



Effects of anonymity, invisibility, and lack of eye-contact on toxic online disinhibition

Noam Lapidot-Lefler*, Azy Barak

University of Haifa, Mount Carmel, Haifa 31905, Israel

ARTICLE INFO

Article history:

Available online 10 November 2011

Keywords:

Online communication
Disinhibition
Anonymity
Invisibility
Eye-contact

ABSTRACT

The present research studied the impact of three typical online communication factors on inducing the toxic online disinhibition effect: anonymity, invisibility, and lack of eye-contact. Using an experimental design with 142 participants, we examined the extent to which these factors lead to flaming behaviors, the typical products of online disinhibition. Random pairs of participants were presented with a dilemma for discussion and a common solution through online chat. The effects were measured using participants' self-reports, expert judges' ratings of chat transcripts, and textual analyses of participants' conversations. A $2 \times 2 \times 2$ (anonymity/non-anonymity \times visibility/invisibility \times eye-contact/lack of eye-contact) MANOVA was employed to analyze the findings. The results suggested that of the three independent variables, lack of eye-contact was the chief contributor to the negative effects of online disinhibition. Consequently, it appears that previous studies might have defined the concept of anonymity too broadly by not addressing other online communication factors, especially lack of eye-contact, that impact disinhibition. The findings are explained in the context of an *online sense of unidentifiability*, which apparently requires a more refined view of the components that create a personal sense of anonymity.

© 2011 Elsevier Ltd. All rights reserved.

1. Introduction

1.1. The online disinhibition effect

Instant messaging, video chats and social networks are just few examples of online communication frameworks that have shown rapid advancement and growth over the last decade. Such frameworks have become accessible to larger groups of Internet users, who can connect with one another from their home computer, laptop or mobile smartphone. One phenomenon that has been shown to be characteristic of online communication participants is the *online disinhibition effect*, defined as a lowering of behavioral inhibitions in the online environment (e.g., Dyer, Green, Pitts, & Millward, 1995; Joinson, 2003, 2007; Kiesler, Siegel, & McGuire, 1984; Suler, 2004). Many of the human behaviors that are witnessed in cyberspace, including violence, incitement, flaming, and verbal attacks, on the one hand, and self-disclosure, philanthropy, and the dispensing of help and advice, on the other, may be attributed to the online disinhibition effect (Joinson, 1998, 2001; Kiesler et al., 1984).

The psychological restraints that often serve to block or conceal emotions and undisclosed needs are found to be lowered in

cyberspace in various online interpersonal behaviors (Chiou, 2006; Joinson, 1998, 2003, 2007; Rosen, Cheever, Cummings, & Felt, 2008; Suler, 2004). The negative online disinhibition effect is the concept used to refer to the negative results of this loss of inhibitions, usually manifested in aggressive behaviors that apparently would not be exhibited in a similar scenario in the "real world." Suler (2004) coined the term *toxic disinhibition* to describe phenomena of online flaming and acting-out behaviors that often involve damaging the other's or even one's own self-image, without any beneficial personal growth. This can be seen in Pro-Ana and Pro-Mia blogs (Brotzky & Giles, 2007), social loafing in online communities (Shiue, Chiu, & Chang, 2010), online gaming sites (Williams & Skoric, 2005), hate sites (Chau & Xu, 2007), violent pornographic and pedophilic sites (Malamuth, Linz, & Yao, 2005), cyberbullying (Huang & Chou, 2010), comments on YouTube (Moor, Heuvelman, & Verleur, 2010), online interpersonal relationships (Barak, 2007), organizational conflicts (Turnage, 2008), and more.

Flaming behavior—considered a typical manifestation of toxic online disinhibition (Alonzo & Aiken, 2004; Derks, Fischer, & Bos, 2008)—is defined as the use of hostile expressions toward others in online communication. It typically includes the use of a variety of textual elements, such as aggressive and hostile language, swearing, derogatory names, negative comments, threats, and sexually inappropriate comments (Dyer et al., 1995). Flaming behavior can also be observed in the use of capital letters, in the increased use of question marks and exclamation points (Turnage, 2008),

* Corresponding author. Present address: Department of Behavioral Science, The Max Stern Yezreel Valley College, Emek Yezreel 19300, Israel. Tel./fax: +972 77 5153868.

E-mail address: noaml@yvc.ac.il (N. Lapidot-Lefler).

and in the mixture of letters, numbers, and dingbats conceptualizing shouting or calling a derogatory name. It can also be seen in the use of color (e.g., red) or bold face in the script to express hostility.

1.2. Factors affecting toxic online disinhibition

Previous studies and theoretical conceptualizations have referred to a list of situation-specific factors that appear to account for the online disinhibition effect—including anonymity, invisibility, asynchronicity, and textuality—in addition to personality-related factors (cf. Joinson, 2003, 2007; Suler, 2004).

1.2.1. Anonymity and toxic online disinhibition

Anonymity, or the condition of being unknown (nameless) to others, is considered a major determinant of disinhibitive behavior. In an early experiment, unrelated to the virtual environment, Zimbardo (1969) examined behavioral disinhibition by manipulating the anonymity variable by asking participants to administer electric shocks to fellow participants. Some of those who were asked to administer the shocks had their faces covered by hoods with eyeholes and were dressed in loose-fitting smocks, while others had no hoods and were dressed in their regular attire and bore name tags. The anonymous group of shock administrators behaved more aggressively, delivering longer shocks than did their non-anonymous counterparts.

Although the concept of anonymity as a research construct is being discussed for more than a decade (e.g., Anonymous, 1998; Scott, 1999), it seems that confusion and misunderstanding regarding the concept still exist. While referring to the theoretical model of anonymity, Anonymous (1998) indicated that the concept was lacking definition and basic understanding, and could be better comprehended in studying mediating variables such as those related to self, others, and the social communication arena.

In an attempt to refine and elucidate the concept of anonymity we chose to refer to the *unidentifiability* aspect of anonymity rather than namelessness. That is, other than being nameless we argue that a major—actually crucial—aspect of anonymity should focus on the unidentifiability dimension, which is quite broader and more personally significant than just being nameless. The unidentifiability factor refers to the realistic condition of being unknown to online partners in terms of identifying personal details, such as gender, weight, age, occupation, ethnic origin, residential location, and so on. Online unidentifiability thus makes it possible to use real names while remaining relatively anonymous, as long as other identifying details remain concealed. Conversely, in a face-to-face encounter, people may avoid revealing their names and yet be recognized by means of their looks alone or some other important personal feature (Bargh, Fitzsimons, & McKenna, 2003; Chester & Bretherton, 2007; Giles, 2006; Valkenburg, Schouten, & Peter, 2005). Identifiability, furthermore, may affect a person's own behaviors and feelings even more than perceiving the identity-enabled cues of others (Tanis & Postmes, 2007). Another implication of unidentifiability, particularly in computer-mediated social situations, is the reduced willingness to cooperate (Cress & Kimmerle, 2008; Kimmerle, Cress, & Hesse, 2007).

As seen with the shock experiment, anonymity may cause Internet users to feel unaccountable for their negative actions, as they cannot be identified as the perpetrators of certain actions or behaviors. This loss of accountability may result in an increased level of toxic disinhibition, consequently promoting impulsive, aggressive, and abusive behaviors (Christopherson, 2007; Dumont & Candler, 2005; Kabay, 1998; Suler & Phillips, 1998).

