CONTEXTUAL DIFFERENCES IN THE DYNAMIC MEASUREMENT OF TRUST IN WEBSITES

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ABSTRACT

The purpose of this study is to better understand a user's trust in web sites designed for three different contexts: commerce, health and news. The study evaluates changes in self-reported user trust ratings as the users interacted with different website elements. Differences in user trust ratings were observed between websites, suggesting changes in trust ratings are likely related to website context. Therefore, consumers may develop different thresholds of trust based on usability, privacy, and content based on the context of the website. The results can be used to design web sites across contexts in order to foster appropriate user trust.

Keywords: Trust, Web Sites, Usability, Dynamic Evaluation

INTRODUCTION

Online trust is defined as “an attitude of confident expectation in an online situation of risk that one’s vulnerabilities will not be exploited” (Corritore, Kracher, & Wiedenbeck, 2003, p. 740). There are a myriad of stimuli, cues, knowledge, past experiences and beliefs that can influence trust. The most frequently cited definition of trust is “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor irrespective of the ability to monitor or control that other party” (Mayer, Davis, & Schoorman, 1995). For the present study, Mayer et al.’s (1995) definition of trust was extended to encompass the growing necessity for trust between humans and technology. Trust was defined as the user’s relationship with an interface and the expectation that the technology (web sites) will correctly perform in a particular situation.

The inherent nature of trust is dynamic (Vega, Sun, McCrickard, & Harrison, 2010); trust can be expected to increase and decrease over time based on reliability and performance factors. Zahedi and Song (2008) introduced the concept that user trust in web sites evolves over time. According to Zahedi and Song, it is essential to observe the causes that enable users to change their level of trust in a website over time. Trust is also subjective and context dependent, as it evolves over time through new experiences (Coetzee & Eloff, 2005). However, most studies look strictly at initial trust and its impact on user intention and behavior (Jarvenpaa, Tractinsky, & Vitale, 2000). To date, there has been very little research that describes how users’ trust in web sites evolves or the time necessary for a user to establish trust (Zahedi & Song, 2008). The few studies that have observed users’ trust in health websites over time (Sillence, Briggs, Harris, & Fishwick, 2006; Song & Zahedi, 2007; Zahedi & Song, 2008) have done so using only a single type of website, such as health infomediaries (online health information providers).

When encountering new information, people compare their current experience to previous experiences and knowledge (Norman, 1983). Well-designed websites can act as a person’s virtual representation of a physical construct. The more congruent the virtual representation is to the individual’s existing mental model of the construct, the more likely the person is to have a comfortable initial interaction. Aligning the website with the user’s expectations also allows users to remember the website (Roth, Schmutz, Pauwels,

Bargas-Avila, & Opwis, 2010). Both initial and subsequent trust ratings of a newly encountered site might be influenced by (1) the degree to which the characteristics of the virtual representation matches the individual's mental model and (2) the individual's expectations of the functional properties of similar types of web sites (see Figure 1). As the individual interacts with the web site, their mental model may change and become more detailed (Roth et al., 2010). It is expected that the user's trust will change as the individual's mental model changes. For this reason, it is extremely important to understand the process by which the user interacts with the website and, in turn, updates their mental model and trust in the website (Figure 1).

Figure 1 User's Mental Model Representation upon Interaction with a Website

This study investigates changes in users' trust in three types of websites (e-health, commerce, and news) as they completed tasks (e.g. searching for single items, information, or articles). The website types were chosen because they are the most commonly used (Fisher, Burstein, Lynch, & Lazarenko, 2008; Russell, 2006). The websites represent three important contexts that warrant comparison with regards to the construct trust in websites. It was anticipated that each of these three web sites types would yield varied levels of trust and criteria for warranting trust from the user. In addition, less popular websites were chosen in order to minimize the influence of brand recognition on trust measurements; 90 percent of participants were unfamiliar with the websites at the start of the study.

BACKGROUND

Over the last twenty years, interaction with websites to complete or expedite tasks has increased tremendously (Quan-Haase & Wellman, 2004). Use of the Internet has become casual, commonplace and expected. Today, the average consumer is willing to provide personal information over the Internet, possibly multiple times daily, through websites that they believe to be trustworthy (Quan-Haase & Wellman, 2004). Consumer website assessment is based on subjective criteria such as previous experiences and beliefs (Roth et al., 2010) that affect the level of trust of the individual during each website interaction (Roth et al., 2010).

