication, in order to be able to classify online communication technologies accordingly. Second, more research is needed to uncover the underlying mechanisms responsible for outcomes of online communication, for example by focusing on the role of uncertainty reduction theory. Finally, more research is needed regarding how individual users perceive online communication technologies. In other words, what perceptions do different users have of the attributes of online communication technologies, and how do certain personality characteristics influence these perceptions.

Only within such a framework can predictions be made about the outcomes of online communication. Other effects of online communication may then also be explained, such as flaming or increased social attraction in online communication. Furthermore, predictions may also be made about future communication technologies by classifying them according to their attributes. Furthermore, such a framework is able to explain individual differences in use and effects of online communication technologies. Therefore, this framework not only helps online communication researchers, but can also be used to educate the wider public about how and which adolescents are affected by certain online communication technologies.

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Nederlandse Samenvatting

Hoe Jongeren Zich Online Uiten en Presenteren

Introductie

Internet is niet meer weg te denken uit het leven van jongeren. Terwijl in 1997 slechts 4% van de jongeren thuis internettoegang had, is dit tegenwoordig 98% (Duijmel & De Haan, 2007). De functie die internet voor jongeren heeft is door de jaren heen drastisch veranderd. Waar internet vroeger vooral werd gebruikt om te surfen en informatie te zoeken (Valkenburg & Peter, 2007), is communicatie nu de belangrijkste activiteit. Behalve de omvang is ook de aard van online communicatie veranderd; deze is verschoven van communicatie tussen vreemden naar communicatie binnen het bestaande sociale netwerk (Peter, Valkenburg, & Schouten, 2006).

De meeste jongeren (82%) zijn dagelijks op internet te vinden. Van alle online activiteiten is MSN'ën de belangrijkste activiteit, nog voor downloaden en gamen (Duijmel & De Haan, 2007). Jongeren MSN'ën gemiddeld 6 uur per week; 10% van de jongeren geeft zelfs aan elke dag 3 uur of meer te MSN'ën (Schouten, Valkenburg, & Peter, 2007). Voor jongeren is MSN belangrijker dan de mobiele telefoon of de vaste lijn (Duijmel & De Haan, 2007). E-mail wordt door jongeren onderling nauwelijks meer gebruikt, zij vinden e-mail iets voor oude mensen (Lenhart, Madden, & Hitlin, 2005). Naast MSN hebben veel jongeren een of meer profielen aangemaakt (58%). Daarnaast worden 3D grafische werelden (Habbo Hotel, World of Warcraft), waar jongeren in kunnen rondlopen en met elkaar kunnen chatten, steeds populairder.

Met de toegenomen populariteit neemt ook de interesse toe voor de mogelijke gevolgen van internet en online communicatie voor jongeren. Veel ouders zijn niet precies op de hoogte van het online communicatiegedrag van hun kinderen, en voor veel ouders geven deze nieuwe communicatietoepassingen aanleiding tot enige bezorgdheid. Vaak wordt gewezen op de gevaren van internet voor jongeren, zoals pesten, seksuele verzoeken of internetverslaving (Van der Eijnden & Vermulst, 2006). Een rondje Amazon onthult tientallen boeken over het onderwerp met titels als "Generation MySpace: Helping Your Teen Survive Online Adolescence" en "No Child is Safe from Internet Crime." Ook in Nederland is een aantal boeken en websites beschikbaar over het onderwerp, die een wat genuanceerder beeld geven (e.g., Delver, 2006; Pardoën & Pijpers, 2005, 2006).

Ook het wetenschappelijk onderzoek naar de mogelijke gevolgen van online communicatie voor de sociale ontwikkeling van jongeren neemt toe. De resultaten zijn gemengd.

Sommige onderzoeken vinden negatieve gevolgen van online communicatie en internetgebruik (Beebe, Asche, Harrison, & Quinlan, 2004; Kraut et al., 1998). Andere onderzoeken vinden weer positieve effecten (Hu, Wood, Smith, & Westbrook, 2004; Kraut et al., 2002). Het onderzoek richt zich echter vooral op directe verbanden tussen online communicatie en sociale ontwikkeling en niet op onderliggende verklaringen voor de gevonden effecten. Het onderzoek kan dus niet verklaren waarom online communicatie bepaalde gevolgen heeft voor de sociale ontwikkeling, noch waarom verschillende onderzoeken verschillende resultaten laten zien.