Several studies have shown that anonymity is a main factor in inducing the online disinhibition effect (e.g., Bargh & McKenna, 2004; Bargh, McKenna, & Fitzsimons, 2002; Joinson, 1998, 2001, 2007; McKenna & Seidman, 2005; Spears, Lea, & Postmes, 2007;

Suler, 2004; Tanis & Postmes, 2007). For instance, in an early study, Kiesler and her colleagues (1984) found that among participants who argued over moral dilemmas using different communication modalities, those who employed computer-mediated communication demonstrated higher degrees of disinhibition, reflected in flaming behavior, than did those who engaged in face-to-face communication. The highest degree of flaming was noted in synchronized communication.

Although many researchers point to the importance of anonymity in inducing online disinhibition, results from previous studies are not unequivocal. Spears, Postmes, Lea, and Wolbert (2002) found that anonymity in Internet communication induced more incidents of flaming than did face-to-face settings. However, Douglas and McGarty (2001) showed that disclosing users' identity by means of their name or address (electronic or residential) increased their tendency to engage in flaming behavior compared to participants in either anonymous or face-to-face settings. Aiken and Waller (2000) examined the degree of flaming among two anonymous groups of students who participated in an online discussion. No relationship was found between the degree of controversy regarding the subject under discussion and the degree of flaming. Since both groups maintained anonymity, the researchers claimed that flaming was apparently the result of individual attributes. Such findings suggest that the role of anonymity in inducing the online disinhibition effect is more complex than was previously surmised. In a recent experiment, Wodzicki, Schwämmlein, Cress, and Kimmerle (2011) found that individual differences among online group members, as well as the purpose of their participation, interacted with the effects of anonymity on their information-sharing behavior, hence insinuating that those effects might not be general (i.e., main effects) but were moderated by other factors. Chesney and Su (2010) showed that bloggers' degree of anonymity did not influence the credibility perception of their writings. Also in the blogging arena, Qian and Scott (2007) found that anonymity had little impact on bloggers' self-disclosure as reflected in their postings. Also, based on their experiment, Flanagan, Tiyaamornwong, O'Connor and Seibold (2002) suggested that the effects of anonymity on participatory group work interacted with participants' gender as men tend to maintain online interaction with women using offline communication cues, women in the same situations tend to employ reduced social cues.

1.2.2. Invisibility and toxic online disinhibition

Invisibility was found to affect behavioral disinhibition both over the Internet and in offline communication. Although anonymity and invisibility are undoubtedly related, they are two distinct variables. Given that computer-mediated communication usually involves invisibility—as most online interpersonal communication is textual—it fosters a unique form of social presence that is defined by the degree of perception, awareness, recognition, or acknowledgment of others. Invisibility renders irrelevant stereotypes and prejudices related to gender, age, skin color (McKenna & Green, 2002), physical attributes (e.g., weight, height, and general appearance), stigmatizing behaviors (e.g., stuttering; McKenna & Seidman, 2005), and physical and sensory impairments (Barak & Sadosky, 2008; Bowker & Tuffin, 2002). Diminished social presence may lead to a process of communication-induced deindividuation, which in turn may produce instances of disinhibition. Competing theoretical models, such as SIDE and hyperpersonal communication, used different arguments and explanations in accounting presence of others (Postmes, Spears, & Lea, 2002; Short, Williams, & Christie, 1976; Spears et al., 2007; Walther, 1996). Cyberspace allows users to control their level of social presence and, thus, their degree of intimacy; that is, to control the amount and duration of visibility or invisibility during social interactions through the use or non-use of pictures, webcam, and videos. Thus,

the absence of visibility and the unique form of social presence inherent in online communication accelerate the processes of online disinhibition (Morahan-Martin & Schumacher, 2003; Suler, 2004) because of reduced visibility-originated interpersonal communication cues. Selective use of photos and videos/movies significantly contribute to impression management and online relationships (Chung-Wen, 2007; Suler, 2008; van Dijck, 2008; Yang, Hsu, & Tan, 2010).

The effect of invisibility on behavior was originally studied in the context of examining the conduct of people under complete anonymity. Participants placed in a dark, fully padded room, in conditions of utter invisibility, were found to exhibit greater behavioral disinhibition than did an experimental group that was left in an illuminated room under conditions of full visibility. Based on this observation, the investigators concluded that visual anonymity induced a sense of freedom from social norms and restrictions, allowing people to manifest their feelings, whether aggressive or affectionate, in more meaningful ways (Gergen, Gergen, & Barton, 1973). In controlling visibility through collocation vs. distribution (through online communication) of working teams to examine the impact on interpersonal relationships, Cramton, Orvis, and Wilson (2007) found that situational invisibility produced dispositional attributions rather than situational attributions, thus affecting team members' satisfaction and cohesion. Castellá, Abad, Alonso, and Silla (2000) presented findings that further supported the presumed impact of invisibility on the online disinhibition effect. Their study compared the level of flaming noted during debates in several discussion groups that employed different communication modes. Although flaming demonstrations were rare, they were more common in the text-based communication group than in the face-to-face group or in a webcam conference call (i.e., a visibility integrated) group. It appears, therefore, that invisibility contributes to the online disinhibition effect.

A different research approach employed an online survey, in which the social presence of the surveyor was enhanced by adding speech or by posting photos of the surveyor. It was found that posting photos of the surveyors (whether male or female) decreased a respondent's willingness to reply to sensitive questions. The use of telephone surveys and audio-enhanced online surveys yielded similar results. Willingness to answer extremely sensitive questions was highest for online surveys in which the social presence of the surveyor was minimal (Tourangeau, Couper, & Steiger, 2003).

Yet another study that observed the effect of invisibility during online communication about highly sensitive subjects, such as masturbation and shoplifting, yielded different results. Online interviews with students were conducted via either Internet-posted questionnaires with full invisibility or conference calls affording visibility between interviewer and respondent. As expected, the respondents in both settings were more willing to talk about sensitive behaviors than to admit to engaging in them. No differences in the level of self-disclosure between the two settings were noted (Mühlenfeld, 2005).

1.2.3. Eye-contact and toxic online disinhibition

According to Walther (1999) webcams cannot provide sufficient information about facial expressions and fails to supply the kind of information provided directly by eye-contact. Barak (2007) emphasized this issue and added that even when online interpersonal communication includes visibility, eye-contact may still be absent. Webcams may allow visibility, yet they do not ensure eye-contact during interactions. Hence, visibility and eye-contact are two distinct factors, each influencing interpersonal communication in a different manner.

