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The impact of risk and affect on information search efficiency

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ABSTRACT

We develop and test a theoretical framework of the joint influence of risk and affect on information search efficiency. Our framework proposes that information search is less efficient (i.e., less strategic) when risk is high, versus low. It further proposes that the influences of positive and negative affect on search efficiency are asymmetric and depend on the level of risk. Negative affect improves search efficiency when risk is high, but not when it is low. Positive affect degrades search efficiency when risk is low, but not when it is high. We find results consistent with our framework in two experiments. We discuss implications for affect research and for decision making in risky contexts, including financial statement auditing.

Introduction

Information search is a critical aspect of many professional and personal decision tasks, including the auditor's task of determining the acceptability of a client's financial reports and the individual's tasks of selecting an appropriate investment and deciding which school to attend or job to accept (e.g., Barrick & Spilker, 2003; Cloyd & Spilker, 1999; Einhorn & Hogarth, 1981; Simon, 1977). The amount and relevance of information a decision-maker selects to examine in diagnostic tasks such as these affect the quality of subsequent decisions. In particular, information search efficiency, or the amount of relevant information gathered relative to the amount of information available, is an important determinant of the quality of subsequent decisions for at least two reasons. First, decision quality appears to be maximized when decision-makers use selective sets of highly relevant information (Keller & Staelin, 1987; Rosman, Seol, & Biggs, 1999). The cognitive costs of using larger information sets can reduce decision quality through information overload, even if the quality of the information is held constant (Axt-Adam, van der Wouden, & van der Does, 1993; Keller & Staelin, 1987). If the quality of the information set is not held constant as the size increases, additional problems can arise from inappropriate reliance on irrelevant items (Bastardi & Shafir, 1998; Chinander & Schweitzer, 2004) or from over-weighting of redundant information (Hall, Ariss, & Todorov, 2007; Joe, 2003).

Second, in applied settings, gathering information is typically costly. For example, independent financial statement auditors are faced with the task of reaching critical decisions about the acceptability of a client's reported financial numbers within limited time budgets. Professional investors face similar time and cost constraints in evaluating information and making investment choices. If external variables interfere with decision-makers' ability to efficiently search for information, they may either extend information search, thereby increasing search costs and costs of missed deadlines, or make a decision with insufficient evidence, thereby increasing expected costs of decision error.

Risk and affect are external variables common in professional decision settings that have the potential to influence search efficiency. We define risk as the variance of potential outcomes (e.g., Kahneman & Tversky, 1979; Libby & Fishburn, 1977; Sharpe, 1964). Risk is an important aspect of natural decision settings, and is likely to influence information search behavior because decision-makers tend to prefer certainty to expected values and estimates (e.g., Sitkin & Pablo, 1992). In particular, auditors, investors, and other decision-makers faced with high variance in potential outcomes can reduce the variance by collecting more or more relevant information. For example, auditors extend evidence search when perceived risk is high (Bedard & Johnstone, 2004; Blay, Sneathen, & Kizirian, 2007).

Affect is a general term used to describe a variety of feeling states, including moods, which are relatively diffuse, low-intensity, and enduring states of feeling generally good or bad, as well as emotions, which are relatively specific, intense, and short-lived (Forgas, Wyland, & Laham, 2006). Like risk, affect is pervasive in

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natural decision settings. Moreover, affect influences information processing in a variety of ways. Most research in this area focuses on the impact of ambient mood, as opposed to emotion (Forgas et al., 2006). Negative affect has been shown to focus information search (Fiedler, Pampe, & Scherf, 1986; Isen, 1984; Keinan, 1987; Lewinsohn & Mano, 1993; Mano, 1992). On the other hand, studies of the influence of positive affect on information processing tasks indicate that positive affect may reduce focus of attention (George & Brief, 1996) and increase risk aversion (Mittal & Ross, 1998), which would lead to less efficient information search (Mittal & Ross, 1998).

We develop a theoretical framework that predicts when and how the increased focus from negative affect and the reduced focus from positive affect will moderate the effects of risk on the efficiency of information search. We conduct two experiments using tasks that are similar to an auditor's verification task to test our predictions. We manipulate ambient affect and risk in both experiments. Information is costly.

Information search: a theoretical framework

We begin by developing a theoretical framework of how risk and affect influence information search efficiency. We first propose that higher risk settings are associated with less efficient search than lower risk settings, because the desire to decrease uncertainty under high risk increases decision makers' demand for information. We then argue that affect moderates the impact of risk on information search efficiency, but that it does so in asymmetrical ways (Forgas, 1995). In particular, we propose that negative affect causes a focusing of attention that improves search efficiency in high-risk settings. We further propose that positive affect causes distraction in low-risk settings, degrading search efficiency.

