ASSESSING MANAGERIAL DECISIONS USING THE DUAL SYSTEMS THEORY OF REASONING: FUTURE CHALLENGES FOR MANAGEMENT RESEARCHERS

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ABSTRACT

We focus on likely challenges that will be encountered by field researchers investigating managerial decision-making using theoretical frameworks based on the dual systems of reasoning. This decision-making theoretical framework is currently the subject of theory building research in the management literature (e.g. Dane & Pratt, 2007). Future field studies investigating how dual systems of reasoning affect consequential decisions made by entrepreneurs and managers in actual business settings are necessary for further development of this theory. Major issues that challenge the field researcher include choosing the decision or decisions to investigate, deciding on how to operationalize the criterion variable, consideration of alternate normative outcomes resulting from multiple legitimate goals of the decision-maker, the choice between measurements of the decision process or decision outcomes and choosing among possible operationalizations of predictor variables already shown to be significant factors in determining the extent logic-based reasoning is used in decision-making. We offer suggestions for dealing with many of these challenges and other issues in conducting field research investigating dual process theories.

INTRODUCTION

Decisions of major consequence occur in response to real life situations. Often these situations are very complex and require decision-making that occurs over lengthy periods of time. The theoretic framework based on two systems of reasoning draw a distinction between the reasoning processes employed in making these decisions (e.g. Sloman, 1996). One system is purposeful and rational, the other automatic and affective (Hamilton, Sherman & Maddox, 1999). These systems can coexist and influence decision-making behavior in everyday life (Epstein & Pacini, 1999). Although the terminology used to describe these two systems varies, the characteristics of the two systems are described in a similar manner. Epstein (1994) described the two systems as experiential and rational; Sloman (2002) characterized them as associative and rule-based, Stanovich and West (2000) and Kahneman (2003) have labeled them as System 1 and System
2. The System 1 or the experiential system describes a fast, effortless, intuitive reasoning process that is subject to emotional influences and which is often utilized to make many decisions in a near simultaneous manner. The System 2 or the rational system describes a slow, effortful, logic-based process that results in decisions that are made sequentially rather than simultaneously. The underlying assumptions regarding the use of the two systems are that System 2 reasoning requires a greater use of appropriate information and analysis (Kahneman 2003) and that a greater use of System 2 or logic-based reasoning by the decision maker will result in better solutions to more complex problems than a greater use of intuitive reasoning (Stanovich and West 2002).

While experimental research provides useful evidence regarding the nature of the dual systems and the significance of hypothesized factors that tend to enhance or inhibit the use of logic-based reasoning, certain distinctions between reasoning in an experimental setting and real-world decision-making are likely to limit generalizability of experimental results. While continued experimental research is clearly important for the further refinement of dual process theories, field research designed to help better understand how people make important decisions in everyday life settings should also be an integral part of this theory development. Because of the potential impact the quality of business related decisions by entrepreneurs or managers have on their company and its stakeholders, field research related to the dual systems of reasoning in business contexts is particularly important. However, future field research investigating how these consequential decisions are actually made, and how they could be made more accurately, faces challenges not faced by experimental research. This discussion will highlight some of these challenges to future field studies, and suggest alternative methods of meeting those challenges.

Individuals frequently make complex decisions in their various business roles such as manager, entrepreneur or director. Business researchers have an interest in improving individual decision-making in one or more of these areas. The dual process of reasoning theories show great promise in helping achieve a better understanding of decision-making behavior and, therefore, provide a pathway for its improvement. Field research that results in even modest improvements in this business decision-making has the potential to make a significant impact on society.

For purposes of this discussion, one common significant decision-making process will serve to illustrate some of the challenges field researchers face in investigating how the dual processes of reasoning affects how important business decisions are made. A typical decision-making process by an entrepreneur involved with creating a new venture will serve to illustrate some of the challenges to the researcher. The outcome of new venture creation decisions are important to these entrepreneurs because of the effect either success or failure will have on their personal lives and these decisions are commonly made by many entrepreneurs involved with a business startup. New ventures favor less complex businesses in certain industries, due in part to low barriers to industry entry, and frequently have only one individual that serves as the primary decision-maker. Yet, although these ventures are often relatively simple, the study of the decision-making process surrounding the creation of this new venture will illustrate many of the complex issues field
researchers investigating the dual process theory of reasoning may face in numerous other research settings. The discussion will first consider field research issues related to the likely criterion variables reflective of the dual processes of reasoning, and then consider issues related to likely predictor variables whose relationships with those criterion variables will likely be tested in those field studies.