Online Zelf-Onthulling en Zelf-Presentatie

Twee processen die een rol kunnen spelen in het verklaren van effecten van online communicatie op de sociale ontwikkeling van jongeren zijn zelf-onthulling en zelf-presentatie. Zelf-onthulling is het uiten van intieme informatie over jezelf (Derlega, Metts, Petronio, & Margulis, 1993). Zelf-presentatie wil zeggen dat jongeren zich op bepaalde manieren aan anderen presenteren om in de hand te houden hoe ze op anderen overkomen (Leary, 1996). Zelf-onthulling en zelf-presentatie vervullen een aantal belangrijke functies in de sociale ontwikkeling van jongeren (Buhrmester & Prager, 1995; Leary & Kowalski, 1990). Ten eerste spelen ze een belangrijke rol bij de ontwikkeling van vriendschappen. Zelf-presentatie is vooral van belang voor het ontstaan van een vriendschap en zelf-onthulling dient vooral om een vriendschap te verdiepen (Buhrmester & Prager, 1995). Ten tweede spelen ze een rol in de identiteitsontwikkeling van jongeren. Door verschillende identiteiten uit te proberen en te leren van de reacties die ze hierop krijgen, kunnen jongeren besluiten deze identiteiten integreren in hun zelfbeeld. Bovendien vergelijken jongeren zichzelf met anderen met betrekking tot de manieren waarop ze zich uiten en zich presenteren, zodat ze hun meningen, normen en waarden kunnen valideren. Tot slot zijn zelf-onthulling en zelf-presentatie belangrijk voor de ontwikkeling van het zelfvertrouwen en welzijn, vanwege de feedback die jongeren van anderen krijgen op hoe ze zich presenteren en wat ze over zichzelf vertellen.

Online communicatie biedt unieke mogelijkheden voor zelf-onthulling en zelf-presentatie. Experimenteel onderzoek naar Computer-Mediated Communication (CMC) laat zien dat jongeren zich in anonieme CMC interacties beter kunnen uiten dan in vergelijkbare face-to-face interacties (Joinson, 2001). Ook in niet anonieme online interacties, zoals in MSN conversaties, blijken veel jongeren makkelijker intieme onderwerpen te kunnen bespreken dan face-to-face (Schouten et al., 2007). Online chatrooms en virtuele gemeenschappen stellen jongeren in staat zich te presenteren zoals ze willen, waardoor ze kunnen experimenteren met hun identiteit (Turkle, 1995; Valkenburg, Schouten, & Peter, 2005). En ook op persoonlijke websites hebben jongeren vele nieuwe mogelijkheden om zich te presenteren (Bortree, 2005;

Huffaker & Calvert, 2005; Stern, 2004).

Online communicatie kan grote gevolgen hebben voor hoe jongeren zich uiten en zich presenteren. Omdat communicatie tussen jongeren tegenwoordig voor een groot deel online plaatsvindt en omdat zelf-onthulling en zelf-presentatie zo belangrijk zijn voor de sociale ontwikkeling van jongeren, is het van belang te onderzoeken hoe online communicatie de manieren waarop jongeren zich uiten en zich presenteren beïnvloedt. Onderzoek dat zich richt op de wijze waarop jongeren zich uiten en zich presenteren via online communicatie is echter nog schaars. Bovendien is er nog weinig specifiek onderzoek naar nieuwe online communicatietoepassingen die jongeren gebruiken, zoals MSN en profielsites, en hoe deze zelf-onthulling en zelf-presentatie beïnvloeden. Daarom onderzoekt dit proefschrift de rol die online communicatie speelt in de wijze waarop jongeren zich uiten en zich presenteren.

Daarnaast richt dit proefschrift zich op het onderliggende proces dat kan verklaren waarom online communicatie zelf-onthulling en zelf-presentatie beïnvloedt. Tot nu toe is het meeste onderzoek gericht op hoofdeffecten van online communicatie, zoals de directe relatie tussen online communicatie en zelf-onthulling (Hu et al., 2004) of tussen persoonlijkheid en bepaalde vormen van online zelf-onthulling (Birnie & Horvath, 2002). Minder aandacht is er voor hoe online communicatie deze effecten veroorzaakt. Onderzoek naar de processen die ten grondslag liggen aan online zelf-onthulling en zelf-presentatie kan bijdragen aan de theorievorming over mogelijke uitkomsten van online communicatie (Bargh, 2002). Kennis van deze mechanismen stelt ons in staat om meer specifieke uitspraken te doen over welke vormen van online communicatie onder welke omstandigheden gevolgen hebben voor welke jongeren. Hiermee kan betere voorlichting gegeven worden over de risico's en voordelen van online communicatie, zonder te verzanden in algemene, eenzijdige uitspraken over de risico's of voordelen van online communicatie.

Tot slot kan onderzoek naar het onderliggende proces van zelf-onthulling en zelf-presentatie zorgen voor een bredere toepasbaarheid van gevonden resultaten. Nu is het nog grotendeels onduidelijk welke kenmerken van online communicatie verantwoordelijk zijn voor veranderingen in zelf-onthulling en zelf-presentatie. Daardoor staat elk onderzoek op zichzelf en kunnen resultaten moeilijk worden gegeneraliseerd naar andere online communicatietoepassingen. Onderzoek laat bijvoorbeeld zien dat CMC zelf-onthulling kan stimuleren (Joinson, 2001). Het is echter niet duidelijk welke kenmerken van CMC verantwoordelijk zijn voor deze toegenomen zelf-onthulling. Hierdoor kunnen de resultaten moeilijk worden toegepast op andere online communicatietoepassingen, zoals MSN.

