

## Economic Decision Making and Theoretical Frameworks: In Search of a Unified Model

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### Abstract

**Purpose:** The purpose of this paper is to present a unified model of behavioural theories that address cognitive and heuristic properties of economic decision making.

**Methodology:** This paper adopts a discourse approach to explore the literature to develop and synthesise a unified model that addresses economic decision making behaviour. The model encapsulates various aspects from Cognitive and Heuristic theoretical frameworks.

**Findings:** Whilst this paper is not of an empirical nature and does not seek to provide results from any statistical testing it does present findings from prior research that support the model developed in this paper. A unified model for researching behavioural economic decisions is presented.

**Implications:** The paper provides a model of theoretical frameworks juxtaposed for the purpose of future research considerations.

**Keywords:** Behavioural economics, psychology of decision making, cognitive models, heuristic models.

**JEL Classification:** A12; D03; G11; M40

**PsycINFO Classification:** 2340; 3410

**FoR Code:** 1401; 1501; 1702

## Introduction

Economics has as a prime concern the imperative to explain and predict decision making behaviour at the macro and micro levels of activity within society. Theoretical models have arisen and form the basis of the extensive literature in the discipline of economics. For example, the Capital Assets Model (CAPM) exemplifies a model which is prescriptive in terms of the mathematical application for determining behaviour. By contrast the Efficient Markets Hypothesis exemplifies a model which seeks to explain the behaviour in respect of markets in different states of existence. A body of research abounds in the economic literature addressing the varied models and frameworks which have as a consequence arisen from the desire to prove or disprove the validity or superiority of each. Behavioural economics as a field within the economics discipline has however suffered from being marginalised within what may be referred to as the traditional economic literature. In essence economics is focused on examining possible reasons for decision behaviour whether the outcomes can be measured in purely financial terms or not, as in the case espoused in economic literature as utility.

At the heart of this economic exploration into decision behaviour is the belief that decision makers are bound by the inherent need to abide by rational choice. The notion of decision makers being rational actors is at the very heart of the economic paradigm most apparent in the adopted / supported view that decision makers will seek to either maximise profits or minimise losses (Brown & Solomon, 1987). This neo-classical economic view of rational self-maximisation is otherwise referred to as "homo economicus" (Marsden, 1984). Economics is therefore more concerned with mapping the flow of inputs that underlie choices where the belief is that the decision process is linked to an immutable preference for rationality and the subsequent cognitive process is explained by a preference for maximization (or loss minimization) (Lee, 1971; McFadden, 1999).

The rational perspective has been criticised for failing to consider the cognitive limitations inherent in human nature (Simon, 1979). Research has identified the existence of a number of circumstances which result in the violation of (?) profit maximization. The implications are that individuals give meaning to information and that their ability to make decisions is subsequently a function of both the capacity of the individual and the choices faced (Awasthi & Pratt, 1990; Shapira, 1995). The most notable examples of violations to the rational decision making model are the sunk cost effect (Arkes & Blumer, 1985) also considered in terms of escalation to commitment (Staw, 1976; Whyte, 1991) and the Allais Paradox (Allais, 1953; Li, 1994).

Whilst the rational model has been unable to explain the violations, research employing approaches from psychology have been more promising. In contrast to the rational model, the psychology of decision making is more concerned with the nature of decision elements. Thus the decision process is viewed from the perspective that behaviour is local; adaptive; learned; dependent on context; motives; attitudes and affect (McFadden, 1999). Psychology has been defined as "...the study of behaviour and experience pursued by methods, the status of which is continually under review ..." (Ribeaux & Poppleton, 1978).

Research has identified that the rational decision model overlooks the influence of (?) an individual's personal biases and cognitive capacity for making decisions. The explanation for observed behavioural differences varies from the desire to avoid waste (Arkes & Blumer, 1985); the commitment to and need to justify prior decisions (Staw, 1981; Brockner, 1992); and the tendency to be risk-seeking as a result of previous losses (Whyte, 1986; Garland & Newport, 1991).

To better understand the nature of the violations to the rational decision making model it is proposed to develop a unified model of economic behaviour from the most promising of the theories which draw on the psychology of behaviour.

