Counting on Friends:
Cues to Perceived Trustworthiness in Facebook Profiles

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Abstract

Personal profiles on social network sites have become an important tool for social evaluation   that is, assessing pro file owners' characteristics (e.g., personality traits, narcis sism, physical and social attractiveness). The present study is one of the first to examine how users' *trustworthiness* is evaluated by naïve observers based on information con tained in Facebook profiles, or profile cues. Drawing on un certainty reduction theory, warranting theory, and hardwired perceptions of facial displays, we propose a framework that identifies cues associated with trustworthiness in Facebook profiles. Results show that six profile cues (number of friends, number of tagged photographs, number of "about me" categories filled out, number of comments and "likes" received from friends, and smiling profile photographs) ex plained about a third of the variance in Facebook users' per ceived trustworthiness. Number of friends had a curvilinear, U shaped effect on trustworthiness perceptions, with an in flection point at about 500 friends. That is, trustworthiness decreased as number of friends increased up to 500, and then trustworthiness increased as number of friends in creased beyond 500. Theoretical and design implications of the findings are discussed.

Introduction

Personal profiles on social network sites, such as Face-book, are rich repositories of personal information. Profile owners disclose their activities, hobbies, and interests in the "about me" section; present their physical selves through photographs; post revelations about their everyday thoughts via "status updates;" and usually allow their friends within the system to contribute comments and "likes" (i.e., one-click indicators of support and encour-agement) to their profiles (Ellison and boyd 2013). This in-formation is actively scrutinized by others, a phenomenon labeled 'social surveillance' (Joinson 2008), and used to form impressions of the profile owners (Gosling, Gaddis, and Vazire 2007). Indeed, a growing body of research demonstrates that profile information is used by observers to evaluate profile owners' characteristics, such as narcis-

sism (Buffardi and Campbell 2008; Mehdizadeh 2010; Ong et al. 2011), personality traits (Gosling et al. 2007; Hall, Pennington, and Lueders 2013), physical and social attractiveness (Walther et al. 2008), and popularity (Utz 2010).

This line of research has been particularly interested in how information contained in the profile, or profile cues, shapes interpersonal impressions. On what cues do observ-ers rely to evaluate profile owners' characteristics? For in-stance, research shows that extroversion is gauged from cues such as the number of friends, unique number of friend comments, and "likes" (Hall, Pennington, and Lueders 2013). Similarly, narcissism is extracted from cues such as the attractiveness of the main profile photograph and the quantity of social information captured on the pro-file wall (Buffardi and Campbell 2008).

The goal of the present study is to extend this literature by examining how profile owners' *trustworthiness* is eval-uated based on profile cues. Trustworthiness is an essential interpersonal judgment, with important consequences for relationship development. Perceived trustworthiness is used to determine whether to approach or avoid others, disclose information to them, or pursue personal or profes-sional relationships with them (Rotter 1980). Extant re-search has investigated the dynamics of trust formation in several online environments, such as instant messaging (Zheng et al. 2002), video-conferencing (Bos et al. 2002), online dating (Toma 2010) and Twitter (Morris et al. 2012), but less so on Facebook. When it comes to Face-book, one study has found that naïve observers demon-strate high ability to distinguish real Facebook profiles from Sybil profiles (i.e., fake accounts used to spread spam and malware) (Wang et al. 2013). However, to the best of our knowledge, no research to date has examined the pro-file cues on which observers rely to gauge real individuals' trustworthiness based on their Facebook profiles.

Such an examination has important theoretical, practical, and design implications. One of the vital goals of theories of impression formation is to understand how people pro-cess available information to make sense of others (Gos-ling, Augustine, and Vazire 2011). Social network sites such as Facebook provide access to previously unavailable

or difficult to obtain personal information, collated into one centralized, easily accessible location. This information is presented in multiple modalities (i.e., textual and photographic), is generated by multiple sources (i.e., the self-presenter and friends), and is often copious in quantity. Before the advent of Facebook, it would have been extremely difficult to observe, in an unobtrusive manner, how a person talks to a wide range of her friends, how much attention she receives from her social circle, and how much she discloses about her activities, preferences, and daily musings. By the same token, it would have been impossible to review this information at leisure, going back and forth between pages of written documentation. By virtue of being an unprecedentedly rich and diverse container of recorded information, Facebook profiles can provide new theoretical insights into how people utilize information for evaluating others' trustworthiness.