Samenvatting van de Studies

Het proefschrift bestaat uit vier artikelen, die zich richten op de drie populairste online communicatietoepassingen: chatrooms, instant messaging (MSN), en profielsites. Alle artikelen zijn gepubliceerd (Artikelen 1, 2 & 4), ofwel ingediend (Artikel 3). De inhoud van de hoofdstukken in dit proefschrift zijn gelijk aan de gepubliceerde of ingediende artikelen. Daarom heeft elke studie een eigen samenvatting, introductie, discussie en referenties.

Studie 1

De eerste studie richtte zich op chatrooms. Een chatroom is een tekstgebaseerde online communicatietoepassing waarin meerdere gebruikers tegelijkertijd met elkaar kunnen communiceren. Chatrooms worden voornamelijk gebruikt om met vreemden te communiceren. De laatste jaren verliezen tekstgebaseerde chatrooms aan populariteit. Ten eerste vanwege de opkomst van grafische toepassingen waarmee gechat kan worden, zoals Habbo Hotel of World of Warcraft. Ten tweede vanwege de populariteit van MSN, waarmee vooral binnen het bestaande netwerk wordt gecommuniceerd in plaats van met vreemden. Toch bezoeken veel jongeren af en toe een chatroom en geeft 57% van de jongeren aan weleens met vreemden te chatten (Peter et al., 2006).

Het doel van de eerste studie was te onderzoeken (a) hoe vaak, (b) hoe en (c) waarom jongeren met hun identiteit experimenteren op internet. Van de jongeren die chatten had 50% wel eens met zijn of haar identiteit geëxperimenteerd op internet. De meeste jongeren deden zich ouder voor dan ze zijn. Ook deden jongeren zich vaak voor als een vriend of bekende, als een fictief persoon of als iemand van het andere geslacht. Tot slot durfden sommigen meer te flirten, deden ze zich mooier voor dan ze in werkelijkheid waren, of gedroegen zich meer macho. Het belangrijkste motief voor jongeren om met hun identiteit te experimenteren was zelf-exploratie (zien hoe anderen op je reageren), gevolgd door sociale compensatie (om verlegenheid te overwinnen) en sociale facilitatie (om nieuwe mensen te ontmoeten).

Het onderzoek liet een aantal verschillen in strategieën en motieven van zelf-presentatie zien tussen jongens en meisjes, jongere en oudere tieners en introverte en extraverte tieners. Zo experimenteerden jongere tieners veel vaker dan oudere tieners met hun identiteit. Dit komt doordat vooral bij jongere tieners de behoefte aan experimenteren heel groot is (Harter, 1999). Meisjes bleken zich vaker ouder voor te doen dan jongens, waarschijnlijk omdat meisjes eerder fysiek volwassen zijn dan jongens en zij daardoor een wat grotere behoefte hebben om met oudere tieners te praten (Allison & Schultz, 2001). Tot slot experimenteerden introverte tieners vaker dan extraverte tieners met hun identiteit om hun verlegenheid te overwinnen.

Studie 2

De tweede studie richtte zich op MSN. In Nederland is MSN de met afstand populairste online communicatietoepassing onder jongeren. De officiële naam voor MSN is Instant Messaging, maar omdat Microsoft's MSN messenger door vrijwel iedereen wordt gebruikt, wordt Instant Messaging in Nederland MSN'ën genoemd. Het doel van deze studie was om het onderliggende proces en antecedenten van zelf-onthulling in MSN te onderzoeken. CMC theorieën stellen dat bepaalde kenmerken van online communicatie zelf-onthulling kunnen stimuleren (Joinson, 2001; Tidwell & Walther, 2002). Volgens Walther's hyperpersonal communication theory (Walther, 1996) zijn twee kenmerken van CMC hiervoor verantwoordelijk: de verminderde non-verbale cues (reduced non-verbal cues) en de controleerbaarheid (controllability) van CMC. De verminderde non-verbale cues duiden op het gebrek aan audiovisuele informatie in CMC. De controleerbaarheid van CMC wil zeggen dat jongeren online meer tijd hebben om te bepalen wat en hoe ze iets zeggen, omdat geen directe reactie verwacht wordt. Deze kenmerken zijn ook van toepassing op MSN en kunnen mogelijk verklaren waarom jongeren zich via MSN beter kunnen uiten.

Het model dat wij toetsten in de tweede studie stelde dat de verminderde non-verbale cues en de controleerbaarheid ten grondslag zouden liggen aan zelf-onthulling in MSN. Echter, wij stelden dat de percepties die jongeren hadden van het belang van deze kenmerken uiteindelijk de mogelijke effecten van MSN op zelf-onthulling bepaalden. Verder verwachtten we dat deze percepties de relatie tussen bepaalde persoonlijkheidskenmerken (zelfbewustzijn en verlegenheid) en online zelf-onthulling zouden verklaren. Deze verwachtingen werden bevestigd. Hoe belangrijker jongeren de verminderde non-verbale cues en de controleerbaarheid van MSN vonden, hoe makkelijker zij zich konden uiten. Ook mediëerden deze percepties de relatie tussen de drie persoonlijkheidskenmerken en zelf-onthulling. Naarmate jongeren meer verlegen waren, of zich meer bewust waren van zichzelf of hun omgeving, hechtten zij meer belang aan de non-verbale cues en de controleerbaarheid van MSN en voelden zij zich daarom vrijer om intieme informatie te uiten.

