

How Emotions Influence Trust in Online Transactions Using New Technology

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Online trust has recently become a critical issue, due to widely publicized information leaks, account hacking, and privacy breaches. This study investigates whether or not emotions have effects on trust in online transactions, particularly when a new technology is involved. We explored the effects of happiness and sadness on participants' choice of a payment method for online transactions. Forty-four undergraduates participated in online transactions with a prototype webpage after either happiness or sadness induction, compared to a neutral group. Different emotion mechanisms would predict different effects of each emotion. Results showed that when the item cost was relatively low (\$10), a higher percentage of participants in both emotion conditions selected a novel payment method than those in a neutral condition. With more expensive items (\$50 and \$100) the number of participants who chose the new option equally increased across all conditions because participants could benefit relatively a large amount of discount (10%) from the novel payment method. Various emotion mechanisms are discussed with our results.

INTRODUCTION

It seemed as if the issue of web security was diminishing. Users seemed to be inching toward an almost cavalier attitude toward online transactions, willingly supplying personal and credit card information to websites around the world that claimed to protect customer data to the maximum. However, the recent spate of information leaks, account hacking, and privacy breaches by both governments and corporations seems to have reawakened people's distrust of both technology and the corporations that encourage us to use it. Research (cited in Horsager, 2011) shows that 86% of consumers in the United States and Europe report that they are less trusting of companies than they were five years ago.

Trust can be difficult to define, but many definitions include the notion of *vulnerability*. Pavlou (2003) defines it as the belief that the other party will behave in a socially responsible manner, and by so doing, will fulfill the trusting party's expectations without taking advantage of its vulnerabilities. Similarly, Dunn and Schweitzer (2005) state that trust is the willingness to accept vulnerability based upon positive expectations about another's behavior. The definition of vulnerability often includes a reference to emotions. In fact, Jones and George (1998) propose that trust results from the interaction of an individual's values, attitudes, moods, and emotions. The ultimate goal of the present study is to examine how emotions influence trust with the use of new technology.

Effects of Trust on Acceptance of Web Technology

Trust is linked to uncertainty, and the uncertainty prevalent in most online transactions means that the importance of trust is elevated in e-commerce (Pavlou, 2003). Trust helps to reduce people's uncertainty and also reduces the complexity of interactions because trust means that people do not need to carefully consider every possible outcome of every interaction (Gefen, 2000). Online transactions typically involve two types of trust: trust in the integrity of the transaction (behavioral risk) and trust in the infrastructure supporting the transaction (environmental risk).

Perceived risk is another element that negatively affects technology acceptance. Interestingly, Jarvenpaa, Tractinsky, and Vitale (1999) found that people with a higher level of web experience demonstrate an increased level of perceived risk and a lower level of trust, whereas one might assume that familiarity would decrease perceived risk and increase trust.

Familiarity with a specific retailer *does* help build trust in a website. This often involves a person having prior experience with the retailer offline, where trust can be built up gradually through multiple interactions before the person makes a commitment to a purchase. Even though familiarity with a retailer can build trust, Gefen (2000) indicated that a person's *disposition to trust* is the biggest factor in determining whether he or she will trust a new technology.

How Emotions Influence Trust

Emotions have an effect on trust, and emotions with a positive valence typically increase people's level of trust. A series of experiments performed by Dunn and Schweitzer (2005) found that emotions characterized by other-person control and weak control appraisals, such as happiness, influence trust significantly more than emotions characterized by situational control, such as sadness.

Dunn and Schweitzer also discovered that emotions influence trust more when there is not much relevant information available about the trustee. When a person has relevant information about the trustee, judgments about trustworthiness are not based on emotions; in this case, a preformed trust judgment may be used.

How Emotions Influence Technology Use

Beaudry and Pinsonneault (2010) studied emotions relating to people's usage of a new information technology (IT) system and developed a framework based on the appraisal tendency framework (ATF). ATF suggests that each emotion has motivational properties that affect the appraisal of subsequent events and actions. For example, since sadness usually occurs when a negative event is seen as resulting from factors they cannot control, sad people will blame a new event on situational factors and then adapt.

Beaudry and Pinsonneault found that people's emotional reactions to new IT events are determined by primary (is it an opportunity or a threat?) and secondary (how much control do I have over the consequences?) appraisal. They conclude that it is important to note that it is not the IT event or the IT artifact itself that triggers emotions but the unique psychological and evaluative assessment of the event/artifact by an individual. This is why we need to look into emotion and affect theories more deeply.

Affective Mechanisms

Since this study focuses specifically on the discrete emotional states of happiness and sadness, it is beneficial to examine some potential affective mechanisms by which those emotions can influence technology users and their ability to trust.