Risk and information search

A significant body of research considers decision-making under uncertainty and risk (e.g. Kahneman, Slovic, & Tversky, 1982). Much of this research focuses on the cognitive processes surrounding decision-making and how individual decision-makers respond to varying levels of risk (Kahneman et al., 1982; Slovic, 2002). Consistent with many professional decision settings, including auditing and investing, we define "risk" as the variance in potential outcomes, such that higher variance in potential outcomes equates to higher risk (e.g., Libby & Fishburn, 1977).

In many decision settings, individuals can perform information search to reduce the variance of potential outcomes. For example, auditors select a larger sample of transactions underlying a client's financial reports in order to reduce the range of possible appropriate values for the reported numbers when the risk that earnings have been manipulated is higher (Bedard & Johnstone, 2004; Blay et al., 2007). Household investors' perceptions of the risk of investing in the stock market are positively associated with the number of information sources they consult before investing (Cho & Lee, 2006), and tax professionals conduct more extensive and effortful search for clients they view as high risk (Kadous, Magro, & Spilker, 2008).

Consistent with this reasoning, decision makers will likely acquire more information when risk is high, versus low. Efficient information search involves targeting the most relevant cues and examining a higher ratio of relevant cues to total cues, avoiding the costs associated with viewing less relevant information (Barrick & Spilker, 2003; Camerer & Johnson, 1991). If the higher extent of search under high risk is not met with increased consideration of the relevance of information, increasing the extent of information search will result in diluting the most relevant information with less relevant or even redundant information. In higher risk settings, decision makers include less diagnostic information in their search (Hammersley, Johnstone, & Kadous, 2011). Thus, we expect less efficient search when risk is higher.

Negative affect, risk, and information search

Prior research has identified means by which negative affect both improves and degrades decision performance. For example, ambient negative affect has been shown to improve decision performance by focusing individuals' attention on the most important information (Ben Zur & Breznitz, 1981; Bower, 1981; Bower & Mayer, 1989; Easterbrook, 1959; Hockey, 1970; Payne, Bettman, & Johnson, 1988; Wallsten & Barton, 1982; Wright, 1974), increasing recall of negative items, and reducing the time for mood congruent judgments (Forgas & Bower, 1987). On the other hand, ambient negative affect has been shown to degrade decision performance by narrowing decision-makers' focus to a limited number of available alternatives (Fiedler et al., 1986; Isen, 1984; Keinan, 1987; Lewinsohn & Mano, 1993; Mano, 1992), narrowing categorization breadth (Bachrach & Jex, 2000), increasing the use of more erratic and less systematic information searches (Eysenck, 1984; Kahneman, 1973; Keinan, 1987; Rothstein, 1986), impairing memory by producing distracting thoughts (Seibert & Ellis, 1991; Wenzlaff, Wegner, & Roper, 1988), and reducing the accuracy of performance (Seibert & Ellis, 1991). It appears that under mild negative affect, narrowing the focus of information search increases performance, as long as the task is not too difficult, but it degrades performance when task difficulty is high (Payne et al., 1988; Stone & Kadous, 1997).

Forgas and George (2001) argue that tasks that require elaborate substantive processing are more likely to be influenced by affect than tasks that can be solved using more simple and directed processing strategies. This is because affect influences both what people think and how they think. Thus, when processing is more substantive, there are more paths by which affect can influence judgment (Forgas & George, 2001). Affect may influence information search by impacting information integration, identification of relationships among cues, and/or ability to discover creative solutions (Bachrach & Jex, 2000). Prior work on these sub-tasks indicates that individuals in negative moods process information in a more controlled, focused manner and, as a result, use more strategic methods of information search (Bless, 2000; Fiedler, 2000; George & Zhou, 2002; Sinclair, 1988). We posit that this narrowing of focus with negative affect is context specific.

In particular, processing in a more controlled, focused manner is effortful. When risk is low, the corresponding motivation to engage in strategic search is also low. Negative affect may trigger increased focus in this setting, but individuals may not be willing to engage in effortful calculations and strategies. Therefore, we expect that negative affect will have a minimal impact on search efficiency when risk is low.

However, when risk is high there is greater uncertainty about outcomes, and so decision makers have a greater need to reduce that uncertainty. This higher need to reduce uncertainty provides motivation to engage in the effortful strategies triggered by negative affect. When risk is high, negative affect should serve to focus the decision maker on the task, moderating the impact of risk on the information search efficiency. Thus, we predict that when risk is high, decision-makers will exhibit more efficient information search when affect is negative than when affect is neutral.

Positive affect, risk, and information search

Prior research has also examined means by which positive affect both improves and degrades decision performance. Ambient