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AFFECT AND RISKS IN IS RESEARCH

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ABSTRACT

Affect and reliance on affect in making decisions under risk (affect heuristic) are important and distinct concepts that have received virtually no attention in the study of IS/ecommerce risk assessment. Affect in response to a risky stimulus is automatic and precedes all judgments/decisions. When processing of information is difficult, due to ambiguity or stimulus novelty, people might substitute a readily available evaluation (affect) for deliberation. When affect results in a strong positive/negative feeling state, people report benefits and costs, which are congruent with affect - thus, there is a possibility that privacy calculus and similar trade-off models may be artifacts of ignoring affect, rather than genuine phenomena. Finally, the concept of affect directs attention to the affective evaluability of attributes of stimulus as a key step in measuring, understanding and communicating risk. We are in the process of developing a model of risk which incorporates affective considerations for IS/Ecommerce research.

Keywords

Affect, risk, concern, privacy, security, imagery, affect pool, affect heuristic, risk-as-feeling

INTRODUCTION

Almost all models used in understanding risk perception and attitudes in IS literature assume that people evaluate the consequences of outcomes and trade-off the benefits and costs of consequences in deciding whether to engage in an act. For example, when deciding whether to purchase online, a consumer is assumed to trade off the benefits of an online purchase with the potential consequences of (say) identity theft resulting due to loss of personal information. In the privacy literature, this notion is rather explicit (e.g., APCO model: Antecedents → Privacy Concerns → Outcomes). Concepts such as privacy concerns discuss how various task/context/individual factors influence a person's concern with an action (e.g., disclosing some personal information) and people are assumed to use a privacy calculus (essentially, a cost-benefit tradeoff analysis) in deciding whether to engage in privacy-affected behaviors.

The fundamental assumption behind these models is the idea that people engage in a deliberate evaluation of costs and benefits of potential consequences prior to engaging in a risky activity. Lowenstein et al. (2001) call such models cognitive-consequentialist, since the focus is on cognitive evaluation of potential consequences. IS risk studies based on reasoned action models such as TRA (Theory of Reasoned Action), TPB (Theory of Planned Behavior) and their variants, those based on multi-attribute utility theory (e.g., Glover and Benbasat, 2011) as well as those based on health risk models (e.g., Liang and Xue, 2009), are examples of explicitly cognitive-consequentialist models. These models do not incorporate notions such as affect, feeling state, or generally, even emotions[1].

AFFECT AND RISK PERCEPTION

In this section, we summarize the notion of affect based on the work of Slovic and colleagues and Lowenstein et al. (2001). The early work of Slovic, et.al. introduced the psychometric paradigm to risk analysis. Influenced in part by the existing work in personality theories at that time, hazards (risk objects) were assumed to have several risk characteristics. Factor analytic methods were used to reduce subject ratings of risk characteristics across hazards in several domains into a smaller subset of factors or dimensions. Across the various domains, two factors explained significant variation in perception of risk: a) magnitude of consequences and b) unknown risk. Later work by Slovic and colleagues focused more on the *feeling* caused

[1] We focus on affect and feelings in the context of risk and thus draw from risk psychology literature. In social psychology literature, affect is discussed under the affect-as-information hypothesis and also as an affect-infusion model.

by the dread of consequences rather than the consequences themselves. This shift in focus was prompted by the appreciation of the automatic nature of affect, novel findings in neuroscience literature suggesting the role of affect in guiding deliberation, and the development of two-system theories of mind (Slovic et al., 2004).

AFFECT, IMAGERY, AFFECT POOL AND THE AFFECT HEURISTIC

In general, affect can refer loosely to an attitude (e.g., an evaluation with a positive/negative valence), a strong emotion (e.g., fear, dread etc.), a mild emotion (e.g., anxiety, etc.) or a mood state (e.g., bored). Slovic et.al. view affect as a "faint whisper of emotion" which results in a positive/negative feeling state in a person. Because of the distinct nature of affect, we discuss Slovic et.al.'s view of affect in some detail below.

Affect is defined as "the specific quality of "goodness" or "badness" (1) experienced as a feeling state (with or without consciousness) and (2) demarcating a positive or negative quality of a stimulus". Affective responses occur rapidly and automatically and precede other stages in decision-making. Affect is related to the idea of "preferences without inferences" postulated by Zajonc (1980) in that no deliberation is necessary for the formation of an affective feeling towards a stimulus.