**ISSUES RELATED TO THE CRITERION VARIABLE**

Experimental decision research often involves assessing outcomes of a single decision with a single correct answer. Field research may involve decision processes involving multiple related decisions with many alternatives that may vary as to degrees of correctness under multiple decision logics. The specific decisions to choose for study, methodological challenges, and alternative goals of the decision makers are examples of the type of issues field researchers are very likely to encounter.

**The Decision(s)**

An investigation into the decision-making surrounding the new venture creation process immediately presents the researcher with choices. The researcher may seek to investigate the degree decision outcomes reflect a correct result or the degree the decision process reflect a normative logic-based methodology. One discreet decision for study or some or all of the numerous decisions comprising the entire decision-making process may be investigated. Selection of a single decision for study from a decision sequence requires the selected decision to be somewhat representative of the type of reasoning employed in the sequence. Selection of a multiple decision sequence for study requires definition of the start and the end of the sequence. The field researcher may experience difficulty in determining these starting and stopping points.

Our hypothetical entrepreneur has likely decided early in the entrepreneurial process to start a business, what goods or services the business will offer and has tentatively decided on other basic parameters of the business. These parameters might include such matters as approximately where the business will be located, product or service mix and target market. As the commencement of operations nears for the new venture, the entrepreneur will typically have to make numerous related decisions regarding the specific location of the business, type of facility improvements that will be necessary, equipment and supplies that will be needed, the number of personnel to be hired, the amount of capital that will be required during the initial period of operations and so on.

Singling out one important decision for study from a process that involves numerous related important decisions is problematic. One decision may be made intuitively, and subsequent decisions required by that intuitive decision may be made using logic-based reasoning. For example, the entrepreneur may intuitively decide to open a business without benefit of research into the economic
desirability of that industry and then intuitively decide to locate the business in the current neighborhood of residence merely because of the familiarity of the area. However, when choosing between alternative locations for the business in that neighborhood, the entrepreneur could then utilize logic-based reasoning to identify and evaluate the reasonable alternative locations and make the decision. The field researcher must then determine if the two primary decisions, that were made intuitively, effectively precludes subsequent logic-based decision-making if an entirely logic-based decision-making process would not have yielded the alternatives that are now being subjected to a logic-based evaluation.

If one logic-based decision out of a series of intuitive decisions can be considered reflective of a logic-based process, the field researcher may need to demonstrate why the predictor variables of the logic-based reasoning method employed in the decision of interest did not uniformly predict logic-based reasoning in any other decisions in the decision sequence. If the researcher is limited to a sequence uniformly reflective of logic-based reasoning, the researcher will need to clearly identify the significant decision at the start of the sequence and take the position that any prior intuitive decisions in the sequence were of much lesser significance.

However, even if the “important” upstream decision can be identified and is found to be made using logic-based reasoning, there may be sufficient downstream intuitive decision-making to reduce the entire process to being reflective of intuitive reasoning. For example, the entrepreneur may logically chose to participate in an industry after concluding that it would likely result in increased income compared to likely current wage prospects, and logically choose to locate the business in an area with great market potential. However, because of the numerous demands on his or her attention as the startup date approaches, the entrepreneur does not take the time to explore alternate locations and opts for the first available location that was presented for consideration. As a result, the entrepreneur commits to a facility that is too limiting and has occupancy costs that are much higher than would have been incurred at other locations. The resulting reduced revenue and higher costs result in organizational performance that is materially lower than would have occurred if logic-based decision making would have extended through the whole decision sequence. In this example, one could argue that “downstream” intuitive decision-making converted what was an otherwise logic-based decision-making sequence into what was in effect an intuitive one.

Methodological Challenges

The selection of a sequence of decisions for investigation presents the field researcher with a methodological dilemma, particularly when there is a lack of homogeneity in the reasoning method used for the decisions in the decision sequence. In this case, the empirical results derived from aggregating the reasoning criterion scale scores for each decision in the decision sequence could be difficult to interpret when assessing the characteristic reasoning method employed by an individual, or the effect of the reasoning method on individual or organizational level performance. The
example in the previous section where initial decisions were made using logic-based reasoning and subsequent decisions were made using an intuitive process illustrates this point. The scores on each of these decisions could be aggregated to yield some sort of overall representation about the degree of logic employed in the decision sequence. Alternatively, the number of decisions in the decision sequence made intuitively could be compared to the number of decisions that were using logic-based reasoning to yield this representation. In either case, analyzing aggregated results that do not reflect a pattern of either highly intuitive or highly logical decision-making could be difficult.