Studie 3

De derde studie was een experiment waarin het onderliggende proces van zelf-onthulling in CMC werd onderzocht. In de tweede studie vonden we dat percepties van bepaalde kenmerken van CMC ervoor zorgen dat jongeren zich online beter kunnen uiten dan face-to-face. Studie drie onderzocht waarom deze kenmerken, in het bijzonder de verminderde non-verbale cues, zelf-onthulling kunnen stimuleren. Gebaseerd op bestaande CMC theorieën werden vier hypothesen getoetst die de relatie tussen CMC en zelf-onthulling konden

verklaren. Deze vier hypothesen werden getoetst in een experiment waarin 81 man-vrouw paren willekeurig waren verdeeld over drie condities: een tekstuele CMC conditie (alleen een chatvenster), een visuele CMC conditie (een chatvenster met webcam) en een face-to-face conditie. Zelf-onthulling was lager in de face-to-face conditie dan in de tekstuele CMC conditie en de visuele CMC conditie. Alleen de vierde hypothese, gebaseerd op uncertainty reduction theory (Berger & Calabrese, 1975) werd bevestigd. Deze theorie gaat uit van de basisbehoefte om onzekerheid over anderen te verminderen in sociale interacties en stelt dat communicatiepartners elkaar daarom zo goed mogelijk willen leren kennen. In CMC hebben communicatiepartners dan niet veel om op terug te vallen en zijn ze aangewezen op de mogelijkheid die overblijft, namelijk directe vragen stellen. Het stellen van directe vragen bleek de enige variabele die de relatie tussen CMC en zelf-onthulling kon verklaren. Paren in de beide CMC condities stelden elkaar meer directe intieme vragen en wisselden daardoor ook meer intieme informatie uit.

Opvallend was dat geen verschil gevonden werd in het stellen van directe intieme vragen en in zelf-onthulling tussen de tekstuele CMC conditie en de visuele CMC conditie. Visuele cues worden als een belangrijke factor gezien in het verklaren van effecten van CMC (Joinson, 2001; Walther, Slovacek, & Tidwell, 2001), maar blijkbaar was alleen de afwezigheid van visuele cues niet genoeg om het effect van CMC op zelf-onthulling te verklaren. Een mogelijke verklaring is dat vragen stellen en zelf-onthulling in CMC geaccepteerde strategieën zijn om anderen te leren kennen, ongeacht of er visuele cues beschikbaar zijn in de interactie. Vooral onder jongeren, die opgegroeid zijn met toepassingen als MSN, kan het zijn dat vragen stellen en zelf-onthulling normale strategieën zijn om onzekerheid te verminderen (Walther et al., 2001).

Studie 4

De vierde studie richtte zich op een relatief nieuw fenomeen, profielsites, en onderzocht de mogelijke effecten van zelf-presentatie op het zelfvertrouwen en welzijn van jongeren. Op profielsites presenteren jongeren zichzelf door middel van een online profiel, waarop ze een beschrijving van zichzelf plaatsen (zoals een biografie, activiteiten of intiemere onderwerpen), en een aantal foto's. Een belangrijke functie is het geven van feedback op elkaars profiel. Deze feedback is openlijk beschikbaar en wordt bij het profiel geplaatst. Profielsites hebben de laatste jaren een enorme vlucht genomen. De populairste site in Nederland, Sugababes/Superdudes herbergt meer dan een miljoen profielen. Bij CU2, die het onderzoek faciliteerde, zijn 500.000 profielen aangemaakt. Volgens een recent onderzoek heeft 58% van de Nederlandse tieners tussen de 13 en 18 ooit een profiel aangemaakt (Duimel & De Haan, 2007).

De studie toetste verschillende manieren waarop het gebruik van profielsites gevolgen

kan hebben voor het zelfvertrouwen en welzijn van jongeren. De resultaten lieten zien dat alleen de aard van de reacties op het profiel (positief of negatief) een sterk effect had op het zelfvertrouwen en welzijn van jongeren. De aard van de reacties hing niet direct af van het gebruik van de profielsite, maar werd gemedieerd door het aantal reacties op het profiel. Met andere woorden, hoe meer reacties, des te positiever deze reacties werden. Dit wijst op een leereffect in het gebruik van het profiel. Op basis van de reacties die jongeren krijgen op hun profiel, leren ze hoe ze zich het best kunnen presenteren, met als gevolg meer positieve reacties. En hoe meer positieve reacties, hoe hoger het zelfvertrouwen en welzijn. Hiermee laat deze laatste studie zien dat bepaalde communicatietoepassingen niet alleen de mogelijkheden tot zelf-onthulling en zelf-presentatie beïnvloeden, maar hierdoor ook effect kunnen hebben op de sociale ontwikkeling van jongeren.

