

Self-Generated Versus Other-Generated Statements and Impressions in Computer-Mediated Communication

A Test of Warranting Theory Using Facebook

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The warranting principle pertains to impression formation in Internet communication. It posits that perceivers' judgments about a target rely more heavily on information which the targets themselves cannot manipulate than on self-descriptions. Two experiments employed mock-up profiles resembling the Internet site, Facebook, to display self-generated clues and to display other-generated clues about a Facebook user. The first experiment ($N = 115$) tested perceptions of extraversion. Although warranting was supported, rival explanations (negativity and additivity) also pertained. The second experiment ($N = 125$) tested perceptions of physical attractiveness. Friends' comments overrode self-comments, supporting warranting theory exclusively. Implications concern boundary-setting research for warranting, and potential effects of social comments on a variety of new information forms.

Keywords: *computer-mediated communication; warranting; Facebook; negativity; impression formation*

When individuals form impressions about others via the Internet and when they anticipate an offline meeting, they are often concerned about the reliability of the self-presentations others put forward. The warranting principle (Walther & Parks, 2002) proposes that observers place greater credence in information about the personal characteristics and offline behaviors of others when the information cannot be easily manipulated by the person who it describes. The present research provides two experiments testing the warranting principle (and a competing perspective, the negativity effect) by comparing the effects of positive versus negative information about an individual, when it is ostensibly generated by the target individuals, versus information about target individuals that they did not themselves create. Because the Facebook

social networking system provides, on any single page, both users' self-descriptions and descriptions of about users that are generated by other people, Facebook offers a useful setting in which to compare these types of information on interpersonal impressions. In the present research, a personality judgment and a physical appearance judgment were affected in different ways, in some ways validating and in some ways offering limitations to the warranting hypothesis.

Interpersonal Impressions Online

The Internet provides numerous communication spaces in which people meet others. People look for dates and prospective mates among strangers in online matchmaking sites. They find others with common interests or common maladies in online discussion groups. People look for articulate and intriguing chatters in multi-player online role-playing games. Newshounds find sources of information or professional insights via blogs and blog directories. People look to see what their friends are doing and with whom they are associating using social networking sites such as Facebook, Myspace, and others. As people do so, a variety of influences may confront them in terms of how they make sense of one another.

As technologies change, new frameworks may be needed with which to understand the communication dynamics that technologies involve. At one time, the Internet was not as facile a medium for meeting and evaluating other people. Text-based discussions via chat, bulletin boards, and e-mail systems were devoid of nonverbal cues. Although this limitation does not occlude interpersonal communication, it necessitates greater effort and time to develop impressions and relationships via questions and disclosures (Tidwell & Walther, 2002), emotional language (Walther, Loh, & Granka, 2005), chronemics (Walther & Tidwell, 1995), and other linguistic, typographic, and temporal cues (see for review, Walther & Parks, 2002). However, the Internet has changed, heralding new information-processing potentials and new theoretical views with which to understand them. For instance, Ramirez, Walther, Burgoon, and Sunnafrank (2002) argued that whereas interpersonal information-seeking formerly relied on users' volitional disclosures and conversational behaviors, an expanded Internet allows users to exploit a variety of stored information about others in whom they may be interested. These sources include easily searchable discussion archives, Web sites, and documents that are often beyond the target's ability to manipulate over time. A more recent development of social networking sites, the purpose of which is to share identities within relatively large social networks, provides additional repositories of impression-enabling information. These systems, like previous developments, bring into view conceptual questions about how impressions are formed and how they are tempered.

Accompanying these developments there continues to be considerable concern among Internet users about the use and veracity of information individuals present about themselves online, as there is a general suspiciousness about the truthfulness of

online disclosure. An early case study about online discussions reflected how easily a male psychiatrist pretended to be a woman online and deceived a number of women into intimate and sometimes sexual encounters (van Gelder, 1991). Aside from gender switching, the possibility of deception in online self-descriptions is taken to be a given, according to some sources (Cornwell & Lundgren, 2001): Contemporary users of online Internet dating sites indicate that their primary concern about online match-making is that prospective partners misrepresent themselves. These concerns appear to be based in the assumption that without immediate physical presence, people feel more free to dissemble, and/or that observers are less able to detect deception online than off (Frankel & Sang, 1999). This reflects the assumption that deception is more reliably detected face-to-face or using more traditional communication media, regardless this assumption's questionable merit (Carlson, George, Burgoon, Adkins, & White, 2002; Walther, 2002). Donath (1999) argued that there are certain types of claims people make about themselves in online communication about which observers are likely to be skeptical. For example, in text-based CMC, it takes little effort to claim to be muscular, whereas it would require more cost and effort to appear muscular in a face-to-face encounter. Because it costs so little to advance advantageous self-descriptions online, according to Donath (1999), Internet communicators reserve doubts about the authenticity of claims of this nature.

Although few researchers have examined the relative frequency with which deceptive self-presentation takes place online versus offline (Hancock, Thom-Santelli, & Ritchie, 2004), Internet users' suspicion of deceptive self-presentation is not unfounded in many cases. Even when they anticipate a possible offline encounter, people often distort the self-descriptions they list in online dating profiles (Toma, Hancock, & Ellison, 2008), sometimes knowingly and with compelling justifications for doing so (Ellison, Heino, & Gibbs, 2006). In online role-playing games, individuals occasionally "try on" the opposite gender, although most individuals do not continue to do so once their curiosity has been satisfied (Roberts & Parks, 1999). Aside from the question of outright deception, many CMC users avail themselves of the medium's potential for selective self-presentation, and they do so without a great deal of mindful effort (Walther, 2007). Thus, regardless of whether their suspicions about others' distorted self-presentations are well or poorly founded, CMC users have concerns about the reliability of online self-presentations.