While the exact definition of trust is still a source of debate, trust can be thought of as a combination of judgment and decision-making. Judgment and decision-making, in contrast to trust, have abundant precedents. Several different affective mechanisms potentially guide user behaviors in their proclivity to trust a new online payment method. First, according to the *levels-of-focus hypothesis* it is possible to divide cognitive processing into two types: local processing and global processing (Gasper, 1999). Global processing is regarded as a quick, heuristic, broader level of processing (Gasper, 2002). Local processing, on the other hand, is considered to be a narrower, slower, and substantive process (Bless et al. 1995). Studies have demonstrated that global processing has been associated with positive emotions, whereas local processing is associated with negative emotions.

Another widely studied mechanism that might be considered important for the understanding of human-technology trust is the *mood-congruent effects*. Mood congruency is a phenomenon wherein people in positive valence emotional states would predict higher probabilities of positive events than the neutral group (Forgas, 1995). On the other hand, people who are experiencing a negative valence emotion predict higher probabilities of negative events than people in neutral states. In short, happy users might select a new option because of the relatively low predicted probability of negative events (such as a potential scam). Further, sad users could perceive new technologies (such as a novel online shopping payment method) as negative relative to people in neutral or happy conditions and thus, are not likely to select the new method.

The Affect Infusion Model (AIM) (Forgas, 1995) provides more justification of this mood-congruent effect in our experimental situation. The AIM identified the relationship between four judgmental strategies and the degree of affect infusion into judgments. Affect is unlikely to influence judgments in a mood-congruent direction during *direct access processing* and *motivated processing*. Direct access processing is used when the target is either highly familiar or typical, a relevant past judgment can be directly accessed in memory, and there is little internal or external demand for reprocessing. Similarly, when highly targeted motivated processing is used, the mood-congruent effects are

not likely to occur. In contrast, affect is likely to influence judgments in a mood-congruent direction during *heuristic processing* and *substantive processing*. Heuristic processing is used when the target is simple or highly typical, the personal relevance of the judgment is low, or there are no specific motivational objectives. In substantive processing, the judge is required to select, learn, and interpret novel information about a target and relate this information to preexisting knowledge structures.

Dunn and Schweitzer (2005) studied how different types of trust judgments might be affected differently by incidental emotions. With trust, one factor that moderates the relationship between emotions and trust is the familiarity of the trustee. They suggest that when the truster has little history with the trustee (e.g., an acquaintance), he or she will use heuristic information processing to form a trust judgment; as a result, trust judgments of unfamiliar trustees are frequently influenced by the mood-congruent effects, which is similar to our experimental environment. When the trustee is well known to the truster, trust judgments are likely to involve either direct access or substantive information processing. Thus, in our experiment the mood-congruent effects might occur with happy participants who are likely to be involved in heuristic processing.

In contrast to the traditional mood-congruent effects, research has also suggested specific emotional effects. For example, in a study (Gallagher & Clore, 1985) angry and fearful participants were asked to make judgments about whether a person deserved to be blamed and about the likelihood of negative life events. While angry participants reported higher assessments of blame and lower assessment of risk, fearful participants reported the reverse. In a conceptually similar study (Raghunathan & Pham, 1999), researchers conducted three experiments using gambling decisions (Experiment 1 and 3) and job options (Experiment 2). Results consistently showed that sad individuals were biased in favor of high-risk/high-reward options, whereas anxious individuals were biased in favor of low-risk/low-reward options. These specific effects of different negative emotions can be explained by the *cognitive appraisal mechanism* (Ellsworth & Smith, 1988), which proposes unique appraisal dimensions that are important in differentiating emotional experience. According to the cognitive appraisal mechanism, anxiety primes an implicit goal of uncertainty reduction, whereas sadness primes an implicit goal of reward replacement because sadness is associated with the loss or absence of a reward.

When it comes to risk perception research, positive moods have shown a risk aversion. In an experiment with a roulette game, participants in a positive mood were more risk-averse than participants in a control group (Isen & Geva, 1987). A *motivational explanation* can account for this. People in positive moods are not likely to take risks in order to maintain their current happy state (Isen, 1987; Wegener, Petty, & Smith, 1995).

The Current Study and Hypotheses

This study aims to investigate the impact of emotional states on trust in the context of online purchasing

transactions. In particular, this experiment explores the effects of happiness and sadness on participants' choice of the payment method for online transactions (which is operationalized as "trust"). As shown above, there are some conflicting predictions based on diverse affective theories and mechanisms. Therefore, in this exploring study, we hypothesize both aspects.

H1) The levels of designated emotions will increase after the mood induction procedure.

H2-a) Participants in a happy condition will more likely select the new payment option than those in a neutral condition (based on the mood-congruent effects).