To date, research on the effects of eye-contact have been limited to the 'real world' situations in regard to positive disinhibition, such

as self-disclosure and degree of intimacy. Nonetheless, it has been suggested that the absence of eye-contact in online conditions may promote the onset of disinhibition (Suler, 2004). Research in the field of gaze and eye contact in 'real world' found that the dynamics of eye-contact communication greatly effects emotions such as trust, security, confidence, embarrassment, confusion, honesty, admonition, and pleading. However, the actual degree of impact of eye-contact on interpersonal communication is still unclear. Some studies point to a negative correlation between eye-contact and disinhibition. Absence of interviewer, and therefore the absence of eye-contact, was found to increase the duration of self-disclosure for participants who were presented with intimate questions (Jourard & Friedman, 1970; Siegman & Reynolds, 1983). Similar results were found for young children: increased frequency of eye-contact proved detrimental to the establishment of understanding and rapport between an adult tester and the children: smiling, by contrast, had the opposite and a positive effect on the establishment of a relationship (Rotenberg et al., 2003). An experiment by Doherty-Sneddon and colleagues (1997) had also pointed to the major role of eye gazing on providing interpersonal feedback: it was regarded as constituting a central ingredient in interpersonal communication that visibility alone could not provide.

In a comprehensive review summarizing numerous studies, Kleinke (1986) showed the significant effects of eye-contact and gazing in interpersonal communication. His review revealed that they played a central role in (a) providing information (liking and attraction, attentiveness, competence, social skills and mental health, credibility, dominance, and communicating feelings); (b) regulating interpersonal interaction (synchronization and regulation); (c) expressing intimacy; (d) social control (persuasion and deception, ingratiation, threat and dominance, escape and avoidance, and compliance); and (e) service tasks (information seeking, interpersonal interactions, learning, and cooperation and bargaining). Additional reviews and models support the existence of these dimensions while underlying the importance of eye-contact and gazing in communicating supporting behaviors (Boyle, Anderson, & Newlands, 1994; Webbink, 1986).

It appears that the absence of eye-contact has numerous, far-reaching emotional and behavioral effects on online interpersonal communication in general (Barak, 2007) and, presumably, on the online disinhibition effect in particular (Suler, 2004). However, no study to date has focused directly on the effect of eye-contact in the context of the online disinhibition effect.

1.3. The current study

Many of the unique characteristics of online communication have been cited as affecting the cyberspace experience in general, and as generating the disinhibition effect in particular. Research has identified several factors involved in either creating or moderating the online disinhibition effect. It seems that a sense of anonymity, invisibility, and lack of eye contact are dominant in generating the effect, but other factors also exist, such as textuality and asynchronicity. In the current study, we chose to focus on three dominant factors with the aim of examining their independent, main effects, as well as their interaction effects, and in an attempt to examine the relative contribution of each source of variance to flaming behavior. Through employing an experimental design, we hypothesized that each of the inducing factors, and their combinations, would affect flaming behavior. On the basis of previous research, we further hypothesized that anonymity (independently and in interaction with the other factors) would show the strongest effects, followed by invisibility and then the lack of eye-contact.

Theoretically, the premise of the current research was that the mentioned factors (i.e., anonymity, invisibility, lack of eye-contact),

A self-report flaming behavior questionnaire was developed for the study based on the Buss and Warren Aggression Questionnaire (Buss & Perry, 1992; Buss & Warren, 2000). The questionnaire included 34 items, to which participants were asked to respond on a 5-point scale (1 = totally disagree; 5 = totally agree). Total self-reported flaming scores were calculated by summing up the 34 responses, yielding a total score range of from 34 (low flaming) to 170 (high flaming). The original questionnaire was adopted and modified to refer to participants' feelings and behaviors during the online chat. For example, "I got very angry for no good reason"; "I had trouble controlling my temper." Internal consistency (Cronbach's alpha) in the present study was 0.91. The mean total score was 67.05 ($SD = 19.94$).

2.3.4. Total flaming score

Correlations among the dependent measures were between 0.45 and 0.68. An exploratory factor analysis, with varimax rotation, using eigenvalue greater than 1, led to the emergence of a single factor accounting for 65.5% of the variance. The total flaming score was calculated using factor-weighted scores, which ranged from 24.72 to 179.31 ($M = 61.84$, $SD = 26.44$).

2.4. Procedure

Participants were recruited by means of advertisements (through online and offline bulletin boards) that specified the time required and the compensation offered. All participants volunteered for a 1 h study and, in return, received a free voucher to purchase coffee and pastry at a nearby coffee shop.

Participants were asked to arrive at the experiment 10 min apart in order to avoid face-to-face encounters prior to the start of the experiment. Each dyad was divided and directed into separate rooms that were identical in terms of size, illumination, and background. There, the participants were introduced to their assignment and presented with the dilemma for discussion. Then they logged onto the chat to start a conversation with their respective partner.

The participants were unaware of the purpose of the study; they were told it was to examine how individuals who were unacquainted with one another use online chat to discuss different subjects. Participants assigned to the eye-contact group received special instructions to ensure that they would establish eye-contact with their partners. Actual eye-contact was monitored by experimenters to ensure the validity of this condition.

The dyads were told that they had unlimited time available for the discussion, that they had to reach an agreement with their partner, and that they should direct the chat in such a way as to convince the partner to relinquish the drug. These instructions

were given in order to engage the partners in discussion, to induce rivalry, and to instill a drive to win.

Once the debate ended, that is, a decision was reached, participants were asked to fill out the self-report questionnaire and a form that provided personal details. They were then debriefed, thanked for their participation and asked to refrain from discussing the experiment or the facility in which it had taken place in order to prevent any leaking of the experimental procedures. In addition, according to the customary ethics standards, the participants were handed with the researcher's detailed contact information, for obtaining additional information, copies of the results, or other specific details. The data collection lasted approximately 6 months.

2.5. Ethical considerations

The current study examined aggressive aspects of online disinhibition behavior, which required the maintaining of participants' anonymity and secrecy. Therefore, participants were ensured full confidentiality of the information collected during the research. All participants freely volunteered to participate in the study after receiving information about the task involved. The participants' activity was planned and directed to avoid harm and distress. Deception was minimal so that participants received all necessary study-related information without damaging the validity of the research. Furthermore, the participants received the researcher contact details, in order to obtain additional information, copy of the results, or other details if needed, according to the customary ethical standards.

3. Results

Table 1 presents the means and standard deviations of the flaming measures according to the eight experimental conditions.

Table 1
Means and standard deviations of flaming, by experimental condition ($N = 142$).