Suspicion and potentially distorted online self-presentations are especially problematic for people who meet online and consider moving their acquaintanceship offline. Ellison et al. (2006) documented that users of Internet match-finding services may experience tension between presenting oneself as more attractive but stretching the truth to do so, or presenting oneself more honestly (in anticipation of the face-to-face revelation) but risking being less attractive to a larger pool of suitors in doing so. Perceivers are suspicious of these impression management motives. When people are first attracted to one another via online impressions, the anticipation of meeting offline increases their desire for authentic clues about their partners' appearance, behavior, and attitudes.

To improve the confidence they have in their inferences about one another, individuals may have systematic preferences among the various information sources they can use in making assessments about people they meet online (Henderson & Gilding, 2004).

Warranting Value of Information

Walther and Parks (2002) proposed that individuals rely on information with greater warranting value. Warranting refers to the capacity to draw a reliable connection between a presented persona online and a corporeally anchored person in the physical world (see Stone, 1995). When one presents a persona online, for example, in a virtual environment from which a character's offline identity cannot be traced, little warrant exists between the self-presentational claims and the typist's offline personality; auditors may not trust the self-presentational claims individuals make in such environments. Even apparently sincere disclosures, of course, can be faked. However, other forms of information can be exchanged, which receivers will interpret as being more authentic. Walther and Parks (2002) proposed that the warranting value of information is "derived from the receiver's perception about the extent to which the content of that information is immune to manipulation by the person to whom it refers" (p. 552).

On this basis, several forms of information can be predicted to hold greater or lesser warranting value based on specific characteristics, according to Walther and Parks' (2002) framework. A personal Web page (apparently constructed by the target his or herself) should provide less warranting value than an institutionally based Web page that appears to be constructed by a webmaster or other third party. A photo provided by an individual of himself online should have less warranting value than an online photo that is attributable to a newspaper photographer. Following Parks and Adelman (1983), connecting a person to a social network reduces uncertainty because of the possibility of corroborating impressions among network members. Therefore, in warranting terms, comments provided to Person B about Person A should be more valuable to B if they come from or are corroborated by another member of A's social network (a testimonial) than if they come from Person A directly (a disclosure).

Walther and Parks (2002) argue that competent CMC users, implicitly knowledgeable of these dynamics, feed warranting information pointers to online partners when they anticipate a future meeting in order to reduce concerns about the legitimacy of their online self-presentations. For instance, a job seeker may point a prospective employer to her accomplishments listed on her current company's Web site rather her personal Web site. A romantic suitor might send a link to a picture of himself at a Sierra Club meeting to bolster his claim that he is an environmentalist.

The warranting hypothesis has received indirect empirical support to date. Ellison et al. (2006) reported interview data confirming their contention that individuals offer

warranting information in online personals. Toma et al. (2008) found that the more members of one's social network were aware that an individual was using an online matchmaking service, the less distortion appeared between the individuals' online self-descriptions and their objectively verified physical attributes. The impact of externally generated information on virtual self-presentations is seen in recent research examining the Facebook Web-based social networking system (www.facebook.com). On Facebook, in addition to a user's self-generated profile, users' friends are allowed to leave messages on a user's profile, which anyone else who views the profile can see. Walther, Van Der Heide, Kim, Westerman, and Tong (2008) experimentally varied the content of friends' messages on otherwise neutral profiles to suggest prosocial (popular and inclusive) or antisocial (drunken and promiscuous) behavior on the part of the profile owner. These messages, which comprised a small part of the overall information on the profiles, exerted a significant difference on observers' ratings of the targets' likeability and physical attractiveness. These findings indicate that externally generated information about a person affects evaluation of that person's persona, even though (and perhaps because) the target did not disclose the information. The findings do not indicate whether such postings have greater warranting value than self-generated information. To establish the warranting effect, research may present a perceiver with both (a) valenced information bits about a target, some of which are ostensibly disclosures and others ostensibly testimonials and (b) a situation in which the valences of the disclosures and testimonials conflict.

Although warranting offers predictions about the value of different sorts of information, person perception research suggests other predictions about how perceivers resolve conflicting information. A rival prediction focuses on the valence of information, rather than the source that conveys it, and the especially informative nature of negative information: the negativity effect.

Negativity as an Alternative Hypothesis

Research often shows that negative information is weighed more heavily than positive information in impression formation processes (for review, see Kellermann, 1984). For example, in the 1984 and 1988 presidential campaigns, perceptions about candidates' weaknesses were better empirical predictors of the election outcomes than were perceptions of the candidates' strengths (Klein, 1991). Potential employers weigh negative characteristics of interviewees more heavily than positive characteristics (Webster, 1964). Information with a negative valence is generally seen as more credible than information with a positive valence (Hamilton & Zanna, 1972; Leventhal & Singer, 1964).

Kellermann (1984, 1989) suggested the negativity effect is due to the informativeness of negative information. Based on Jones and Davis' (1965) correspondent inference theory, Kellermann argued that negative information is seen as informative because it is thought to be nonnormative. People are normally assumed to express

flattering and/or positive aspects about the self or others. However, because normative information is more common, it may be discounted as reflecting adherence to societal standards rather than reflecting an individual's dispositions. Therefore, Kellermann argued, negative information is weighed more heavily in impressions because it is uniquely informative. Negative things are more likely to tell us about a person's attributes, whereas positive things reflect situational standards (cf. Fiske, 1980).

Discounting positive attributes may be even more likely in an environment where there is an expectation of positively distorted impression management behavior. Gibbs, Ellison, and Heino's (2006) survey of online dating site users found that 86% of respondents felt that others misrepresented their appearance in self-serving directions. Brym and Lenton's (2001) survey of Canadians' online dating habits found that respondents felt that others distorted their age, appearance, and, in some extreme cases, marital status (presumably to appear single and available when they actually were not) to appear more favorable. These findings suggest that some CMC users suspect other users normally inflate their online self-presentations. In this context, negative information may appear particularly nonnormative and sway impressions in negative directions.

