

Perceptions of Trustworthiness Online: The Role of Visual and Textual Information

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ABSTRACT

People increasingly rely on social networking websites to initiate personal and professional relationships. This requires that a considerable amount of trust be placed in strangers solely on the basis of their online profiles. This paper examines how the nature of online information affects how trustworthy online daters are perceived. Visual (i.e., photographs) and textual (i.e., “about me” section) information is considered. Results show that textual information elicits the highest ratings of trustworthiness, and that the addition of a photograph decreases daters’ perceived trustworthiness. However, the accuracy of trustworthiness impressions is low regardless of the type of information available, because of a truth bias. Results are discussed in terms of (1) hyperpersonal impression formation and the nature of truth bias; and (2) practical implications for building trustworthiness online.

Author Keywords

Trustworthiness, truth bias, impression formation, accuracy of impressions, Hyperpersonal Model

ACM Classification Keywords

J4 Social and behavioral systems: Psychology

General Terms

Theory, experimentation

INTRODUCTION

In recent years, social networking websites have become a popular avenue for forming relationships. Users find friends, relationship partners and business collaborators by browsing information posted in online profiles (e.g., Facebook, Match.com, LinkedIn). This method of initiating relationships requires that a considerable amount of trust be placed in virtual strangers. An important question, then, is how people gauge others’ trustworthiness online, and what role technology plays in shaping these impressions.

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One way technology shapes the process of impression formation is by altering the nature and amount of information available about others. Indeed, impression formation, or the process of inferring other people’s characteristics, depends on the type of information available, such as nonverbal behaviors (e.g., smiling or using gestures), proxemics (i.e., the physical distance between the interactants) or paralinguistics (e.g., accents, vocal pitch). In computer-mediated applications, some of these cues are removed (e.g., visual information is typically absent from email), while others are added (e.g., typing speed and use of emoticons are important in instant messaging). For this reason, research in computer-mediated communication (CMC) has focused on how the presence or absence of certain cues alters the impression formation process [e.g., 8, 21].

This paper examines the role of CMC cues in forming impressions of trustworthiness in online dating profiles. Two types of cues are considered: (1) visual information about self-presenters’ physical appearance in the form of photographs, and (2) textual information in the form of self-presenters’ written personal descriptions. These cues are a staple of self-presentation in social networking websites, where users are typically required to post photographs and describe themselves in their own words.

An important consideration is that online dating (and social networking websites more generally) features a specific kind of visual and textual cues. A major goal of social networking websites is to forge and maintain bonds with others, be they potential relationship partners, employers or friends; as a result, users tend to create flattering profiles that can attract and impress others [7, 9, 18]. Photographs are chosen for their attractiveness, and self-descriptions are written in a personal tone and contain a high amount of self-disclosure. The purpose of this study then is to examine how the presence or absence of this specific type of information alters the impression formation process. Are profiles with photographs considered more trustworthy than those without photographs? Do written statements engender more trustworthiness than photographs? Or do photographs and textual self-descriptions *together* inspire the most trustworthiness?

An additional goal of this paper is to examine the role of visual and textual cues in forming *accurate* impressions of trustworthiness. Indeed, a key concern with initiating relationships via online profiles is that judgments of trustworthiness be made wisely, given the costs associated with encountering deception (e.g., unsuccessful dating encounters, unprofitable business collaborations). What type (visual or textual) and what amount of information (only visual, only textual, or visual and textual together) increases perceivers' chances of making accurate impressions about others' trustworthiness in online dating profiles?

Trust and trustworthiness online

Trust is defined as the expectations that others (i. e., the trustees) will perform a certain action important to the trustor in environments characterized by uncertainty and informational incompleteness [e.g., 4, 12]. Trust is only required in the presence of risk, when the trustees' motives and abilities are unknown and betrayal is possible. An additional prerequisite of trust is the vulnerability of the trustor, who must rely on the trustee for the fulfillment of certain desired outcomes. For example, in an online dating context, the risk involved is that potential mates are not who they claim to be in their profiles, leading daters to waste time and be disappointed. Daters are vulnerable in the sense that they must rely on strangers to start romantic relationships—a very meaningful personal goal.

Trustworthiness is closely related to trust, yet a distinct concept. While trust is an act of the trustor (i.e., a person places his or her trust in another, the trustee), trustworthiness is a characteristic of the trustee that indicates he or she is worthy of trust. Developing interpersonal trust is a *process* that requires interaction between the trustor and the trustee. However, judgments regarding someone's trustworthiness can be made even in the absence of social interaction, simply by observing the person or learning about him or her indirectly. As previously mentioned, it is very common for CMC interactants to form impressions of someone's trustworthiness based on static profile information, before actually interacting with that person.