	Visibility	Yes			No			Total		
Anonymity	Eye-contact	Yes	No	Total	Yes	No	Total	Yes	No	Total
Self-reported flaming										
Yes	M	65.94	70.23	68.21	57.27	78.33	67.80	61.35	74.28	68.00
	SD	18.41	20.10	19.16	13.94	23.52	21.84	16.54	21.95	20.43
No	M	61.76	66.57	64.17	67.16	68.97	68.06	64.46	67.77	66.11
	SD	18.76	26.47	22.75	15.58	16.38	15.78	17.22	21.73	19.54
Total	M	63.73	68.40	66.13	62.22	73.65	67.93	62.95	71.03	67.05
	SD	18.44	23.24	21.03	15.41	20.53	18.92	16.84	21.93	19.94
Threats										
Yes	M	0.67	0.57	0.62	0.26	0.88	0.57	0.46	0.72	0.59
	SD	0.87	0.91	0.88	0.57	0.91	0.81	0.74	0.91	0.84
No	M	0.19	0.42	0.31	0.22	0.67	0.44	0.21	0.54	0.38
	SD	0.52	0.81	0.68	0.65	0.85	0.78	0.58	0.83	0.73
Total	M	0.42	0.49	0.46	0.24	0.77	0.51	0.33	0.63	0.48
	SD	0.74	0.85	0.80	0.60	0.87	0.79	0.67	0.87	0.79
Negative atmosphere										
Yes	M	0.92	0.75	0.83	0.57	1.31	0.94	0.74	1.03	0.89
	SD	0.73	0.70	0.71	0.79	0.70	0.83	0.77	0.75	0.77
No	M	0.79	0.50	0.65	1.08	1.00	1.04	0.94	0.75	0.84
	SD	0.67	0.72	0.70	0.86	0.90	0.87	0.77	0.84	0.81
Total	M	0.85	0.63	0.74	0.83	1.15	0.99	0.84	0.89	0.86
	SD	0.69	0.71	0.71	0.85	0.81	0.84	0.77	0.80	0.79
Flaming-related expressions										
Yes	M	12.06	15.50	13.88	8.56	21.06	14.81	10.21	18.28	14.36
	SD	13.58	22.06	18.37	11.95	26.44	21.19	12.67	24.16	19.73
No	M	15.06	13.39	14.22	17.56	13.94	15.75	16.31	13.67	14.99
	SD	16.35	26.65	21.81	17.21	12.24	14.83	16.60	20.44	18.53
Total	M	13.65	14.44	14.06	13.06	17.50	15.28	13.34	15.97	14.68
	SD	14.96	24.14	20.07	15.30	20.62	18.17	15.03	22.34	19.07

Table 2Means and standard deviations of total flaming score, by experimental condition ($N = 142$).

Anonymity	Visibility	Yes			No			Total		
		Yes	No	Total	Yes	No	Total	Yes	No	Total
Yes	M	59.11	64.80	62.12	49.32	75.95	62.63	53.93	70.37	62.39
	SD	22.96	30.79	27.14	16.80	34.74	30.09	20.24	32.85	28.49
No	M	58.02	60.07	59.04	64.26	62.91	63.59	61.14	61.49	61.31
	SD	24.62	31.48	27.87	22.36	19.48	20.68	23.39	25.84	24.47
Total	M	58.53	62.43	60.54	56.79	69.43	63.11	57.64	65.93	61.84
	SD	23.50	30.79	27.36	20.91	28.53	25.64	22.06	29.68	26.44

Table 3

Results of Univariate analyses for the measures of flaming.

Factor	df	Self-reported flaming incidents				Threats			Negative atmosphere			Flaming-related expressions		
		MSE	F	η^2		MSE	F	η^2	MSE	F	η^2	MSE	F	η^2
Anonymity	1	118.81	0.31	0.00		1.72	2.87*	0.02	0.65	0.11	0.00	17.01	0.05	0.00
Visibility	1	115.88	0.30	0.00		0.68	0.11	0.00	2.19	3.76*	0.03	57.72	1.56	0.00
Eye-contact	1	2263.78	5.92**	0.04		3.06	5.11*	0.04	0.79	0.14	0.00	251.73	0.68	0.01
Visibility \times anonymity	1	154.97	0.41	0.00		0.32	0.54	0.00	0.77	1.32	0.01	2.25	0.01	0.00
Visibility \times eye-contact	1	420.34	1.10	0.01		1.94	3.24*	0.02	2.76	4.73*	0.03	112.25	0.30	0.00
Anonymity \times eye-contact	1	778.08	2.03	0.02		0.55	0.92	0.00	1.95	3.35*	0.02	997.12	2.70	0.02
Visibility \times anonymity \times eye-contact	1	864.51	2.26	0.02		0.54	0.89	0.01	1.08	1.86	0.01	268.40	0.73	0.01
Error	134	382.47				0.60			0.58			369.80		

* $p < .05$.** $p < .01$.

A three-way MANOVA revealed a significant main effect for eye-contact ($F = 3.02$; $p < .01$), a significant interaction effect for anonymity \times eye-contact ($F = 2.09$; $p < .05$), and insignificant effects for the remaining sources of variance.

Table 2 gives the means and standard deviations of the total flaming score according to experimental condition. Table 3 shows the results of the univariate analyses of variance. As can be seen in this table, the main effect of anonymity produced a single significant effect: there were more threats in the anonymous condition than in the identified condition ($M = 0.59$ vs. 0.38 ; $F = 2.87$; $df = 1, 134$; $p < .05$). The main effect of visibility also accounted for a single significant effect: the invisible condition produced a more negative atmosphere than did the visible condition ($M = 0.99$ vs. 0.74 ; $F = 3.76$; $df = 1, 134$; $p < .05$). The main effects of eye-contact produced two significant outcomes: self-reported flaming was higher in the lack of eye-contact than in the eye-contact condition ($M = 71.03$ vs. 62.95 ; $F = 5.92$; $df = 1, 134$; $p < .01$), and the number of threats with lack of eye-contact almost doubled that in the eye-contact condition ($M = 0.63$ vs. 0.33 ; $F = 5.11$; $df = 1, 134$; $p < .05$).

The interaction effects yielded several interesting findings: the anonymity \times visibility interaction revealed insignificant effects, whereas both visibility \times eye-contact and anonymity \times eye-contact interactions produced several significant effects. In the condition of a lack of eye-contact and invisibility, threats more than tripled compared to the presence of eye-contact and invisibility condition ($M = 0.77$ vs. 0.24 , respectively, $F = 3.24$; $df = 1, 134$; $p < .05$). Similarly, the combination of the eye-contact and visibility factors produced a negative atmosphere interaction effect: the negative atmosphere in the lack of eye-contact and invisibility condition was almost double that of the lack of eye-contact and visibility condition ($M = 1.15$ vs. 0.63 ; $F = 4.73$; $df = 1, 134$; $p < .05$). The combination of eye-contact and anonymity, too, yielded significant effects. In the presence of eye-contact, anonymity produced less negative atmosphere than in the lack of anonymity (identified) condition ($M = 0.74$ vs. 1.03 , respectively). However, this direction reversed itself in the lack of eye-contact condition, with anonymity producing a higher negative atmosphere than did lack of anonymity ($M = 0.94$ vs. 0.75 ; $F = 3.35$; $df = 1, 134$; $p < .05$).

Table 4

Results of analysis of variance for total flaming score.

Factor	df	MSE	F	η^2
Anonymity	1	34.13	0.05	0.00
Visibility	1	241.38	0.35	0.00
Eye-contact	1	2416.07	3.54*	0.03
Visibility \times anonymity	1	132.29	0.19	0.00
Visibility \times eye-contact	1	682.29	1.00	0.01
Anonymity \times eye-contact	1	2212.67	3.24*	0.02
Visibility \times anonymity \times eye-contact	1	1312.07	1.92	0.01
Error	134	682.44		

* $p < .05$.

Table 4 offers the results of ANOVA for a total flaming score. As expected, the *highest* flaming mean appeared for the anonymous and invisible participants who had no eye-contact with their partners ($M = 75.95$). Interestingly, the *lowest* total flaming score appeared in the same anonymity and invisibility conditions, but with the inclusion of eye-contact ($M = 49.32$). As shown in Table 4, ANOVA revealed only two significant effects: First, there was a main effect for eye-contact ($F = 3.54$; $df = 1, 134$; $p < .05$), reflecting a total mean flaming score of 65.93 vs. 57.64 for lack of eye-contact and presence of eye-contact, respectively. Second, there was a significant anonymity \times eye-contact interaction effect so that in the anonymous condition, participants who had no eye-contact had a higher total flaming score than did participants who had eye-contact with their counterparts ($M = 70.37$ vs. 53.93 ; $F = 3.24$; $df = 1, 134$; $p < .05$).