Website users may encounter factors that affect the stability of their trust in the sites over time, e.g., the visual layout and content of the site as well as the actions and behavior of web customers (Cyr, Head, & Larios, 2009). It is essential for website designers and providers to understand these factors and how they influence the user's behavior.

Previous research examining the importance of trust in Internet relationships suggests that different types of websites require higher or lower levels of user trust. Roy, Dewit, and Aubert (2001) conducted a study where subjects performed a book-purchasing task on a series of websites with differing interface qualities. The study found ease of navigation, ease of learning, perception and support are key factors for users when interacting with a website (Roy et al., 2001). Contextual differences in use domain may afford different levels of trust from users. For example, trust in an e-commerce site may differ from a user's trust in a health website. Trust is an especially important component in e-commerce as it mediates the relationship between the vendor and customer (Gefen et al., 2003). Additionally, e-commerce websites must overcome the uncertainty of economic transactions that inherently exist in a virtual environment (Grabner-Krauter & Kaluscha, 2003). Online customers' trust levels impact their shopping decisions (Kim, Kim, & Park, 2010). Moreover, customer trust has a positive influence on satisfaction and repurchase intention (Fang, Chiu, & Wang, 2011). When online viewers do not trust e-vendors, they may choose to purchase their product from a different site (Reichheld & Schefter, 2000).

The health industry is a central and growing component of the United States economy (Shi & Singh, 2007). There are many government and medical/health agencies worldwide seeking cost-effective ways to disseminate health information (Fisher et al., 2008). As the number of people using health websites is increasing, exploring which features contribute to assessments of trust is becoming more important. Previous research has examined the relationship between the perceived quality of health websites and the resultant impact on

user trust (Fisher et al., 2008). Researchers determined that in order for health information websites to be effective, they need to be reliable, trustworthy, easy to use, and have some level of computational intelligence to assist in the retrieval of relevant information (Fisher et al., 2008).

The need to provide private information such as credit cards to shop online greatly increases customers' risk perception, which may dissuade or cause consumers to hesitate from shopping online (Roy et al., 2001). If a consumer's trust is too low, their fear of breaches in confidentiality may cause them to have difficulty finalizing a transaction (Grabner-Krauter & Kaluscha, 2003). Gefen et al. (2003) suggest that e-vendors must gain a consumer's trust in order to sustain a productive relationship with them. Therefore, trust is necessary to encourage e-commerce consumers to make purchases (Reichheld & Schefter, 2000). Once trust is established, online customer reviews can be used to increase the user's trust levels (Lee, Park, & Han, 2011).

Most research surrounding news websites has focused on the credibility of the source rather than the concept of trust. For news websites, a key factor in determining credibility is the source of information. However, Kiouisis (2001) claims that trustworthiness can be a facet of source credibility.

METHODS

Participants

Twenty-seven participants took part in this study. The mean age of the participants was 23 years old. Participants were all familiar with the Internet; 85% reported more than two hours a day of Internet use. The majority of the participants (89%) were not initially familiar with the websites used in the experiment.

Experimental Tasks and Design

Two workstations, one for the participant and one for the researcher, were remotely connected to each other. Extraneous information was removed from the participant's website interface, leaving only back, forward, and home buttons in the toolbar. Three different types of websites were chosen for this study. The first was a health information website designed for public education. Health information sites are designed to help visitors obtain information without seeing a doctor and participate in virtual healthcare activities (Fisher et al., 2008). The second website was an e-commerce site. E-commerce sites provide information about the product and enable the consumer to see product details. Specifically, customers can choose

products, purchase products, choose the shipping method, track orders, and rate the product easily from the website (Xue, Harker, & Heim, 2002). The third site was a news website. News sites collect and publish news on the web.

Participants were asked to complete six to seven specific tasks for the selected three websites. These tasks were adapted from a study conducted by Russel (2006), who used a similar concept for comparing three toy store websites. These tasks included finding single items, information, articles, or customer service (see Appendix A). Each participant's initial trust was measured after a brief encounter with the website. For each site, participants were limited to using the search field for only one of the six (or seven) tasks. This method was loosely based on the Trust Incremental Measurement Evaluation (TIME), which focuses on repetition and taking repeated measures of trust across the pages of a website (Vega et al., 2010).