Discussie

Gevolgen voor de Theorievorming over Online Communicatie

Dit proefschrift draagt op verschillende manieren bij aan de theorievorming over online communicatie. Ten eerste laat het proefschrift zien dat effecten van online communicatie met bestaande CMC theorieën verklaard kunnen worden. CMC theorieën veronderstellen dat CMC bepaalde kenmerken heeft, zoals de verminderde non-verbale cues en de controleerbaarheid van de interactie, en dat deze kenmerken verantwoordelijk zijn voor bepaalde uitkomsten van CMC (e.g., Walther, 1996). In tegenstelling tot eerdere studies naar online communicatie hebben we in dit proefschrift online communicatie aan de hand van deze kenmerken geïdentificeerd en hiermee bepaalde uitkomsten van online communicatie verklaard, zoals toegenomen zelf-onthulling. Bestaande CMC theorieën kunnen dus gebruikt worden om de processen die aan online zelf-onthulling en zelf-presentatie ten grondslag liggen te verklaren.

Een tweede theoretische bijdrage van dit proefschrift is de integratie van CMC theorieën en perceptieonderzoek. CMC theorieën zijn ontwikkeld op basis van experimenteel onderzoek en zien kenmerken van CMC als vaste, structurele kenmerken. Als gevolg hiervan hebben zij weinig aandacht voor individuele verschillen in uitkomsten (Schouten et al., 2007). Perceptieonderzoek stelt echter dat mensen verschillen in percepties die ze hebben over bepaalde kenmerken van een medium en dat eventuele effecten afhangen van deze percepties (Rubin, 2002). Dit proefschrift toonde aan dat jongeren verschillen in de percepties die ze hadden van kenmerken van CMC (cf., Peter & Valkenburg, 2006) en dat deze percepties de uiteindelijke effecten bepaalden. Deze koppeling tussen perceptieonderzoek en CMC theorieën is een waardevolle bijdrage aan onderzoek naar online communicatie. CMC theorieën geven een theoretische verklaring voor de uitkomsten van online communicatie, en perceptieonderzoek kan verschillen tussen gebruikers verklaren.

Ten derde draagt dit proefschrift bij aan de theorievorming over online communicatie door een verklaring te geven voor de relatie tussen persoonlijkheidskenmerken en uitkomsten van online communicatie. Bepaalde persoonlijkheidskenmerken leiden tot bepaalde uitkomsten van online communicatie (Amichai-Hamburger, Wainapel, & Fox, 2002; Wolak, Mitchell, & Finkelhor, 2003). Verlegen jongeren kunnen bijvoorbeeld online makkelijker met anderen in contact treden dan face-to-face. Percepties van bepaalde kenmerken van online communicatie blijken echter deze relatie te mediëren. Bepaalde persoonlijkheidskenmerken zijn gerelateerd aan de percepties die jongeren hebben van de kenmerken van online communicatie, en deze percepties verklaren op hun beurt individuele verschillen in de uitkomsten van online communicatie (Peter, Valkenburg, & Schouten, 2005). Verlegen jongeren bijvoorbeeld zullen veel belang hechten aan de verminderde non-verbale cues en de controleerbaarheid van online communicatie omdat deze kenmerken hen in staat stellen om makkelijker met anderen in contact te treden.

Gevolgen voor Online Zelf-Onthulling en Zelf-Presentatie

De studies in dit proefschrift laten zien dat online communicatie een belangrijke rol speelt in hoe jongeren zich uiten en zich presenteren. Chatrooms en profielsites bieden jongeren unieke mogelijkheden om zichzelf te presenteren zoals ze willen. Zo kunnen jongeren bepaalde identiteiten uitproberen en hier feedback op krijgen (Bortree, 2005; Stern, 1999). Jongeren geven aan zich ook van deze mogelijkheden bewust te zijn: de voornaamste reden die jongeren gaven om zich anders voor te doen in chatrooms was zelf-exploratie, oftewel om uit te vinden hoe anderen op je reageren. Daarnaast stimuleert online communicatie zelf-onthulling. De derde studie liet zien dat zelf-onthulling hoger was in de CMC condities dan in de face-to-face conditie. Uit de tweede studie bleek dat meer dan de helft van de jongeren zich via MSN net zo goed of zelfs beter kon uiten dan face-to-face. Blijkbaar kan zelfs een niet anonieme CMC toepassing als MSN zelf-onthulling stimuleren.

Dit proefschrift biedt een interessante nieuwe visie op de rol van zelf-onthulling in online communicatie. Een belangrijke functie van online zelf-onthulling is het verminderen van onzekerheid over communicatiepartners. Uncertainty reduction theory stelt dat mensen een basisbehoefte hebben om onzekerheid over anderen te verminderen in sociale interacties (Berger & Calabrese, 1975). Om deze onzekerheid te verminderen, proberen nieuwe communicatiepartners elkaar zo goed mogelijk te leren kennen. Als vreemden elkaar ontmoeten in een face-to-face setting hebben ze een aantal mogelijkheden om onzekerheid te reduceren, zoals observeren van non-verbaal gedrag en het vormen van impressies op basis van kleding en uiterlijk. In CMC hebben communicatiepartners weinig om op terug te vallen en zijn ze aangewezen op de

mogelijkheid die overblijft, namelijk vragen stellen en het wederzijds uitwisselen van intieme informatie (Tidwell & Walther, 2002). De rol die onzekerheidsreducerende strategieën spelen in online communicatie moet nader onderzocht worden. Verder onderzoek zou zich bijvoorbeeld kunnen richten op de strategieën die jongeren gebruiken op profielsites om onzekerheid over anderen te verminderen en hoe deze informatie het beeld dat zij hebben van anderen bepaalt.