The purpose of this study is to examine this initial stage in the process of trust development online: forming impressions of trustworthiness *prior* to social interaction, solely on the basis of online profiles. This is an important addition to the literature on online trust, which has so far focused on trust development *after* social interaction.

One pertinent line of research has investigated whether having access to static profile information about an interaction partner, such as a photograph or a personal information sheet, affects trust development, as measured at the end of the interaction. Zheng and colleagues [23] found that static profile descriptors (e.g., age, gender, hobbies), had no effect on trust development, but having a photograph of the communication partner boosted trust

almost to the same levels as having a face-to-face meeting with that person. Similarly, Davis and colleagues [6] found that static profile descriptors had no impact on trust when participants communicated with each other via text or speech. The present study fills in some of the gaps of this line of research by 1) considering other important profile components, such as personal descriptions (i.e., the “about me” section); and 2) assessing impressions of trustworthiness even before any interaction takes place.

Perceptions of trustworthiness online

The first question of interest is whether the type and number of CMC cues affect perceptions of trustworthiness in online dating profiles. Generally speaking, two opposing theoretical viewpoints have been offered on the role of cues in impression formation: the cues filtered out perspective [5, 16] and the Hyperpersonal perspective [20, 21]. Recall that the visual and textual cues that comprise online dating profiles are unique in the sense that they are meant to be flattering and attractive. The present study then tests the opposing predictions of the cues filtered out perspective and the Hyperpersonal model in this specific context.

Cues filtered out perspective

A cluster of early CMC theories, known as “cues filtered out” theories, equate richness of cues with an ability to successfully engage in socio-emotional exchange. Because face-to-face provides the most cues, it is considered the best channel for interaction and socio-emotional exchange, while the media, with its reduced cues, is thought to result in impoverished, impersonal interaction. For instance, Social Presence Theory [16] claims that the more cues (e.g., visual, auditory) a medium provides, the more conducive it is to socio-emotional exchange, such as liking and trust. Similarly, Media Richness Theory [5] proposes that only rich media (i.e., environments providing access to lots of cues, such as face-to-face) are appropriate to interactions that involve ambiguity, whereas lean media with fewer cues is less suitable for complex, ambiguous tasks.

Since forming impressions of trustworthiness is a complex socio-emotional process (even more so in an online dating context, where it is critical to build connections with others), the cues filtered out perspective predicts that more cues are beneficial in conveying trustworthiness. Specifically, perceivers who have access to targets' photographs *and* textual self-descriptions should rate the targets as most trustworthy. Text alone, which is viewed by these theories as the most impoverished means of communication, should elicit the lowest perceptions of trustworthiness, whereas the photograph alone should fare better than text, because it provides a wealth of information about the person's physical appearance:

H1a: The highest number of cues (photograph and textual self-description together) will elicit the highest perceptions of trustworthiness, followed by photographs alone and least of all textual self-descriptions.

Hyperpersonal perspective

A different prediction is provided by the Hyperpersonal model of impression formation in computer-mediated environments [21], which claims that online communicators form exaggerated or hyperbolic impressions of each other when they are interacting under conditions of visual anonymity. Visual anonymity, or the lack of cues that identify interaction partners as individuals, leads online communicators to use any bit of information about their partners to form impressions about them. Because information is scarce, online communicators tend to fill in the blanks for unavailable information – a process known as overattribution. Overattribution leads online communicators to either strongly like their interaction partners if they perceive the initial information as positive, or strongly dislike them if they perceive this information as negative. Since online self-presentations tend to be positive and flattering [18], the Hyperpersonal model predicts that the textual self-description alone will be perceived as most trustworthy, because the lack of visual information leads observers to idealize the self-presenters. In fact, the addition of a photograph is expected to reduce perceptions of trustworthiness, because it provides visual identifiability and therefore impedes the idealization process. Indeed, in a study that examined the effects of giving collaborators photographs of each other, Walther and colleagues [20] found that groups who had interacted with each other for a long period of time under conditions of visual anonymity scored higher in intimacy and affection than groups who were provided photographs of the team members.

H1b: Textual self-descriptions will elicit the highest perceptions of trustworthiness, and the addition of a photograph will deflate these perceptions.

Accuracy of trustworthiness perceptions

The second issue under consideration is the type of online information that may lead observers to form *accurate* impressions of others' trustworthiness online. Profile information is used by online daters looking for love, by Facebook users looking for friends, and by business people looking for collaborators on LinkedIn. In all of these situations, it is important to assess others' trustworthiness correctly. What kind of information should users be attending to in order to increase their chances of making wise decisions regarding others' trustworthiness?