The present studies sought to provide a direct examination of the warranting and negativity hypotheses by offering valenced self-disclosures and other-testimonials in an environment where disclosures and testimonials can conflict. The first study examined the extent to which self-generated versus other-generated statements carried greater weight with observers with regard to a common personality characteristic: an individual's extraversion.

Study 1: Extraversion

Extraversion refers to an individual's outgoingness and eagerness to interact with other people. In initial encounters, observers judge others' degree of extraversion quickly; people make extraversion judgments based on a target's physiognomy prior to the expression of any behavioral cue (see for review, Burgoon & Saine, 1978). Extraversion is one of the most basic three psychological characteristics that are central to a variety of other trait and behavior inferences (Eysenck & Eysenck, 1991). Extraversion influences judgments of an individual's credibility (McCroskey, Hamilton, & Weiner, 1974), the quality of male-female interactions (Berry & Miller, 2001; Garcia, Stinson, Ickes, Bissonnette, & Briggs, 1991), perceptions of leadership (Bass, 1990), and the effectiveness of salespeople (Vinchur, Schippmann, Switzer, & Roth, 1998). Moreover, extraversion is generally associated with positive affect (Costa & McCrae, 1980) and is related to self-perceptions of well-being (DeNeve & Cooper, 1998). In contrast, characteristics associated with introversion and shyness include poor social adjustment, lower esteem, and isolation (Hayes &

Meltzer, 1972; McCroskey, 1977). Because a lack of extraversion or outgoingness is associated with negative attributes, the presence of information suggesting a low level of extraversion may trigger negative judgments.

Extraversion is an important and easily inferred characteristic, in offline, interactive settings, as well as in e-mail (Gill & Oberlander, 2003) and Web sites (Vazire & Gosling, 2004). For some people, however, there may be a disparity between the level of extraversion they convey online versus offline. Caplan (2005) has shown that there are individuals with social skills deficits, which inhibit their offline communication, who prefer online interaction. Online venues enhance their control and enable them to communicate more deliberately (see Walther, 2007). Such individuals might seem more expressive in online contexts than face to face. In online social support groups, users value anonymity, which online discussions can provide, where they are more likely than offline to say a lot about their experiences and problems (Walther & Boyd, 2002). These dynamics suggest that extraversion and sociability constitute an interesting social judgment to evaluate, as it is a judgment quickly made offline, which online may be less reliable, making it a worthwhile candidate for potential warranting effects.

In the present case, if information appears online which suggests that a person is withdrawn and unsociable, it may not matter to an observer whether that suggestion is self-generated or other-generated; no matter its source, where negative and positive information are both present, the negative valence of the information may tip the scales in observers' judgments of the target. Thus, a negativity effect may override the warranting effect.

Although the warranting and negativity effects may occur in a variety of online settings, the present research examined these dynamics in a relatively new Internet environment: the Facebook online social networking system. As discussed by Lampe, Ellison, and Steinfield (2007), Facebook "allows users to create in-depth profiles describing themselves, and then to establish explicit links with other users, who are described as 'friends' by the system" (p. 1). At the time of this study, profiles included a central photograph and self-descriptive statements in response to standard categories. Moreover, one's friends may leave comments on a profile-owner's site by typing messages for inclusion on a virtual "wall," and these messages can be viewed by other visitors to the profile as well. Thus, on any Facebook profile, there exist quite naturally self-generated claims, as well as postings by members of an individual's social network. When the wall postings also allude to characteristics about the profile owner, these two types of information—self-generated and other-generated—meet the definitions of contrasting information sources that the warranting framework defines, in that other-generated comments are not modifiable by the person to whom they refer. Because friends' comments come from members of one's social network, they further offer the corroboration potential Parks and Adelman (1983) suggested.

Based on these considerations the following hypotheses are tendered. The first hypothesis reflects predictions based on the warranting principle: A Facebook target's

perceived extraversion is derived from friends' statements more so than self-statements; there is a main effect of comments originating from self versus friend on extraversion. The second hypothesis reflects the negativity effect: A Facebook target's perceived extraversion is accorded based on negative statements (alleging introversion); there is a main effect of negative statements on perceived extraversion.

Method

Participants ($N = 115$; 52 male and 63 female) were undergraduate students from a large university in the Midwestern United States who volunteered to participate in the study in exchange for extra course credit or in partial fulfillment of a class research requirement. All participants reported owning a Facebook profile. The average age of participants was 19.68 ($SD = 1.41$) years. The sample identified their racial and/or ethnic background to be 72.2% Caucasian, 9.6% Asian/Pacific Islander, 7.8% African American, 1.7% Hispanic, 1.7% Native American, and 7.0% were unspecified. Following an induction designed to increase the plausibility of the experience, participants viewed one of eight stimuli containing a mock-up of a Facebook profile. These stimuli were designed to reflect differences in (a) the profile owner's statements about his or her own high versus low extraversion, (b) the profile owner's friend's statements about the profile owner's high versus low extraversion, and (c) whether the profile owner's photo depicted a male or female. Thus, the study generated eight separate conditions based on this $2 \times 2 \times 2$ design.

Stimuli

Stimuli were comprised of mock-up Facebook profiles, such as that depicted in Figure 1. Some information presented on these mock-ups was consistent among all versions (such as a home network, number of friends, and the name Chris Smith), except for a neutrally attractive central photo that either depicted a male or a female. Both photos were verified to reflect a neutral level of physical attractiveness in a previous study (Walther et al., 2008). A number of other features were manipulated to create the differentially valenced information, which reflected the hypothesized qualities of extraversion and introversion. Ostensibly self-generated items included self-descriptive statements ("about me"), interests, activities, favorite quotations, and Facebook "groups" (real or imaginary aggregations with revealing names). Ostensibly other-generated items appeared as wall postings ostensibly written by friends. Researchers studied Facebook postings to select, adapt, and devise statements to match the style that appears to be normative in Facebook postings.