4. Discussion

Online disinhibition is a basic, wide-spread effect, associated with a wide range of behaviors that have been observed among many people engaged in online activities and interactions. Accumulated research shows that disinhibition significantly affects modes of discussion, information-searching behavior, online learning, interpersonal contacts and relationships, and behavior in

groups. The toxic aspect of disinhibition has been shown to cause various problematic behaviors in cyberspace, such as flaming and a negative atmosphere. The current study aimed at deepening our understanding of some fundamental factors of the toxic online disinhibition effect in order to better comprehend this phenomenon.

The results of the study show that eye-contact has a significant main effect on negative online disinhibition, as well as on self-reported flaming incidents and threats. When eye-contact was enforced, participants experienced fewer occurrences of flaming and fewer threats than when there was no eye-contact. Anonymity, however, produced a significant main effect for one measure only (i.e., threats). Similarly, visibility exerted a significant main effect on a single measure only (i.e., negative atmosphere). Of the interactive effects, four were significant, all involving eye-contact. It seems that although the eye-contact variable had no significant effects on all of the dependent measures, it caused more impact than either anonymity or invisibility in producing the toxic behaviors implied by online disinhibition.

The results of the current study lend some support to the research hypotheses. Most notably, however, were the findings regarding the relative differential effects of the independent variables. Contrary to the widely accepted belief, our research found that it was possible that the eye-contact factor impacted more strongly on the online disinhibition effect, not the anonymity factor. One possible explanation for this finding may be rooted in the differences between previous definitions of online anonymity and the definition used in the current study. Anonymity implies appearing in public without an associated name or pseudonym (Kabay, 1998). Derlega and colleagues (1993) suggested that anonymity was equivalent to a state of unidentifiability. Thus, the meaning of *anonymity* changes according to context: in paper-based, hard-copy publications, a pseudonym can preclude or foster anonymity and identifiability; in a face-to-face environment, a name—real or not—may be superfluous for the purpose of identifiability. The ability to hold two-way communication in an online environment implies that *anonymity* conforms in this context to neither of the previously offered definitions. Therefore, the current research found it necessary to study the factors of visibility and eye-contact both together and in isolation. Consequently, the results presented here offer a more refined view of the components that create a sense of anonymity (which in turn induces disinhibitive behavior) in the online context.

4.1. Online sense of unidentifiability

To reconcile the prevailing definition of the general and quite obscure term of “anonymity” as used in the context of virtual reality, a more comprehensive definition is apparently required. The present findings suggest that one can think of *anonymity* as an assemblage of *different levels of online unidentifiability*, in which non-disclosure of personal details, invisibility, and absence of eye-contact compose the most significant assemblage; these components appear to combine in different degrees, thus yielding a variety of “anonymities.”

The new concept we refer to—*online sense of unidentifiability*—can be understood as spanning a range, in which three major factors are considered: one end of this range is characterized by a lack of personal information (i.e., anonymity), lack of visibility, and lack of eye-contact; the other end, by disclosure of personal data, visibility, and eye-contact. Even though the factors that influence the experience of the *online sense of unidentifiability* in cyberspace may also affect one another, their experimental isolation and control were required to examine the essence and nature of the experience. We should keep in mind, however, that the artificial orthogonality constraint on the three factors does not represent

actual interactions and interdependence in the +complexity of cyberspace. Nevertheless, the experimental isolation was important for expanding knowledge about the nature of the phenomenon.

The finding that lack of eye-contact induces greater flaming-related behavior raises the following questions: What are the conditions that cause participants to feel that their identity has been revealed? At what point during the interaction do they feel that their inner self has been divulged and disclosed? And: do people feel more secure in their *online sense of unidentifiability* when their personal data are concealed, compared to having these data revealed but eye-contact withheld? Our findings indicate that in relation to expressions of toxic disinhibition, lack of eye-contact leads participants to feel less exposed and more anonymous and, thus, more inclined to engage in flaming-related behaviors.

This novel definition of anonymity—induced by factors greater than a mere lack of personal identity—is derived from the conditions that characterize cyberspace, in which an *online sense of unidentifiability* is one of several online experiences. Using the components of non-disclosure of personal identity, invisibility, and absence of eye-contact, the definition of *online sense of unidentifiability* will change under different conditions or with different people. That is, although the current study investigated the change of conditions by manipulating the independent variables, the variability in participants' subjective perceptions of *online sense of unidentifiability* may also help explain the unexpected findings. A study by Moral-Toranzo, Canto-Ortiz, and Gómez-Jacinto (2007) manipulated the anonymity factor, using an online chat environment in which participants shared their opinions on the issue of immigrants. No differences in behavior were found between the anonymous and the identified participants (whose pictures appeared on a screen next to their full names). In other words, in their own perception, the identified participants apparently felt no less anonymous than did their counterparts in the anonymous group. The study by Moral-Toranzo and colleagues, then, supports the claim introduced here, that a valid concept of *anonymity* cannot rely solely on the overall environmental conditions; it must also take account the participants' subjective perceptions of their *sense of unidentifiability* on the Internet.

In the effort to identify factors that induce the online disinhibition effect, the present study constitutes only the “tip of the iceberg.” The effect appears to be a complex phenomenon, induced by many factors. It is the interaction among these variables that increases the complexity and often the intensity of the effect (Barak, Boniel-Nissim, & Suler, 2008; Joinson, 2007). Thus, the uniqueness of the current findings may both reflect and be considered a manifestation of this complexity.

4.2. Lack of eye-contact and unidentifiability

The present study's focus on variables known to lead to disinhibition processes produced significant findings that can help increase our understanding of the behavioral disinhibition process. It identified a unique psychological pattern that typifies the online social environment, a configuration that leads to an interpersonal dynamic different from other forms of human interaction found outside the Internet. Although sorting out the relative contribution of each of the variety of factors that influence human behavior in cyberspace is undoubtedly difficult, the present and previous studies relating to the online disinhibition effect suggest that users have a tendency to perceive cyberspace as a distinct, transitional psychological space (Barak & Suler, 2008; Suler, 1999; Turkle, 1995; Turkle, 2004).

Despite the uniqueness of the online interpersonal dynamic, it seems that the importance of the absence of eye-contact that typifies this setting resembles the role of this factor in general

interpersonal communication. Eye-contact, or gazing, is recognized as a direct, significant part of communication and a meaningful psychological factor in non-verbal communication. It is a condition that affects one's personal feelings during interpersonal interactions. Studies have found that eye-contact plays a central role in interpersonal communications for varied purposes, such as information transfer, moderating interactions, revealing emotions, and expressing intimacy; it was also found to assist in achieving social control (Grumet, 1983; Kleinke, 1986; Webbink, 1986). During online interpersonal communication, the lack of eye-contact has wide-ranging implications both emotionally and behaviorally, and its effect on online disinhibition in particular has been noted (e.g., Suler, 2004). The latter effect, especially on negative online disinhibition, was substantiated further in the present study: compared to results obtained when eye-contact was enabled, the lack of eye-contact was associated with increased levels of self-reported flaming incidents and threats, and with overall negative online disinhibition behavior scores. Lack of eye-contact was also found to have a significant effect on toxic online disinhibition in interactions with the other factors studied here, namely anonymity and visibility. Finally, an assessment of the relative contribution of each factor to toxic online disinhibition behaviors found eye-contact to impart the greatest relative effect.

