

Affect Feedback during Crisis and its Role in Improving IS Utilization

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ABSTRACT

This research looks at a portion of a larger research question, which is **does including affect feedback into an existing 911 call taking process improve IS utilization?** The first step is to look at the impact of affect feedback in a controlled environment so that possible issues that could arise can be mitigated early on before actual implementation in a call center is performed. This paper focuses on the first step, a controlled laboratory experiment, which is explained in the methodology section of this paper.

Keywords

Affect, Affect Feedback, IS utilization, Crisis Decisions.

INTRODUCTION

After 9/11, researchers began to investigate how people under stress make decisions and how systems could be enhanced to help improve their decisions. Of particular interest has been government agencies Henninger et al., 2003 and emergency responders, such as police, paramedics, and others involved in first response efforts. These responders often face making decisions under uncertainty and stressful environments (Sayegh et al., 2004; Staw et al., 1981). This often means making decisions under a limited amount of time and requires responders to process large amounts of information to make the best decision possible. Information systems (IS) and their effective usage thus become increasingly important in such situations where timely and accurate decisions under extreme time constraints are critical (Turoff et al., 2004). Research also reveals that one's affective states (feelings and emotions) play a critical role in a person's ability to make sound judgments (Hanoch, 2002). Further one's ability to maintain a positive affective state can enable one to better cope with stress and the ability to integrate information more effectively in complex decisions (Isen, 2008)

911 operators are often the first people "on the scene" and thus encounter many stressful situations on a daily basis. They provide the first link a victim or witness has to an emergency responder. Most 911 operation centers use Computer Aided Dispatch (CAD) systems to assist 911 operators in taking information from the caller and making the best decision for how to classify the call and subsequently dispatch the police or fire responders. Additional systems used often include answering platforms, digital mapping applications, digital logging recorders, and management systems.

This research looks at a portion of a larger research question, which is **does including affect feedback into an existing 911 call taking process improve IS utilization?** The first step is to look at the impact of affect feedback in a controlled environment so that possible issues that could arise can be mitigated early on before actual implementation in a call center is performed. This paper focuses on the first step, a controlled laboratory experiment, which is explained in the methodology section of this extended abstract.

Reviewing Statement: This paper represents work in progress, an issue for discussion, a case study, best practice or other matters of interest and has been reviewed for clarity, relevance and significance.

LITERATURE REVIEW

Affect describes one's feelings, moods, or emotions. Further, studies reveal that positive and negative affect are not opposite points on a singular axis (Isen and Labroo, 2003; Isen, 2003; Larsen et al., 2003). They have different theoretical backgrounds and impact on behavior. According to positive affect theory, positive affect cues positive material (Isen and Labroo, 2003; Isen, 1984; Fredrickson, 2003; Fredrickson and Losada, 2005) in one's mind. Since the network of positive cognitive material in one's memory is diverse, elaborately connected, and flexible, when one is in a positive feeling state s/he has access to an abundant amount of quality thoughts to aid in his/her cognitive processes (Isen, 2003; Fredrickson, 2003; Fredrickson et al., 2000; Aspinwall, 1998). According to this theory, these effects including cognitive flexibility, better integration of new information, effective thinking, and increased creativity and innovation are attributed to discerning unusual but useful relationships which are all linked to increased dopamine levels in the brain's anterior cingulate region.

Given that crisis situations require people, especially "first responders" to process complex thoughts and stimuli in many different ways in order to accurately judge the situation and come up with an ultimate decision, people in positive mood would appear to be better equipped to handle complex decisions. In other words, they are more able to process complex information, because they have a higher capacity to connect the perceptions of the stimulus in different ways (Schroder, Driver, and Streufert, 1967). People in a positive affective state exhibit flexibility in integrating new information and are less likely to ignore or distort information not supporting the solution they are considering (Estrada et al, 1997). Thus, it is likely that positive affect can help decision makers be less rigid in their responses. Finally, people in positive affect tend to have more constructive strategies to cope with stressful situations and negative events (Aspinwall, 1998). Because positive mood serves as an "emotional currency" (Aspinwall, 1998) it has the potential to help alleviate the stress experienced in a crisis decision environment.

IS are often implemented to assist users in decision making, however, literature suggests that computerized decision aids are not always used effectively (Benbasat and Todd, 1996; Todd and Benbasat, 1992). Current research suggests that that users' positive affect has a significant influence on how effectively information technologies are used (Djamasbi, 2007) and that experiencing positive affect may help users utilize IS more effectively (Djamasbi et al., 2008). Since emergency situations often require fast decision making, it is likely that they may result in even less effective usage of IS by first response users (e.g., due to time limit) as well. Since experiencing positive affect has been shown to enhance IS usage under pressure (Djamasbi et al., 2008) ,it is likely that decision makers can benefit from their positive affect during a crisis.

In order to measure affect, several self-report measures exist, such as PANAS (Watson et al., 1988) or the scale developed by (Elsbach and Barr, 1999). However, recent advances in physiological and medical research reveal that muscular and heart rate variability measures can reliably measure one's affect. In particular, heart rate variability (HRV) can be extracted and converted to one's heart rhythm coherence (Djamasbi et al., 2008; McCraty et al., 2006) which appears to correspond to one's affective state (demonstrated by an increased synchronization between heart and brain). Most currently available devices are wired systems that require the user to be tethered to it. The system we will be using is wireless and thus enable the user more natural movement.

RESEARCH QUESTION

Again, the broader research question is to examine whether including affect feedback into an existing 911 call taking process will improve IS utilization. Before testing this application in the actual crisis environment, a series of preliminary tests for both testing the device and its effectiveness in affect management will take place. For these series of investigation, the research question will be: **Does including affect feedback into a stressful environment, war games, improve performance?**

METHODOLOGY

In order to investigate this question, several steps will be conducted. First, a wireless HRV device will be developed along with a visual affect feedback system to inform the users of their level of positive affect. Second, student subjects will be used to test the device to ensure that affective states (e.g., positive affect) are accurately collected through the device. In order to simulate an environment where a broad range of emotions is likely to be experienced, a war game scenario will be used. Third, the subjects will be taught to interpret the affective feedback and how to manipulate it (i.e., by receiving affect management training; they will learn to sustain a positive affective state). Fourth, the affect feedback application will be incorporated into the war game.

Through an additional laboratory experiment, we will collect more data to determine the effectiveness of the affect feedback feature on users' affect management as well as performance.

Fifty subjects will be randomly assigned to two groups which will play the war game in two time periods approximately 15 minutes each. In the first period all fifty subjects will play the war game. Then half of the subjects will be trained in affect management (experimental group). In the second all will play the game but only those that received the affect management training will use the affect feedback feature.

ANALYSIS

We will use t-tests to compare the average performance of subjects in the experimental and control group. Additionally we will use paired t-tests to compare the pre-and post performances of those who received affect training.

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