

## **The social influence of users' emotional expression on the acceptance of information systems by peer users**

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In memory of Ofek Feinblit who inspired this work.

### **Abstract**

Information systems have crucial functions in a modern organization. Yet, for such technologies to fulfil their goals, they must be accepted and used by the employees in their organizations. Present models explaining acceptance and use of technology are somewhat limited due to their strong focus on the cognitive and behavioral factors influencing user adoption of information systems, while mostly ignoring affective factors that are likely to play an important role in this process. Research that does consider affective factors typically focuses on the affective reactions of users of the systems and how these influence aspects such as system acceptance. Recently, psychological research has established the crucial role of emotions and other affective states in basic human functioning. In particular, psychological research has stressed the important social function of emotions by indicating how the emotion of one individual may affect others. This study examined the effect on one user's emotional expressions, emitted in response to his or her experience of assimilating a new information system, on peer observers who are also about to be exposed to the new system and intend to use it. Specifically, the research examined the effect of anger and shame versus emotional neutrality, expressed by users of a new information system on peer observers who also are about to be exposed to the new system in aspects of positive and negative emotions, perceived performance expectancy, perceived effort expectancy, the observer's expectation that important others think he should use the system and observer's intentions to use the IS. In two different studies, participants, students from university of Haifa, were asked to carry out a search task in the university search system after being exposed to emotions such as anger and shame, expressed by early users who used the same system. The participants were asked to answer questionnaires checking the impact of the exposure to the emotions on their perception of the information systems. In the first study, emotion exposure was implemented by observing the earlier user's answers to questions about his feelings after using the information system, exhibited on a computer screen. In the second study, before committing the search task, participants watched a short film explaining the study procedure, and were exposed to actors playing earlier users, expressing their feelings after using the new information system.

The results show that exposure to emotions expressed by peer users have an impact on the observer and his perception of the Information System and intentions to use it. This study opens a window to further research in the context of emotions-Information Systems relationships and has potential implications for Information system adoption in organizations.

**Keywords:** information system adoption, anger, shame, social influence, negative emotions.

**JEL classification:** O32, O35.

### **1. Introduction**

Information systems (henceforth, IS) serve functions in modern organizations and can improve individual and organizational performance. Yet, to achieve these goals, they must be accepted and used by employees in organizations. Previous research documented the existence of a gap between the development of new technology and the ability to get workers to use it (Davis et al., 1992, Ackoff, 1967, Ginzberg, 1981, Markus and Keil, 1994). Accordingly, understanding

the factors determining information technology adoption in the workplace is highly important. Different models attempting to explain the factors that determine users' acceptance of IS were developed. For example, the Technology Acceptance Model (TAM) suggested by Davis (1989), and its extensions, the TAM2 (Venkatesh and Davis, 2000) and the Unified Theory of Acceptance and Use of Technology, UTAUT, (UTAUT, Venkatesh et al., 2003). These models offer a significant understanding of the factors that predict successful adoption of IS by users. However, they are somewhat limited due to their focus on cognitive and behavioral factors while ignoring affective factors that are likely to play an important role in this process (Sun and Zhang, 2006, Zorn, 2002).

In response to this limitation, our research focuses on the effect that emotions expressed by peers of a prospective user have on this user's attitude and reaction to the first encounter with the system. Indeed, one factor that was found to be of significant importance in determining users' acceptance of a new IS is related to how others in their surroundings react to the system and think about it (Taylor and Todd, 1995, Venkatesh and Davis, 2000, Lucas and Spittler, 1999).

Research of emotions in the field of information systems, is focused on a users' emotions caused by their interaction with the system and the effects of these emotions on adoption of a new system. In general, this line of research has shown that these emotions significantly affect system adoption. However, the emotions experienced by users may not only determine their own adoption of a given system, but that of others who witness their experience and emotional reaction to the system. The possibility that observing a peer user's emotional expressions, triggered by system use, affects the observer's acceptance of the system has not been explored before. Yet, observing other's emotions has been shown to play an important role in shaping observers' behaviors and judgments (e.g., Hareli et al., 2013). Testing such a mechanism in the context of IS adoption is the focus of the present research.