It seems, nevertheless, that the findings on the essential role of lack of eye-contact in contributing to online disinhibition are preliminary in nature; it is still one of the very few research investigations that have considered the role of eye-contact in online communications (e.g., Cowell & Stanney, 2005; Gamer & Hecht, 2007; Yee, Bailenson, Urbanek, Chang, & Merget, 2007). None of those others, though, examined the role of eye-contact between two people in cyberspace. There are no previous studies that we know of that have focused on the effects of lack of eye-contact on interpersonal communication online in general or on its effects on negative online disinhibition in particular.

The technical complexity involved in such research may explain the paucity of studies on this issue. As demonstrated here, eye-contact plays an important role in webcam communication. However, existing technologies do not support the desirable level of eye-contact: webcams and computer screens are positioned in such a way as to render direct eye-contact difficult. Although the solution to this problem is undoubtedly technological, the current study demonstrates that it promises to fulfill an important psychological need. Technological progress in this realm could facilitate the development of better, more meaningful eye-contact during computer-mediated communication, and thus attenuate negative online disinhibition.

Even though the lack of eye-contact may be a virtue of online communication, in that people are willing to use online communication because they feel less inhibited, less formal, less embarrassed, and more willing to speak their minds because they do not have to look or avoid looking someone in the eye, our findings suggest that the toxic outcome of a lack of eye-contact might need to be considered when initiating interpersonal interaction in cyberspace. In this context, the research findings imply that allowing webcams, which enable eye-contact, might have significant impact on reducing toxic disinhibition and its adverse expressions in various online environments, including support groups, educational settings, and other online interpersonal interactions.

4.3. Limitations of the study

It is important to note that the current research employed an experimental design hence its external validity is limited. Additional research is needed to examine differential and independent effects of anonymity, visibility, and eye-contact under real social situations. It should be noted, however, that although the gender

variable was neutralized by matching equal pairs of different partners, gender and gender matching might have influenced the results, and further study is required on this aspect. It is also possible that other individual differences, especially personality-related variables, interact with anonymity, invisibility, and the lack of eye-contact, but such interactions were not examined here.

4.4. Directions for future research

The current findings suggest that previous definitions of anonymity did not take into account all the factors that characterize the online communication environment, specifically invisibility and absence of eye-contact. Thus, it seems advisable that future studies define the online social setting carefully and precisely so that the effects of anonymity on the behavior of communicants in cyberspace can be evaluated alongside the effects of other online situational variables. First and foremost, it is advisable that the presence of eye-contact (or its absence) between communicants be assessed in future studies of online disinhibition. It also appears that the term anonymity, as we know it, has not yet been adapted to the parameters of the new virtual reality. Henceforth, studies that include the anonymity variable should consider the broader definition the *online sense of unidentifiability*: non-disclosure of personal details, invisibility, and absence of eye-contact. It may well be within the purview of future studies to adopt the updated definition of anonymity formulated here because it is tailored to fit the conditions prevalent in cyberspace. To recapitulate, such a definition relies on the above-mentioned three factors, with the relative contribution of each factor to the overall sense of unidentifiability varying according to the particular Web application (e.g., dating sites, shopping sites, learning sites) and the user's particular attributes (e.g., personality type).

The role of eye-contact in the online disinhibition process should be further studied. Given that a direct outcome of lack of eye-contact is a decrease in the types of social cues available in cyberspace communications, the specific effects of reduced social cues on the online disinhibition effect should also be studied. In particular, the absence of nonverbal cues, such as physical gestures, posture, and oral and tactile information, as well as the differences between writing and speech—all of which play an important role in interpersonal communication—should be examined. Moreover, the differential effects of reduced social cues in various communication settings (e.g., computer-mediated, face-to-face, and telephone) on the negative online disinhibition effect may shed additional light on the significance of the eye-contact variable. Several studies of these effects have been conducted. Walther and Bazarova (2008), for example, using a webcam, audio-enhanced communications, or text-only communications, compared face-to-face group discussions with similar discussions over the Internet in order to examine the Electronic Propinquity Theory (i.e., the sense of intimacy that characterizes each of the above settings). A study that would monitor eye-contact, as well as levels of online disinhibition, during face-to-face communications, synchronized and unsynchronized computer-mediated communication (with and without audio accompaniment), and phone communications may well help to elucidate the role of eye-contact in the online disinhibition effect.

Interpersonal differences and their effect on the creation of identity over the Internet warrant investigation, as does the effect of asynchronicity on the online disinhibition effect. The interactions between those factors and anonymity, invisibility, and the absence of eye-contact, individually and collectively, in the social online environment also merit further study. Finally, since gender and gender-matched pairing might also contribute to the online disinhibition effect, more research is required to determine the precise role of gender in the online disinhibition effect.

5. Conclusions

As demonstrated, the most notable outcomes of this study are the inclusion of variables that refine our understanding of the conditions associated with negative online disinhibition. Lack of eye-contact plays a major role in triggering behaviors related to negative online disinhibition. Thus, the professional literature's overwhelming attention to the anonymity factor appears to be misplaced: the definition of anonymity reflected in past studies and theoretical conceptualizations may, perhaps, be too general. The current study suggests employing a new concept: *Online Sense of Unidentifiability*. This term is broader than anonymity, yet it includes specific components; namely, non-disclosure of personal data, invisibility, and lack of eye-contact (and possibly other significant components yet to be investigated).