Within each website, the participants were given one particularly difficult task and one easier task. This method allowed for examination of changes in trust across different levels of task difficulty. A rating scale was used to quantify trust dynamically. The scale for trust was a five-point Likert scale that ranged from no trust to complete trust. If trust is dynamic, then simply asking questions at the completion of the task may unknowingly mask the factors affecting variations in the user's trust (Vega et al., 2010). Therefore, during each task, the user was interrupted every 15 seconds by a single pop-up question asking about his/her trust at that specific moment. There was a two-minute time frame for each task. Some participants could not complete certain tasks within two minutes, especially when the tasks were inherently more difficult. The time data were used to determine whether a correlation existed between task completion time and trust.

Procedure

The study was conducted in a single one-hour session. After signing a consent form, participants were given short written instructions about the study and the opportunity to ask questions to eliminate any ambiguity. The researcher explained the pop-up process and rules such as "the search field cannot be used until specified" and provided clarification such as "the meaning of trust in the context of our study" to the participants. The session was recorded using Cam Studio software.

The same process was used for each of the three websites. The participant was allowed to look at the website for three to four minutes before noting their initial trust level. After recording the participant's initial trust, they began to complete the tasks. The

participant was given two minutes to complete each task. During this period, the task was interrupted every 15 seconds by a pop-up asking the participant for their current level of trust. If the user needed the full two minutes to complete the task, they answered eight pop-up questions per task; however, if they finished sooner, they answered fewer trust rating questions for the given task. For the health and news websites, the participants completed six tasks; for the e-commerce website, the participants completed seven tasks. Upon completion of the tasks for each website, participants were asked to respond to a questionnaire that included 15 validated questions. Using an instrument adapted from Roy et al. (2001) and Flavian et al. (2006), each question evaluated an aspect of the web site such as clutter, ease of navigation, usability, and reliability. The responses were based on a Likert scale ranging from 1 to 5, with five indicating the highest, one indicating the lowest.

HYPOTHESIS

Trust Changes Dynamically over Time

Many studies focus on initial trust. For the purpose of this paper, initial trust is defined as the trust level of the participant before beginning Task 1. Initial trust is based on the first impression, past experience and preferences of the individuals regarding online environments (Koufaris & Hampton-Sosa, 2004; McKnight, Cummings, & Chervany, 1998). Even with the extensive research on the subject, gaps still exist in the research about how trust changes over time. The relationship between initial trust and subsequent trust of web site users was explored in order to identify factors that can influence how the user's trust changes over time. Factors include successful task completion (Uggirala, Gramopadhye, Melloy, & Toler, 2004), the content of the information (Fisher et al., 2008), and interactive website features (Flavian et al., 2006). Initial trust is essential but not the only criterion for determining a user's overall trust in a website (Kim & Prabhakar, 2004; Vega, et al., 2010).

In addition to initial trust, three other measures of trust were used (Table 1). For the purpose of this study, "middle trust" is defined as the last trust rating given at the end of Task 3. Average trust is defined as the mean of all trust scores of the participant (excluding the initial trust score). For example, if a participant gave a total of 37 trust scores throughout the six tasks, their average trust rating would be the average of their last 36 trust scores. "Final trust" is defined as the last trust score given after Task 6 (or, when applicable, Task 7).

Table 1 The Definition of Trust Terms Used in the Study

Average trust: The mean of all trust scores of the participant (excluding the initial trust score)
Middle trust: Last trust rating given at the end of Task 3
Final trust: The last trust score given after Task 6 (or when applicable, task 7).

The relationship between middle trust and initial trust was evaluated to determine if initial trust had an effect on a participant's trust level after the completion of Task 3. It was expected that after only completing three tasks, the initial trust rating of the website would still influence the user's trust level, thus creating a correlation between initial trust and middle trust (H1a).

Taking this hypothesis into consideration, it was also expected that the initial trust score would affect average trust. With only six tasks, it was expected that there would be a correlation between initial trust and average trust (H1b).

After completing the final task, participants were asked to state their final trust score for the particular website. It is expected that initial trust is not a predictor of final trust given the belief that trust is dynamic (Zahedi & Song, 2008) (H1c).

H1a: Initial trust is predictive of middle trust.

H1b: Initial trust is predictive of average trust.

H1c: Initial trust is not predictive of final trust.

Trust is Context Dependent.