Figure 1
Sample Facebook Profile Mock-Up

facebook Profile edit Friends Networks Inbox home account privacy logout

Chris Smith
 MSU '08 Share

Interested In: Men
 Relationship Status: Single
 Hometown: Rochester, MI
 Political Views: Other

Information

Contact Info
 Email: csmith@0876
 AIM:
 Mobile:
 Residence: 1223 Goodyear Ct.

Personal Info
 Activities: hanging out online
 Interests: photography
 Favorite Music:
 Favorite TV Shows:
 Favorite Movies:
 Favorite Books:
 Favorite Quotes: "Judge not according to the appearance..." --John 7:24
 About Me: I like to hang out online, and im trying my best to lose a few pounds.

The Wall
 Displaying 4 of 40 wall posts. Wall-to-Wall | See All

MSU Friends
 273 friends at MSU. See All

Mark Brown Shana Brisbane Courtney McFee
 Blake Rogers Rick Allen Marie Rodin

Groups
 3 groups. See All
 Ugly daddings. - I hate mirrors. - Heavy is the new hot.

Wall Posts:

- Mark Brown** wrote at 1:11pm on February 18th, 2007
 have you lost weight? Good job keep workin at it!
 Wall-to-Wall - Message
- Courtney McFee** wrote at 12:02am on February 10th, 2007
 dont pay attention to those jerks at the bar last night, what matters is on the inside!
 Wall-to-Wall - Message
- Blake Rogers** wrote at 5:59pm on February 4th, 2007
 Hey, chris, much better picture of you...the last one wasnt all that flattering.
 Wall-to-Wall - Message
- Marie Rodin** wrote at 9:02pm on January 14th, 2007
 Im so sorry things didnt work out with that blind date you went on, who knew he would turn out to be so shallow.
 Wall-to-Wall - Message

Note: Faces have been blurred for publication purposes.

“About me.” In the personal information section of the Facebook owners’ profiles, the extraverted version contained the following self-statement: “Im really really really outgoing until you get to know me...then Im even more outgoing.” In the introverted condition, the parallel statement read, “Im really really really shy until you get to know me...then Im just quiet” [*sic*].

Interests. The extraverted condition mentioned dance clubbing and photography, whereas the introverted version listed coffee shops and photography.

Activities. Extraverts’ activities entry stated “partying,” but the introverted version specified “chess club.”

Quotations. The extraverts’ version featured the following favorite quotation: “‘The only thing worse than being talked about is NOT being talked about.’—Oscar Wilde.” In the introverts’ condition, the favorite quotation was “‘Solitude and silence teach me to love my brothers for what they are, not for what they say’—Thomas Merton.”

Groups. In the extraverted condition, group memberships included “I am not arrogant, just bubbly,” “Self proclaimed party-animals,” and “If this group hits 1,500 I will streak.” The introverted condition listed the groups “I am not stuck up, I am just shy,” “Self proclaimed wall-flowers,” and “Quiet is the new loud.”

Other-generated wall postings. In terms of statements that appeared to be generated by others, rather than self-generated, wall postings allegedly left by the profile owners’ friends also suggested extraversion or introversion. The valences of these postings, as a set, were either consistent or inconsistent with the profile owners’ self-generated clues, depending on the experimental cell.

To suggest extraversion, one wall posting said, “That was such a blast last night... my friends from home love you!” Another stated, “Hey, call me when you hear where the partyz at...youll hear before I do”; “Hey, me and james are going out to dance at the Dollar. Your going to be there right?” and “sorry i couldnt make it last night your roommate said you were the life of the party as always I assume?” [*sic*]

In the condition intended to suggest introversion, wall postings stated, “missed you last night, your roommate said you stayed in . . . are you ok?” “Hey, me and james are going to Beaners, to chat and study. havent seen you in like 4ever,” “Stop studying and come out with us sometime!!” and “You missed another great party. Come out and play someday?” [*sic*]

Procedure

A research assistant greeted each participant who reported to a research laboratory and ushered him or her individually into a small room containing a computer

with Internet access, a desk, and a chair. Participants completed an informed consent form and were briefly introduced to the study. Assistants inquired whether participants had their own Facebook profiles, and if they did not, they were given the option of completing another study. Only participants with an active Facebook profile participated further.

Participants were instructed that they would be looking at the Facebook profile of another individual who was also in the lab, and after viewing that profile and filling out a questionnaire, they would have a conversation with their partner face to face or via a CMC chat. This instruction was employed because, based on previous research, anticipation of future interaction with a previously unknown partner increases motivation to attend to information about that partner (Kellermann & Reynolds, 1990; Ramirez, 2007; Walther, 1994). To increase the apparent realism of this induction, because individuals can block access to their Facebook profiles from nonfriends or nonnetwork members, participants were then asked to log in to Facebook to allow temporary access to their profiles by the researchers if access was not already permitted. They were further told that the researchers would capture a snapshot of their profile so that it could be shown to their alleged experiment partner in such a way that only the profile content would be displayed but none of the links would be active, to reduce distraction during the study. In fact, there was no other real participant, but the stimulus profiles were presented to participants as if they depicted another real person, and the links appearing on the profiles did not respond to pointer clicking.