Users of a new IS often experience anger (Zorn, 2002, Allen et al., 2000, Hassenzahl et al., 2000, Brave and Nass, 2002, Pinsonneault, 2005) and shame. (Bagozzi and Dholakia, 2002, Perlusz, 2004, Diaz and Loraas, 2009, Loraas, 2005). Relying on these findings, the present research examined the effect of anger and shame expressed by users of a new information system on peer observers who also are about to use the new system.

In two studies, participants were asked to conduct a search task using the university search system after ostensibly accidentally witnessing emotions expressed by users who used the same system before them. Participants answered questions checking the impact the exposure to the different emotions had on their perception of the IS. Measures were taken from previous research and included the dimensions known to predict users' acceptance of the system. Specifically, we measured, perceived performance expectancy, perceived effort expectancy, and perceived opinions' of important others about the system (Venkatesh et al., (2003).

## 2. Hypotheses

Observing emotions expressed by others affects observers' emotions and judgments (Hareli & Rafaeli 2008;(Van Kleef, 2009)). Based on this idea, the following hypotheses were tested:

(1) Observing peer users reacting with anger will evoke more negative feelings towards the system, compared to observing peers reacting with shame or with a neutral emotion. This expectation is based on the fact that anger reflects a blame of an external factor for the undesirable situation (Ortony et al., 1988, Lazarus, 1991, Frijda, 1986), unlike shame which reflects an internal cause for an undesirable situation (Lindsay-Hartz et al., 1995, Weiner, 1985, Roseman et al., 1990), or neutrality which does not provide any specific information about the experience with the system.

(2) Observing peer users reacting with anger will negatively affect observers' perceived performance expectancy compared to observing peers reacting with shame or with a neutral emotion.

(3) Observing peer users reacting with anger will positively affect observers' perceived effort expectancy compared to observing a peer reacting with shame or a neutral emotion.

(4) Observing peer users reacting with anger will reduce the observers' expectation that "important others" think they should use the system, compared to observing a peer reacting shame or neutral emotion.

(5) Observing peer users' emotions will not have a direct effect on observers' intentions to use the IS. However, it will affect observers' intention to use the IS, mediated by performance expectancy, effort expectancy and observers' expectation that "important others" think they should use the system.

### **3. Study 1**

#### **3.1. Method**

##### **3.1.1. Participants**

A total 99 Haifa university BA students (54 men, 45 woman) with a mean age of 28 years ( $SD = 7.95$ ,  $Min = 19$ ,  $Max = 72$ ) were invited by advertising on notice board to participate in this research. 63 were Hebrew mother tongue speakers, 23 Arabic mother tongue speakers and 13 other mother tongue languages speakers.

##### **3.1.2. Procedure**

Participants were asked to seat in a separate cubical and wait for the experimenter. While waiting, facing the computer, they could see the computer screen on which ostensibly the answers of the previous participant to the question how did you feel about the system appeared. Answers were "angry", "ashamed" or "calm". After giving the participant sufficient time to see the answer, they were asked to execute a specific search task on the library's literature search system.

##### **3.1.3. Depended measures**

Participants were asked to rate, on the scale 1- "do not agree" to 7 – "agree to a large extent" a series of questions about the perceived performance expectancy, perceived effort expectancy, the observer's expectation that important others think he should use the system and observer's future intentions to use the IS. In addition they were asked to rate their emotions using the Positive and Negative Affect Schedule (PANAS) (Watson & Clark, 1994).

To ensure that participants saw the emotional reaction of the previous participant, the last question asked explicitly if they took note of the emotion reported by the previous participant.

### **3.2. Results and discussion**

In order to examine hypotheses 1 to 4 a series of 3 (Peer emotion) one-way ANOVA's were conducted. A significant effect emerged for negative feelings,  $F(2, 96) = 3.09$ ,  $p = .05$ ,  $\eta^2 = .061$ , but not for positive feelings,  $F(2, 96) = .94$ ,  $p = .396$ ,  $\eta^2 = .019$ . As shown in the upper row of Table 1, exposure to peer anger produced more negative feelings relative to exposure to shame or a neutral emotion.

