

# **Relational aspects of information, time, and risk within a decisional context.**

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## **Issue/Abstract**

**Does the amount of multivariate information affect the neutral nonrecurring strategic decision when both risk and time pressure is perceived as significant?**

There has been significant research dealing with three distinct areas relating to the effects of risk and time pressure on decisions. The first area is where risks are discounted because benefits are either obtained quickly or the potential negative consequences are delayed. The second involves the choice of selection criteria based either upon dispositional or situational factors. The third is how decisions are made in probabilistic environments. These scenario decisions usually involve chance where the probable outcome is known with few variables which could affect outcome.

What has not been satisfactorily discussed is how information simultaneously interacts with these two factors within a complex decision context. More specifically, we want to know how the quantity of information affects the decision process when there is both time pressure and either real or perceived risk in the decision in complex environments.

## **Introduction:**

Every day, we all take and experience risks. In most situations, the risk that we experience is not brought about by random chance but rather our individual decisions to intentionally put ourselves into those risky situations. Most of these day-to-day risks are things which happen frequently and we have developed some sort of individual heuristic to cope with them without much thought. Examples include crossing a street, going on a trip, purchasing a lottery ticket or a mocha latte. Often the risk could be considered mild but occasionally we find ourselves deciding to engage in situations in which the potential risk is moderate to significant and in which there is no heuristic framework to make decisions. Examples here include the decision to buy a house or a car, have a child, look for and then take another job, start or expand a business. These risks are neither frequent nor slight in their consequence. Usually, we first apply some sort of reasoning process prior to making a conscious decision to take the risk. The processes often involve using the information that we already have or cause us to gather as much information as possible (more commonly known as making an informed decision). Often, we make the decision to take or not take the risk based upon incomplete or weak information.

Often, because of either time constraints or the inability to gather all of the information need, we often make the decision without complete knowledge. Frequently this problem is complicated by time pressures to make the decision, such as when the seller has other buyers and where failure to act quickly could cost the opportunity or when a prospective employer offers you employment but gives you only a few days to accept or reject. It is in these situations that we would like to focus our attention, particularly as to the quantity and efficacy of the information used to make the decision.

### **Background and discussion:**

The decisions involving risk under time pressure are often complex or multivariate with many potential outcomes. The information used to make these decisions is seldom simply probabilistic. The multivariate situation is more true to life often necessitating complex decision processes. These decisions are strategic in nature. The opposite of strategic is the gamble, where the potential outcome is probabilistic only, with the decision is based upon perception of risk to reward probabilities. However, most of the studies use games of chance in which the only information given to the decision maker involves relative probabilities of winning or losing.

Our interest is to focus on the strategic decision to avoid this problem. Research has shown that there is a greater propensity to consider or weight negative information when making probabilistic decisions under time pressure, for example Das and Teng (519). However, the more complex the situation and thus the decision, the less negative information is disproportionately considered. This was supported by the Maule test in which they discovered that the proportion of time spent on the most negative information source actually decreased under time pressure when the information used to make the decision was complex and multivariate (Maule et. al., 298).

In further support of this proposition, there was a study done in which the research team tested 3 groups of subjects under the following conditions: "no hint", "medium hint", and "strong hint". Subjects in the no hint group received no information about how to make the decision, the subjects in the "medium hint" group received some information and the strong hint group was given the most information about how to make the decision and the potential outcome. The subjects in the medium and strong hint groups chose the more delayed but higher overall reinforcement rate alternative. These hints had a "significant transient effect on choice: with the provision of hints, subjects in both hint groups initially chose the more delayed but higher overall reinforcement rate alternative" (Kudadjie-Gyamfi, & Rachlin, (65). Citing Herrnstein, J.J., Lowenstein, G.F., Vaughan, W. Jr. Prelec, D., 1993).

Usually when the decision is significant it is also nonrecurring, insuring that the predisposition of the decision maker is typically neutral. As originally observed by Mischel (1968), Teng stated that the dispositional effects are most noticeable in weak situations - that is where stimulus conditions are either weak or ambiguous. On the other hand when stimulus conditions are strong, the effects of individual dispositions are unlikely to surface, as situational factors tend to dominate the decision process.

Studies have shown that there is a negative correlation between risk and (past) performance. An example is where troubled firms tend to take more risk, which leads to even worse performance and non-troubled firms tend to avoid risk (Das & Teng 519, citing Bowman, 1982, Bromiley, 1991). Again, emphasis needs to be placed on non-reoccurring situations to eliminate this negative correlation within any subsequent studies.

A second reason for avoiding non-reoccurring situations and decisions is to insure that no internal mechanisms have been formed due to familiarity, such as the decision to proceed through a yellow light. Since most of us make these decisions relatively often and have some predetermined construct for when and if we will engage in the behavior, we rarely rely on significant amounts of external information prior to making the decision. To avoid these biases the test used should either screen for or use situations which are both unique and significant in their consequences.

For there to be interplay between time constraint and the decision process, subjects must feel the pressure of the situation (Ordonez, Lisa, & Benson III, Lehman, 122, citing Svenson and Benson). Time pressure indicates that the time constraint induced some feeling of stress and created a need to cope with the limited time. Thus, it is possible to have time constraint with but no time pressure (Ordonez, 122). To validate if the new time limitation caused actual stress, the researchers asked the test subjects if they felt stress upon completion of the tests (126). It's worth noting that the subjects were only asked if they felt time pressure, but there were no tests for the perception or sense of any sort of risk.