Kernel of truth theory

One perspective on this issue is offered by kernel of truth theory [1], which claims that trustworthiness can be reliably detected from faces, as faces serve as an accurate “window into the soul.” This theory is based on a self-fulfilling prophecy model of human behavior: trustworthy and untrustworthy-looking people are treated differently by others, leading them to internalize the trustworthy or untrustworthy characteristics [10, 17]. What constitutes trustworthy and untrustworthy looking faces? Research in social perception [17] has shown that trustworthy faces are

characterized by high inner eyebrows, pronounced cheekbones, and a wide chin, while untrustworthy faces are characterized by low inner eyebrows, shallow cheekbones and a thin chin.

A central tenet of kernel of truth theory is that humans have evolved to recognize the facial features that signal trustworthiness, because correctly identifying others' trustworthiness is essential for survival. Several empirical studies provide support for the claim that people can form accurate impressions about others' trustworthiness by observing their faces [e.g., 1, 10]. This theory predicts that judges will accurately detect online self-presenters' trustworthiness when looking at their photographs, but not in the absence of information about their facial appearance (i.e., when they are only reading their textual self-descriptions):

H2a: Perceivers will form accurate perceptions of targets' trustworthiness when given the opportunity to examine their photographs, but not when they do not have access to the photographs.

Truth bias perspective

An opposing theoretical perspective claims that humans have evolved to respond to others with feelings of trust and cooperativeness, regardless of how trustworthy these other people really are. If this wasn't the case, human relations and joint tasks would be difficult because of constant suspiciousness. This tendency to think of others as trustworthy is known as the *truth bias*. Truth bias is thought to be responsible for humans' general inability to detect deception [for a review, see 19]. According to this perspective, perceivers should perform badly at detecting others' trustworthiness across the board. However, their performance should improve when there is no visual information available, because seeing partners' faces is likely to activate the truth bias [3]. Indeed, Burgoon and colleagues [3] found that channels in which audio-visual information was available (audio-video and face-to-face) led to poorer discrimination between truth and deception than channels that did not offer visual information.

This perspective predicts that trustworthiness perceptions should be generally inaccurate, but that they will improve when judges do not have access to the target's photograph.

H2b: Perceivers will be unable to accurately detect targets' trustworthiness, but their performance will improve when they do not have access to targets' photographs.

Better discriminative ability

Lastly, the discriminative ability perspective [11] suggests that increased levels of information increase the accuracy of social judgments. Several studies performed by Riegelsberger [11] support this claim: the more information participants had about online vendors, the better able they were to accurately determine which ones were trustworthy and which were not. From this perspective, judges who

have the most information about their targets will be most accurate in gauging trustworthiness. This perspective does not specify, however, whether pictorial information is more conducive to accurate impressions than textual information.

H2c: Perceivers will form the most accurate impressions about targets' trustworthiness when they have both visual and textual information about them, but their performance will decrease as information becomes scarcer (i.e., when seeing the textual self-description alone, or the photograph alone).

Present study

To summarize, the present study is concerned with the role of online cues in shaping impressions of trustworthiness in online dating profiles. The nature (visual or textual) and number of cues (visual, textual, or visual and textual together) is examined with respect to how it impacts trustworthiness impressions and the accuracy of these impressions. A sample of online daters from the New York City metropolitan area was used to address these questions. Online daters' profiles were downloaded and the accuracy of their statements was assessed during a research appointment. Subsequently, the visual (i.e., photographs) and textual (i.e., "about me/in my own words") portions of the profiles were isolated and shown to groups of judges, who rated their trustworthiness.

METHOD

Participants and stimuli

Participants were 54 online daters (27 men and 27 women) who subscribed to one of four online dating services: Match.com, Yahoo Personals, American Singles and Webdate. These services were selected because they allow participants to connect with other daters by creating profiles of themselves (rather than through automated matching systems), and because they appeal to mainstream rather than niche audiences. Participants were invited to take part in a study of "self-presentation in online dating profiles" and signed-up through a secure website. Participants then met with the experimenter at New School University in New York City and were interviewed about their profile deceptions. Participants were paid \$30 for their time.

Participants' online dating profiles were downloaded and archived. Only participants who posted photographs of themselves and who composed self-descriptions in the "about me" portion of the profile were included in this study. The following parts of the profile were used as stimuli: 1) the main profile photograph, which is prominently displayed in the top-left corner of every profile; 2) the "about me" section, in which daters describe themselves in their own words; and 3) the main profile photograph and the textual self-description together.