After giving these instructions, researchers left the room for several minutes—enough time that it seemed plausible that the participant's Facebook profile could be captured—and returned to open a Web browser with which to view the ostensible partner. In actuality, the Web browser linked to a page with a built-in randomizing script (Burton & Walther, 2001), which transparently redirected the browser to one of eight stimulus Facebook profile mock-ups embedded within a frame-style Web page, with a link to the dependent measures questionnaire in the lower frame. Participants were instructed to view the profile as long as they required to form a substantial impression of their partner. Once they had finished viewing the profile, they proceeded to the online questionnaire.

Measures

The dependent variable was presented as an online questionnaire. A subscale of the NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1991, 1992) that was adapted for observers (Hancock & Dunham, 2001) provided scales for the dependent measure of extraversion. Scales included items such as “This person likes to have a lot of people around,” and “This person really enjoys talking to people.” Participants responded to these items on five-interval Likert-type scales, which ranged from strongly disagree to strongly agree. The Cronbach's *alpha* score showed acceptable reliability, $\alpha = .88$.

On completion of the dependent measure, a research assistant thoroughly debriefed participants as to the nature of the study's purpose and its deceptive manipulation. Once the assistants obtained written verification of participants' complete understanding of these steps, they credited participants for their participation and asked them not to discuss the specific activities of the experiment with others for several weeks.

Results

Initial analyses examined whether the sex of the participant or the ostensible sex of the Facebook profile owner (reflected in the male and female version of Chris Smith) affected results. A 2 (sex of subject) \times 2 (sex of target) \times 2 (target self-statements: extraversion vs. introversion) \times 2 (friend statements: extraversion vs. introversion) analysis of variance on extraversion revealed no main effects of either sex variable or interactions with the hypothesized message factors. Both sex factors were dropped from further analysis.

Because of the focused, directional predictions, hypotheses were tested using two separate a priori contrast analyses (Rosenthal, Rosnow, & Rubin, 2000). Contrast weights for the warranting hypothesis reflected the prediction that messages emanating from people other than the Facebook profile owner (i.e., friends' wall postings) would drive perceptions of the target's extraversion, regardless of what the target appeared to say about him or her. For the two cells in which friends' messages suggested greater extraversion (in one of which the profile owner described the self as extraverted, and in one of which he or she self-described as introverted), weights of +1 were assigned; in both cells where friends' messages suggested introversion, -1 was assigned. (See Table 1 for all contrast weights.) The test was significant, $t(112) = 5.28$, $p < .001$, $r_{\text{effect size}} = .27$.² Descriptive statistics appear in Table 2. Friends' comments had a predicted warranting effect on ratings. That is, when a target described the self as shy, friends' comments to the contrary increased perceived extraversion; when a target claimed outgoingness, friends' comments to the contrary lowered extraversion ratings. The gross pattern of the means, however, suggested that friends' comments were not the only causal influence on perceptions.

Hypothesis 2 reflected a potential negativity effect on perceptions of extraversion. The hypothesis was tested using -1 weights for all three of the cells in which introverted comments had appeared when they were expressed only by the target but not the friends, or when they were expressed by the friends but not the target, or when they appeared to come from both the target and the friends. A weight of +3 was assigned for the cell in which all comments suggested outgoingness.³ This test was also significant, $t(112) = 10.75$, $p < .001$, $r_{\text{effect size}} = .54$. Both negativity and warranting appear to have affected perceptions of Facebook profilers' extraversion.

Table 1
Contrast Weights for Analyses of Warranting, Negativity,
and Additivity Effects

Self-Claim	Negative	Negative	Positive	Positive
Friend's Statements	Negative	Positive	Negative	Positive
Warranting	-1	+1	-1	+1
Negativity	-1	-1	-1	+3
Additivity	-1	0	0	+1

Table 2
Means, Standard Deviations, and Sample Sizes For Perceived
Extraversion Because of Self-Described and
Other-Described Outgoingness

Friends' Statements	Self-Statements					
	Introverted			Extraverted		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Introverted	2.22	.51	26	3.99	.58	31
Extraverted	2.98	.66	29	4.27	.28	30

The patterns of the means (see Table 2) further suggested a progression such that when self and others described the target as introverted, the target was rated lowest (i.e., most introverted). When an introverted self-description was accompanied by friends' outgoingness messages, the score was greater, followed by self-outgoing and others-shy, and finally, self-described outgoing and friends suggesting outgoing. The trend was examined using a post hoc Newman Keuls test, which demonstrated that each cell was significantly different than each other. The pattern may be described as reflecting an additive effect such that two negatives are lower than a negative plus a positive, which are, in turn, lower than two positives. A post hoc contrast test (see Table 1 for weights) confirmed this description of the data, $t(112) = 14.49, p < .001, r_{\text{effect size}} = .86$. Although unhypothesized, this pattern provides a further, plausible explanation of extraversion perceptions. Moreover, it demonstrates that target's own apparent assertions about their extraversion exerted a significant influence on observers' judgments, contrasting the warranting hypothesis, in addition to the influence on observers because of others' statements, which the warranting hypothesis suggested.

The significance tests indicate that each pattern—warranting, negativity, and additivity—describes the data meaningfully.

Discussion

This experiment showed some evidence for the effects of other-generated information on the personality impressions observers made when exposed to an online self-presentation, consistent with the warranting hypothesis. Clearly, other hypothetical effects also affected observers' judgments. Overall, with respect to inferences about a target's extraversion, the effect of external information appeared to have a significant but limited role in a complex impression-formation process, tempering but not altogether overcoming self-generated information, negativity effects, and the simple addition and averaging of favorable and unfavorable comments. Little if any research has examined multiple explanations of extraversion judgments as this test has done, and we cannot rule out whether there have always been multiple causes of extraversion attributions in dynamic interactions, let alone in static information environments. Although one study found that observers can make extraversion judgments from personal Web pages (Vazire & Gosling, 2004), more recent research finds that extraversion judgments are less sensitive to variations in Facebook pages, compared to attractiveness judgments (Tong, Van Der Heide, Langwell, & Walther, 2008). It may be that extraversion is more reliably judged from thin slices of interactive behavior than from static sources. In Internet environments, extraversion may be clued by observable dynamic behavior, such as discussion board participants posting messages often (Smith, 1999) and e-mailers replying quickly (Walther & Tidwell, 2002, or reciprocating messages (Wellman & Gulia, 1999), regardless of claims about extraversion made by self or others.