H2-b) Participants in a happy condition will less likely select the new payment option than those in a neutral condition (based on the motivation explanation).

H3-a) Participants in a sad condition will less likely select the new payment option than those in a neutral condition (based on the mood-congruent effects).

H3-b) Participants in a sad condition will more likely select the new payment option than those in a neutral condition (based on the cognitive appraisal mechanism).

METHOD

Participants

Forty-four undergraduates (34 male, 10 female; mean age = 20; 15 happy, 10 male; 15 sad, 12 male; and 15 neutral, 12 male) participated in this study for partial course credits.

Experimental Design

This study employed a mixed factorial design. Between-subjects measures include measures of subjects' payment method selection for three different emotional conditions (happy, sad, and neutral). Within-subjects measures included three self-report emotional status questionnaires that participants completed at three points during the experiment.

Procedure

After signing an informed consent statement, each participant was led to a computer station equipped with a desktop computer and set of headphones. On each computer was a Microsoft Excel file containing three identical emotional self-report questionnaires. Participants were instructed to indicate their emotional status on the 7-point Likert-type scale and report their answers by typing directly in the Excel file. The emotion rating was given three times: before induction, after induction, and after all tasks were completed. After completing the emotional self-report, participants were presented with a mood induction video (a different video for each condition). Next, participants completed another self-report, identical to the first one. Participants were then instructed to perform an online shopping task on a website created for the study, which is illustrated in Figure 1. (The online shopping task is described below.) Finally, after finishing the shopping task, participants completed the emotion rating again. Participants were excused and were given course credits for their participation.

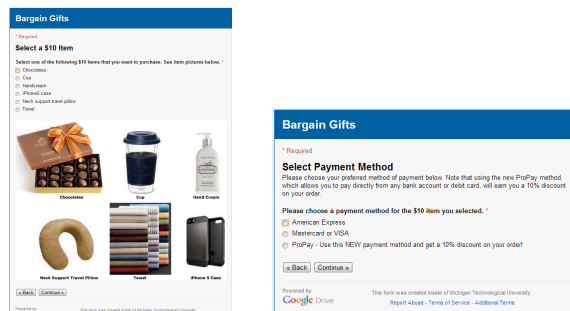


Figure 1. Screenshots of mocked-up website.

Videos

Participants were asked to watch video clips. Three video clips were used, one for each condition. Each clip lasted three to five minutes, and each was previously validated, either directly or by previous research.

Happy video clip. The happy video clip was from the movie *Wall-E*. The scene depicts two anthropomorphized robots in a celestial dance with cheerful, upbeat music playing in the background. This clip has been validated in a study investigating new versus old video clips in their ability to induce mood (Bartolini, 2011). In this study, it was demonstrated to be the best of a wide array of videos including many traditional mood induction videos such as *When Harry Met Sally*.

Sad video clip. The sad video clip was a scene from the movie *My Girl*. The scene depicts a funeral of a young boy as a friend grieves his death. A young girl is crying, exasperated, and confused about her friend's death. This video was also validated by Bartolini's study (2011) and was rated the best video for inducing a sad mood.

Neutral video clip. The neutral video clip was taken from an informational/instructional video about low-slope roofing. In this clip, a man describes proper techniques, tools, and methods for putting shingles on a roof. Previous research established that instructional videos such as this are very effective for inducing a neutral mood state (Johnson & Fredrickson, 2005).

Shopping Task

The shopping task required participants to navigate a mock Internet website (Figure 1) created for the study which participants could use to purchase a variety of items. The site opens with brief instructions stating that users will be shown sets of items of varying prices that they can purchase. (The items themselves and which ones were purchased are not variables of interest.) Proceeding to the second page, the participant enters his or her age, gender, and country of origin (not a variable of interest). On the next page, participants are presented with a list of items selling for ten dollars each with accompanying pictures; participants are required to choose one item. After selecting an item to purchase, the participants "check out" from the store. The checkout page displays three payment options: American Express, VISA or MasterCard, and ProPay. The first three (American Express, VISA and MasterCard) are traditionally used credit cards. ProPay is a fictional purchase method

which has an added bonus attributed to it, namely, a ten percent discount on the purchase. This procedure was then repeated for items costing \$50 and \$100. Despite being a confounding variable, the ten percent discount was included to try to entice participants who would otherwise ignore the new payment option due to heuristic biases.