For this study, three different websites in three different contexts were used: commerce, health, and news. Since a user's trust level may depend on the type of website that they are using (Coetzee and Eloff, 2005), it was expected that trust scores would differ across website types for each individual (H2a). For instance, commerce websites deal with credit card information, while health websites may hold sensitive health information. Just because an individual declares high trust for a health website does not mean the individual will also declare high trust for a commerce website. In addition, many studies support the notion that usability has a strong impact on trust (Roy et al., 2001). One study indicated that users have different mental models for web features on different websites (Roth et al., 2010). For this reason, a website usability assessment (metrics) questionnaire was conducted for each site after completion of all tasks. This questionnaire included items such as clutter, responsiveness, ease of use, usability, lack of

feedback, etc. While these metrics can play a large role for some users and in turn significantly correlate with trust scores, all users were not expected be heavily impacted by these metrics. Therefore, the correlation between usability metrics and trust scores should vary across the websites (H2b). Kirakowski and Cierlik (1998) propose that task completion time may affect the evaluation of a web site's usability. In addition, task completion time should have an effect on users' trust. (H2c).

H2a: Trust is a subjective phenomenon.

H2b: The relationship between trust scores and usability assessments will vary across the three website types.

H2c: Total task completion time will affect trust scores.

RESULTS

Two types of data were collected throughout the study: (1) trust scores (taken at 15 second intervals during a task) indicating changes in trust ratings throughout the participant's interaction with the website and (2) survey questions after the completion of all tasks. Table 2 shows the descriptive statistics of the survey.

Table 2 Mean Scores of Usability Metrics

Questions	Health	Commerce	News
Usability (simplicity)	3.6 (0.21)	3.7 (0.18)	1.8 (0.20)
Usability (findings)	3.3 (0.22)	3.4 (0.18)	1.8 (0.21)
Usability (navigation)	3.6 (0.19)	3.6 (0.17)	1.7 (0.21)
Clutter	3.6 (0.19)	3.5 (0.20)	1.2 (0.10)
Lack of feedback	3.4 (0.19)	3.6(0.19)	2.1 (0.24)
Honesty	3.8 (0.17)	3.3 (0.21)	2.4 (0.23)
Benevolence	3.7 (0.18)	3.5 (0.18)	2.4 (0.21)
Reliability1	2.6 (0.20)	2.7 (0.22)	3.9 (0.29)
Reliability2	3.8 (0.13)	3.4 (0.19)	2.3 (0.22)
Readability of interface	3.9 (0.15)	4.1 (0.12)	2.5 (0.20)
Ease of use	3.1 (0.24)	3.8 (0.21)	2.3 (0.24)
Perceived Interface quality	3.8 (0.21)	3.6 (0.19)	1.1 (0.06)
Font size	4.2 (0.13)	4.0 (0.15)	2.3 (0.27)
Brand awareness	1.6 (0.19)	2.1 (0.25)	1.3 (0.10)
Responsiveness	3.9 (0.13)	4.0 (0.13)	3.6 (0.24)

H1b: Initial Trust is Predictive of Average Trust.

An ANOVA test was conducted to examine the relationship between initial trust and average trust for each of the three websites. The results indicate a significant correlation between initial trust and average trust for the health, commerce and news sites ($F = 5.477$, 6.549 , and 11.965 and $p = 0.027$, 0.016 , and 0.002 , respectively). For the news site, initial trust values were relatively low, and there was a general increase in average trust values, showing that trust does not remain static. For the health and commerce sites, an initial cluster around a level-four trust rating was observed. Average trust levels also pooled around ratings of three and four. Since the average trust level includes trust measures from early in the two-minute period, there is a natural tendency for the initial and average trust levels to correlate, even if trust changes substantially between task 0 and task 6. Given these results, we fail to reject the null hypothesis H1b.

H1a and H1c: Initial Trust is Predictive of the Middle Trust Level but Not Predictive of Final Trust.

Regression tests comparing initial trust levels to the middle trust levels found the relationship between initial trust and the middle trust level to be insignificant (commerce, $p = 0.082$; health, $p = 0.096$; news, $p = 0.064$). This shows that initial trust is a poor predictor of the middle trust level measured after task 3. This result rejects hypothesis H1a.

Regarding final trust, initial trust was found to be a very poor predictor of final trust. This finding supports hypothesis H1c (commerce, $p = 0.111$; health, $p = 0.977$; news, $p = 0.059$).

H2a: Is Trust A Subjective Phenomenon?