One potential concern with this study is the lack of a manipulation check to assure that both profile owners' or friends' statements, in isolation, stimulated the intended perceptions about a target's extraversion. This concern is largely mitigated by the significant additivity effect: The more there were sources suggesting introversion, the more introverted the ratings. Given that observers therefore responded to the extraversion cues, the test of the warranting hypothesis does not seem handicapped. A similar concern relates to whether perceptions of introversion actually connoted more negative evaluations. This concern may be addressed by the significant negativity effect: Whenever introversion was depicted in self- or friends' statements, it resulted in more introverted assessments, in a manner reflecting the negativity predictions. It is not clear whether cues to introversion beat out extraversion in the manner that negativity seems to beat positivity; the literature, to our knowledge, does not suggest such any such effect. If the negativity effect alone was supported, this issue would deserve further scrutiny.

Although the results showed tenuous support for warranting, a warranting effect should be more pronounced when there is a discrepancy between self-generated and externally generated information. Warranting data should be most useful to observers when discrepancies are great and where they are suspected to result from distortion or deception emanating from a target's motivation to appear more desirable. Conflicting information about extraversion may not be maximally discrepant, or be perceived as reflecting much manipulation on the part of a target. Additionally, observers may see no reason for profile owners to deceive them with regard to their extraversion because they see little benefit from presenting oneself as extraverted as opposed to introverted. Although there was an effect for the negativity hypothesis, extraversion may not be a self-presentation characteristic that Internet users expect others to distort. Because these characteristics may be more strongly related to physical appearance, a second study was conducted examining the warranting, negativity, and additivity hypotheses with regard to judgments of physical attractiveness.

Study 2: Physical Attractiveness

Users' physical appearance is another aspect of online self-presentation that raises numerous issues. According to Toma et al. (2008), users of online dating systems self-report less accuracy in the description of physical appearance—frequently distorting their online presentation of weight and height—than any other category of self-presentation. Despite this tendency, posting a photo online raises the honesty with which other information is reported, suggesting that the presence of photos raises candor. Physical attractiveness is associated with a variety of positive personality traits (Dion, 1981, 1986; Dion, Berscheid, & Walster, 1972; see meta-analysis by Eagly, Ashmore, Makhijani, & Longo, 1991) including altruism, safety, sensitivity, sincerity, warmth, kindness, and so forth. Even though Facebook profiles usually display a large photo of the profile owner, judgments of these targets' physical attractiveness can be significantly affected by contextual factors such as others' photos and statements (Walther et al., 2008). For these reasons, a second study was conducted focusing on the perceived physical attractiveness of the target because of self-statements and friends' statements on Facebook. The warranting and negativity hypotheses were replicated, and a new research question was examined: Do discrepancies between targets' and friends' statements trigger judgments of greater dishonesty?

Method

Participants ($N = 125$; 68 male and 57 female) were undergraduate students from a large university in Midwestern United States who volunteered to participate in the

study in exchange for extra course credit or partial fulfillment of a class research requirement. The average age of participants was 20.13 ($SD = 2.96$) years. The sample identified their racial and ethnic background to be 77.4% Caucasian, 10.5% African American, 5.6% Asian/Pacific Islander, 4.0% Hispanic, and 2.4% were unspecified.

Study 2 used the same general protocols as Study 1. Participants reported to a lab where a research assistant led participants to view a Facebook profile of an individual with whom they believed they would soon interact. In fact, the Facebook profile a participant observed was one of eight randomly selected mock-ups generated by the 2 (self-statements) \times 2 (friend statements) \times 2 (male and female profile photo) design.

Stimuli

The mock-ups depicted the same name and neutrally-attractive photographs of a male or female profile owner, home network, number of friends, and the name Chris Smith as had been employed in Study 1. In this case, the apparent self-generated statements by Facebook profile-owners', and other-generated friends' wall postings reflected variations in assessments of the profile owners' physical attractiveness. Elements of the profile owners' self-statements included the following:

"About me." The attractive version of these self-descriptions included "Just hangin out...getting better looking everyday." The unattractive version stated, "I like to hang out online, and I'm trying my best to lose a few pounds."

Interests. The attractive version listed interests as "dance clubbing, photography," whereas the unattractive version reflected only "photography."

Activities. Dance team was the activity in the attractive condition, but for the unattractive condition, the activity was "hanging out online."

Quotations. The attractive version featured this quotation: "All you have to do in life is go out with your friends, party hard, and look twice as good as the bitch standing next to you.—Paris Hilton." The unattractive version quoted "Judge not according to the appearance—John 7:24."

Groups. Most of the names of Facebook groups to which the profile owners ostensibly belonged were copied verbatim from group names appearing on actual Facebook profiles. For the attractive condition, they included "Bitch, I'm not conceited, I'm just gorgeous. I love to look at myself in mirrors. They almost kicked me off Facebook because I was making other people look bad." For the unattractive condition, groups included "Ugly ducklings. I hate mirrors. Heavy is the new hot."

Other-generated wall postings. As in Study 1, researchers populated the Facebook mock-ups with messages that observers would attribute to the profile-owners' friends, by modifying actual Facebook wall postings, in most cases, and inserting them on the profiles. One set of statements were crafted to suggest that the profile owner was physically attractive, and the other set to suggest the owner was physically unattractive.