Gevolgen voor CMC Theorieën

Dit proefschrift stelt twee centrale aannames van CMC theorieën ter discussie: de rol van non-verbale cues en de rol van anonimiteit in het verklaren van CMC uitkomsten. Veel CMC theorieën stellen dat de verminderde non-verbale cues, en in het bijzonder de afwezigheid van visuele cues, een centrale rol spelen in het verklaren van de effecten van CMC, zoals een verhoogde zelf-onthulling (Joinson, 2001). Een opvallend resultaat uit de experimentele studie was echter dat geen verschil werd gevonden in zelf-onthulling tussen de tekstgebaseerde CMC conditie en de visuele CMC conditie. In zowel de tekstgebaseerde CMC conditie als de visuele CMC conditie werden meer directe vragen gesteld en werd meer intieme informatie uitgewisseld dan in de face-to-face conditie. Het toevoegen van visuele cues aan een CMC interactie leidde niet tot een vermindering in zelf-onthulling.

Blijkbaar is alleen de afwezigheid van visuele cues niet genoeg om bepaalde effecten van CMC te verklaren. Eerdere studies hebben echter wel gevonden dat zelf-onthulling wordt gestimuleerd door de afwezigheid van visuele cues (Joinson, 2001). Een mogelijke verklaring hiervoor is dat voor de huidige generatie jongeren het stellen van directe vragen en intieme informatie over jezelf vertellen algemeen geaccepteerde strategieën zijn geworden in CMC settings, zelfs wanneer visuele cues aanwezig zijn. Vooral bij de huidige generatie jongeren, die opgegroeid zijn met deze communicatietoepassingen, kunnen deze strategieën om onzekerheid te reduceren zelfs de norm zijn (Baym, 1995; Hu et al., 2004; Walther et al., 2001). Visuele cues veranderen deze norm niet. Verder onderzoek zou dan ook bepaalde aannames van CMC theorieën moeten testen onder de huidige generatie jongeren.

Ook de rol van non-verbale cues in het verklaren van CMC uitkomsten moet nader onderzocht worden. Dit proefschrift heeft laten zien dat naast de afwezigheid van non-verbale cues, ook de controle die men heeft over de CMC interacties een belangrijke rol kan spelen (Madell & Muncer, 2007). Ook moet nader onderzocht worden welke non-verbale cues bepaalde effecten van CMC veroorzaken. CMC theorieën zijn nooit duidelijk geweest over welke non-verbale cues welke effecten veroorzaken. Dit was nooit een probleem, omdat de afwezigheid van de ene cue, zoals visuele informatie, ook de afwezigheid van andere non-verbale cues betekende. Jongeren hebben tegenwoordig de mogelijkheid om verschillende non-verbale cues

afzonderlijk te manipuleren, bijvoorbeeld door een webcam of microfoon te gebruiken (Peter, Valkenburg, & Schouten, 2007). Ook door de opkomst van profielsites en grafische werelden zoals Habbo Hotel hebben jongeren grote controle over de informatie en cues die ze willen verstrekken. In vervolgonderzoek naar de effecten van non-verbale cues moeten de verschillende non-verbale cues niet als één unidimensioneel construct beschouwd worden, maar als apart te onderzoeken variabelen.

Een tweede aanname van CMC theorieën die in dit proefschrift ter discussie wordt gesteld is de rol van anonimiteit. Anonimiteit is lang gezien als een van de belangrijkste kenmerken van CMC (e.g., Jessup, Connolly, & Tansik, 1990). Gebaseerd op inzichten als het stranger-on-the-train effect (Thibaut & Kelly, 1959), waarbij mensen zomaar intieme informatie delen met onbekenden, nam men aan dat de anonimiteit van CMC verantwoordelijk was voor veel effecten, zoals een verhoogde zelf-onthulling. De studies in dit proefschrift hebben echter laten zien dat verhoogde zelf-onthulling ook optreedt in niet-anonieme online communicatietoepassingen, zoals MSN. Andere kenmerken van CMC, zoals de verminderde non-verbale cues en de controleerbaarheid, bleken verantwoordelijk voor deze verhoogde zelf-onthulling. Eerder onderzoek maakte veelal geen duidelijk onderscheid tussen anonimiteit en andere kenmerken van CMC. Zo werd de afwezigheid van non-verbale cues ook wel visuele anonimiteit genoemd (Joinson, 2001). Verder onderzoek moet een duidelijker onderscheid maken tussen effecten die toe te schrijven zijn aan anonimiteit van bepaalde interacties, en effecten die veroorzaakt worden door andere kenmerken van CMC.