A correlation test was conducted and illustrated with a scatter plot matrix. This matrix shows the linear relationship of trust scores between each website (N = News, C = Commerce, and H = Health). Figure 2 quantifies the degree to which trust levels are subjective and unique; it illustrates that an individual participant may declare high trust for one website and low trust for another. Reviewing the correlation between sites and across subjects, the correlations are modest in size (H&C, $r = 0.195$; H&N, $r = 0.536$; and N&C, $r = 0.437$). This indicates that the variance in trust levels is not solely a function of a subject's personal level of trustworthiness or interpretation of the numeric Likert scale. The results illustrate substantial (within-subject) differences in trust level assignment.

Hypothesis H2a, trust as a subjective phenomenon, is supported by these results.

Figure 2 The Relationship for Trust Scores Across the Websites

H2b: The Relationship between Trust Scores and Usability Assessments Will Vary Across the Three Web Site Types.

Table 3 shows the correlation between the average trust data and survey questions. The highlighted scores indicate significant correlation between the metrics in the survey and the trust scores. For each website, the average trust scores and the average score for each survey metrics were calculated. A correlation test was performed to determine if significant correlations exist between each combination of average trust and a survey question, using 25 degrees of freedom with $\alpha = 0.10$. It was determined that trust scores varied greatly across website types. The correlation test results indicated that usability was related to trust for e-commerce website ($F(1, 24) = -0.6712^*, 0.5363^*, 0.4175^*, p = 0.1$), but it was not significant for the news website (0.1384, 0.042, 0.214). For the news site, honesty and reliability correlated with trust scores ($F(1, 24) = 0.5317^*, 0.5916^*, p = 0.1$). Therefore, these findings support hypothesis H2b.

H2c: Total Task Completion Time Will Not Affect Trust Scores.

An ANOVA test was performed to examine the relationship between trust scores and completion time of the task. The results suggest that while there are inter-site differences (e.g., the news site was less trustworthy and tasks could be completed faster),

there do not appear to be any clear trust/time relationships within sites as proposed in the hypothesis (Health ($F = 2.368$, $p = 0.136$), Commerce ($F = 2.349$, $p = 0.138$), News ($F = 1.356$, $p = 0.255$). Therefore, hypothesis H2c is not supported.

Table 3 Correlation and Regression Results for Trust Scores and Survey Items

Correlation	Health	Commerce	News
Usability (simplicity)	0.2706 ($p = 0.177$)	-0.6712* ($p = 0.001$)	0.1384 ($p = 0.493$)
Usability (findings)	0.3681* ($p = 0.052$)	0.5363* ($p = 0.004$)	0.0424 ($p = 0.815$)
Usability (navigation)	0.1378 ($p = 0.492$)	0.4175* ($p = 0.032$)	0.214 ($p = 0.293$)
Clutter	0.0878 ($p = 0.678$)	0.4255* ($p = 0.028$)	0.4169* ($p = 0.027$)
Lack of feedback	0.5154* ($p = 0.007$)	0.3697* ($p = 0.063$)	0.5282* ($p = 0.004$)
Honesty	0.3612* ($p = 0.064$)	0.5965* ($p = 0.013$)	0.5317* ($p = 0.004$)
Benevolence	0.1961 ($p = 0.313$)	0.4546* ($p = 0.016$)	0.5709* ($p = 0.001$)
Reliability1	-0.365* ($p = 0.055$)	-0.4181* ($p = 0.033$)	-0.2791 ($p = 0.172$)
Reliability2	0.1852 ($p = 0.363$)	0.6183* ($p = 0.007$)	0.5916* ($p = 0.001$)
Readability of interface	0.1211 ($p = 0.558$)	-0.5088* ($p = 0.008$)	0.2945 ($p = 0.142$)
Ease of use	-0.0844 ($p = 0.664$)	0.3896* ($p = 0.055$)	0.1982 ($p = 0.306$)
Perceived Interface quality	0.265 ($p = 0.157$)	0.3789* ($p = 0.050$)	0.3976* ($p = 0.045$)
Font size	0.1864 ($p = 0.326$)	0.0833 ($p = 0.709$)	0.3866* ($p = 0.046$)
Brand awareness	0.1857 ($p = 0.360$)	0.2262 ($p = 0.267$)	0.0078 ($p = 0.977$)
Responsiveness	0.164 ($p = 0.419$)	0.5137* ($p = 0.007$)	0.2223 ($p = 0.251$)