Research shows that trustworthiness judgments tend to be made in the beginning stages of relationships, when information is scarce and uncertainty is high (Flanagin 2007; Larrimore et al. 2011). For this reason, we focus in this study on how *unacquainted observers* (i.e., strangers) assess Facebook profile owners' trustworthiness (see Buffardi and Campbell 2008; Gosling, Gaddis, and Vazire 2007; Hall, Pennington, and Lueders 2013, for a similar approach). This focus has practical relevance. Although Facebook users increasingly use privacy settings to restrict outsiders' access to their profiles (Liu et al. 2011), they frequently friend strangers or de facto strangers (e.g., friends of friends, people they only met once). A recent survey shows that the largest category of Facebook friends, accounting for about a third of all friends, is that of de facto strangers. Furthermore, 4% of all Facebook friends are complete strangers (Manago, Taylor, and Greenfield 2012). Thus, strangers do have the opportunity to ascertain others' trustworthiness based on Facebook profiles in everyday practice.

In particular, Facebook profiles can be a source of information about the profile owners' trustworthiness in contexts where trustworthiness is especially important, such as friendship initiation, roommate identification, and job applicant assessment. Research shows that college underclassmen, who likely have limited social connections at their new campus, friend strangers from the college network in order to strike friendships. Based on Facebook interaction, they then decide whether to migrate the relationship to the face-to-face realm (Ellison, Steinfield, and Lampe 2007). Although no empirical research yet exists on this topic, the popular media has reported on trends for incoming college freshmen to use Facebook to identify future roommates at their university (Farrell 2006; Lewin 2006). Finally, employers sometimes request access to Facebook users' profiles in order to determine their suitability for the job (Smith and Kidder 2010). In all these applied contexts, it is pivotal to understand how people utilize Fa-

cebook profile information to establish the trustworthiness of potential relationship partners.

Finally, from a design point of view, understanding how people evaluate the trustworthiness of online communicators, and subsequently designing online platforms that foster mutual trust, is a recognized challenge in computer-mediated communication and computer-supported cooperative work (e.g., Bos et al. 2002; Zheng et al. 2002). The present examination can contribute insights into the self-presentational elements that are likely to foster trust, and may therefore be incorporated in designing platforms for collaboration.

In what follows, we present a theoretical framework for identifying profile cues that are used when evaluating Facebook users' trustworthiness. We draw on theories from communication and social psychology to argue that the source, quantity, and hardwired connotations of certain profile cues should affect profile owners' perceived trustworthiness.

Facebook Profile Cues as Signals

Self-presentation in Facebook profiles is distinctive because it represents an amalgamation of self- and friend-generated information, is conveyed through visual and textual modalities, and is recorded for easy perusal. It is also notable that Facebook self-presentation is governed by an array of technological features that significantly shape what gets presented. Specifically, *asynchronicity* (i.e., unlimited composition time), allows users time to ponder their claims and to compose them in a careful fashion. *Editability* allows them to revise self-presentational statements, by altering or deleting them (Walther and Parks 2002). *The presence of an audience* motivates self-presenters to construct flattering and desirable profiles (Bernstein et al. 2013; Litt 2012). Together, these features work in tandem to produce profiles that are carefully managed and project a flattering image of the profile owner (Toma, 2013; Toma and Hancock 2013).

Given the high degree of control that Facebook self-presenters have over their claims, observers are challenged to disentangle truth from embellishment and outright falsehood, in their efforts to construct an accurate mental model of the Facebook self-presenter. For this reason, observers do not necessarily take Facebook profile content at face value, but approach it as *signals* to what the identity of the profile owner might be. Observers then decode these signals by making inferences about their meaning (Lampe, Ellison, and Steinfield 2007).

Following this reasoning, we also argue that certain profile cues are viewed by observers as signals to profile owner's trustworthiness. What cues should observers attend to when making trustworthiness assessments, out of the plethora of personal information available in Facebook profiles, and why? We argue that not all cues are created equal. Rather, certain cues should have greater signaling

value by virtue of their source, amount, and hardwired connotations.

In a nutshell, the *source* of Facebook cues (self- or friend-generated) should be a primary consideration in assessments of trustworthiness. Friend-generated cues provide information about how the self-presenter is viewed and accepted socially, a signal of trustworthiness. Moreover, friend-generated cues are less likely to be manipulated by the self-presenter, and hence should be perceived as more credible. Self-generated cues should signal trustworthiness when there is a greater *amount* of self-disclosure, because this allows for uncertainty about the self-presenter to be reduced. Finally, smiling facial displays of the self-presenters, via photographs, should enhance trustworthiness because of *hardwired associations* between smiling and cooperativeness and friendliness. We elaborate on these propositions below.