## Sunk Cost Effect

The term sunk cost is used in economics to refer to resources that have been committed and subsequently cannot be reversed (Frank & Glass, 2000; McEachern, 1997; Terry & Forde, 1984). Because a sunk cost is not capable of being put to alternative uses (Dewett, 1963) it is irrelevant in weighting the future consequences of the current decision (Bornstein & Chapman, 1995). The notion of sunk cost has a long history in the literature albeit known by different names including: asset fixity (Taussig, 1891; Brown, 1916; Clark, 1923) and sunk capital (Dewett, 1963).

The sunk cost effect is a term used to describe the situation where a sunk cost influences a decision which violates expected utility theory resulting in non-rational (irrational) behaviour. In essence the sunk cost effect is predicated upon the influence of past costs and the unwillingness of individuals to let go of those past costs (Teger, 1980; Northcraft & Neale, 1986). This explains an individual's tendency to continue an endeavour once an investment in money, effort or time has been made (Arkes & Blumer, 1985) and persist with a course of action beyond what economic rationality would dictate (Parayre, 1991).

Research has revealed that sunk cost is a cause of error in decision making that can result in excessive costs to business and society. For example, the decision to continue with the Shoreham Nuclear Power Plant project that commenced with an original cost estimate of \$75 million (US) was mistakenly escalated. The project took 23 years to complete, only to be closed before becoming fully operational due to safety issues and technological obsolescence. By the time of closure the cost had blown out to \$5 billion (US) (Ross and Staw, 1993). Other examples of the sunk cost effect have been documented as occurring in decisions regarding information technology projects (Keil, 1995; Drummond, 1998) and real estate development projects (Cornell, Longstaff & Schwartz, 1996). However, the sunk cost effect is not just a major problem in business decision making the effect can and does arise in real life influencing every-day decisions (Drummond, 1994). Seemingly simple decisions such as waiting for an inordinately long time for a bus to take you someplace where you could just as easily have walked (Brockner, 1992) or situations where you are waiting in a queue at a supermarket.

The inclusion of sunk cost information in decision making is a major source of non-rational behaviour of concern in particular to management accountants. The normative assumptions of management accounting consider information regarding sunk cost as immaterial to the decision-making process. This type of non-rational behaviour— referred to as the “sunk cost effect”— arises when sunk cost information is regarded when it should be disregarded as irrelevant. Implicit in the normative view of rational decision making is the concept that once an asset is irrevocably committed and cannot be changed, or a contract is irrevocably committed and cannot be changed, then the cost of that asset or contract is sunk (Mas-Colell, Whinston & Green, 1995, 131).

The definition of sunk cost varies slightly across the economic, finance and accounting disciplines. However, the basic tenet of sunk cost information's irrelevance to the decision making process remains constant. The following definitions provide evidence of this consistency across the disciplines:

*Microeconomics- A sunk cost is an expenditure that has already been made and cannot be recovered (Pindyck & Rubinfeld, 2001, 205).*

*Finance- A sunk cost refers to an outlay that has already occurred (or been committed), so it is an outlay that is not affected by the accept/reject decision under consideration (Brigham & Gapenski, 1993, 263).*

*Management Accounting- Past costs that are unavoidable and irrelevant because they cannot be changed no matter what action is taken [are sunk costs] (Horngren, Foster & Datar, 2000, 379).*

The common theme is that past costs cannot be avoided and are irrelevant to decision making because they cannot be changed. In other words, sunk costs are irrelevant because they do not contain information about the future effects of the decision. Another view is that sunk costs are irrevocably committed and thus irreversible (at least in the short-term) and are not relevant to the economic consideration of alternative courses of action (Terry & Ford, 1984; McEachern, 1997; Frank & Glass, 2000).

Financial decision making primarily evolved from microeconomic models that treat sunk cost information as irrelevant to decision making. Stermole (1982, 294) provided the most comprehensive explanation for excluding sunk costs from economic and financial considerations:

*In general sunk costs are past costs that nothing we do now or in the future can affect. Costs that are relative to evaluations in general are future costs that have not been made. Evaluations should be made to determine if proposed costs should be incurred or not, and if they are incurred, to determine what economic gains will be realised that would not be realised if we do nothing.*

Parayre (1991, 23) defined the sunk cost effect as “the tendency to persist with a committed course of action beyond what economic rationality, based on marginal costs and benefits, would dictate.”