The field researcher will also need to consider what weighting to give each decision in a sequence if the scores are aggregated. Equal weighting of the decisions needs to be carefully evaluated by the researcher intending to aggregate results. Certain decisions in our hypothetical entrepreneur’s decision sequence are likely to be much more important in terms of likely impact on organizational level performance and an argument could be made that the scores on the more important decisions should be given more weight. While equal weighting of decisions may not be theoretically supported, lack of data supporting alternative weighting protocols may result in equal weighting of decisions by default.

The design of measurement scales also raises issues, some of which are at the heart of differentiating the group of dual process theories from other theories. Administering a scale that has items representing completely logic-based and completely intuitive reasoning as anchor points on a single scale with other interim points representing methods of reasoning that have differing combinations of logic-based and intuitive components conceptualizes the method of reasoning employed as a continuum. Alternatively, two points could appear on the scale, one representing intuitive and the other representing logic-based reasoning. This approach requires a single scale cut point that differentiates the two methods of reasoning. Using our example, this approach might require an a priori determination as to the point where the amount of due diligence transforms an intuitive process to a logic-based process. Thus, one approach presumes an integration of the two systems, the other dominance of one system or another in each decision (Hamilton et al., 1999). Utilization of an a priori cut point presumes a certain level of theoretical refinement. Unfortunately, many fields such as entrepreneurship have not reached consensus on defining either normative outcomes or processes, much less specifying their threshold conditions that could be translated into cut points on a survey instrument.

It is likely any survey instrument will use ordinal scales. Unless the researcher treats the scale like an interval scale, the resulting analysis may possibly require the use of nonparametric statistical techniques (Velleman & Wilkinson, 1993) and complicate the aggregation of scores from multiple decisions. Choosing to treat the system of reasoning criterion variable as a dichotomous or continuous criterion variable affects the analytic methods the researcher may employ. Measuring the reasoning system as a continuous variable offers the ability to utilize regression or structural equations modeling to test relationships between hypothesized predictor variables and the continuous reasoning criterion. Measuring the reasoning system as a dichotomous variable dictates
that logistic regression or discriminant analysis should be used. Because of the requisite assumptions for discriminant analysis, logistic regression is preferable when dealing with a criterion variable with two possible values (Cohen, Cohen, West & Aiken, 2003).

Experimental research usually assesses decision-making in an environment where contact with other individuals during the decision process is eliminated. The field researcher assessing a decision-making process after the fact cannot assume that the process was done completely unaffected by interactions with one or more other persons. A study by Smith, Peterson and Schwartz (2002) illustrates how middle managers facing ambiguous situations frequently consult other persons for guidance and the pattern of consultation varies between cultures.

Patterns of communication with other individuals also present measurement challenges to the field researcher. The degree of logic-based reasoning employed may be related to the quantity and quality of consultation with other individuals. The entrepreneur will likely derive a decision-making benefit from consultations with other experienced entrepreneurs and qualified professional advisors. Measuring the quantity and quality of those consultations presents their own unique methodological challenges. For example, the entrepreneur can have fifteen consultations with one individual or one consultation with fifteen different individuals. The field researcher can measure the number of interactions between the entrepreneur and a second party, or merely the number of second party consulted. The researcher may also attempt to measure the quality of the consultation by attaching a weight to the party consulted based on professional credentials, industry experience or some other criteria. Patterns of consultation or communication may prove useful in explaining a portion of the variance in the method of reasoning employed, but also have the potential to influence the relationships between individual-level predictors and reasoning system criteria.

Another issue that researchers will consider in the research design is to what extent the study will be longitudinal. Typically, that would involve the decision maker’s recall of the decision process for all of specific individual decision elements if a process-based criterion variable is used. Similarly, the use of an outcome-based criterion variable would also require recall of the elements of the decisions that were made. However, use of an outcome-based criterion would also require a measure of outcome stemming from the time of decision(s) to the time of the field work. The field researcher choosing an outcome-based criteria may have difficulty in assessing whether the time from the decision to the gathering of data has been sufficient to allow the effect of decisions to substantially impact performance and yet not so long that other variables have been able to intervene and also materially affect performance.