Friend-generated Cues

Friends have the ability to contribute various pieces of information to the Facebook profile, such as photographs, comments, "likes," and links to interesting pieces of information (e.g., news articles, videos). Several of these cues should serve as important signals of trustworthiness, because they indicate the extent to which the profile owner is liked, approved of, supported, and socially integrated. Specifically, "likes" are explicit signals or endorsement and liking. The number of comments posted by friends on the Facebook wall signals the extent to which the profile owner is attracting social attention, feedback, and support. Finally, the total number of friends accrued on Facebook indicates the profile owner's sociability and popularity. One study found that Facebook profile owners with more friends were judged as more popular and socially attractive than those with fewer friends (Utz 2010). Similarly, in face-to-face settings, individuals who have more friends are judged as more kind and trustworthy (Parkhurst and Hopmeyer 1998).

However, the total number of friends may not have a straightforward positive relationship with perceived trustworthiness. One study finds a curvilinear relationship between number of friends and positive social judgments (i.e., extraversion and attractiveness), with number of friends positively associated with desirable evaluations up to a point, and then negatively associated with them (Tong et al. 2008). In other words, having more friends initially leads to positive social perceptions, but having too many friends leads to negative perceptions. The reason for this shift could be that it is impossible to genuinely maintain extremely large numbers of social relationships. Therefore, accumulating too many friends may signal a propensity for superficial connections, emotional detachment, and a desire to show off. For this reason, the phenomenon of accruing too many friends is sometimes referred to as "friendship whoring" (Donath and boyd 2004, Tong et al. 2008).

Due to the positive connotations of having friends, but the negative connotations of having too many friends, we also postulate that more friends should increase perceived trustworthiness up to a point, and then decrease it. All in all, we postulate that:

H1: There is a positive association between number of "likes" and number of comments received from friends and perceived trustworthiness.

H2: There is a curvilinear, inverse U-shaped relationship between number of friends and perceived trustworthiness.

Self-generated Cues

Self-generated cues refer to traditional self-presentational elements, in which the self-presenter herself divulges personal information. On Facebook, this is primarily accomplished through photographs, status updates, and a detailed "about me" section. When it comes to self-generated information, we argue that the *amount* of disclosure is pivotal in engendering trustworthiness, because it signals familiarity and openness.

This idea lies at the heart of Uncertainty Reduction Theory (URT) (Berger and Calabrese 1975). URT proposes that individuals find uncertainty to be an aversive, unpleasant state, because it puts them in the vulnerable and risky situation of not knowing how to approach a person or event. Therefore, individuals constantly seek to reduce uncertainty. URT predicts that when uncertainty is successfully reduced, individuals experience greater affiliation (i.e., liking, trust) towards the new person or situation.

Support for URT has emerged in online contexts where communicators evaluate strangers. On peer-to-peer lending websites, lengthier loan requests were more likely to be funded, an indicator that loaners trusted loan recipients to repay the debt (Larrimore et al. 2011). On EBay, products with longer descriptions received more bids and were sold at higher prices, suggesting that decreased uncertainty resulted in more positive evaluations of the products and sellers (Flanagin 2007). Most germane to this study, online daters who had written longer "about me" sections were perceived as more trustworthy by unacquainted observers (Toma and Hancock 2012).

Following URT, Facebook self-presenters who disclose a greater quantity of information on dimensions relevant to trustworthiness should be perceived as more trustworthy by unacquainted observers, as this increased quantity of information signals openness and predictability. We argue that there are three sets of self-generated Facebook cues that provide meaningful information about profile owners' trustworthiness: the "about me" section, status updates, and photographs.

First, a detailed "about me" section straightforwardly reveals the profile owner's identity. By design, Facebook allows users to select which categories of information they wish to provide about themselves (e.g., "interests," "books," "movies,"), rather than asking them to write

open-ended paragraphs (as is the case on online dating sites, for instance). Previous work shows that the number of such categories that are populated with information, regardless of how much information is provided for each, is a strong predictor of relationship formation on the site (Lampe, Ellison, and Steinfield 2006) and therefore is a particularly telling cue in interpersonal processes. Second, status updates offer insight into profile owners' everyday thoughts and emotional states and hence should be meaningful signals of openness. Finally, photographs provide an in-depth view into profile owners' lives, as they often illustrate their activities and interests, and also depict their friends and family. Hence:

H3: The number of photographs, status updates, and "about me" categories contained in the Facebook profile are positively associated with perceived trustworthiness.