This sunk cost effect manifests in cases involving sequential decisions and results in a tendency to escalate commitment to a course of action that will not maximize profits or minimize costs.

The sunk cost effect can be observed in normal every day events. For example, Quayle, Robinson and McEachern (1994) highlighted how the concept of a sunk cost can occur at the supermarket check-out.

"First how do you decide which queue to join? I venture to say that you pick the queue that you think will take you the least time to get served.

Now suppose that after waiting in line for ten minutes you realise that another queue has moved more quickly and is now much shorter than yours. Do you switch queues? Or do you think, 'I've already spent 10 minutes in this queue so I'm going to stay in it'? The 10 minutes spent in the queue represents a sunk cost, which is a cost that cannot be recovered whatever you do.

Accordingly, such costs should be ignored when evaluating alternative courses of action and making economic decisions."

Source: (Adapted from Quayle, Robinson & McEachern, 1994, 29)

Another classic example of the sunk cost phenomenon demonstrating irrational decision making was developed by Thaler (1980). In his example, a prominent individual paid \$5,000 to join a major tennis club and developed tennis elbow after a short period. Rather than give up tennis in favour of a less strenuous sport, the individual persisted with tennis, thus refusing to quit. The individual continued to the point of incurring medical and pharmaceutical costs far in excess of the \$5,000 sunk cost to join the club, not to mention incurring intangible social costs of pain and suffering. Rational decision theory suggests that this behaviour is irrational because sunk costs should not be a consideration in the decision taken as to whether or not to give up the sport.

The more fundamental treatment of sunk cost has remained particularly problematic in outsourcing and investment decisions. Even finance professionals can be wrong about the relevance of a sunk cost. For example, the Western Australian Treasury in the late 1990's produced a guide for public sector managers on evaluating outsourcing decisions that included an error of the basic principle in the treatment of a sunk cost (Johnstone, 1999, 38). This guide had the potential to direct public sector managers to make erroneous outsourcing decisions.

Staw (1976) and Whyte (1991) found that the sunk cost effect was more likely to occur when the decision maker felt personally responsible for negative consequences which might result from the original decision. Baron (1999) suggested that the inclusion of sunk cost information in a decision is a cognitive bias in decision making. If all factors on which the decision is based are equal, then greater utility should be achieved by ignoring past costs and focusing solely on future consequences. Decision research literature tends to emphasis rational, or at least analytical processes, rather than intuition and holistic thinking. Smith and Kida (1991, 487) argued that *"conclusions drawn regarding specific professional judgements should...be based on investigations using tasks and subjects representative of those contexts."*

## Behavioural Research

Behavioural decision making research has relied on either motivational or cognitive theories to explore the decision making processes of individuals (Heath, Larrick & Wu, 1999). From a psychological perspective, cognitive biases and motivational biases affecting decision making are considered to be different (Caplan, 2000). Specifically, motivational biases depend on the emotions of an individual, while cognitive biases relate to the thought processes involved (Nisbett & Ross, 1980). In addition there are behavioural explanations for decision making which rely on the psychological theories of social learning and reinforcement behaviour.

Social learning theory proposes that learning takes place vicariously and through imitation (Bandura, 1965, 1976). Vicarious learning is learning by observation resulting in behaviour patterns that are learned by watching others and observing the consequences (Atkinson et al, 1987). Reinforcement theory is concerned with the consequences or outcomes that influence behaviour (Skinner, 1969). Another social learning theory is learned helplessness (Hart, 1983; La Forge, 1989). In this situation an individual is likely to repeat the same behaviour ignoring relevant information (Gross, 1991). Following along the same line of thought is the illusion of vulnerability theory which posits that where an individual has experienced extended successes they develop an unrealistic view that they are infallible (Janis & Mann, 1977). The underlying assumption of social learning theories is that what an individual learns from experience is likely to influence their perception of a task and the subsequent choice they make. To that extent the theories

offer some insights into human behaviour that may explain irrational decisions such as the sunk cost effect.