**Alternative Logics of Decision Makers and Measurement of Outcomes**

Outcome-based decision criterion variables presume the existence of an optimum result or set of results. While economic theory has traditionally presumed a decision maker sought to maximize economic utility, other goals that correspond to alternative decision logics are no less
important or rational (Schneider & Barnes, 2003). Normative decision outcomes can be related to achieving the logic-based goals of the decision maker or derived as representing best reasoning practices observed for a particular class of decision makers. Sarasvathy (2001) provided an excellent example of how a normative solution could be derived from an investigation into the best practices of a particular group of subjects. She investigated the decision-making behavior of entrepreneurs that were highly successful. She discovered they used a logic that she termed as effectuation. The basis of the logic used by that group was to maximize objectives based on a given set of means rather than the logic of seeking means to achieve given objectives.

The business literature has recognized alternative normative goals for business decision makers (e.g. Stewart, Watson, Carland & Carland, 1998). One logic is based on maximizing current earnings and achieving financial stability; another is based on maximizing growth. Owners of existing small businesses have been found to manage primarily to provide an acceptable, consistent level of income; the more entrepreneurial individuals have been found to manage with less emphasis on current earnings and more emphasis on growing the business as quickly as possible. Entrepreneurs and small business owners may choose different decisions alternatives based on their individual basis of logic that stem from their differing goals. Both logics are considered normative. In addition, the owner of a home-based business could employ an additional noneconomic logic based on the goal of maximizing time spent with his or her children that could be also considered normative. Thus, different researchers could conclude that any of these logics and possibly other additional logics could be considered normative in assessing important startup decisions made by entrepreneurs.

The field researcher using decision outcomes as the criterion variable will need to decide which logic or combinations of logics should apply in each research context in order to develop instruments to measure the decision-maker’s behavioral conformity with that logic. However, the possible lack of comparability between studies that define different logics as normative could likely result in a variety of results within that research context and between various other research contexts. For these reasons, measurement of the reasoning system employed criterion by making an assessment of the decision-making processes that were used could be preferable to measurement of decision outcomes. However, an assessment of the decision-making process is not accomplished without overcoming significant challenges as well.

Assessing Decision Processes

This discussion has previously alluded to some of the practical difficulties with outcome-based criterion measures of decision-making. Different logics can result in different normative solutions and as result outcome-based studies are likely to be difficult to compare. Research studies in which the degree of logic used in the decision process is the criterion variable reflecting the type of reasoning employed can provide the basis for greater comparability among studies in different
research domains. For example, decision-making processes that are made in a very short time period with little or no information search and analysis or consideration of reasonable alternatives could likely be described as intuitive regardless if the process involved starting a business, selecting a personal residence, choosing a career or educational institution. Similarly, decisions that are made carefully after much information search, consultation, analysis and evaluation of alternatives could be considered logic-based in a number of research contexts. This would be true even if the decisions made using logic-based reasoning were ultimately found to be incorrect.

Consider the elements that are necessary for logic-based reasoning in a complex and dynamic real world environment that these entrepreneurs will be facing. Requisite knowledge and experience, together with the desire and the opportunity to employ logic in the decision process, are likely prerequisites for their logic-based decision-making. Our hypothetical entrepreneur serves as an example of how these requirements will limit the use of logic-based reasoning in many cases.

Not all entrepreneurs possess a formal business education. This would lead one to expect that many important decisions would be made intuitively simply because these entrepreneurs would not know what issues are important, what information about these issues is necessary to make a logic-based decision or where that information could be found (Cooper, Folta & Woo, 1995). In addition, unless they have received a formal business education, they may have never been exposed to analytic tools that are necessary to evaluate what information has been gathered. If only a small minority of these entrepreneurs possess the requisite tools to make these decisions logically it is unrealistic to expect they would employ a decision process that reflects logic-based reasoning. The entrepreneurs that have the requisite experience and education but possess certain traits, such as a low need for cognition, or are subject to situational constraints, such as severe time pressures, would also be likely to engage in intuitive decision-making (Kahneman, 2003).

Thus, one would expect typical samples of entrepreneurs to include a majority of individuals that make practically all of the important decisions rapidly and intuitively, a minority that makes some of the decisions intuitively and the rest logically and a very small minority of decision-makers that make virtually all the decisions logically. An exploratory study found this was indeed the case (Leaptrott, 2006). The majority of respondents in that study reported only cursory amounts of information gathering or analysis before making important functional new venture decisions. Approximately one third of respondents did not seek information from anyone about where to advertise the business, where to get inventory or supplies for the business or how much money it would take to start the business and made those decisions in one day or less. A majority of participants only sought information from one person or less, and spent a week or less to gather information, analyze it and reach a decision.