When a person is exposed to a stimulus, features of the stimulus can evoke *images* (i.e., perceptual and symbolic representations) in memory. All such images are tagged with varying degrees of affect. It is assumed that each person has an *affect pool* that contains images tagged with positive and negative markers and a stimulus evokes a subset of these images. A lifetime of learning leads to the tagging of the constituent images with affect[2].

Authors (2012) illustrate affect processing in the context of online privacy using an example. They provide two contrasting accounts of how users possibly process the privacy policy changes initiated by Google. In a *cognitive-consequentialist account*, a user might evaluate the potential impact of the new policy in terms of attributes/dimensions of privacy risk, compare the old versus new policy and compute an overall net benefit using a calculus (e.g., multiply differences in attribute scores by a weight reflecting the importance of an attribute). Such a weighted score may determine the decision to stay with Google or stop using Google. In an *affective account*, a user might have a good feeling for the imagery evoked by "Google", a bad feeling for "change" and probably no feeling/arousal for the imagery corresponding to "privacy policy". The cumulative effect of tagged imagery results in a feeling state, which might be described overall as good/bad or pleasant/unpleasant. The induced feeling state influences judgments of costs and benefits of taking an action.

In an interesting experiment, Finucane et al. (2000) illustrate that affect influences people's judgments of costs and benefits *systematically*. Contextualizing the finding to the Google case, if a user were to have a negative feeling toward privacy policy changes initiated by Google, then s/he would rate the benefits of new policy to be low and costs to be high – thus, the affective feeling drives judgment of costs and benefits. A researcher using a cognitive-consequentialist model who measures only the benefits and costs may conclude that people's judgments reflect careful deliberation of costs versus benefits of a decision, even though it is *affect* driving such a pattern of findings.

The affect heuristic refers to a predominant reliance on affect to make judgments. Under the two-system theory of mind, System 1 is responsible for affect while System 2 engages in deliberation. If the task/context/user factors (e.g., stress, time pressure, complexity) decrease System 2's ability to engage in deliberation, then affect would factor dominantly in those judgments.

Affect and related literature

Since our focus is on perception and evaluation of risk, we restrict our attention to the work published in risk literature; specifically, that by Slovic et al. (2004) and Lowenstein et al. (2001). Affect is distinct from attitudes in that affect occurs automatically and is experienced at the moment of the decision. It need not involve a prior evaluation and is consistent with the notion that "preferences need no inferences" (Zajonc, 1980). Lowenstein et al. (2001), in discussing the risk-as-feelings hypothesis, suggest that "...gut feelings experienced at the moment of making a decision, which are often independent of the consequences of the decision, can play a critical role in the choice one eventually makes." (pp. 281).

Affect is different from anticipated emotions, which are sometimes included in measuring risk (e.g. items in a questionnaire that measure how one might feel if a negative consequence occurred at a future date). Since anticipated emotions are evaluations of a future state, they necessarily include a cognitive component. Affect is distinct from mood – a mood is a

[2] Spontaneous evaluation of a stimulus may not require pre-existing evaluations (e.g., pre-existing attitudes, prior beliefs, or even tagged imagery). See Duckworth et al. (2002) on the automatic evaluation of novel stimuli.

relatively stable and mild affective state that typically lasts longer and does not have a specific focus; whereas, affect is a derivative of the stimulus. While affect is a "whisper of an emotion" and an evaluation, emotions (e.g. fear, joy) tend to be far more intense and are likely to induce drive states (e.g., approach or avoidance). In a paper titled "What's fear got to do with it? It is affect we need to worry about", Slovic (2004) distinguishes between affect and emotion in context and highlights the importance of the role of affect in risk judgments.

Affect and Evaluability:

The discussion so far suggests that stimuli prompt an affective state, i.e. a feeling, which in turn plays a significant role in evaluations of benefits and costs. According to Bateman et al. (2007), affective impressions vary not only in terms of their valence (i.e., good versus bad), but also in the precision with which they are held. The weight of a stimulus attribute in an evaluative judgment or choice is proportional to the ease of precision with which the value of that attribute (or a comparison on the attribute across alternatives) can be mapped into an affective impression. Thus, affect "bestows meaning on information" and the precision of the affective meaning influences one's ability to use information in judgment and decision making.

Going back to the Google privacy policy example, existing cognitive-consequentialist research uses several scales to measure privacy concerns, which in turn are used to predict privacy attitudes and behaviors (sometimes using a privacy calculus). In a recent paper, Hong and Thong (2012) came up with a scale for privacy concerns with six first order factors (collection, secondary usage, errors, improper access, control and awareness) based on the correlations among the underlying items. The notion of affective evaluability would suggest that the real question ought to be whether a particular dimension (e.g., access) evokes a negative *affect*, for if an attribute is not affectively evaluable, it may play no role in risk judgments.