Cognitive theories, by comparison, employ information processing models to explain how individuals organise information in order to make a decision (Cronbach, 1960). The three key cognitive approaches are heuristic/analytic reasoning, Image theory and Prospect theory. Heuristic reasoning involves searching for familiar solved problems and reducing the task to a core set of causal relationships to make a decision (Huysman, 1968). Image theory posits that individuals apply existing knowledge (images) to establish standards that guide their decision making (Beach, 1990). Image theory does not however, make the link between causal considerations and perceived realism in framing a task scenario. Prospect theory is a descriptive model that modifies expected utility theory to accommodate decision behaviour that violates the rational choice model (Tversky & Kahneman, 1981). Prospect theory posits that when outcomes are framed in a positive manner decision makers tend to be risk-averse, and when the frame is negative they are more likely to be risk-seeking (Kahneman & Tversky, 1979). Cognitive biases are assumed to influence the decision process as a result of an individual's reliance on biased heuristics (Etzioni, 1988). Cognitive heuristics are basically information processing shortcuts (Wang, 1966a) which appear to be efficient and yet still lead to decision biases and errors (Kahneman, Slovic & Tversky, 1982).

Inherent in the heuristic approach is the notion that in coping with uncertainty, individuals use some form of judgemental heuristics as general strategies to simplify otherwise complex tasks. The result of this over simplification of information processing emphasises the limited capacity of cognitive processes. Prospect theory and Image theory have been the most commonly used theories in the literature concerning behavioural analysis of decision making.

## Prospect Theory Constructs

### Problem Frame

The notion of a decision "framing effect" was introduced by Kahneman and Tversky (1979; 1982) as an extension of, and modification to, subjective expected utility theory. Subjective expected utility theory combines a subjective probability function with a utility function to represent risky preferences (Payne, 1985, 3). The decision frame was defined by Kahneman and Tversky (1979; 1982) as the "set of issues that form a decision maker's conception of the problem". Research provided compelling evidence that the way individuals cognitively represent a particular decision problem (framing) has a strong influence on their preferences and the subsequent decision that is made (Tversky & Kahneman, 1981; Brewer & Kramer, 1986). Empirical research also demonstrated that decisions are affected by how outcomes are framed in the presentation of information to the decision maker (Kahneman & Tversky, 1979; Fagley & Miller, 1987; Miller & Fagley, 1991; Tversky & Kahneman, 1981; 1992).

The use of alternative wordings (positive or negative) for decision problems is "semantic framing". An example used to explain semantic framing is the metaphor of the glass which may be labelled as being either "half-full" or "half-empty" (Bazerman, 1990; Paese, 1995). Hartman and Nelson (1996) postulated that individuals' risk-taking behaviour differs depending on whether they perceive themselves to be in a "negative domain" or a "positive domain". When problems, choices or alternatives are framed in terms of losses, individuals tend to be risk-seeking. However, when the same problem is framed in terms of gains, individuals tend to be risk-averse.

Levin, Schneider and Gaeth (1998) reviewed the framing effect literature and proposed a typology to distinguish between three different kinds of framing: risky choice, attribute, and goal framing. The methodological differences that distinguish these three categories of framing manipulations are presented in Table 1.

**Table 1:**  
*Risky Choice, Attribute and Goal Framing Manipulations*

<i>Frame Category</i>	<i>What is Framed</i>	<i>What is Affected</i>	<i>How Effect is Measured</i>
Risky Choice	Set of options with different risk levels	Risk preference	Comparison of choices for risky options
Attribute	Object/event attributes or characteristics	Item evaluation	Comparison of attractiveness ratings for the single item
Goal	Consequences or implied goal behaviour	Impact of persuasion	Comparison of rate of adoption of the behaviour

Source: (Adapted from Levin, Schneider and Gaeth, 1998, 151)

Studies provide evidence that the framing effect depends on task, content, and context variables inherent in choice problems which themselves may involve distinct psychological mechanisms (Fagley & Miller, 1987; Highhouse & Paese, 1996; Levin et al., 1985; Petrinovich & O'Neil, 1996; Roszkowski & Snelbecker, 1990). Kuhberger (1998) conducted a meta-analysis of the influence of framing on risky decisions and found that a positive frame led to risk-aversion while a negative frame led to risk-seeking, as predicted by the prospect theory model. While providing evidence that the framing effect was a reliable phenomenon, the study highlighted the need to distinguish between outcome salience manipulations and reference point manipulations as well as drawing attention to the considerable effect that procedural features of the experimental settings had on the size of the framing effect.