One issue to consider is whether friend- or self-generated cues are more influential in shaping perceptions of the profile owners' trustworthiness. As mentioned earlier, Facebook self-presenters have a motive to create desirable images, which is why their own claims may be met with skepticism from observers. Instead, observers may rely more on friends' statements, as these are less likely to be manipulated by the self-presenter and are therefore more credible. This is the key idea of warranting theory (Walther and Parks 2002; Walther et al. 2009), which argues that communicators are concerned with the accuracy of online claims, because of the ease with which deception can be implemented online. Therefore, as they form impressions, they place great emphasis on information contributed by others, as such information is less likely to be censored and manipulated by the self-presenter.

Support for this theory has emerged in several online environments. On Facebook, friends' comments were given greater credence than self-generated comments when the two were in contradiction (Walther et al. 2009). When considering a range of online media, such as email, IM, and Facebook, the more acquaintance warrants the medium possessed (i.e., information contributed by one's social network), the more honest the messages exchanged in that medium were (Warkentin et al. 2009). Hence, we predict that friend-generated cues are more potent in shaping trustworthiness evaluations than self-generated cues:

H4: Friend-generated cues explain more variance in trustworthiness perceptions than self-generated cues.

Hardwired Facial Cues

One final cue to consider is profile owners' physical appearance as depicted in the main profile photograph. When it comes to trustworthiness, one aspect of physical appearance is particularly evocative: smiling. Indeed, research shows that humans may be evolutionarily hardwired to respond positively to smiling, a cue that signals warmth and approachability (Mehu, Little, and Dunbar 2008). Smiling has been shown to generate positive interpersonal impres-

sions, such as enhanced attractiveness, cooperativeness, and trustworthiness (Scharlemann et al. 2001). Interestingly, the hardwired associations between smiling and positive interpersonal impressions occur automatically, without much conscious thought. That is, individuals often do not realize how much they are influenced by a smile.

In light of this evidence, we propose that including a smiling main profile photograph should elicit greater perceptions of trustworthiness in Facebook profiles:

H5: Facebook profiles that depict the self-presenter as smiling in the main profile photograph will be judged as more trustworthy than those that depict the self-presenter as not smiling.

Method

Two categories of participants were included in this study: profile owners who provided access to their Facebook profiles, and judges who rated the trustworthiness of these profiles.

Profile owners were 199 undergraduates at the University of Wisconsin-Madison (77.4% women; age $M = 20.36$, $SD = 1.92$; 78.1% White, 10.7% Asian, 5.6% Hispanic, 2.3% Black), who provided access to their profiles by friending the research team. We then captured each profile using Jing, an Internet browser plugin that creates a video of the information displayed on the computer screen. Since Facebook profiles contain multiple portions (e.g., "about me" section, wall, photographs) connected through hyperlinks, we navigated through each of these portions while the plugin captured a video of them. As a result, Jing allowed us to record the multiple elements of a Facebook profile into one easily accessible document.

Judges ($N = 290$; 74.1% women; age $M = 20.20$, $SD = 1.16$; 77.9% White; 13.8% Asian, 4.1% Hispanic, 1.0% Black) were undergraduate students at the same institution, who were unacquainted with the profile owners. Judges were asked to rate their impressions of the trustworthiness of the Facebook profile owners, based on the videos we had previously recorded. Each judge was assigned ten Facebook profiles through randomization software. The judges were instructed to carefully examine each profile and then rate the perceived trustworthiness of the profile owner. Judges were allowed to take as much time as necessary to complete the task, and to pause and rewind the videos as they deemed fit, in order to absorb all the information they considered necessary for their trustworthiness ratings. Each profile was rated, on average, 14.50 times.

Both profile owners and judges were compensated with extra-credit in their classes.

Dependent Variable

For each profile, judges were asked to consider "your impression of this person based on her/his Facebook profile" along two dimensions: "honest – dishonest" and "trustworthy – untrustworthy." Both dimensions were measured through semantic differentials on a scale from 1 to 7. Judges' ratings on these two dimensions were averaged to create a score for each profile. Further, the two dimensions demonstrated high reliability ($\alpha = 0.91$) and were collapsed into one trustworthiness index. The trustworthiness index was normally distributed.