Assume for the sake of discussion that this distribution of decision-makers was typical and would commonly be encountered in several research contexts. If this is the case, the more pressing research priority would appear to be to develop and test interventions hypothesized to improve decision-making by the majority that primarily use an intuitive method, rather than to attempt to
further refine the definition of the normative logic-based decision-maker. The related methodological challenge would be to detect the threshold where the decision-making stops being primarily intuitive and begins to be logic-based. An argument could be made that process-based criterion variables could be more helpful in identifying elements of the decision process that could be more easily improved than an outcome-based criterion variable because relatively few decision-makers achieve the optimal decision outcomes.

**OPERATIONALIZING LIKELY PREDICTOR VARIABLES**

Field studies frequently involve the administration of survey instruments to study participants. Because of the negative relationship between instrument length and complexity and the response rate, the field researcher conducting survey research faces constraints as to the scope of a particular research project. Therefore, the field researcher may not be able to simultaneously assess the relationship between all likely predictors and the method of reasoning employed. The use of test studies and exploratory factor analysis often results in a modified instrument for use in the main study that will hopefully yield an acceptable response rate and meet the study objectives. Kahneman (2003) has summarized several factors that have been found to affect the degree System 2 cognition is utilized. How field researchers may operationalize some of these factors as predictors of the method of reasoning employed will now be discussed.

**The Need for Cognition**

Cacioppo, Petty, Feinstein and Jarvis (1996) define the need for cognition as “a stable individual difference in people’s tendency to engage in and enjoy effortful cognitive activity” (1996, p. 198). Cacioppo and Petty (1982) developed an instrument to measure an individual’s propensity to engage in such effortful cognition. Researchers have used variations of this instrument in over 100 empirical studies and have demonstrated that “…individuals low in need for cognition were likely to endorse items depicting heuristic rather than vigilant or effortful information processing, whereas individuals high in need for cognition were likely to endorse items depicting effortful rather than heuristic information processing” (Cacioppo et al., 1996, p. 202).

Cacioppo et al. note “…individuals high in the need for cognition are more likely to seek information about a wide range of tasks, issues and current events than are individuals that are low in need for cognition” (p. 238). The process of gathering information and considering alternative decisions regarding new venture issues is often time consuming, expensive and difficult. Individual who embrace cognitive activity rather than avoid it are more likely to be motivated to undertake the challenges of information gathering and put forth the cognitive effort required to analyze it. There is evidence that is indeed the case. Subjects higher in the need for cognition desired to see more information than subjects that were lower in the need for cognition (Verplankern Hazenberg &
Palenewen, 1992). In addition, subjects with a higher need for cognition put more effort into external information search prior to making a decision (Verplanken, 1993).

Measuring the need for cognition in a field study is a relatively straightforward endeavor involving administration of a version of the need for cognition scale as part of the survey instrument. One version consists of a rather parsimonious 18 items with the anchors “extremely characteristic” and “extremely uncharacteristic” as anchors on a 5 point Likert-type scale.

**Intelligence**

Stanovich and West (2002) suggest that higher intelligence is predictive of a higher usage of the rational or System 2 mode of cognitive processing. Their empirical studies utilized a sample of university students attempting to solve either a conjunction fallacy reasoning problem (1998b) or a variety of abstract reasoning problems (1998a). They found the average SAT scores of correct responders were significantly higher than the scores of incorrect responders. They also noted that the effects of differences in intelligence were higher when the cognitive tasks were more difficult.

While some of the decisions the entrepreneur often faces are routine and could be made correctly with little cognitive processing, many important decisions involve great uncertainty and unfamiliarity with elements of the environment the new venture will face. Consequently, substantial cognitive processing could be required to correctly analyze the new venture’s environment and provide an appropriate organizational response. As a result, studies such as those by Stanovich and West (1998c), would suggest that the more intelligent entrepreneur would be more successful making decisions that require substantial information gathering and analysis.

Intelligence has been a predictor of success in many occupational situations. Schmidt and Hunter (1998), citing findings from a meta-analysis on predictors of job performance, reported intelligence was the best job performance predictor. The correlation was highest for professional-managerial jobs and lowest for completely unskilled jobs. These results suggest that professional and management jobs more often require intelligence in decision-making to a greater degree than the more unskilled jobs.