Affect in IS Risk Research:

Almost all IS research on risk recruits concepts from reasoned action models (TRA, TPB, health-models and variants) to speculate about perception and evaluation of risk. In their recent survey of the field, Fishbein and Ajzen (2012) discuss affect and its role on attitudes and behavior. Fishbein and Ajzen (2012, pp. 246-247) view affect as a) a generalized mood state without a clearly defined object of reference (e.g., happiness/sadness) as well as b) such qualitatively different emotions as anger, fear and pride. While such generalized moods are likely to influence beliefs, intentions and behaviors, "…but like other background factors, this influence is assumed to be indirect". Fishbein and Ajzen (2012) also state that such generalized moods "...are likely to influence beliefs such that pleasant affective states would make favorable outcomes more likely and the outcomes themselves more positive".

Slovic uses the term affect to refer to an evaluative feeling, caused by the stimulus (and probably its context) – thus, it is not a generalized mood (that is, the mood/feeling state is not incidental to the judgment task but is integral to the stimulus – see Pham, 2007). Slovic does not include strong, distinct emotional states (e.g., fear, joy etc.) in his notion of affect but suggests, rather, that the automatic and instantaneous evaluation of a stimulus results in a feeling state in a person (pleasant versus unpleasant). While affect always influences information processing, in some cases, people could rely on affect predominantly to the exclusion of deliberation (affect heuristic). As illustrated in the Finucane et.al. (2000) experiment, people in a positive feeling overstate benefits (positive beliefs) and understate costs (negative beliefs) – thus, Slovic's model would suggest that affect influences beliefs. In sum, while Fishbein and Ajzen (2012) seem to relegate affect to a background factor, Slovic et.al. seem to treat affect as always influencing beliefs and in some cases, determining beliefs. Overall, Slovic et.al (2004) present a fundamentally different view of how people judge risk.

If privacy concerns (beliefs and evaluations in reference theory) are not stable, can the risk/privacy calculus be a valid concept? Most IS papers propose a risk or privacy calculus based on the relation between attitudes, beliefs and evaluations ($A= \sum b_i * e_i$). Fishbein and Ajzen (2012) say that (p.100) "The equation used to compute an attitude estimate on the basis of accessible beliefs may seem to imply that people go thru a complex calculus, involving multiplication of belief strength by attribute evaluation and summation of the resulting product terms. In actuality, although the investigator does perform these computations, people are *not (*italics in original*)* assumed to do so. We merely propose that attitude formation may be *modeled* (italics in original) in this fashion". Thus, the various risk/privacy calculus models (and the reasoned action models which form the basis of such models) may be seen as "as-if" models rather than models of a subject's decision process.