Independent Variables

Following the hypotheses, we extracted self-generated and friend-generated cues from the profile. It is worth noting that the Facebook wall archives all information posted since the user joined the system. At the time of data collection, Facebook presented the most recent such information on the first page of the wall, with users prompted to open additional pages by clicking on "older posts" if they were interested in going back in time. This study focused solely on the most recent information presented before the "older posts" prompt.

Self-generated cues. First, we captured the total number of categories in the "about me" section (e.g., "activities," "interests," "books") that were populated with information.

Next, we recorded the total number of photographs of the profile owner posted on the profile. While these photographs can be tagged both by the profile owner and his/her friends, profile owners can and do un-tag themselves regularly if they deem the photos undesirable. Due to the high degree of control exercised by profile owners over their photos, we consider them to be a self-generated cue.

Finally, we recorded the total number of status updates posted by the profile owner on the most recent wall page.

Friend-generated cues. The total number of friends accrued by each profile owner was recorded. Acquiring Facebook friends is a transaction between the profile owner and the friends in question. However, a Facebook friend can only be added if that person either initiates the friend request or accepts the request sent by the profile owner. Since friends have a decisive amount of control over whether or not they are added, we consider total number of friends as a friend-generated cue (see also Tong et al. 2008).

Additionally, the total number of "comments," or messages posted by friends in response to the profile owner's status updates, was extracted.

Finally, the total number of "likes" posted by friends on profile owners' status updates was recorded.

Facial cue. We used a dichotomous measure to record whether the profile owner was smiling in her/his main profile photograph.

All the independent variables, with the exception of number of likes and number of comments, were normally distributed. Means and standard errors for all the variables included in the study are displayed in Table 1.

Variable	*M*	*SE*
Trustworthiness index	4.78	0.04
Number of photos	956.13	56.20
Number of "about me" categories	13.91	0.35
Number of status updates	3.24	0.23
Number of friends	688.55	24.68
Number of comments	13.53	0.89
Number of "likes"	11.08	0.94

Table 1. *Means and standard errors for the study's variables.*

Results

To test which Facebook cues were related to perceived trustworthiness (H1, H2, H3, H5), a hierarchical OLS regression model was constructed, with judges' trustworthiness index as the dependent measure, profile owners' gender as a covariate, and self-generated cues, friend-generated cues, and facial cue as independent variables added in separate blocks. All regression assumptions were met (i.e., residuals were normally distributed, were not autocorrelated, and did not display heteroskedasticity). Since quadratic effects produce issues of multicollinearity, the number of friends variable was mean-centered. After mean-centering, multicollinearity no longer occurred in the data, with the variance inflation factors for all independent variables ranging from 1.07 to 1.72.

The model demonstrated a good fit, $F(9, 125) = 7.77$, $p < .001$, and explained a substantial portion of the variance in the dependent measure ($R = .60$, $R^2 = .36$, $R^2_{adj} = .31$). All the predictors reached significance, with the exception of the number of status updates. The numbers of "likes" and comments reached significance after performing a one-tailed test, which is appropriate when testing directional hypotheses (Cohen et al. 2003). However, contrary to predictions, the number of photographs had a negative effect on perceived trustworthiness, with more photographs *decreasing* trustworthiness. Similarly, the number of friends had a curvilinear U-shaped effect (rather than the inverted U-shaped effect predicted), as indicated by the combination of a negative linear effect and a positive quadratic effect (Cohen et al. 2003). That is, perceived trustworthiness first decreased as the number of friends increased, and then increased as the number of friends increased. The upper

panel of Table 2 reports the standardized coefficients for all predictor variables included in the model.

In sum, H1 (friend-generated cues) was supported, H2 (curvilinear U-shaped effect of friends) was not supported, H3 (self-generated cues) was partially supported, and H5 (facial cue) was supported.