References

- Alonzo, M., & Aiken, M. (2004). Flaming in electronic communication. *Decision Support System*, 36, 205–213.
- Aiken, M., & Waller, B. (2000). Flaming among first-time group support system users. *Information and Management*, 37, 95–100.
- Anonymous (1998). To reveal or not to reveal: A theoretical model of anonymous communication. *Communication Theory*, 8, 381–407.
- Barak, A. (2005). Sexual harassment on the Internet. *Social Science Computer Review*, 23, 77–92.
- Barak, A. (2007). Phantom emotions: Psychological determinants of emotional experiences on the Internet. In A. Joinson, K. Y. A. McKenna, T. Postmes, & U. D. Reips (Eds.), *Oxford handbook of internet psychology* (pp. 303–329). Oxford, UK: Oxford University Press.
- Barak, A., Boniel-Nissim, M., & Suler, J. (2008). Fostering empowerment in online support groups. *Computers in Human Behavior*, 24, 1867–1883.
- Barak, A., & Sadovsky, Y. (2008). Internet use and personal empowerment of hearing-impaired adolescents. *Computers in Human Behavior*, 24, 1802–1815.
- Barak, A., & Suler, J. (2008). Reflections on the psychology and social science of cyberspace. In A. Barak (Ed.), *Psychological aspects of cyberspace. Theory, research, applications* (pp. 1–12). Cambridge, UK: Cambridge University Press.
- Bargh, J. A., Fitzsimons, G. M., & McKenna, K. Y. A. (2003). The self, Online. In S. J. Spencer, S. Fein, M. P. Zanna, & J. M. Olson (Eds.), *Motivated social perception, the Ontario symposium* (Vol. 9, pp. 195–213). London: Lawrence Erlbaum Associates.
- Bargh, J. A., & McKenna, K. Y. A. (2004). The internet and social life. *Annual Review of Psychology*, 55, 573–590.
- Bargh, J. A., McKenna, K. Y. A., & Fitzsimons, G. M. (2002). Can you see the real me? Activation and expression of the “true self” on the Internet. *Journal of Social Issues*, 58, 33–48.
- Bowker, N., & Tuffin, K. (2002). Disability discourses for online identities. *Disability & Society*, 17, 327–344.
- Boyle, E. A., Anderson, A. H., & Newlands, A. (1994). The effects of visibility on dialogue and performance in cooperative problem solving task. *Language and Speech*, 37, 1–20.
- Brotsky, S., & Giles, D. (2007). Inside the “Pro-ana” community: A covert online participant observation. *Eating Disorders*, 15, 93–109.
- Buss, A. H., & Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology*, 63, 452–459.
- Buss, A. H., & Warren, W. L. (2000). *The aggression questionnaire manual*. Los Angeles: Western Psychological Services.
- Castellá, V. O., Abad, A. M. Z., Alonso, E. P., & Silla, J. M. P. (2000). The influence of familiarity among group members, group atmosphere, and assertiveness on uninhibited behavior through three different communication media. *Computer in Human Behavior*, 16, 141–159.
- Chau, M., & Xu, J. (2007). Mining communities and their relationships in blogs: A study of online hate groups. *International Journal of Human-Computer Studies*, 65, 57–70.
- Christopherson, K. M. (2007). The positive and negative implications of anonymity in Internet social interactions: “On the Internet, nobody knows you’re a dog”. *Computers in Human Behavior*, 23, 3038–3056.
- Chesney, T., & Su, D. K. S. (2010). The impact of anonymity on weblog credibility. *International Journal of Human-Computer Studies*, 68, 710–718.
- Chester, A., & Bretherton, D. (2007). Impression management and identity online. In A. Joinson, K. McKenna, T. Postmes, & U. Reips (Eds.), *The Oxford handbook of internet psychology* (pp. 223–236). Oxford, UK: Oxford University Press.
- Chiou, W. (2006). Adolescents’ sexual self-disclosure on the Internet: Deindividuation and impression management. *Adolescence*, 41, 547–561.
- Chiung-Wen, H. (2007). Staging on the Internet: Research on online photo album users in Taiwan with the spectacle/performance paradigm. *CyberPsychology & Behavior*, 10, 596–600.
- Cowell, A. J., & Stanney, K. M. (2005). Manipulation of non-verbal interaction style and demographic embodiment to increase anthropomorphic computer character credibility. *International Journal of Human-Computer Studies*, 62, 281–306.
- Cramton, C. D., Orvis, K. L., & Wilson, J. M. (2007). Situation invisibility and attribution in distributed collaborations. *Journal of Management*, 33, 525–546.
- Cress, U., & Kimmerle, J. (2008). Endowment heterogeneity and identifiability in the information-exchange dilemma. *Computers in Human Behavior*, 24, 862–874.
- Derks, D., Fischer, A. H., & Bos, A. E. R. (2008). The role of emotion in computer-mediated communication: A review. *Computers in Human Behavior*, 24, 766–785.
- Derlega, V. J., Metts, S., Petronio, S., & Margulis, S. T. (1993). *Self disclosure*. Newbury Park, CA: Sage.
- Doherty-Sneddon, G., Anderson, A. H., O'Malley, C., Langton, S., Garrod, S. C., & Bruce, V. (1997). Face-to-face and video-mediated communication: A comparison of dialogue structure and task performance. *Journal of Experimental Psychology-Applied*, 3, 105–125.
- Douglas, K. M., & McGarty, C. (2001). Identifiability and self-representation: Computer mediated communication and intergroup interaction. *British Journal of Social Psychology*, 40, 399–416.
- Dumont, G., & Candler, G. (2005). Virtual jungles: Survival, accountability, and governance in online communities. *American Review of Public Administration*, 35, 287–299.
- Dyer, R., Green, R., Pitts, M., & Millward, G. (1995). What's the flaming problem? or computer mediated communication–deindividuating or disinhibiting? In M. A. R. Kirby, A. J. Dix, & J. E. Finlay (Eds.), *People and computers X* (pp. 289–301). Cambridge, UK: Cambridge University Press.
- Flanagin, A. J., Tiyaamornwong, V., O'Connor, J., & Seibold, D. R. (2002). Computer-mediated group work: The interaction of member sex and anonymity. *Communication Research*, 29, 66–93.
- Gamer, M., & Hecht, H. (2007). Are you looking at me? Measuring the cone of gaze. *Journal of Experimental Psychology: Human Perception and Performance*, 33, 705–715.
- Gergen, K. L., Gergen, M. M., & Barton, W. H. (1973). Deviance in the dark. *Psychology Today*, 7, 129–133.
- Giles, D. (2006). Constructing identities in cyberspace. The case of eating disorders. *British Journal of Social Psychology*, 45, 463–477.
- Grumet, G. W. (1983). Eye contact: The core of interpersonal relatedness. *Psychiatry*, 46, 172–180.
- Huang, Y.-Y., & Chou, C. (2010). An analysis of multiple factors of cyberbullying among junior high school students in Taiwan. *Computers in Human Behavior*, 26, 1581–1590.
- Joinson, A. N. (1998). Causes and implication of disinhibited behavior on the Internet. In J. Gackenbach (Ed.), *Psychology and the internet: Intrapersonal, interpersonal, and transpersonal implications* (pp. 43–60). San Diego: Academic Press.
- Joinson, A. N. (2001). Self-disclosure in computer-mediated communication: The role of self-awareness and visual anonymity. *European Journal of Social Psychology*, 31, 177–192.
- Joinson, A. N. (2003). *Understanding the psychology of internet behavior: Virtual worlds, real lives*. New York: Palgrave Macmillan.
- Joinson, A. N. (2007). Disinhibition and the Internet. In J. Gackenbach (Ed.), *Psychology and the internet: Intrapersonal, interpersonal and transpersonal implications* (2nd ed., pp. 76–92). San Diego, CA: Elsevier Academic Press.
- Jourard, S. M., & Friedman, R. (1970). Experimenter-subject “distance” and self-disclosure. *Journal of Personality and Social Psychology*, 15, 278–282.
- Kabay, M. E. (1998, March). Anonymity and pseudonymity in cyberspace: Deindividuation, incivility and lawlessness verses freedom and privacy. Paper presented at the Annual Conference of the European Institute for Computers Anti-virus Research (EICAR), Munich, Germany.
- Kiesler, S., Siegel, J., & McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist*, 39, 1123–1134.
- Kimmerle, J., Cress, U., & Hesse, F. W. (2007). An interactional perspective on group awareness: Alleviating the information-exchange dilemma (for everybody?). *International Journal of Human-Computer Studies*, 65, 899–910.
- Kleinke, C. L. (1986). Gaze and eye-contact: A research review. *Psychological Bulletin*, 100, 78–100.
- Lee, H. (2005). Behavioral strategies for dealing with flaming in an online forum. *Sociological Quarterly*, 46, 385–403.
- Malamuth, N., Linz, D., & Yao, M. (2005). The internet and aggression: Motivation, disinhibitory, and opportunity aspects. In Y. Amichai-Hamburger (Ed.), *The social net: Human behavior in cyberspace* (pp. 163–190). New York: Oxford University Press.
- McKenna, K. Y. A., & Green, A. S. (2002). Virtual group dynamics. *Group Dynamics*, 6, 116–127.
- McKenna, K. Y. A., & Seidman, G. (2005). Social identity and the self: Getting connected online. In W. R. Walker & D. J. Herrmann (Eds.), *Cognitive technology* (pp. 89–110). Jefferson, NC: McFarland.
- Moor, P. J., Heuvelman, A., & Verleir, R. (2010). Flaming on YouTube. *Computers in Human Behavior*, 26, 1536–1546.
- Morahan-Martin, J., & Schumacher, P. (2003). Loneliness and social use of the Internet. *Computers in Human Behavior*, 19, 659–671.
- Moral-Toranzo, F., Canto-Ortiz, J., & Gómez-Jacinto, L. (2007). Anonymity effects in computer-mediated communication in the case of minority influence. *Computers in Human Behavior*, 23, 1660–1674.
- Mühlenfeld, H. U. (2005). Differences between ‘talking about’ and ‘admitting’ sensitive behavior in anonymous and non-anonymous Web-based interviews. *Computers in Human Behavior*, 21, 993–1003.