Time pressure serves to keep the subjects focused on the risk. When the time horizon becomes too long, decision makers tend to discount risk factors, which in turn allow the individuals' dispositional characteristics for risk taking to become more pronounced or prominent in the decision process (Teng, 522 – 523). It also promotes individuals to prefer high variability alternatives (Hanson, 153). It is the belief of the present researchers that discounting plays a greater role in situations involving the gamble or chance than situations involving complex decisions and in which information is relatively plentiful.

While too much time from decision to consequence/reward can cause risk to be discounted, too little can also cause decision makers to rely less on information and more on loss

minimization heuristics. (Hanson et al, 153). While this conceptual framework may simply filter the information that is used or omit certain information from consideration altogether in favor of some dispositional construct. (Ordonez 122), Citing (Miller 1960).

We define risk broadly “as the unpredictability in decision outcomes”. “Thus risk taking would be to consciously undertake tasks which are associated with uncertain consequences”. (Das & Teng, 517)

When the potential risk is slight, most research has shown there is a propensity on the part of the decision maker to risk more often. It also shows that the dispositional characteristics of the decision maker are interjected into the decision to a greater extent. The converse of this is when the potential risk and reward is significant; there is the propensity on the part of the decision maker to risk less often and to use available information to help with the decision process.

## Hypotheses

**Hypothesis 1:** The amount of multivariate information will affect the neutral nonrecurring strategic decision when both risk and time pressure is perceived as significant.

**Hypothesis 2:** The decision maker will opt for taking expedited additional information in exchange for a decreased expectation of return, if they believe that the additional information will reduce the risk of uncertainty and potential loss.

**Hypothesis 3:** When the probabilistic gamble is replaced with a non-probabilistic situation, negative information will not be weighted greater than positive information and effects of discounting will be lessened.

Within a relational continuum of risk and time as illustrated by quadrants below, does the affirmative decision to accept or reject change as the amount of positive or supportive information increases or decreases? When:

Positive or supportive information is abundantly available within the following matrix:

High Risk/High return


Low Risk/Low return

Little or no time pressure

Significant time pressure

Positive or supportive information is somewhat available within the following matrix:

High Risk/High return


Low Risk/Low return

Little or no time pressure

Significant time pressure

Positive or supportive information is scarcely available within the following matrix:

High Risk/High return


Low Risk/Low return

Little or no time pressure

Significant time pressure

### Potential problems with research

- Are hypotheses dependent on the magnitude of the risk to reward? When risk and reward are small, does the choice present a great enough interest to avoid significant testing bias? A potential solution is to run multiple tests with lesser to greater rewards to test sensitivity to this potential bias.
- Can time and information be treated as interchangeable variables for experimental purposes?

### Research Implications and applications:

- Business implications:
  - In the acquisition of unique business items or unique opportunities, where complete and/or accurate information is not always available to all potential buyers simultaneously.
  - At auctions, where there is a limited time to make a purchase decision often using incomplete or inaccurate information.
- Personal implication examples include:
  - The purchase of a home or a car in a seller's market in which both time and information is limited. If the buyer tries to gather more information about the

home or car he may lose out to another buyer who is willing to make the buying decision sooner with less information.

- The purchase of “time shares”, in which the choice is often to buy now or lose out on the potential option. There is little or no time to analyze the information given or to compare the opportunity to other similar opportunities.
- The occasion when one comes across some antique that one thinks is significantly undervalued, but taking the time to research its actual worth may allow someone else to come along to buy it.

### **Potential tests:**

#### **Optional test 1 –**

Each participant will play a version of “who wants to be a millionaire”. The difference will be that instead of “life lines”, “50/50” or “calling a friend”, participants can choose to sell off some or all of the next potential reward for information or clues to help them answer the questions to stay in the game. Just like the game show, the number of times they can use this option will be limited. We assume there will be some who opt to receive the information earlier in the game, thereby reducing the risk of being eliminated and losing what they have won. Others will engage in a higher risk to reward decision process by saving their information helps, hoping for greater returns.

#### **Optional test 2 –**

Each participant will play the game Bandu. This is a game in which each player uses oddly shaped wood pieces, stacking them one on top of the other. For each block stacked the participant will earn additional monetary rewards. However, the payoff is also reduced by the length of time they take as a percent of the total. For an informational price the participant can buy additional practice time thereby reducing the potential return.

For both tests we will apply a little pressure by limiting their time. The amount of time given to each will be arrived at by subtracting 1 standard deviation of time. This will be developed from a pre-test base line of participants that had no specific time expectation placed upon them. Also, we will use an audible timer or stop watch which may give a countdown etc to help with the sense of time constraint or urgency. For all, we will conduct an assessment/survey with the participants to see if they are either self described “risk” takers or more conservative. We will look for well established standardized tests which potentially measure these and other personality dimensions.

### **Areas of potential interest and journal publication:**

Entrepreneurship, OB, Game theory, Strategic Management, Risk, Decision Making, Military Science

### **Annotated References**

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**Maule, John A., & Hockey, Robert J., & Bdzola, L., (2000).** Effects of time-pressure on decision-making under uncertainty: changes in affective state and information processing strategy. *Acta psychological*, 104, 283-301.

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**Alais, M. (1953).** Le comportement de l'homme rationnel devant le risqué: Critique le postults et axioms de L'Ecole Americaine. *Econometrica*, 2, 503-546.