In all conditions, the stimuli were split into 5 sets of 22 and the order of the stimuli was randomized within each set in order to eliminate order effects. This procedure was also meant to reduce judge fatigue, whereby judges who have to

evaluate large numbers of stimuli might get tired and become unable to allocate attentional resources to the last stimuli. Each set contained half of the stimuli in the preceding set and half of the stimuli in the following set.

Judges

Judges were undergraduate students at Cornell University, and participated in exchange for extra-credit in their courses. Judges were randomly assigned to one of the three conditions. In all conditions, judges were told they would be viewing information downloaded from *real* online daters' profiles, and were instructed to use this information to answer several questions about each dater. Judges participated in small groups, but did not interact with each other. The stimuli were presented one at a time on a large projection screen and judges were told to take as much time as they needed to answer questions about each one of them (about 30 seconds – 1 minute, depending on the length of the profile).

Forty-six judges (17 men, 28 women, 1 did not report gender) participated in the photograph condition; 42 judges (20 men, 20 women, 2 did not report gender) participated in the textual self-description condition; and 43 judges (17 men and 26 women) participated in the photo and text condition. In each condition, each judge rated only one set of stimuli, but because the sets overlapped with each other, each stimulus was rated by at least 15 judges.

Measures of perceived trustworthiness

After viewing each stimulus (i.e., photograph; textual self-description; or photograph and textual self-description together), judges rated the trustworthiness of the person depicted by the stimulus. Because trustworthiness is a broad concept, judges were asked to rate daters' trustworthiness as *self-presenters* – in other words, the extent to which judges expected daters to present themselves honestly in their dating profiles. This was assessed via two items adapted from Rotter's Interpersonal Trust Scale [14]: 1) I would expect this online dater to tell me the truth about himself/herself; and 2) This online dater seems trustworthy to me. Judges used a scale from 1 (strongly disagree) to 7 (strongly agree). The two items were reliable indicators of perceived trustworthiness ($\alpha = 0.96$ for the photograph condition; $\alpha = 0.94$ for the text condition; and $\alpha = 0.91$ for the photograph and text condition), and were averaged to create a trustworthiness score for each judge. Subsequently, the scores of all the judges in a given condition were averaged to create a trustworthiness score for each dater in each condition.

Measures of actual trustworthiness

Profile deception was measured in order to determine the extent to which online daters had indeed been trustworthy in their profile self-presentation. The online dating profile is composed of a variety of multiple-choice questions, an open-ended question, and photographs. Three of the most important and widely scrutinized pieces of information that

comprise the profile are daters' height, weight, and age. During their research appointment, participants' height and weight were measured by the experimenter (using a standard measuring tape and scale, respectively), and their age was recorded from their driver's licenses. This procedure provided an *objective* measure of profile deception that eschews the problematic nature of self-reported deception. Specifically, participants in deception studies often feel embarrassed to admit the true extent of their lies, because deception is socially undesirable.

Deviations from participants' real height, weight and age were calculated by subtracting profile claims about these characteristics from the objective measurements. These deviations were standardized and then averaged to create a *deception index*. This deception index is (1) objectively derived; and (2) represents deception patterns on three important profile elements. For these reasons, it serves as a proxy for participants' actual trustworthiness as *self-presenters* in dating profiles. Lower scores on the deception index indicate higher actual trustworthiness. Recall that the current definition of trustworthiness is narrow and domain-specific: participants' trustworthiness as online daters, not as persons in general, is considered.

RESULTS

The data is analyzed across the two hypothesized dimensions: (1) perceptions of trustworthiness as a function of the quantity and quality of information available about the daters, and (2) the accuracy of these perceptions.

Trustworthiness perceptions

To test which type of cues elicited the highest ratings of trustworthiness from judges, a repeated-measures ANOVA on trustworthiness ratings across the three conditions was set up, and revealed a significant overall difference, $F(1, 53) = 20.73, p < 0.001$. Planned pair-sample contrasts were conducted to compare each condition to the textual self-description condition, which was hypothesized to be highest by the Hyperpersonal perspective. These analyses revealed that trustworthiness ratings in the textual self-description condition were indeed higher than in the photograph condition, $t(53) = 4.55, p < 0.001$, and also higher than in the combined (photo and text) condition, $t(53) = 3.40, p < 0.001$. Trustworthiness ratings in the photo condition were lower than in the photo and text condition, $t(53) = 2.92, p < 0.005$. These results suggest that trustworthiness ratings were highest in the textual self-description condition and lowest in the photograph condition (see Table 1 and Figure 1). These results provide support for H1b.

Accuracy of trustworthiness perceptions

The second issue considered was the accuracy of these trustworthiness judgments. Recall that targets were online daters whose weight, height and age were measured during their research appointment and then compared with their profile statements.