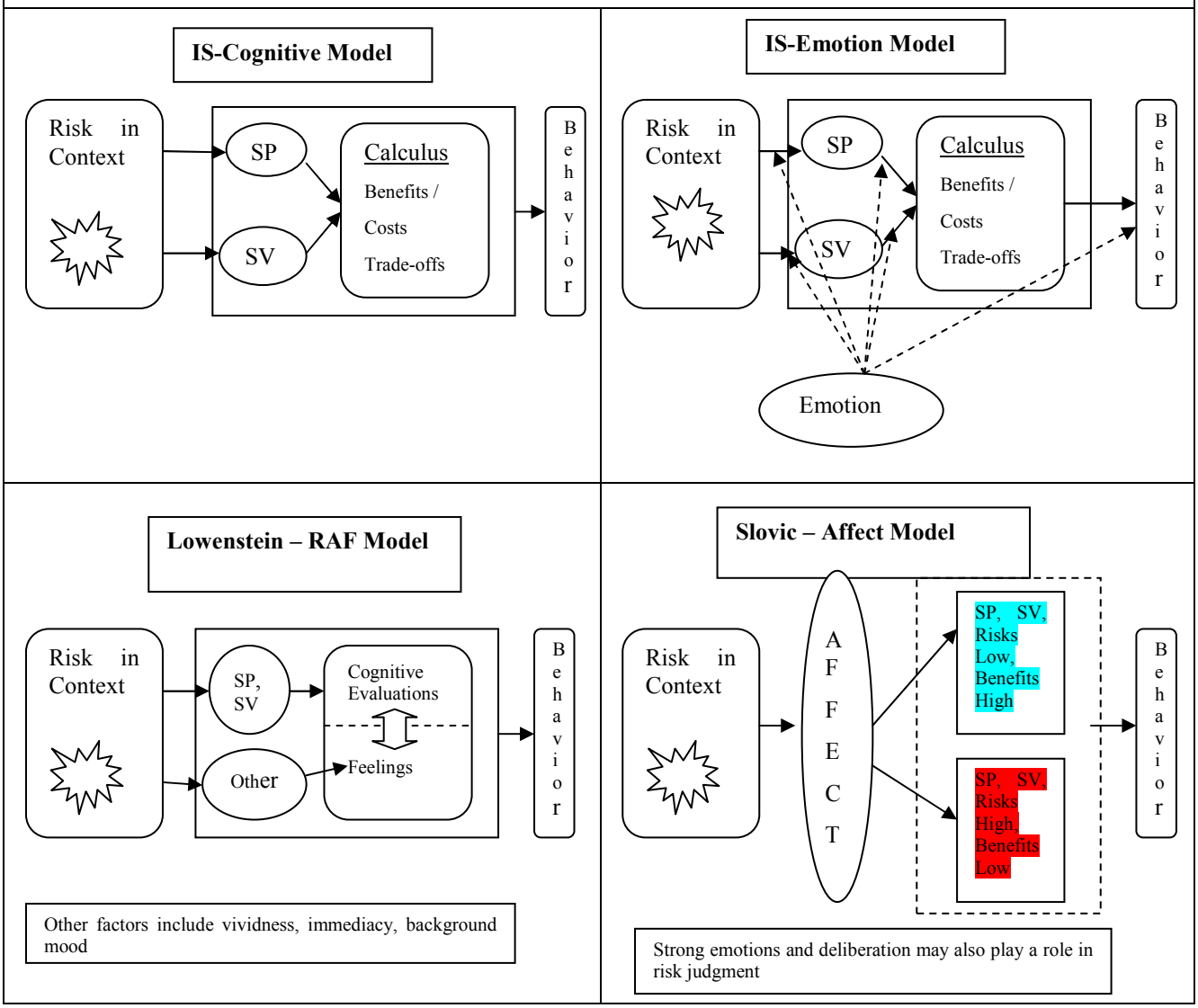
A Sketch of Four Models

In order to further illustrate the feelings-based notion of risk, we discuss four models with simplified graphical representation for each model. The purpose of the graphical models is to highlight key constructs and relationships in each model, so that the contrast between affect-based models and typical IS models is brought into sharp relief. We also present the models as process models of risk – even though some models may actually be as-if models.

The prevailing model of risk in IS/ecommerce, is primarily cognitive-consequentialist (IS-Cognitive model). More recent work has tried to introduce emotion into IS-risk research and we call this the IS-Emotion model. The IS-cognitive and IS-Emotion models are prototypical of most IS models. The risk-as-feelings hypothesis by Lowenstein et al. (2001) is presented as the Lowenstein-RAF model. We present a graphical representation of Slovic's model as the Slovic-Affect model.

The prototype for an IS-cognitive model assumes that a person judges the hazard in context in terms of a subjective probability of unfavorable event and potential loss if the event were to happen. The subject may then compute the net benefits thru a risk/privacy calculus. Models of this type are usually based on concepts/primitives in reasoned action models, multi-attribute utility theory and health-based models. Hazard specific and context factors influence the probability and loss/benefit judgments and the risk calculus is usually a simple net benefit calculation.

Fig 1. Four Models of IS Risk (SP= subjective probability, SV= subjective value)



The prototype for an IS-Emotion model assumes that emotion enters somehow into the judgment/decision. Emotions (fear, joy, anger) may enter the model thru the front end (e.g., influence judgments of probability and loss), may moderate the affect of benefits/costs (i.e., modify risk calculus to include an emotional component) or may independently impact judgment/behavior. Emotions typically refer to discrete and primary emotions and may sometimes be operationalized as

anticipated emotions (i.e., evaluation of a future emotional state). Specifically, emotions are modeled as if their effect on decision is independent from cognition[3].

Lowenstein et al. (2001) propose the risk-as-feelings hypothesis and provide a graphical representation of the model. The simplified version we present suggests that a) anticipated outcomes (and emotions) and subjective probabilities determine cognitive evaluations as well as feelings, b) other factors, seemingly irrelevant to rational decision making such as vividness, immediacy and background mood impact feelings alone, and, c) cognition and feelings interact to produce a judgment/decision. In contrast to IS-Cognitive and IS-emotion models, cognitive evaluations and feelings *jointly* determine behavior – thus, apart from conceptualizing risk as feelings, Lowenstein-RAF model suggests a different privacy calculus.