Gevolgen voor Onderzoek naar Jongeren en Online Communicatie

Een voorzichtige conclusie die uit dit proefschrift op te maken valt is dat online communicatie veel voordelen heeft voor jongeren. Ten eerste laat de laatste studie zien dat zelfpresentatie op profielsites en de feedback die jongeren hierop krijgen een positief effect hebben op het zelfvertrouwen en welzijn van jongeren. Ten tweede bieden chatrooms jongeren de mogelijkheid om op een veilige manier nieuwe identiteiten uit te proberen, bijvoorbeeld om te experimenteren met hun seksuele identiteit (Subrahmanyam, Greenfield, & Tynes, 2004). In chatrooms experimenteren met seksuele identiteit brengt waarschijnlijk minder risico's met zich mee dan experimenteren met seksuele identiteit in het echt. Ten derde is online communicatie een makkelijke manier om nieuwe mensen te ontmoeten in een veilige omgeving. Online communicatie fungeert als een sociale buffer. Voordat tieners iemand face-to-face ontmoeten, kunnen ze informatie over die persoon inwinnen via profielsites. Ook MSN is een veilige manier om met anderen te praten voordat een echte ontmoeting plaatsvindt. Bevalt iemand niet, dan hoeft deze alleen maar geblokkeerd te worden.

Een belangrijke reden voor de populariteit van online communicatietoepassingen is dat ze zo goed aansluiten bij de ontwikkeling van jongeren. De behoefte aan sociale interactie is nergens zo groot als in de adolescentie (Harter, 1999). De mogelijkheden die online communicatie biedt sluiten hier goed op aan. Jongeren zijn erg bezig met hoe ze op anderen overkomen en willen graag laten zien wie ze zijn en waar ze bij horen (Steinberg, 2001; Thibaut & Kelly, 1959). De mogelijkheden die profielsites bieden voor zelf-presentatie vervullen deze behoeftes. Ook het vormen van een persoonlijke identiteit is een van de ontwikkelingstaken in de adolescentie (Harter, 1999). Chatrooms maken het makkelijk om verschillende identiteiten uit te proberen en dit stimuleert de ontwikkeling van een persoonlijke identiteit.

Tot slot kan online communicatie helpen bij het uitwisselen van intieme informatie. Veel jongeren geven aan dat ze zich via MSN beter kunnen uiten dan face-to-face. Dit geldt vooral in interacties met de andere sekse. Communicatie met de andere sekse is voor jongeren extreem belangrijk, maar moeilijk (Hacker, 1981). MSN stelt jongeren in staat om zich makkelijker te uiten, waarschijnlijk mede doordat het online normaler gevonden wordt om je te uiten. Dit geldt voor zowel jongens als meisjes, maar uit de tweede studie bleek dat vooral jongens vinden dat ze zich via MSN makkelijker tegenover meisjes kunnen uiten. Voor jongens is het over het algemeen moeilijker om zichzelf te uiten dan voor meisjes, daarom profiteren zij extra van de verminderde non-verbale cues en de controleerbaarheid van MSN.

Het doel van dit proefschrift was de rol van online communicatie in zelf-onthulling en zelf-presentatie te onderzoeken. Een belangrijke vervolgstap is of en hoe online zelf-onthulling en zelf-presentatie gevolgen hebben voor de sociale ontwikkeling van jongeren. De laatste studie in dit proefschrift heeft laten zien dat zelf-presentatie op profielsites inderdaad effect kan hebben op het zelfvertrouwen en het welzijn van jongeren door de reacties die jongeren op hun profiel krijgen. Toekomstig onderzoek moet uitwijzen wat voor gevolgen dit heeft voor de verdere ontwikkeling van jongeren. Aan de ene kant kunnen jongeren zich misschien beter aanpassen aan verschillende sociale situaties, omdat ze veel makkelijker dan vroeger bepaalde aspecten van zichzelf kunnen presenteren en bepaalde identiteiten kunnen uitproberen. Aan de andere kant is feedback op hun zelfpresentaties vaak publiek zichtbaar. Dit kan grote gevolgen hebben voor het zelfvertrouwen van jongeren, vooral als de feedback negatief is. Een gerelateerde vraag is of jongeren altijd wel ten volle beseffen dat hun activiteiten voor iedereen zichtbaar zijn.

Verder onderzoek is ook nodig naar mogelijke gevolgen van online zelf-onthulling. Zelf-onthulling is van groot belang voor de ontwikkeling van relaties en vriendschappen (Buhrmester & Furman, 1987) en online communicatie lijkt zelf-onthulling te stimuleren wanneer jongeren elkaar voor het eerst ontmoeten. Een interessante vraag voor verder onderzoek

is dan ook hoe toegenomen zelf-onthulling in de eerste fases van relatievorming het verdere verloop van een relatie beïnvloedt. Aan de ene kant kunnen deze relaties beter bestand zijn tegen tegenslagen, omdat ze op een dieper niveau zijn gestart. Aan de andere kant is de vraag hoe een relatie zich ontwikkelt als blijkt dat de fysieke werkelijkheid niet helemaal strookt met de indrukken die online zijn gevormd.