Condition	Peer emotion	Neutral emotion	Shame	anger
Negative emotion	SD	0.49	0.63	0.95
	M	1.44 <sub>a</sub>	1.55 <sub>b</sub>	1.872 <sub>a</sub>
Positive emotion	SD	0.85	0.63	0.69
	M	2.65	2.74	2.67
performance expectancy	SD	1.085	1.5	1.62
	M	5.15 <sub>b</sub>	5.05 <sub>a</sub>	4.27 <sub>a</sub>
Social influence	SD	1.29	1.4	1.24
	M	4.84	4.73	4.19
Intentions to use	SD	1.26	1.49	1.94
	M	5.26 <sub>b</sub>	5.37 <sub>b</sub>	4.36 <sub>a</sub>

Subscripts based on LSD tests at  $p < .05$  numbers with different subscripts differ.

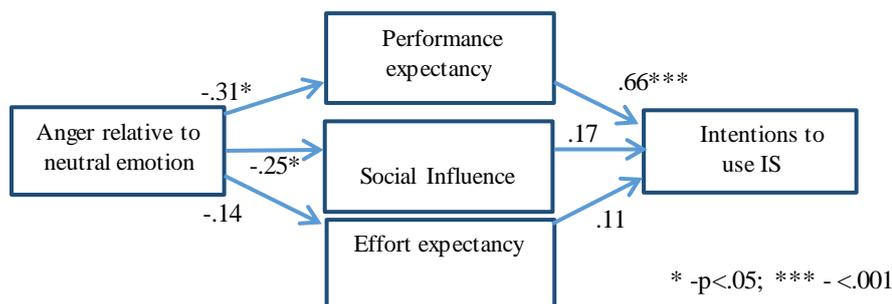
For PA & NA The different between shame and anger is marginally significant,  $p = .06$ .

**Table 1. Observers' reactions averages and SD as function of peers' emotions – experiment 1.**

For perceived performance expectancy a significant effect was found for peer emotions,  $F(2, 96) = 3.54$ ,  $p = .03$ ,  $\eta^2 = .68$ , such that exposure to anger and shame decreased perceived performance relative to peer's neutral emotion (Table 1). No significant effect was found for perceived effort expectancy,  $F(2, 96) = .67$ ,  $p = .51$ ,  $\eta^2 = .01$ , and for the observer's expectation that "important others" think he should use the system,  $F(2, 96) = 2.09$ ,  $p = .13$ ,  $\eta^2 = .04$ .

For user's future intention to use to IS a significant effect emerged for peer emotions,  $F(2, 96) = 3.83$ ,  $p = .025$ ,  $\eta^2 = .07$ , such that anger reduced the intention to use the system relative to both shame and neutral reactions who were rated similarly (Table 1).

A series of path analyses was conducted to test if performance expectancy, effort expectancy and observer's expectation that "important others" think he should use the system observing peer users' emotions mediated the effect of peer emotions on observers' intentions to use the IS. In two separate analyses, the emotions reaction (i.e., anger and shame) were dummy coded as 1 and the neutral emotion as 0 and the direct and indirect effect of the contrast between the two on the dependent variables was assessed (see Figure. 1). Using the IS on user future intentions to use the IS is mediated by performance expectancy. Exposure to shame or neutral emotion had no significant effect.



$\chi^2(1) = .12$ ,  $p = .912$ ; CFI = 1.000. RMSEA < .001;

**Figure 1. Path analyses for anger effect relate to neutral emotion**

The results indicated that emotions reacted by peers affect new IS users. In general, observers report negative emotions evoked after observing anger reacted by peers after experiencing new IS. This result matches the hypotheses and previous findings that anger reflects an external reason to an undesirable situation to the peer user. The observer learns that the reason to the

peer's performance expectancy of the IS is based on the IS. At the same time, the IS is perceived as less useful when the observer is exposed to peer's anger and shame. Observing peer's anger also reduces the observer's intentions to use the IS relative to shame and neutral emotion.