Facebook cues	Std. β	p
Original Model		
Number of "about me" categories	.16	.03
Number of photos	-.21	.03
Number of status updates	.01	.94
Smiling	.28	<.001
Number of friends	-.34	<.001
Number of friends squared	.18	.03
Number of comments	.17	.04*
Number of "likes"	.13	.05*
Revised Models		
Number of "about me" categories	.15	.03
Number of photos	-.19	.03
Smiling	.29	<.001
Number of friends	-.35	<.001
Number of friends squared	.18	.02
Number of comments	.15	.04*
Number of "likes"	.13	.05*

*Indicates a one-tailed test

Table 2. *Standardized regression coefficients for the Facebook predictors of perceived trustworthiness.*

In order to obtain a more accurate estimation of the model's coefficients and fit, the model was revised by removing the non-significant predictors. The revised model showed an improved fit to the data, $F(8, 136) = 9.34$, $p < .001$, and explained about a third of the variance in the dependent measure ($R = .60$, $R^2 = .36$, $R^2_{adj} = .32$). All the predictors reached statistical significance, as did the gender covariate, with women being rated as more trustworthy than men. As before, the total number of friends and the total number of photos had the opposite relationship to perceived trustworthiness than predicted (see lower panel of Table 2). The quadratic, U-shaped effect of number of friends had its inflection point at about 500 friends. That is, perceived trustworthiness decreased as the number of friends increased up to 500, and then increased as the number of friends increased beyond 500.

Friend-generated cues explained 16% of the variance in perceived trustworthiness, followed by 9% explained by the smiling facial cue, 5% explained by self-generated cues, and 2% explained by the gender covariate. Since friend-generated cues explained more variance than self-generated cues, H4 was supported.

Discussion

Facebook profiles contain vast and variegated data about a person, supplied by both the self-presenter herself and her social network. Indeed, Facebook is one of the few venues where profile owners' social connectedness with their friends and family is rendered visible to a large audience. This information is recorded into one location and therefore easy to absorb in a quick amount of time. Due to granting this unprecedented level of access into a person's life, Facebook profiles raise new questions about how people process information in order to make sense of others. Out of this vast deposit of personal information, what cues do observers pick up on when assessing profile owners' characteristics, and why?

Research has shown that people utilize different cues for different interpersonal judgments (e.g., sociability, attractiveness). The present study is the first to investigate the cues utilized for forming impressions of *trustworthiness* based on the unique type of information available in Facebook profiles. Drawing upon uncertainty reduction theory, warranting theory, and evolutionary approaches to facial displays, we presented a framework that identified a series of profile cues that signal trustworthiness to observers. Consistent with predictions, results show that six simple cues explained about a third of the variance in how trustworthy profile owners were perceived. These results have theoretical, practical, and design implications, as described below.

Theoretical Implications

Whereas other studies have manipulated aspects of the Facebook profile, such as the number of friends (Tong et al. 2008; Utz 2010) or friends' attractiveness (Walther et al. 2008) to see how they influence social perception, we investigated here the profile cues that observers spontaneously attend to when examining real Facebook profiles. The fact that profile cues contributed such a large proportion of the variance in trustworthiness perceptions suggests that people are quick to draw dispositional inferences about others (i.e., what others are like), even from little and non-interactive information. Indeed, the observers in our study assumed that even without knowing anything else about a person, they could gauge her trustworthiness from profile activity. This finding is consistent with prior research on impression formation, which shows that strangers assume

they can gauge an individual's personality from the physical spaces that individual inhabits, such as bedrooms or offices, even without meeting them (Gosling 2009).

While quick to impute substantial meaning to small cues on Facebook, observers were not necessarily naïve in their interpretations. Specifically, they assigned more meaning to cues generated by friends, who have less motive to dissemble, than to cues generated by profile owners themselves. This finding provides support to warranting theory (Walther and Parks 2002), which claims that online communicators are cognizant of the *source* of information and use it as a signal of communicators' intentions and motivations. Two other studies have found that observers give more credence to friend-generated than self-generated information on Facebook when forming impressions of attractiveness and popularity. In these studies, profile cues were manipulated by the experimenters using mock profiles (Walther et al. 2009; Utz 2010). The current study extends these findings in two ways. First, it supports warranting theory in the context of a new interpersonal impression – trustworthiness. Second, it uses real, rather than mock, Facebook profiles, and therefore demonstrates the validity of warranting theory in a more naturalistic setting.

When it comes to friend-generated cues, we predicted that observers will strategically look for indicators of social inclusion, endorsement, and approval. As predicted, we found that the more comments and "likes" friends contributed to the profile, the more trustworthy the profile owner was perceived. Similarly to online reviews on commercial websites, others' feedback is valued and attended to in Facebook profiles as well.