Attractive statements included "If only I was as hot as you," "Haven't seen you since that great party last weekend...my friends from home thought you were hottt!," "I was looking at the pictures caitlin posted when it hit me, youre much much more attractive than I am. like, i always knew you were more attractive but looking at pictures of you and me together...damn," and "Hey gorgeous (or "Hey mister"), you looked gr8 last night, youre bringing sexy back" [*sic*]. In the unattractive condition friends' wall postings included "have you lost weight? Good job keep workin at it!" "dont pay attention to those jerks at the bar last night, what matters is on the inside!" "Hey, chris, much better picture of you...the last one wasnt all that flattering," and "Im so sorry things didnt work out with that blind date you went on, who knew she (or "he") would turn out to be so shallow" [*sic*]. After participants viewed the stimuli, they clicked on a link at the bottom of the Web page and completed the following measures on the next Web page.

Measures

Physical attractiveness. To measure participants' perceptions of the targets' physical attractiveness, measures included McCroskey and McCain's (1974) six-item, five-interval Likert-type scales for physical attractiveness, which included "This person is somewhat ugly" (reverse coded) and "This person is very attractive physically." Cronbach's *alpha* reliability was .90.

Honesty. To measure participants' perceptions of the target's honesty, researchers modified two items from Burgoon, Buller, Dillman, and Walther's (1995) dyadic measure of perceived deceit (e.g., "This person is sincere in his or her responses to others," and "This person is very open and honest with others") with three additional, original items (e.g., "This person believes that honesty is not always the best policy" (reverse scored), and "If this person says something, you can believe it's true." The Cronbach's *alpha* reliability for the measure was .78. After completing dependent measures, the subjects were thoroughly debriefed, thanked for their time, credited, and dismissed with the request that they would not divulge the specific activities of the experiment with others for some time.

Manipulation Check

To determine that the stimulus statements induced the intended physical attractiveness perceptions in the absence of warranting effects, a pretest was administered to

undergraduates ($N = 28$) from the same population as the main study participants. Participants were asked to evaluate an unnamed person on the physical attractiveness measure (described above) after reading a set of descriptive statements about the person. The statements were third-person versions of the attractive or unattractive stimulus sets, presented without the appearance of being Facebook comments (e.g., “This person’s activities include hanging out online,” or “This person is just hanging out and getting better looking every day.”) They were presented as third-person descriptions to remove the potential effect of source on observers’ impressions. Participants each rated two targets (reflecting the attractive and unattractive statements). Order of presentation was counterbalanced, and no significant differences because of presentation order affected ratings of the intended attractive targets, $t(26) = -0.11, p = .91$, unattractive targets, $t(26) = 1.57, p = .13$.

A paired-samples t test showed that the statements produced differences in attractiveness perceptions as planned. The intended attractiveness statements generated significantly greater physical attractiveness scores, $M = 3.48, SD = 0.64$, than did the unattractiveness statements, $M = 2.49, SD = 0.56, t(27) = 5.32, p < .001, \eta^2 = .51$.

Results

Preliminary analyses of variance ruled out the main or interaction effects of subject sex, profile owner sex, or interaction effects between these terms and the message conditions on attractiveness and honesty ratings. Hypothesis tests proceeded using a priori contrasts (Rosenthal et al., 2000) comprised to test the warranting, negativity, and additivity hypotheses for the combination of self-statements and friend statements on attractiveness. The warranting test employed contrast weights of +1 for cases in which the friends’ wall postings suggested physical attractiveness (both when the target self-described as unattractive or as attractive), and weights of -1 for both conditions in which the wall postings suggested unattractiveness. For the dependent variable, observers’ perceived physical attractiveness, the contrast test was significant, $t(122) = 1.69, p = .047$ (one-tailed), $r_{\text{effect size}} = .15$. The negativity effect was not significant, $t(122) = .113, p = .455$ (one-tailed). There was no evidence of an additivity effect, $t(122) = .475, p = .318$ (one-tailed). Thus, in conveying physical attractiveness, the statements of friends overrode the statements made by the targets themselves, consistent with the warranting hypothesis. (See Table 3 for descriptive statistics).

Further analyses investigated the research question, do discrepancies between a target’s and his or her friends’ statements trigger judgments of greater dishonesty? A contrast analysis was generated to assess whether honesty ratings were greater when the target and the friends’ comments were consistent (either both suggesting attractiveness or both suggesting unattractiveness) than when they were inconsistent. The test was not significant, $t(122) = .51, p = .308$ (one-tailed). A post hoc

Table 3
Means, Standard Deviations, and Sample Sizes For
Perceived Physical Attractiveness Because of Self-Described
and Other-Described Attractiveness

	Self-Statements					
	Attractive			Unattractive		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Friends' Statements						
Attractive	3.30	.77	33	3.47	.54	35
Unattractive	3.16	.78	29	3.22	.41	29

Neuman Kuels analysis revealed that the two conditions in which the target appeared to claim he or she was attractive (with friends agreeing, $M = 2.87$, $SD = .59$, or with friends disagreeing, $M = 2.98$, $SD = .63$) were perceived to be less honest than when the profile owner claimed to be unattractive (with friends agreeing, $M = 3.60$, $SD = .39$, or with friends disagreeing, $M = 3.40$, $SD = .51$), with no apparent effect of what the friends suggested.

Discussion

Two experiments examined the relative impact of self-generated versus friend-generated statements about a target on the impressions receivers made by examining Facebook profiles and the wall postings on them. The underlying dynamic, the warranting effect, was proposed by Walther and Parks (2002) to predict and explain the way individuals make and modify impressions of others based in different types of information via the Internet. The warranting principle predicts that users attach greater credence to information that is immune to a target's manipulation—in this case, friends' wall postings—compared to targets' self-descriptions. The results of the first experiment examining attributions of introversion and extraversion provided tenuous support for the warranting effect but also supported explanations for other heuristics such as negativity and additivity. The results of Study 2, on physical attractiveness, offer much less ambiguous support for the warranting hypothesis than did Study 1. The same general experimental procedure produced results that definitively supported warranting, not negativity or additivity.