### Reference Points

The concept of a reference point is derived from the psychology of perception which states that when evaluating alternatives, human perceptual mechanisms appear to consider differences rather than absolute levels (Festinger, 1957). A reference point acts as a target level when evaluating risky choices. The theory of rational decision making postulates that individuals have a preference function to rank specific characteristics of alternatives. Fisher (1930) noted "our present behaviour can only be affected by the expected future...not the future as it will turn out but the future as it appears to us." In order to be consistent in the measurement of alternatives, it is important to use the same reference point.

The measurement of costs and benefits is affected by changing reference points when applying preference ranking. When the specific characteristics measured are dollar values, the change in reference point is especially important when determining profit or wealth. Gains or losses are determined relative to the psychologically neutral reference point that represents an individual's current or potential wealth. Outcomes under the prospect theory model are expressed as gains or losses from this neutral reference point (Kahneman & Tversky, 1979).

### Risk Propensity

A review of the literature on the effect of risk on decision behaviour was conducted by Sitkin and Pablo (1992). They concluded that prospect theory was not supported by all the research findings. The implication drawn was that the contradictory findings may be an artefact of the research methods used or that risk perceptions may be correlated with an unidentified variable. Sitkin and Pablo (1992, 26) proposed that the unidentified variable was likely to be risk propensity and then proceeded to develop a model to support their assumption. Risk propensity is defined as the cumulative general tendency of the individual to either take or avoid risks.

Sitkin and Pablo (1992) and Pablo, Sitkin and Jemison (1996) concluded that risk propensity was a general tendency, rather than a universal propensity, on the part of an individual to take or avoid risks. In other words, individuals are not deemed to have one single risk propensity, rather risk propensity may vary according to the prevailing situation. Another key supporter of risk propensity was Wehrung (1989). Sitkin and Pablo (1997) questioned the validity of prospect theory as an all-encompassing model for

observed deviations of risk behaviour. However, they also acknowledged that the framing of the problem was a key determinant of risk perception.

To explain the anomalies Sitkin and Pablo (1992) juxtaposed previously unrelated research to compare risk propensity (risk-averse behaviour versus risk-seeking behaviour) against risk perceptions (positive perceptions versus negative perceptions). They proposed alternative theories such as threat-rigidity (Staw, Sandelands & Dutton, 1981) and hypervigilance (Janis & Mann, 1977) to explain risk-averse behaviour in a negative frame and attention to opportunities (March & Shapira, 1987) for risk-seeking behaviour in a positive frame. Threat-rigidity (Staw, Sandilands & Dutton, 1981) hypothesises that when an individual perceives a situation to be threatening the result will be conservative, risk-averse behaviour. Threat-rigidity was found to be more closely linked with considerations of uncertainty and uncontrollability while prospect theory was linked with the consideration of loss (Ocasio, 1995). Hypervigilance (Jannis & Mann, 1977) also posits that when a situation is perceived in negative, threatening terms an individual will exhibit risk-averse behaviour. Therefore, when a threat is perceived, decision makers are more likely to respond in a conservative or protective manner, preferring to remain with the status quo (Palmer, Danforth & Clark, 1995). Attention to opportunities (March & Shapira, 1987) is based on the premise that when an individual perceives a situation to be positive, they will focus their attention on the opportunities inherent in that situation and will exhibit risk-taking behaviour.

Sitkin and Weingart (1995) found that risk propensity and risk perception moderated the effect on risk behaviour of framing and Pablo (1997) demonstrated that risk propensity influenced risk behaviour by moderating the perceived characteristics of a situation. These findings highlight the importance of risk perception in the decision-making process. Clearly, the framework that Sitkin and Pablo (1992) developed provided an explanation for observations of risk behaviour that contradicted the predictions of prospect theory. Of the two major theories discussed in this section, prospect theory is useful to predict risk propensity and image theory provides insight into risk perception, which has been shown to moderate risk propensity.