However, the total number of friends had an unexpected relationship to trustworthiness. Based on prior research on "friendship whoring" (Tong et al. 2008), we predicted that having a large number of friends would garner positive evaluations only up to a point, after which it will be interpreted negatively, as a signal of superficial relationships and a desire to show-off. Our results ran contrary to these predictions. The number of friends had a U-shaped relationship with trustworthiness, whereby high trustworthiness was indicated by having either few friends or many friends, and the lowest trustworthiness was indicated by having around an average number of friends. This pattern indicates that the number of friends may have a different effect on perceptions of trustworthiness than it does on perceptions of the other personal characteristics examined by prior research (e.g., extraversion, popularity). A possible explanation for the fact that large numbers of friends were associated with more trustworthiness is that perceived trustworthiness is in fact more sensitive to social integration than other traits. Thus, Facebook users who manage to accrue large numbers of friends may be viewed as particularly capable to reach out to people and strike relationships, and this could be interpreted as a signal of trustworthiness.

This explanation is consistent with warranting theory, in that those who connect with many different people face a greater likelihood of being caught lying by one of these many friends, and therefore are more likely to present themselves honestly. At the other end of the spectrum, those with very few friends (who were also rated as highly trustworthy), may be viewed as people who only friend close offline connections (i.e., close friends and family) and do not friend superficial acquaintances just so they can bulk up their number of friends. This could be perceived as signaling a genuine approach to relationships, which in turn indicates trustworthiness.

When it comes to self-generated cues, the findings strongly support uncertainty reduction theory. As predicted by URT, more information categories disclosed by Facebook self-presenters generated more trustworthiness, presumably because they signal openness and enable uncertainty reduction. This is consistent with findings that lengthier online dating profiles were rated as more trustworthy (Toma and Hancock 2012), and that more information categories disclosed on Facebook predicted the number of friends in the system (Lampe, Ellison and Steinfield 2006). Together, these studies underscore the importance of the *amount* of online self-disclosure in affiliative processes: The more information about oneself is provided in contexts where uncertainty is high, the better. Since it is common for individuals to investigate strangers online, be it on Facebook, online dating websites, LinkedIn, or Google, these strangers may be well-advised to include an array of self-descriptors if their goal is to earn trust.

Contrary to expectations, more information was only better when it was textual (i.e., "about me" section), but not photographic. More photographs reduced perceived trustworthiness, indicating that text and photographs may operate differently as uncertainty reduction strategies. Indeed, one other study found that, while textual descriptions from online dating sites increased daters' perceived trustworthiness, the addition of a photograph to these descriptions hindered trust (Toma 2010). A preliminary conclusion, then, is that uncertainty reduction boosts affiliation when it is the result of explicit, textual descriptions of self, rather than of photographs. Written disclosures may be perceived as more meaningful, as they represent a direct gateway into self-presenters' thoughts, perspective, and personal philosophy. Another possibility is that adding a high number of photographs may be perceived as an indicator of narcissism. Indeed, several studies have found a positive relationship between the total number of photographs posted in a Facebook profiles and users' actual narcissism (Ong et al. 2011; Ryan and Xenos 2011). It is possible that observers are sensitive to this relationship, and correctly assume that Facebook users who post more pho-

tographs are more narcissistic. In turn, narcissists may be perceived as less trustworthy.

Also noteworthy is that the number of status updates posted did not affect trustworthiness. We believe this is the case because of a ceiling effect. Since observers only viewed the most recent wall page, it is likely that all wall pages contained high numbers of status updates. It is also possible that observers did not attend as closely to status updates as they did to clearly displayed numeric indicators (e.g., number of photos, number of friends, number of "likes). The latter are easier to process, whereas the former require more attentional resources, which observers may not invest.

A final useful social cue in Facebook profiles is smiling. Smiling had a powerful effect in enhancing perceived trustworthiness, single-handedly explaining 9% of the variance. This suggests that observers rely on simple heuristics that may be unconsciously processed. Smiling has been argued to be an evolutionary cue that signals approachability and cooperativeness, and to which humans are automatically respond positively (Scharlemann et al. 2001). In the same vein, research on another social network, Twitter, also shows that observers are prone to utilizing simple heuristics, such as username and types of photographs, when assessing the credibility of tweets (Morris et al. 2012).

In sum, our framework for identifying cues to perceived trustworthiness in Facebook profile, inspired by several communication and psychology theories, shows that observers actively utilize Facebook profile information to infer strangers' trustworthiness. Specifically, they attend to the source, amount, and hardwired connotations of several profile cues. They do so in a seemingly deliberate and thoughtful fashion, such as when they prioritize friend-generated over self-generated cues, but also in a more automatic, heuristic fashion, such as when they respond positively to a smiling face.