A composite *deception index* was calculated by averaging the standardized deviations from daters' true height, weight and age. The deception index reflects how much each dater deviated from the truth in their online dating self-presentation, and is used as an indicator of their trustworthiness as online daters. If judges were able to accurately determine targets' trustworthiness as self-presenters, their ratings should correlate with the targets' deception index (i.e., higher perceived trustworthiness should correlate with lower scores on the deception index). Results show that judges' trustworthiness ratings were not significantly correlated with the deception index when judges saw targets' photographs ($r = -0.19, ns$), or when judges rated targets' textual self-descriptions ($r = -0.15, ns$). However, when judges saw targets' textual self-descriptions in conjunction with their photographs, trustworthiness ratings were significantly correlated with targets' actual deception practices ($r = -0.31, p = 0.02$), which provides support for H2c.

	<i>M</i>	<i>SD</i>
Photograph	4.17	0.77
Textual self-description	4.61	0.64
Photograph and textual self-description	4.35	0.76

Table 1: Means and standard deviations for trustworthiness ratings across conditions

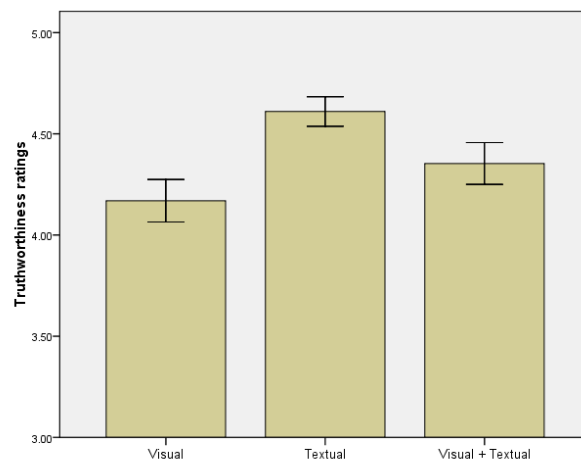


Figure 1: Means and standard errors for trustworthiness ratings across conditions

Hotelling's t-test for correlated correlations was performed to compare these correlations and determine whether the accuracy of judges' perceptions was higher in the photo and text condition than in the photo only and text only condition. A marginal effect emerged whereby judges' accuracy in the photo and text condition was higher than in the photo condition [$t(54) = -1.40, p = 0.08, 1$ -tailed], and also higher than in the text-only condition [$t(54) = -1.38, p = 0.08, 1$ -tailed].

Given the marginal findings for the accuracy of trustworthiness judgments, the proportion of daters who were correctly classified as trustworthy or untrustworthy in each condition was also calculated. The data was prepared for a 2 (actual trustworthiness: high vs. low) x 2 (perceived trustworthiness: high vs. low) classification. The deception index was used to classify online daters into high and low trustworthiness categories using a median split ($median = -0.16$). According to this split, 27 online daters were categorized as high in actual trustworthiness and 27 were categorized as low. Then, judges' ratings were used to categorize daters into high and low in perceived trustworthiness. This was done by recoding the 7 point Likert scale into a dichotomous variable, in which the mid-point of the scale (i.e., four) or higher was classified as high perceived trustworthiness and a score below four was classified as low. Tables 2, 3 and 4 summarize the percentage of daters who were correctly and incorrectly identified as trustworthy in all three conditions.

These analyses show that perceivers were unable to accurately judge trustworthiness regardless of the type of information made available to them. The accuracy rate in the photograph and text combined condition was 61.1%, slightly yet not significantly higher than the accuracy rate in the photograph only condition (53.7%) and the text-only condition (48.1%). Judges did not perform higher than chance in any of the conditions.

Did perceivers show evidence of truth bias in their judgments? Truth bias can be operationalized in several ways. First, truth bias can be assumed to occur if more targets were rated as high in trustworthiness than low in trustworthiness in each condition. This was the case in the text condition, where more daters were rated as trustworthy ($\pi = 83.33\%$) than untrustworthy ($\pi = 16.67\%$) [$z(54) = 6.74, p < 0.001$], and in the photograph and text condition, where more daters were also rated as trustworthy ($\pi = 59.26\%$) than untrustworthy ($\pi = 40.74\%$) [$z(54) = 1.73, p = 0.04, 1-tailed$]. However, in the photograph condition, there was no difference between the proportion of daters rated as trustworthy ($\pi = 51.85\%$) and untrustworthy ($\pi = 48.15\%$) [$z(54) = 0.95, ns$]. Using this operationalizations, truth bias was stronger in the text condition than in the photo condition [$z(54) = 3.29, p < 0.01$] and in the photo and text condition [$z(54) = 2.55, p = 0.01$].