## Image Theory Constructs

### Problem Space

Perceptions emerging from the process of information assimilation and evaluation are collectively referred to as the problem space (Payne, 1980). The role of cognition is well documented as a salient factor in decision making (see for example; Newell & Simon, 1972; Lord & Maher, 1990). The information processing system refers to the individual's cognitive model of problem-solving behaviour (Newell & Simon 1972) and the task environment refers to the problem itself. The problem space refers to the internal representation of the task used by an individual (Payne, 1980, 95). The concept of problem space provides further insights into the differences between choices made by respondents (Payne, 1980). The inclusion of problem space in decision research may provide better understanding of behaviour anomalies related to risky choice. Kahneman and Tversky (1979) suggested these anomalies may be due to the manner in which the problem is coded, edited and represented by the decision maker. These issues are linked with the problem space construct.

Dunegan (1993) examined the influence of framing on the processes that are thought to proceed the eventual actions of a decision maker. He called for more research on the extent to which framing effects influence cognitive processes, in particular, the processes that result in perceptions about conditions regarding the decision (Lord, 1985; Bowen, 1987). The way in which a decision maker processes information can be measured by the cognitive perception of the problem space (Maheswaran & Chaiken, 1991; Louis & Sutton, 1991; Fazio, 1990; Langer, 1989; and Isen, 1984).

When controlled modes of cognitive processing are used, information is subjected to a more comprehensive, deliberate and thorough analysis. When automatic modes are used, the processing of information is limited and there is a reduced attention to detail with fewer incoming cues creating a cognitive representation of the task (Dunegan, 1993). Controlled processing is expected to produce a significant relationship between problem space measures and decision outcomes (funding) because problem space should be more easily recalled and used in the controlled mode. In the automatic mode, the problem space is not easily recalled for conscious use and the relationship between problem space and decision outcomes should be weak or insignificant.

## Image Compatibility

Image compatibility refers to a person's subjective assessment of the progress of a project relative to current performance and future goals (Dunegan, 1993, 1995). There are three categories that are deemed to represent the decision maker's vision of the course of events (Beach, 1993, 165). The three categories are value image, trajectory image and strategic image. Value image considers the principles of the decision maker in terms of values, morals and ethics and is the basis for establishing goals worthy of pursuit. Trajectory image relates to the agenda that underlies the goals. Strategic image implies tactics and forecasts which relate to the goals (Beach, 1990; Beach & Mitchell, 1990; Mitchell & Beach, 1990). The prediction is that a decision made by an individual is a function of the perceptions of the three images (Mitchell, Rediker & Beach, 1986; Dunegan, Duchon & Ashmos, 1995).

These images are relevant to making decisions concerning adoption and progress choices. Adoption decisions are concerned with new projects, plans or activities. Progress decisions are related to deliberations concerning projects, plans or activities already commenced. Dunegan, Duchon and Ashmos (1995, 32) indicated that in both adoption and progress decisions, image compatibility acts as a catalyst for differentiated actions. When information is perceived as positive, the trajectory and strategic images are compatible and no change in course of action is deemed to be warranted by a decision maker. Conversely, when information is perceived as negative, images appear more incompatible and the decision maker is more likely to take action intended to rectify the situation (Beach et al., 1992).

Dunegan, Duchon and Ashmos (1995) found that image compatibility acted as a moderating variable, influencing the degree to which information was used by a decision maker in choosing a course of action. They also found that the use of a problem space image to guide resource allocation decisions varied with perceptions of image compatibility. Typically, when image compatibility was high, information use declined; when compatibility was low, information use increased. Image theory, however, does not address the concept of imagination nor the processes by which images are created and sustained. Unlike the proposed framework of Teigen and Brun (1995), image theory does not make the link between causal considerations and perceived realism in the framing of the scenario.