DISCUSSION

Current research regarding user trust in websites has not addressed its dynamic nature and tends to assume that initial trust is positively correlated with overall trust (Grabner-Krauter & Kaluscha, 2003; Jarvenpaa et al., 2000; Kim, Song, Braynov, & Rao, 2005). However, this study suggests that there is at best a weak correlation between initial trust and final trust (commerce, $p = 0.111$; health, $p = 0.977$; news, $p = 0.059$) or initial trust and middle trust (commerce, $p = 0.082$; health, $p = 0.096$; news, $p = 0.064$). Although there is some effect of initial trust on average trust in the early phases, over time, an individual determines their trust without resorting back to their initial trust level (health, $F = 5.477$, $p = 0.027$; commerce, $F = 6.549$, $p = 0.017$; news, $F = 11.965$, $p = 0.002$, respectively). Therefore, the findings assert that initial trust is not a strong predictor of final trust, as indicated by the significant change in trust ratings from task 0 to task 6. This finding also supports the theory that trust dynamically changes over time (Zahedi & Song, 2008). When a user encounters a website, they quickly formulate an initial level of trust in the site based on their initial mental model. Then, as they continue to interact with the site, their mental model changes and influence their assessment of trust (see Figure 1).

Average trust scores for each website type differed across different users. It can be inferred that users have different values of attributes related to trustworthiness and different thresholds for assessing trust or interpret the meaning of the trust construct in different ways (Coetzee & Eloff, 2005). Accordingly, two subjects may associate the same real level of trust with different numeric scores. These differences are based on the user's mental model. Each individual may have a different interpretation of trust in their mental model; consequently, there would be a variety of trust scores for a single task. Users provided different trust scores for each website type. Most participants declared low trust scores for the news website ($n = 27$, $M = 2.07$) and high trust scores for health and commerce websites ($n = 27$, $M = 3.47$, $M = 3.36$, respectively).

This study evaluated three distinct types of websites (commerce, health and news) using a consistent set of design factors and usability measures to better understand the features that contribute to user trust for each type. Usability, ease of use, and level of clutter measures were positively correlated with trust levels ($F(1, 24) = 0.671^*$, 0.536^* , 0.417^* , $p = 0.1$, usability questions for e-commerce). There was also an insignificant correlation between trust and usability for the news site, unlike the ecommerce site ($F(1, 24) = 0.138$, 0.042 , 0.214 , $p = 0.1$). This finding may be related to content and web

features such as clutter and reliability. It can also be inferred that usability is more important for users' perception of trust in commerce websites than news websites. Yoon (2002) reported that trust and web site properties have a positive correlation and can influence the behavior of the consumer, especially with regards to online commerce. This study found homogeneity in responses to website feature metrics within sites; however, they varied in prevalence across sites (see Table 2). Only the trust scores for the e-commerce site significantly correlated with all metrics (except font size and responsiveness) (between 0.369* and 0.671*, $p = 0.1$). Some site feature metrics (i.e. ease of use, clutter, etc) did not have a significant correlation with trust scores for the health website ($F(1, 24) = 0.084$ and 0.088 , $p = 0.1$, respectively). Perhaps the importance of accurate information for health websites causes an emphasis on metrics such as reliability as opposed to ease of use and clutter. Future research should explore these concepts, as they have important implications for the design of health websites and health information technologies.

Mean trust scores were shown to vary across sites ($n = 27$, $M = 2.04 \sim 3.47$) but very little within each site. However, they do not appear to vary with complexity or the nature of the tasks. Furthermore, task completion time did not significantly affect trust. This suggests that the usability features of the site hold more weight than the difficulty of the task when determining user trust in websites.

CONCLUSION

This data indicates that regardless of a user's initial trust level, their trust level changes over time. Website designers cannot depend on a strong initial trust level to foster consistent levels of trust. Sites need to have features that sustain the appropriate level of trust over time. Designers need to methodically design websites for appropriate trust, e.g., avoiding overtrust or distrust. Overtrust transpires when people place more trust in a technology than is warranted (Parasuraman et al., 1993). This can result in complacency and limit a users' monitoring of the technology to the necessary extent (Wickens, Gordon, & Liu, 2004). If a user places too much trust in an e-commerce website, they may become complacent in checking for privacy and security measures, thus leaving themselves vulnerable. With a news website, overtrust may result in a person blindly believing information that has clear bias. While being misinformed on a particular news event may not result in large consequences, placing too much trust in a health website might have life-threatening consequences. If a user overtrusts a health website,

they may decide not to seek professional medical care when it is truly necessary. Regardless of the degree of severity, website designers should aim to avoid overtrust.