		Perceived Trustworthiness	
		Low	High
Actual Trustworthiness	Low ($n = 27$)	14 (51.85%)	13 (48.15%)
	High ($n = 27$)	12 (44.44%)	15 (55.55%)

Table 2: Correctly and incorrectly identified daters in the photograph-only condition

		Perceived Trustworthiness	
		Low	High
Actual Trustworthiness	Low ($n = 27$)	4 (14.81%)	23 (85.19%)
	High ($n = 27$)	5 (18.52%)	22 (81.48%)

Table 3: Correctly and incorrectly identified daters in the text-only condition

		Perceived Trustworthiness	
		Low	High
Actual Trustworthiness	Low ($n = 27$)	14 (51.85%)	13 (48.15%)
	High ($n = 27$)	8 (29.63%)	19 (70.37%)

Table 4: Correctly and incorrectly identified daters in the text and photograph condition

Another way to operationalize truth bias is to consider the proportion of untrustworthy daters who were incorrectly classified as trustworthy in each condition. In the photograph condition and the photograph and text condition, 48.14% of the untrustworthy daters were misclassified; however, in the text condition, a full 85.19% were misclassified. The rate of misclassification was higher in the text condition than in the other two conditions [$z(27) = 2.60, p = 0.05, 1-tailed$].

DISCUSSION

The purpose of this study was to examine whether the nature and amount of information in online dating profiles (i.e., photographs and text-only self-descriptions) affect how trustworthy online daters are perceived. This is an important issue as an increasing number of people make decisions about who to initiate relationships with based on information presented in online dating profiles. Additionally, this provided a context for testing the boundary conditions of two prominent cues-based theoretical models: the Hyperpersonal model and the cues-filtered out perspective.

This study adds to the growing literature on trust development in online environments by: (1) focusing on perceptions of trustworthiness online, a previously ignored issue; (2) using a community sample and their realistic self-presentations as stimuli for trustworthiness perceptions; and (3) examining whether trustworthiness decisions are accurate.

Results show that, in the context of online dating, the nature of available cues does affect perceptions of trustworthiness: text-only self-descriptions were perceived as most trustworthy, and the addition of a photograph decreased trustworthiness ratings. This provides support for the Hyperpersonal model of impression formation. Results also show that judges were generally inaccurate in detecting trustworthiness because of a truth bias that was particularly strong in the absence of visual information. With respect to

the accuracy of trustworthiness perceptions, some evidence suggests that more information leads to more accurate decisions, although more research is needed on this issue.

Perceptions of trustworthiness

Two distinct theoretical perspectives were pitted against each other to predict the strength of trustworthiness impressions in online dating profiles: cues filtered-out theories vs. the Hyperpersonal perspective. Both theories are concerned with impression formation in online environments as a function of the cues available. As such, an important contribution of this study is boundary work on the predictive power of these theories when (1) the outcome variable is impressions of trustworthiness, a specific category of socio-emotional exchange, and (2) the online cues considered are produced in the unique context of online dating profiles, where users create flattering and attractive self-presentations [7, 9, 18].

Under these distinct circumstances, the predictions of the Hyperpersonal model [21] received support, whereas those of the cues filtered out theories did not. The Hyperpersonal model claims that, in the absence of visual identification, online communicators form exaggerated impressions of others by making overattributions on the basis of the scant information available. More often than not, these exaggerated impressions are idealizations of the interaction partner, because online environments allow the opportunity to create very controlled and flattering self-presentations that elicit positive impressions from observers. This was the case in the present studies: observers found targets most trustworthy when they had limited but positive information about them, and when they couldn't see their faces.

The Hyperpersonal model also claims that the addition of photographs dampens the idealization process by restricting observers' opportunities to overattribute. Results show support for this contention: when a photograph was added to the textual self-description, perceptions of trustworthiness decreased. Prior work by Walther [20] shows that online communicators felt they had more control over and were happier with their self-presentation when it was purely textual, without photographs. Although the current study does not directly test this claim, it is possible that textual self-descriptions were indeed more flattering than photographs, which is why the former elicited higher trustworthiness ratings than the latter.

Conversely, the predictions of the cues filtered out theories did not receive support in the online dating environment. Text-only communication was not perceived as the coldest and most impersonal form of communication – quite the contrary, it elicited the highest impressions of trustworthiness. Additionally, visual information in the form of photographs hindered rather than helped impressions of trustworthiness, contrary to predictions.