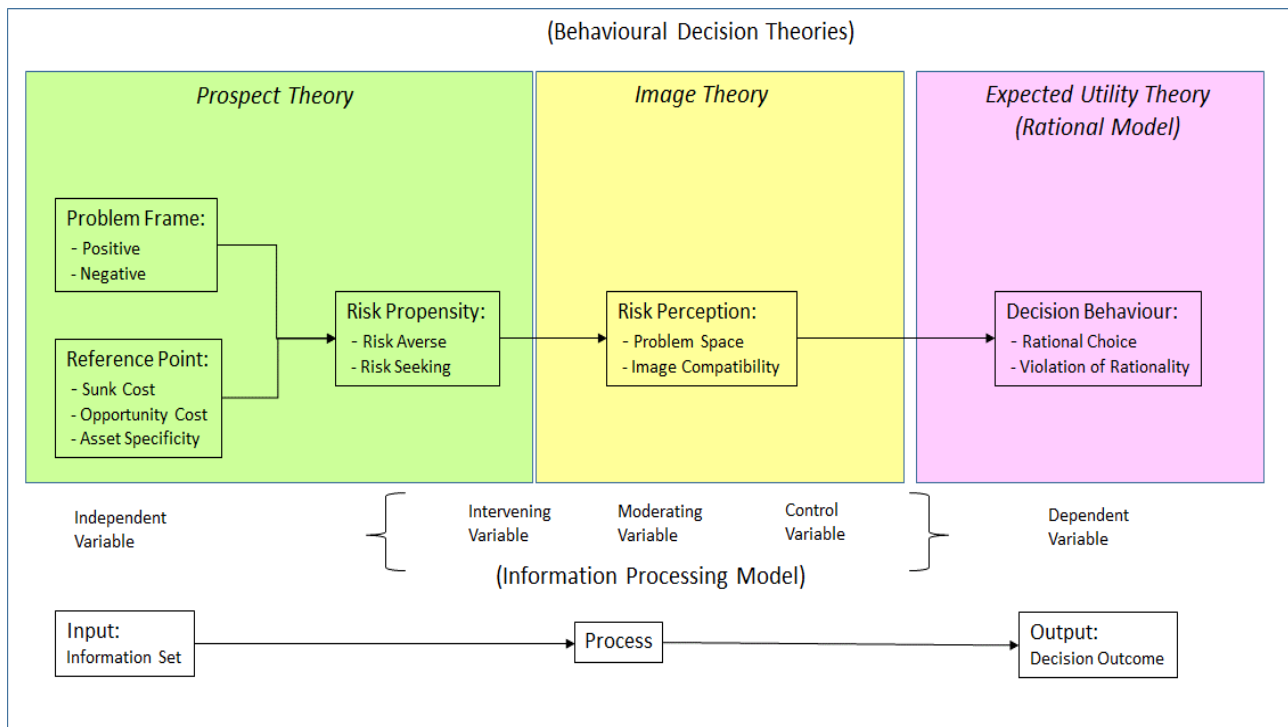
## Unified Model for Researching Behavioural Economic Decisions

The development of the model is presented in stages and is based on an underlying process model upon which three separate theories which are synthesised in an overall perspective. The first stage was the identification of a simple information processing model that could be the basis for studying variables pertaining to rational choice. In this case the model selected was that of Libby and Lewis (1977; 1982) which assumes that when an individual is confronted with a choice, the input is the relevant information set or data which is combined or processed to make a choice from among alternative courses of action (note that these are prospects). This model focuses on the ability of decision makers to use the information they have.

By combining the behavioural theories of Prospect theory and Image theory to predict rational choice (expected utility theory) and overlaying these with the simple information processing model the unified model, Figure 1, is produced. The unified model focuses on explaining the factors within the process of decision making which influence the decision outcome and accommodates the consideration of variables such as, independent, intervening, moderating, control and dependent.



**Figure 1:**  
*Unified Model for Researching Behavioural Economic Decision*



## Discussion

Research employing the unified model (Laing, 2009; 2013) has shown that risk propensity which is predicted by Prospect theory to be influenced by the problem frame and reference point can be moderated by the cognitive perception of risk. The results indicate that the model is capable of accommodating the effects of framing, sunk cost, problem space and image compatibility as well as other variables, such as asset specificity and opportunity costs. The model allows for the combination of prospect theory, image theory and expected utility theory for the purpose of the survey research. Risk propensity - predicted by prospect theory to be influenced by the problem frame and reference point - was shown to be moderated by the cognitive perception of risk. The results indicate that the model is capable of accommodating the effects of framing, sunk cost, problem space and image compatibility as well as other variables, such as asset specificity and opportunity costs. The model provides a framework for testing the predicted outcomes of expected utility theory - that is the optimal or rational choice - that can be adapted to allow for further manipulation of variables.

## Future Research

This model provides a framework for testing the predicted outcomes of expected utility theory with regards to an optimal or rational choice and can be adapted to allow for further manipulation of variables. Future research could explore the possibility that other variables, or more salient items for consideration may act to moderate or intervene in the decision making process.

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