The Slovic-affect model is our attempt to provide a graphical model of Slovic and colleagues' ideas. As discussed earlier, the hazard (and possibly, the context), automatically create a state of pleasant/unpleasant feeling in a person. If a pleasant feeling is created by the stimulus, the benefits (or positive attributes) of the stimulus are judged high and costs are judged low (and vice-versa). Within Slovic et al.'s model, a person can feel strong emotions (e.g., fear, joy), but these discrete emotions are distinct from affect. It is also possible that people engage in a deliberation (thru System 2), depending on context. Thus, Slovic's model introduces an automatic affect, the ability of properties/attributes of stimulus/context to create a "feeling state" (affective evaluability) and the congruence between costs and benefits of decision and affect as novel concepts in understanding risk.

Neither of the authors of this paper are trained in psychology and thus we approach the problem of understanding risk in IS/Ecommerce based on our intuitive understanding of the models and their potential role in IS Risk research. Feelings based models, especially the Slovic-affect model, can potentially answer some fundamental question in IS risk research. One such question is: What is perceived risk? Most existing accounts for defining and measuring perceived risk rely on subjective probabilities and subjective values. The vexing problem is that many risks in IS are rather novel – thus, it is not clear that people have subjective estimates for probability and value and it is possible that people may not even understand risks. Even if one were to assume that risks are somehow understood by lay people, there is no objective data on which a person could rely in making precise judgments. Positing that people have stable beliefs or pre-existing evaluations (attitudes) for such novel risks seems rather aggressive.

We believe that the Slovic-Affect model and Lowenstein's - RAF model (2001) can help cut the Gordian knot by equating risk with feelings experienced at the moment of the decision. Slovic also discusses the concept of affective evaluability – unless a hazard (or an attribute of the hazard and context) can evoke a feeling in a person, it may not influence perceived risk. The notion of affective evaluability may thus inform the development of measures of perceived risk and concern. Further, since affect precedes deliberation, the notion of risk/privacy calculus may need a revision/refinement to incorporate affect – Lowenstein's model shows the strong interaction between emotions and cognition using a double arrow between them (see Lowenstein-RAF model) and Slovic talks of the "dance of affect and reason".

Current work in IS risk research is based primarily on cognitive-consequentialist notions, imposes strong theory a priori and favors confirmatory testing. Our feeling is that risk is not well understood in the IS research and we suggest conducting exploratory work by paying more attention to the phenomena. Such studies, we believe, could lead to a re-examination of IS risk concerns and risk calculus. Advanced measurement techniques (e.g., reaction times, skin conductance, neuroIS) can be useful in understanding the role of affect in the context of IS risks.

CONCLUSION

Affect and reliance on affect in making decisions under risk (affect heuristic) are important and distinct concepts that have received virtually no attention in study of IS/ecommerce risks. Affect in response to a risky stimulus is automatic and precedes all judgments/decisions. For completely novel hazards, for which a person may no pre-existing beliefs and

[3] IS models have a strong preference for linear functional forms in empirical work – for example, SP and SV are always modeled linearly. In the leading descriptive theory for decision making under risk/ambiguity, the analogues to SV (utility) and SP (decision weight) are both non-linear. While utility is S-shaped (around a reference point), decision weight is inverse S-shaped around the 45 degree line. Not accounting for the known non-linear functional forms may lead to serious misinterpretation. For example, when a linear function is used for SP instead of the inverse S-shaped function, the important phenomena of overweighting of small probabilities and underweighting of high probabilities completely disappears from the discussion of IS risks. Worse still, unexplained variance due to misspecification may falsely be attributed, based on chance correlations, to task or context effects. See Hsee and Rottenstreitch (2003) and Rottenstreich and Hsee (2001) for an affect-based explanation of functional forms for SV and SP.

evaluations, aversive behavior toward a hazard could arise thru affect. When processing of information is difficult, due to ambiguity or stimulus novelty, people might substitute a readily available evaluation (affect) for deliberation. When affect is strong resulting in a strong positive/negative feeling state, people report benefits and costs, which are congruent with affect - thus, there is a possibility that risk calculus and similar trade-off concepts may be artifacts of ignoring affect. Finally, the concept of affect directs attention to the notion of affective evaluability of attributes of stimulus as a key step in understanding and communicating risk. We believe that systematic introduction of affect into IS risk research can lead to an improved understanding of risk processing.

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