Trust and trustworthiness

An important theoretical issue in computer-supported collaborative work is to explicate the process of trust development online. Prior work shows that trust does develop online, but that it takes a different course than it does in face-to-face: it develops more slowly [2], it correlates with a distinct set of verbal cues [15], and is facilitated by getting acquainted exercises, such as seeing partners' photographs [23]. The present work adds to this growing literature by analyzing the process of forming impressions of trustworthiness, an important component of trust. Prior work that considered the effect of profile information on trust development found that access to partners' photographs prior to the interaction increased trust, but access to generic profile information did not [23]. Current findings suggest that having access to personalized self-descriptions may boost trust even more by boosting perceptions of the partners' trustworthiness. An important note is that the self-descriptions considered here were written with the purpose of impressing and attracting others, and it is likely that this specific kind of carefully managed written statements are most useful in establishing trustworthiness. Future research is invited to examine whether such self-descriptions increase trust when participants interact online.

This research also suggests that photographs should be used with caution when the goal is to present oneself as trustworthy. Because photographs provide a healthy dose of reality, they can decrease the idealized impressions produced by text-only self-descriptions [20]. An interesting avenue for future research is to examine the effect of written texts accompanied by photographs vs. texts alone in developing trust, not just trustworthiness, during online interactions.

Accuracy of trustworthiness perceptions

One of the most robust findings in social psychology is that humans are poor deception detectors, as they perform only slightly better than chance in lie detector tasks [19]. The present study extends this finding by examining humans' ability to detect others' trustworthiness. Trustworthiness and deception are closely related constructs, with trustworthiness involving a conceptualization of someone's likelihood of engaging in deception rather than detecting specific deceptions. Results show that, as with deception, judges appear to be unable to correctly classify others as trustworthy or not, regardless of the type and amount of information available to them. This inability to detect others' trustworthiness can be attributed to the truth bias [19], or humans' general predisposition to consider others to be trustworthy. Indeed, across conditions, the majority of daters were rated above the mid-point of the trustworthiness scale, suggesting that they were perceived as mostly trustworthy, and untrustworthy daters were generally misclassified as trustworthy.

While this study provided support for the truth bias perspective and its contention that humans are poor detectors of trustworthiness, it did not support the claim that truth bias is activated by visual information (i.e., seeing someone's face) [3]. In fact, truth bias was strongest when there was no visual information available. An important conclusion for CMC research is that it is possible to generate high amounts of truth bias solely on the basis of textual information. Although more research is needed on what exactly activates the truth bias, these findings suggest that carefully managed and flattering textual self-descriptions are very likely to trigger truth bias.

The present study did not find support for kernel-of-truth theory's prediction that humans are able to accurately assess others' trustworthiness based on their faces. This could be due to the different operationalizations of trustworthiness used in this study and in kernel-of-truth studies. The latter typically operationalize trustworthiness as participants' willingness (or lack thereof) to participate in an experiment involving deception. Such a scenario is low in stakes, as participants do not risk anything by engaging in deception in an experiment, and differs markedly from the high-stakes deception in this study: if online daters decide to engage in deception, it can severely affect their ability to accomplish their relationship goals. It is possible that the high stakes environment restricted participants in the present study from engaging in as much deception as they would have liked and, as a result, observers were not able to detect their trustworthiness from their faces. Future research is necessary to investigate the claims of kernel-of-truth theory.

One possibility suggested by the data is that access to increased levels of information about targets may improve the accuracy of trustworthiness judgments. This supports Riegelsberger's [11] contention that increased information is desirable because it improves people's discriminative ability. Although the process through which these judgments improve is not clear, it may be possible that increased information decreases idealization of the targets and decreases truth bias. Future research involving larger amounts of information is needed to clarify this effect. Nevertheless, a preliminary recommendation for online daters who are concerned with encountering deception in others' profiles is to gather as much information as possible about their targets.

Limitations

A key limitation of this study is the narrow operational definition of trustworthiness. Trustworthiness is a broad and multifaceted concept, and this study only examined one aspect of it: online daters' trustworthiness as *self-presenters*, or the extent to which they could be relied on to present themselves honestly in their profiles. Future work is needed to examine other aspects of trustworthiness, such as a propensity to speak the truth more generally, or to keep promises.

A related limitation is the operationalization of deception, which included lies about height, weight and age. Prior research [18] has shown that these lies are small and relatively benign. For this reason, they might have been particularly difficult to detect. Future research should investigate people's ability to accurately detect trustworthiness when the deceptions are more substantial.

Lastly, the analyses presented here are based on a relatively low sample size, which might have obscured significant differences.

Conclusion

The results of the present study suggest that the nature of available cues impacts how impressions of trustworthiness are developed in online dating profiles. Although the data speak only to cues present in online dating profiles, they might inform the impression formation process more generally in social networking profiles, which tend to also feature photographs and textual self-descriptions composed for the purpose of presenting the self in a flattering and attractive manner. In addition to their theoretical significance, the results have practical implications for millions of users who consistently manage their relationships on social networking websites.