Een belangrijke conclusie van dit proefschrift is dat online communicatie geen uniforme effecten heeft op jongeren. Vaak wordt nog gesproken over de –vaak negatieve– effecten van online communicatie, zonder te specificeren voor welke jongeren of voor welke toepassingen dit geldt. Dit onderzoek laat zien dat *de* effecten van online communicatie niet bestaan. Vanuit het uses and gratifications perspectief weten we al dat percepties en motieven voor een groot deel de uitkomsten van een medium bepalen (Rubin, 2002). Ons onderzoek heeft laten zien dat percepties en motieven ook bepalend zijn voor uitkomsten van online communicatie, zoals zelf-onthulling. Bepaalde persoonlijkheidskenmerken hangen op hun beurt weer samen met deze motieven en percepties. Jongeren met verschillende persoonlijkheidskenmerken ervaren dus verschillende uitkomsten van online communicatie. Meer onderzoek is nodig naar de precieze persoonlijkheidskenmerken die van invloed zijn op percepties van en motieven voor online communicatie, en hoe dit leidt tot bepaalde uitkomsten.

Een praktische aanbeveling is dat voorlichting over online communicatie zich niet alleen op jongeren moet richten maar vooral ook op ouders. Online communicatie is niet inherent slecht, en heeft ook geen uniforme effecten op jongeren. Online communicatie lijkt zelfs veel voordelen te hebben. Ouders, en volwassenen in het algemeen, moeten begrijpen dat online communicatie een belangrijk onderdeel is geworden van de jeugdcultuur en moeten interesse tonen voor wat jongeren online doen. De rol van ouders moet er op gericht zijn om uit te leggen wat de voor- en nadelen zijn van online communicatie, en ouders moeten in staat zijn hun tieners te adviseren over wat ze online beter wel en niet kunnen doen.

Wel is meer onderzoek nodig naar het identificeren van bepaalde risicogroepen. De laatste studie vond bijvoorbeeld een positieve relatie tussen feedback die jongeren krijgen op hun profiel en het zelfvertrouwen van jongeren. Een klein groepje jongeren kreeg echter veel negatieve reacties op hun profiel. Voor deze jongeren had het gebruik van een profielsite dus negatieve gevolgen voor hun zelfvertrouwen. Een interessante vraag voor volgend onderzoek is welke jongeren blijkbaar niet in staat zijn zich op een goede manier te presenteren op profielsites en waarom deze jongeren hier niet toe in staat zijn. Onderzoek moet zich richten op die jongeren die voor een groot deel afhankelijk zijn van online communicatie voor hun zelf-onthulling en zelf-presentatie en op de gevolgen die online communicatie heeft voor deze groep jongeren.

Conclusie

Dit proefschrift heeft een bijdrage geleverd aan het onderzoek naar online zelf-onthulling en online zelf-presentatie. In dit proefschrift zijn inzichten uit CMC theorieën empirisch toegepast op online communicatietoepassingen, zoals MSN en profielsites. Het proefschrift heeft een aantal oude inzichten ter discussie gesteld, vooral de rol die anonimiteit en non-verbale cues spelen in het verklaren van CMC effecten. Ook heeft dit proefschrift laten zien dat uncertainty reduction theory een belangrijke rol kan spelen in het verklaren van CMC effecten, zoals zelf-onthulling. Tot slot heeft dit proefschrift laten zien dat online communicatie gevolgen kan hebben op de sociale ontwikkeling van jongeren via zelf-onthulling en zelf-presentatie, zoals effecten op het zelfvertrouwen en welzijn van jongeren. Meer onderzoek naar de mogelijke gevolgen van online zelf-onthulling en zelf-presentatie is dan ook gewenst.

Het uiteindelijke doel van onderzoek naar online communicatie moet zijn om tot een theoretisch raamwerk te komen waarin kenmerken van online communicatie, percepties van deze kenmerken, en mogelijke uitkomsten van online communicatie gekoppeld zijn. Dit proefschrift heeft hier een eerste bijdrage aan geleverd, maar meer onderzoek is noodzakelijk. Ten eerste is meer onderzoek nodig naar de exacte kenmerken van online communicatie, zodat ook andere online communicatietoepassingen aan de hand van deze kenmerken kunnen worden geclassificeerd. Ten tweede is meer onderzoek nodig naar de onderliggende mechanismen die de effecten van online communicatie kunnen verklaren, bijvoorbeeld naar de rol van uncertainty reduction theory. Tot slot is meer onderzoek nodig naar de percepties die gebruikers hebben van de kenmerken van online communicatie en hoe bepaalde persoonlijkheidskenmerken deze percepties beïnvloeden.

Alleen een dergelijk raamwerk stelt ons in staat om uitkomsten van online communicatie te voorspellen. Ook andere uitkomsten van online communicatie kunnen dan worden verklaard, zoals flaming of de toegenomen sociale aantrekkingskracht in online communicatie. Toekomstige communicatietoepassingen kunnen dan worden geclassificeerd aan de hand van kenmerken van online communicatie, waardoor ook de effecten van deze toepassingen kunnen worden voorspeld. Verder kunnen aan de hand van het theoretische raamwerk individuele verschillen in gebruik en effecten van online communicatietoepassingen worden verklaard. Een dergelijk raamwerk helpt niet alleen het onderzoek naar online communicatie verder, maar kan ook gebruikt worden om het bredere publiek voor te lichten over welke jongeren op welke manier worden beïnvloed door online communicatietoepassingen.

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