Design and Practical Implications

Social interaction in online environments depends on users' ability to make sense of one another, a task that is rendered more complex by the absence of traditional impression formation cues (e.g., nonverbal behavior). A challenge for designers, then, is to construct online environments that enable users to develop a sense of one another. The present study uncovers a series of cues that are used to make inferences about communicators' trustworthiness in social network sites. These cues can be emphasized in future applications designed for strangers to meet and interact with one another. For instance, warranting cues such as preserving a record of interactions with others onto the profile may be a valuable tool for stimulating trust. In the same vein, earlier work by Smith and Kollock (1999) shows that persistent

identity claims and logs of previous interactions between online communicators stimulated trust and cooperation. Given the importance of uncertainty reduction in eliciting trustworthiness, designers might consider increasing the number of mandatory "about me" categories that must be filled out. A final design recommendation might be to remove the displays of total number of photographs and total number of friends from the main profile page, because these numbers are apt to hamper perceived trustworthiness if they are too high (for photos) or average (for friends).

In particular, designing online environments where partners trust each other is a critical task for computer-supported cooperative work. Research has noted that online trust is difficult to build and easy to destroy (Bos et al. 2002). As a remedy, it has been suggested that having participants get to know each other before interacting online may boost trust. However, having access to personal profiles of each other prior to interacting did not enhance trust (Zheng et al. 2002). The present research suggests that not all profiles are created equal when it comes to eliciting trust. The following practical recommendations can be made for constructing profiles that appear more trustworthy: 1) post a smiling profile photograph; 2) have either few friends or large number of friends; 3) disclose a great deal of information in the "about me" section; 4) restrict the number of photos tagged in the profile; and 5) foster, if at all possible, social interaction with friends on the wall.

As discussed earlier, Facebook profiles are used in several contexts where trustworthiness is important: initiating new friendships, identifying roommates, and evaluating job applicants. The practical recommendations made earlier can also be implemented by those who wish to come across as trustworthy in these contexts, in order to increase their chances of developing personal and professional relationships.

Another set of design implications concerns the detection of untrustworthy users. A critical issue emerging in social media is the detection of spammers – that is, malicious users who exploit the system for selfish gain, by posting inaccurate information, surreptitiously promoting companies and services, or spreading malware (Lee, Caverlee, and Webb 2010). In order to detect spammers, users are frequently asked to flag inappropriate content and posters (i.e., crowdsourcing) (Markines, Cattuto, and Menczer 2009). Crowdsourcing is a scalable approach and has demonstrated effectiveness (Wang et al. 2013). However, it is less understood what features of social media profiles and postings users find untrustworthy. The present study sheds light on this issue and can therefore help in building algorithms that automatically detect spammers based on the components of social media profiles that users find suspicious.

Limitations & Future Research

Several important limitations need mentioning. First, it is unclear to what extent Facebook users do in fact evaluate strangers' trustworthiness based on Facebook profiles, without being instructed to do so by a researcher (as was the case in the present study). Future research is necessary to investigate Facebook users' spontaneous interest in assessing others' trustworthiness. Also, future research should replicate the current design in online dating or LinkedIn, environments where users may have an especially high interest in assessing others' trustworthiness.

Second, the present research does not claim to present an exhaustive list of all the profile cues that are used for assessing trustworthiness. It is likely that other cues are important as well, such as the content of Facebook self-presentations (i.e., how are users depicted in their photos, in addition to smiling? What are their activities and interests?), or the content of friends' wall postings. In particular, social network information, such as *mutual* friends, organizations, clubs, and groups, is likely to play a significant role in trustworthiness judgments. Future research is invited to investigate these additional cues.

Third, this study took a correlational approach that precludes causations about causality. While it is possible that profile cues *caused* observers to form certain impressions of trustworthiness (because observers simply had no other information at their disposal), future research needs to investigate this claim in an experimental design, where the presence of profile cues is manipulated.

Finally, future research is necessary to examine the cues to profile owners' *actual* trustworthiness, not just their perceived trustworthiness. Are the cues that observers rely on to establish profile owners' trustworthiness valid indicators of trustworthiness?

Conclusion

Forming impressions of strangers in online environments is a consequential social task. The present study shows that, when judging others' trustworthiness through Facebook profiles, observers rely on simple but psychologically meaningful cues, that stem from deep-seated needs to reduce uncertainty, corroborate evidence, and evaluate approachability from hardwired facial displays.

Acknowledgments

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