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REFERENCES

1. Bond, J. F., Berry, D. S., & Omar, A. (1994). The kernel of truth in judgments of deceptiveness. *Basic and Applied Social Psychology, 15*, 523-534.
2. Bos, N., Olson, J. S., Gergle, D., Olson, G. M., & Wright, Z. (2002). Effects of four computer mediated communications channels on trust development. In: *Proceedings of CHI 2002*, (pp. 135-140). New York: ACM Press.
3. Burgoon, J.K., Stoner, G.M., Bonito, J.A., and Dunbar, N.E. (2003). Trust and deception in mediated communication. *Proceedings of HICSS, 2003*, pp. 44-56.
4. Corritore, C. L., Kracher, B., & Wiedenbeck, S. (2003). On-line trust: concepts, evolving themes, a model. *International Journal of Human Computer Studies, 58*, 737-758.
5. Daft, R. L. & Lengel, R. H. (1986). Organizational Information Requirements, Media Richness and Structural Design. *Marketing Science, 32*, 554-571.
6. Davis, J. P., Farnham, S. D., & Jensen, C. (2002). Decreasing online 'bad' behavior. In: *Extended Abstracts of CHI 2002*, (pp. 718-719). New York, NY: ACM Press.

7. Ellison, N., Heino, R., & Gibbs, J. (2006). Managing impressions online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication, 11*, article 2. <http://jcmc.indiana.edu/vol11/issue2/ellison.html>
8. Hancock, J. T., & Dunham, P. J. (2001). Impression formation in computer-mediated environments revisited: An analysis of the breadth and intensity of impressions. *Communication Research, 28*, 325-347.
9. Hancock, J. T., & Toma, C. L. (2009). Putting your best face forward: The accuracy of online dating profile photographs. *Journal of Communication, 59*, 367-386.
10. Penton-Voak, I.S., Pound, N., Little, A.C., & Perrett, D.I. (2006). Personality judgments from natural and composite facial images: more evidence for a 'kernel of truth' in social perception. *Social Cognition, 24*, 490-524.
11. Riegelsberger, J. (2005). Trust in mediated interactions. Dissertation submitted to the University College, London, UK.
12. Riegelsberger, J., Sasse, M. A., & McCarthy, J. (2003). The Researcher's Dilemma: Evaluating Trust in Computer-Mediated Communication. *International Journal of Human Computer Studies, 58*, 759-781.
13. Rocco, E. (1998). Trust Breaks Down in Electronic Contexts but Can Be Repaired by Some Initial Face-to-Face Contact. In: *Proceedings of CHI 1998*, (pp. 496-502). New York, NY: ACM Press.
14. Rotter, J. B. (1967). A new scale for the measurement of interpersonal trust. *Journal of Personality, 35*, 651-665.
15. Scissors, L. E., Gill, A. J., Geraghty, K., & Gergle, D. (2009). In CMC we trust: The role of similarity. *CHI '09: Proceedings of the 27th International Conference on Human Factors in Computing Systems*, Boston, MA. 527-536.
16. Short, J., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications*. London: John Wiley & Sons.
17. Todorov, A. (2008). Evaluating faces on trustworthiness: An extension of systems for recognition of emotions signaling approach/ avoidance behaviors. In A. Kingstone & M. Miller (Eds.), *The Year in Cognitive Neuroscience 2008, Annals of the New York Academy of Sciences, 1124*, 208-224.
18. Toma, C. L., Hancock, J. T., & Ellison, N. B. (2008). Separating fact from fiction: An examination of deceptive self-presentation in online dating profiles. *Personality and Social Psychology Bulletin, 34*, 1023-1036.
19. Vrij, A. (2000) *Detecting lies and deceit: The psychology of lying and the implications for professional practice*. Wiley, Chichester, England.
20. Walther, J. B., Slovacek, C., & Tidwell, L. C. (2001). Is a picture worth a thousand words? Photographic images in long term and short term virtual teams. *Communication Research, 28*, 105-134.
21. Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal and hyperpersonal interaction. *Communication Research, 23*, 1-43.
22. Wilson, J. M., Straus, S. G., & McEvily, B. (2006). All in due time: The development of trust in computer-mediated and face-to-face teams. *Organizational Behavior and Human Decision Processes, 99*, 16-33.
23. Zheng, J., Olson, J. S., Bos, N., Olson, G. M., & Veinott, E. (2002). Trust without Touch: Jumpstarting long-distance trust with initial social activities. In: *Proceedings of CHI2002*, (pp. 141-146). New York, NY: ACM Press.