## 4. Study 2

The goal of Study was to replicate our finding from Study 1 using videos depicting peers users' emotional reactions rather than just written responses.

### 4.1. Method

#### 4.1.1. Participants

A total 160 Haifa university BA students (76 men, 84 woman) with a mean age 25 years ( $SD = 2.94$ ,  $Min = 19$ ,  $Max = 37$ ) were invited by advertising on notice board to participate in this research. 137 were Hebrew mother tongue speakers, 13 Arabic mother tongue speakers and 10 other mother tongue languages speakers.

#### 4.1.2. Procedure

Participants were asked to conduct a search task using the university library's search system after watching a short video presented as meant to explain the procedure. As part of the video, actors who played the role of participants were seen as reporting that they felt shame, anger or neutrality in response to their experience with the new information system.

After giving participants sufficient time to see the answer, they were asked to execute a specific search task on the library's literature search system.

After conducting the search task, participants answered questions assessing the impact of exposure to peers' emotions on their emotions and perception of the IS.

#### 4.1.3. Depended measures

The same measures as in study 1 were used. In addition, to ensure that the participant saw the emotional reaction of the previous participant, the last question asked explicitly if they took note of the emotion reported by the previous participant.

## 4.2. Results and discussion

In order to examine hypotheses 1 to 4 a series of 3 (Peer emotion) one-way ANOVA's were conducted. No significant effect was found for positive emotions,  $F(2,154) = 359$ ,  $p = .699$ ,  $\eta^2 = .005$ , nor negative emotions,  $F(2,154) = .539$ ,  $p = .58$ ,  $\eta^2 = .007$ .

Condition	Peer emotion	Neutral emotion	Shame	anger
Positive emotion	<i>SD</i>	0.74	0.81	0.75
	<i>M</i>	3.22	3.1	3.17
Negative emotions	<i>SD</i>	0.65	0.64	0.87
	<i>M</i>	4.49	4.37	4.36
performance expectancy	<i>SD</i>	1.11	1.17	1.5
	<i>M</i>	5.15 <sub>a</sub>	4.66 <sub>b</sub>	4.53 <sub>b</sub>
Social influence	<i>SD</i>	1.2	1.2	1.18
	<i>M</i>	4.87 <sub>a</sub>	4.47 <sub>b</sub>	4.39 <sub>b</sub>
Intentions to use	<i>SD</i>	1.14	1.3	1.74
	<i>M</i>	5.76 <sub>a</sub>	5.38 <sub>ab</sub>	5.04 <sub>a</sub>

Subscripts based on LSD tests at  $p < .05$  numbers with different subscripts differ.

**Table 2. Observers' reactions averages and SD as function of peers' emotions – experiment 2.**

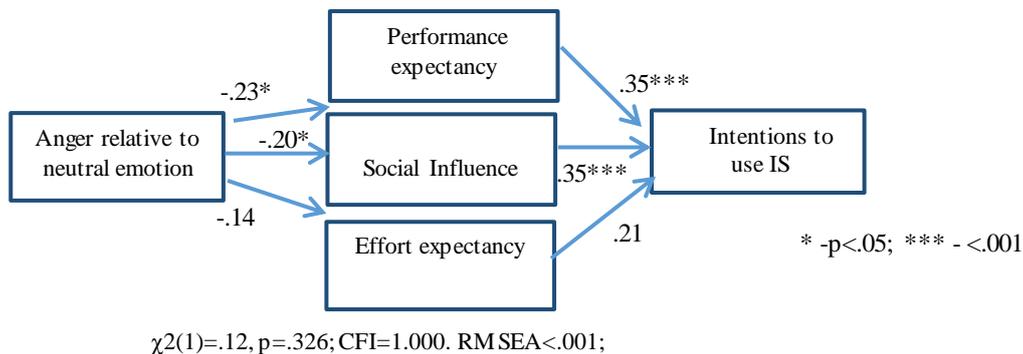
For perceived performance expectancy a significant effect was found for peer emotions relative to neutral emotion,  $F(2,154) = 3.32, p = .04, \eta^2 = .04$ , such as exposure to anger and shame reduced the level of perceived performance expectancy relative to peer's neutral emotion.