Low trust in websites also has consequences. For instance, when users do not trust e-commerce sites, they will not purchase products from the company. If a person's trust is too low regarding a news website, they may choose not to return to the site. Once again, these consequences can become more severe in the context of health websites. Health consumers' low trust may result in missed benefits from empowering information on the website. An appropriate trust level should be the ultimate goal when considering trust in website design.

It has been suggested that website usability may have an effect on user perception of the site and thus on the expected degree of trust (Flavian et al., 2006). Better website usability may have a positive effect on users' perceived interactions. For example, 40% of consumers who failed to find their target item or information on the website due to poor usability did not return to the site (Manning, McCarthy, & Souza, 1998). This is a typical example of poor usability and can result in millions of dollars in lost sales. For e-commerce sites, low usability is one of the main obstacles preventing consumers from making online transactions (Tarafdar & Zhang, 2005). Findings from this study support this argument: when consumers reported better website usability, they reported more trust in the site.

Factors affecting trust vary across different types of websites. For instance, in health websites, the content and quality of information are the leading determinants of a user's trust. These results imply that designers might prioritize different features depending on the type of website; for instance, on a news website, reliability of information might be more important than ease of use. Moreover, the results imply that brand awareness was not a significant factor for predicting overall trust ($F(1, 24) = 0.185, 0.226, 0.007, p = 0.1$). If users have previous positive impressions or experiences with the website, brand awareness may have some minor effect on initial trust.

Limitations from this study provide new opportunities for future studies. Although the sample size was sufficient for the analyses conduction, it was relatively small, and the majority of the participants were students. Future research should be conducted with a larger sample size from a broader base of web users. In addition, trust is expected to be dynamic and constantly changing. However, with only six tasks in the entire experiment, the first few trust ratings will likely impact the calculation of the average trust score. Perhaps with more tasks, this would not be the case. Another limitation is that only one item is used for each variable, which makes it harder to measure reliability. Future

research should investigate implementing pop-ups at different time intervals. Future studies should use different task types or task lengths to further examine how trust changes dynamically. New evaluation methodology, such as a time-related evaluation of trust, may be created to measure trust dynamically. Future experimental research may also explore which design elements have an effective impact on user trust depending on website type; for instance, perceived interface quality might be more essential for news or commerce websites compared to health websites. Finally, future studies evaluating websites, trust, or adoption of technologies should incorporate dynamic measures of trust.

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APPENDIX

Table A1 Task List Used in the Experiment

<i>Havenworks.com</i>	
Task 1	Find Barack Obama's Inauguration speech
Task 2	Find contact information for this company's customer service
Task 3	Find the part of site that has Wisconsin-related news articles
Task 4	Find the third article on the Sport page
Task 5	Use the search engine to find an article related to UW-Madison
Task 6	Find an article from November 4, 2008
<i>Healthline.com</i>	
Task 1	Find the article "Diabetes Type 2: Take Control"
Task 2	Find contact information for this company's customer service
Task 3	Find out how to treat a minor strain
Task 4	Find the symptoms of ADHD
Task 5	Use the search engine to find an article about narcolepsy
Task 6	Find local cost of physical therapy
<i>Newegg.com</i>	
Task 1	Find a torque wrench
Task 2	Find contact information for this company's customer service
Task 3	Find a clock valued over \$150
Task 4	Find a man gold ring that say "DAD" on it and add it to the cart
Task 5	Use the search engine to find headlights 95-01 Impreza and add it to the cart
Task 6	Go through the checkout process, but stop before entering your credit card and go to your shopping cart
Task 7	Empty your shopping cart

Table B1 Survey Questions

Usability_simplicity:	This website is simple to use, even when using it for the first time
Usability_finding:	It is easy to find the information I need
Usability_navigate:	This website is easy to navigate
Clutter:	This website is well organized
Lack of feedback:	When I am navigating this site, I feel in control of what I can do
Honesty:	I trusted the information provided on the website
Benevolence:	This website is able to get you the information I want
Reliability1:	This website was frustrating to use
Reliability2:	I felt confident about the reliability and quality of the information provided
Readability of interface:	The wording on the website was easy to understand
Ease of use:	It did not take to many steps to get to the information
Perceived interface quality:	The website design is attractive
Font size:	The text on the site is large enough to easily read
Brand awareness:	I've heard of this website before
Responsiveness:	The website responds quickly