One implication of these contrasting findings is that there may be domains of impressions for which warranting is heuristically useful and others where it is not. There are many possible dimensions that could prompt such differences, including personality characteristics versus physical characteristics, or behaviorally dynamic

versus relatively static information. It is not clear why internal judgments might require more complex heuristics than appearance. There is a considerable literature on impression formation and social cognition showing that very simple cue variations lead to very consistent personality attributions in other, noninteractive settings. Perhaps it is not the nature of the cues, as it is the level of insight accorded to friends by perceivers in this research: It may be questionable whether one's friends know one's temperament better than oneself. In the first study, it could be that an introverted individual could nevertheless go out socially and that an extravert secludes himself for some period. These temporary variations are not unreasonable even if they are unusual. With respect to socially based reflections of attractiveness, however, beauty may be in the eyes of the beholder, and friends reflect beholders. What inferences are "rightfully" one's own and what others' deserves further research in developing the boundaries and properties of the warranting concept.

One prospective boundary on warranting that these studies suggest has to do with the social desirability of the impression domain. Warranting processes may be particularly potent for impressions with strong desirability value. In the second study concerning physical attractiveness information, participants preferred information with greater warranting value in forming impressions about fellow participants. However, in the first study that focused on introversion and extraversion, results did not support a warranting explanation exclusively. Physical attractiveness has a clear social desirability component. Although extreme introversion has some disadvantageous associations, moderate introversion is not clearly undesirable. Perceivers may be particularly inspired to seek corroboration for personal characteristics that are more socially desirable; if information self-presented by an individual is perceived not to be particularly beneficial to that individual, the warranting principle may not as strongly apply. Furthermore, the social desirability at stake in the impression domain may be suspected to prompt deception. When information is perceived to be particularly beneficial to individuals' impressions, their own words may be trusted less, as our results on perceived honesty illustrate, compared to external sources. The interactions of warranting with social desirability or perceived suspicion deserve further investigation.

The honesty results suggest that self-claims about attractiveness on Facebook are dismissed as insincere, whereas self-deprecation (claiming that one is unattractive, when others think differently) and humility (acknowledging that one is unattractive, as others also perceive) raise trust. It is not the combination of statements, however, that appear to drive (dis)honesty judgments. Rather, it appears that one's own claims of attractiveness are suspect on Facebook. In terms of attractiveness judgments, on the other hand, one's friends' comments carry the weight.

These studies offer direct tests of one new concept related to online communication, but they reflect paradigmatic possibilities for approaching a new and extensive realm of online interaction: the technologies described in contemporary media as Web 2.0 (Levy, 2005). These communication technologies consist of participative or collaborative WWW sites, on which some users display information and/or media,

and other people can append links, media responses, or verbal comments of their own. Specific instances include social networking sites such as Facebook and others, photo sharing and commenting galleries, video exchange systems, location marking and commenting systems, blogs, wikis, as well as reputation systems embedded with product brokerage and auction sites (Xia, Huang, Duan, & Whinston, 2007). One approach we believe will be fruitful in understanding this context will be to ask what the alternative interpersonal and social systems of influence are that affect different kinds of messages that these systems more-or-less broadcast.

In the present studies, we explored whether apparent friends' comments override an individual's apparent self-descriptions. Future research may explore whether friends' comments affect impressions of products the way they affect impressions of people. Whose friends? Are apparent peers sufficient? Edwards, Edwards, Qing, and Wahl (2007) experimentally investigated how seeing computer-mediated word-of-mouth comments on RateMyProfessors.com affected perceptions of a videotaped lecture presented immediately afterward; comments affected students' perceptions of the teacher and their motivation to learn. Elsewhere, research demonstrates that the presentation of other buyers' feedback about an eBay seller has significant effects on the bid prices a seller garners (Resnick, Zeckhauser, Swanson, & Lockwood, 2006). David, Cappella, and Fishbein (2006) examined how adolescents' chat room discussions affected the impact of public service announcements they watched online, although chat room dynamics were not a focus of that research. Wang, Walther, Pingree, and Hawkins (2008) explored online support groups and Web sites and found that readers' perceived similarity to the source drove attitude change about a health topic more strongly than credibility, in both settings. The implications for the influence of such systems on public opinion will deserve investigation. Whereas research at points in the past has studied mass and interpersonal communication dynamics sequentially (Atkin, 1972; Chaffee & Mutz, 1988), it is time to study them as they appear simultaneously: Both may appear on-screen at once, or alternatives—even a discussion—may be only a click away. Warranting is one approach to questions about parallel sources of influence, and more work of such a nature is required to understand the alternative sources that new communication technology present us.

Notes

1. The authors are grateful to Stephanie Tom Tong, Sang-Yeon Kim, Jaime Tunge, and Mitch Louch for help with data collection.

2. The coefficient $r_{\text{effect size}}$ represents the partial correlation of the contrast weights and observed scores as a proportion of the correlation between the predicted and observed pattern of means, according to Rosenthal, Rosnow, and Rubin (2000), who recommend this analysis when there are more than two conditions in a contrast-analytic comparison. It is a more conservative estimate than r_{contrast} (Furr, 2004), which others suggest to be useful in comparing effects from several contrast tests.

3. The contrast tests for H1 and H2, together, do not achieve orthogonal tests, which would be preferable. However, the desirability of orthogonal contrasts is outweighed in the case of a priori, theoretically derived patterns (Furr, 2004; Rosenthal & Rosnow, 1985).

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