No significant effect was found for perceived effort expectancy,  $F(2,154) = .744, p = .47, \eta^2 = .01$ , and for the observer's expectation that "important others" think he should use the system,  $F(2, 154) = 2.40, p = .09, \eta^2 = .03$ .

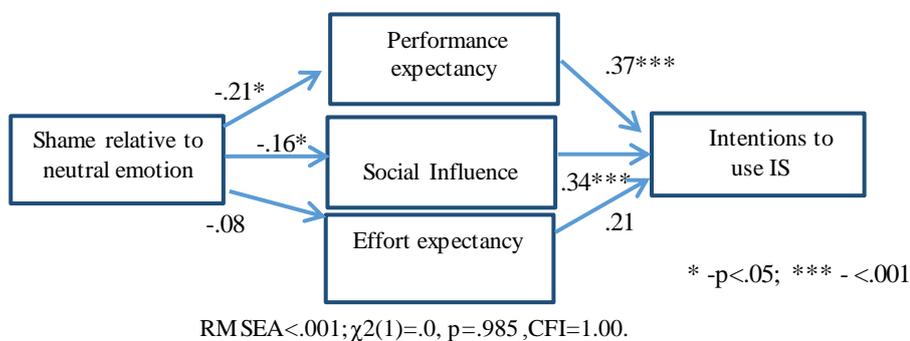
The results in the context of observer's expectation that "important others" think they should use the system were marginally significant but in the expected direction. Specifically, seeing a peer user reacting neutrally increased the observer's perception that significant others expected the user to use the IS relative to users who saw a reaction of shame or anger.

For future intentions to use the IS a significant effect was found for peer anger relative to shame and neutral emotion,  $F(2,154) = 3.16, p = .045, \eta^2 = .04$ , such as exposure to anger reduced the level of intentions to use the IS relative to neutral emotion, while did not have any effect relative to exposure to shame.

A set of path analyses similar to the ones conducted for Study 1, found that significant effect exposure to anger and shame, independently, relative to exposure to neutral emotion decreased the observer's future intentions to use the IS. The results also showed that the effect of exposure to anger reacted by peer users after using the IS on the observer's future intentions to use the IS is significantly mediated by social influence and not by performance expectancy, nonetheless the results showed that the effect of exposure to shame reacted by peer users after using the IS on the observer's future intentions to use the IS is significantly mediated by performance expectancy. No significant effect emerged for exposure to neutral emotion. (Figure 2-3).



**Figure 2. Path analyses for anger effect relate to neutral emotion**



**Figure 3. Path analyses for shame effect relate to neutral emotion**

## 5. General Discussion

Both studies show, as predicted, that exposure to emotions expressed by peer users have an impact on observers' perception of the IS performance and expectations of the social environment to use the new IS. However, in both studies there was no significant evidence that exposure to emotions have any effect on effort expectancy needed to use the IS. This findings could be explained in the fact that only results of participants who succeed in the task where analyzed. Naturally, participant who succeed in the task is more focused on himself and tends to find the IS easy to operate.

Unlike expected, not only anger but also shame affected users' expectations concerning the performance of the system and intentions of using it.

Thus, apparently, exposure to any negative emotion expressed by peer users, have this effect on users. These findings are especially interesting and could have implicative applications for organization who are about to adopt new IS because of the fact that despite the participant's success in the task, exposure to negative emotions reduced his future intentions to use the IS. This may lead organizations to reduce exposure of new IS users to peers who used the new IS before them.

In spite of the encouragement one can draw from the findings they are not free of limitations. The main limitation is the correlation between classic expressions of anger and shame in real life and the way the expression of those emotions was displayed in our study.

This research has contributes to our understanding of the important role that the social influence of emotions has for the adoption of new information systems in organizations. In particular, it stresses the effect of negative emotions on user's intentions to use new systems. This study opens a window to further research into the social function of emotions in adoption of new IS in organizations.

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