RESULTS

Manipulation Check

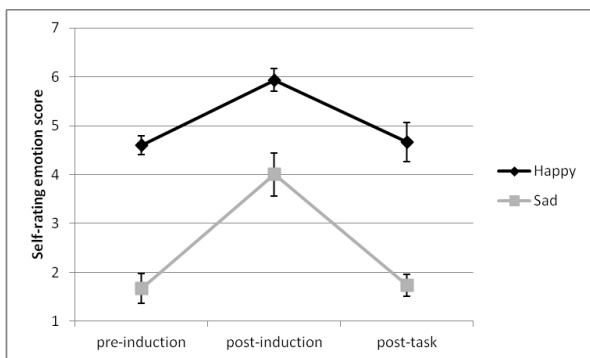


Figure 2. Self-reported emotional states using the 7-point Likert-type scale in pre-induction, post-induction, and post-task. Both emotional levels significantly increased after the induction session.

The participants reported reliably higher ratings for happiness and sadness on post-induction tests relative to pre-induction tests (H1 supported). A paired samples t-test revealed successful mood induction results for both happy, $t(14) = -7.14, p < .0001$, and sad, $t(14) = -4.54, p < .001$, conditions (Figure 2).

Effects of Emotions on a Choice of a Payment Method

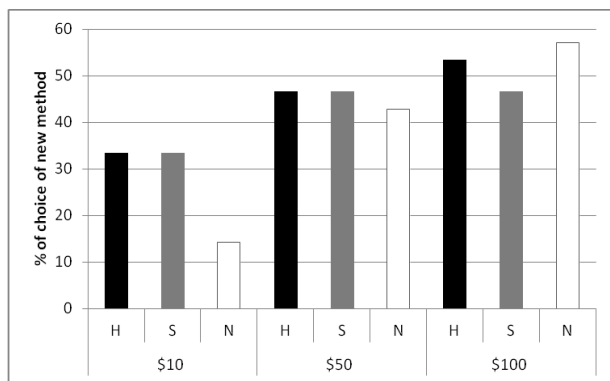


Figure 3. Percentage of the participants who chose ProPay (the new payment method) to purchase their items.

For the payment option choice among the alternatives, there were clear differences depending on emotions when the price is relatively low (\$10). Five participants each in the happy and sad conditions chose the new payment option (ProPay) and the remaining ten participants chose VISA or MasterCard (nobody chose American Express). However, only two participants in the neutral condition chose the new

payment option and twelve participants chose the traditional credit cards. This distinction was statistically confirmed by analyzing the frequency of the choice in each condition: Actual frequencies were not significantly different from the case in which all frequencies are equal for both emotion conditions, $\chi^2(1, 15) = 1.67, p > .05$, whereas actual frequencies were significantly different from the case in which all frequencies are equal in the neutral condition, $\chi^2(1, 14) = 7.14, p = .008$. It means that in the neutral condition, a significantly lower portion of participants chose the new payment option than those in both emotion conditions (H2-a and H3-b partly supported). However, this trend is not shown in either the \$50 or \$100 case. Based on this result, we found that there was a clear difference in payment option selection depending on price (Figure 3).

DISCUSSION

Above all, three-timing manipulation checks made it possible to determine if mood induction was successful rather than assuming the participant did not come to the experiment in a particular mood or emotional state. Moreover, adding these manipulation checks afforded an opportunity to determine if participants' moods lasted throughout the experimental tasks or were transient and faded quickly after induction. The emotion induction was successful, which confirms that the selected videos were capable of eliciting the desired emotions. After the experiment, the emotional states seemed to decrease and return to the original point, which requires further research to determine whether emotions clearly lasted during the task or quickly diminished while doing the task.

With lower priced items (\$10) a higher percentage of participants in both emotion conditions chose the new payment method than those in the neutral condition. The mood-congruent effects can provide an explanation of the choice of happy participants. Happy participants might expect that a happy event will likely occur based on their positive mood. The cognitive appraisal mechanism can account for the choice of sad participants. They might need more reward, which led them to the risk-seeking choice.

With relatively higher priced items (\$50, \$100) equally more participants in all conditions chose the new payment method. This can be easily explained because, with higher prices, participants can get incrementally more benefits from the discount (10%). In other words, even with lower benefits (around \$1 with \$10 items), participants in a certain emotional state (either positive or negative) seem to be more vulnerable to a trust issue and willing to be engaged in the use of a new technology.

CONCLUSION AND FUTURE WORK

We demonstrated that emotions could have subtle effects on people's trust in online transactions and on actual behaviors. Even though this is a good start, we can improve our study further. We can remove the advertising discount for the new payment method to avoid confounding. The discount could have influenced people's decisions independent of emotion. We can consider other personal information, such as personality, level of Internet and web shopping

experience, etc. We can also separate the issue of trust in the website from trust in the payment method. Studies have shown that trust in a site itself is different from trust in the site's infrastructure. We would need to develop a creative way to somehow cause people to feel trust in the website, perhaps by associating it with a well-known site. Other types of emotions can be explored further. For example, Beaudry and Pinsonneault (2010) made a strong case for studying anxiety, excitement, and anger in connection with IT use.

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