- Postmes, T., Spears, R., & Lea, M. (2002). Intergroup differentiation in computer-mediated communication: Effects of depersonalization. *Group Dynamics*, 6, 3–16.
- Qian, H., & Scott, C. R. (2007). Anonymity and self-disclosure on Weblogs. *Journal of Computer-Mediated Communication*, 12, 1428–1451.
- Rosen, L. D., Cheever, N. A., Cummings, C., & Felt, J. (2008). The impact of emotionality and self-disclosure on online dating versus traditional dating. *Computers in Human Behavior*, 24, 2124–2157.
- Rotenberg, K. J., Eisenberg, N., Cumming, C., Smith, A., Singh, M., & Terlicher, E. (2003). The contribution of adults' nonverbal cues and children's shyness to the development of rapport between adults and preschool children. *International Journal of Behavioral Development*, 27, 21–30.
- Scott, C. R. (1999). The impact of physical and discursive anonymity on group members' multiple identifications during computer-supported decision making. *Western Journal of Communication*, 63, 456–487.
- Shiue, Y.-C., Chiu, C.-M., & Chang, C.-C. (2010). Exploring and mitigating social loafing in online communities. *Computers in Human Behavior*, 26, 768–777.
- Short, J. A., Williams, E., & Christie, B. (1976). *The social psychology of telecommunication*. Chichester: John Wiley.
- Siegmán, A. W., & Reynolds, M. A. (1983). Speaking without seeing, or the effect of interviewer absence on interviewee disclosure time. *Journal of Psycholinguistic Research*, 12, 595–602.
- Spears, R., Lea, M., & Postmes, T. (2007). Computer-mediated communication and social identity. In A. Joinson, K. Y. A. McKenna, T. Postmes, & U. D. Reips (Eds.), *Oxford handbook of internet psychology* (pp. 253–269). Oxford, UK: Oxford University Press.
- Spears, R., Postmes, T., Lea, M., & Wolbert, A. (2002). When are net effects gross products? The power of influence and the influence of power in computer-mediated communication. *Journal of Social Issues*, 58, 91–107.
- Suler, J. (1999). Cyberspace as psychological space. <<http://www-usr.rider.edu/~suler/psyber/psychspace.html>> Retrieved 20.10.10.
- Suler, J. (2004). The online disinhibition effect. *CyberPsychology & Behavior*, 7, 321–326.
- Suler, J. (2005). Contemporary Media Forum. *International Journal of Applied Psychoanalytic Studies*, 2, 184–188.
- Suler, J. (2008). Image, word, action: Interpersonal dynamics in a photo-sharing community. *CyberPsychology & Behavior*, 11, 555–560.
- Suler, J. R., & Phillips, W. L. (1998). The bad boys of cyberspace. Deviant behavior in a multimedia chat community. *CyberPsychology & Behavior*, 1, 275–294.
- Tanis, M., & Postmes, T. (2007). Two faces of anonymity: Paradoxical effects of cues to identity in CMC. *Computers in Human Behavior*, 23, 955–970.
- Tourangeau, R., Couper, M. P., & Steiger, D. M. (2003). Humanizing self-administered surveys: Experiments on social presence in web and IVR surveys. *Computers in Human Behavior*, 19, 1–24.
- Turkle, S. (1995). *Life on the screen: Identity in the age of the Internet*. New York: Simon & Schuster.
- Turkle, S. (2004). Whither psychoanalysis in computer culture? *Psychoanalytic Psychology*, 21, 16–30.
- Turnage, A. K. (2008). Email flaming behaviors and organizational conflict. *Journal of Computer-Mediated Communication*, 13, 43–59.
- Valkenburg, P. M., Schouten, A. P., & Peter, J. (2005). Adolescents' identity experiments on the Internet. *New Media & Society*, 7, 383–402.
- van Dijck, J. (2008). Digital photography: Communication, identity, memory. *Visual Communication*, 7, 57–76.
- Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research*, 23, 3–43.
- Walther, J. B. (1999, May). Visual cues and computer-mediated communication: Don't look before you leap. In Paper presented at the Annual Meeting of the International Communication Association, San Francisco.
- Walther, J. B., & Bazarova, N. N. (2008). Validation and application of electronic propinquity theory to computer-mediated communication in groups. *Communication Research*, 35, 622–645.
- Webbink, P. (1986). *The power of the eyes*. New York: Springer.
- Williams, D., & Skoric, M. (2005). Internet fantasy violence. A test of aggression in an online game. *Communication Monographs*, 72, 217–233.
- Wodzicki, K., Schwämmlein, E., Cress, U., & Kimmmerle, J. (2011). Does the type of anonymity matter? The impact of visualization on information sharing in online groups. *CyberPsychology, Behavior, and Social Networking*, 14, 157–160.
- Yee, N., Bailenson, J. N., Urbanek, M., Chang, F., & Merget, D. (2007). The unbearable likeness of being Digital: The persistence of nonverbal social norms in online virtual environments. *CyberPsychology & Behavior*, 10, 115–121.
- Yang, C., Hsu, Y. C., & Tan, S. (2010). Predicting the determinants of users' intentions for using Youtube to share video: Moderating gender effects. *CyberPsychology, Behavior, and Social Networking*, 13, 141–152.
- Zimbardo, P. G. (1969). The human choice. Individuation, reason, and order vs. deindividuation, impulse and chaos. *Nebraska Symposium on Motivation*, 17, 237–307.