The selection of an intelligence measurement technique presents practical challenges to the researcher engaged in a research design based on surveying busy respondents. The length of such an instrument may degrade the ability of the instrument to measure other variables of interest. This limitation would likely also apply to many other research contexts. One parsimonious approach to the measurement of intelligence has been to use the amount of education as a proxy for intelligence. Ceci and Williams (1997) report correlations of between .50 and .90 between intelligence and the amount of schooling one receives, with correlations of .50 to .60 typically resulting. Thus, field studies using intelligence as a predictor variable could consider assessing intelligence by measuring the respondent’s years of formal education with a one-item scale. Conducting field research in a large organizational setting may allow a field researcher to access the results of any organizationally
administered test of general mental ability. Another field research alternative is to administer a parsimonious measure of general mental ability such as the Wonderlic Personnel Test. However, even though assessment tools such as this typically can be administered in 10-15 minutes, the choice to administer an intelligence measure will likely decrease the ability of the researcher to assess other predictor variables.

**Exposure to Statistical Thinking and Other Analytic Tools**

Kahneman (2003) lists exposure to statistical thinking as a factor that is positively correlated with System 2 cognitive processing. Several empirical studies have investigated the utility of such exposure on decision-making. Studies by Jepson, Krantz and Nisbett (1983) and Fong, Kratnz and Nisbett (1986) provided evidence to support a reduction in the use of incorrect inferential rules decision-making as a result of some statistical instruction. Kosonen and Winne (1995) found evidence to support the benefits of exposure to statistical thinking to everyday problem solving by students of various ages. These results tend to suggest that the incidence of System 2 reasoning will increase when the decision maker possesses analytic tools, such as statistical training, that might have gained from education or experience.

The implications of the relationship between prior mastery of analytic tools and their use in logic-based reasoning associated with solving complex reasoning problems possibly extend far beyond this context. The individual is more likely to use analytic tools that have introduced to them, primarily through formal education, than an individual who has not been exposed to them and would therefore have to develop these analytic tools independently before using them.

Different decision-making contexts may require different analytic tools. Analytic tools that may be useful to the entrepreneur in making decisions related to a new venture might include an understanding of statistics necessary to evaluate the estimated probabilities of various occurrences and the likelihood that strategies formulated in contemplation of those occurrences would have the intended effects. The list of other analytic tools that would help logic-based reasoning efforts by an entrepreneur is potentially a long one. It includes knowledge about the use of a business plan preparation and presentation process that would require a detailed analysis of many aspects of a new venture. In addition, an education in the business-related academic disciplines of accounting, management, marketing and finance would provide many analytic tools that the entrepreneur could apply to logic-based reasoning related to new venture creation. The experience an entrepreneur may have in the industry environment of the new venture will also likely provide analytic tools suitable for that particular environment. Cooper, et al. (1995) found that entrepreneurs with relevant industry experience performed more information search, presumably due to their familiarity with what information was important for new venture success and where they could obtain that information.

Assessment of the respondent’s exposure to analytic tools that are relevant to the research context can be assessed indirectly with single item scales inquiring about particular educational
activities such as specific mathematics, science or business courses taken, or assessed by having respondents answers questions or solve problems that would require specific knowledge of the analytic skill of interest.

**Time Pressure and Concurrent Involvement in Multiple Cognitive Tasks**

Kahneman (2003) also has identified time pressure and concurrent involvement in multiple cognitive tasks as factors that tends to inhibit logic-based reasoning. Sources of time pressure and concurrent cognitive tasks can vary greatly and can be very domain specific. These factors can inhibit logic-based reasoning by the entrepreneur starting a new venture in a number of ways. Commitment deadlines for equipment, inventory, facilities and advertising can occur far in advance of the actual commencement of operations. The limited capital resources of the new venture can limit the duration and scope of the information gathering and analytic processes. The sheer number of decisions the entrepreneur has to make in a usually short time period limits the amount of cognitive resources that can be used for each.

Ordonez and Benson (1997) found empirical evidence to suggest that decision makers often expedite the decision process when under time pressure. Expediting the decision-making process can result in behavior that includes switching to simpler decision strategies, relying more heavily on negative information and reducing the input of information. The entrepreneur that is under time pressure might likely gather widely varying amounts of information about a range of alternatives and analyzing a small subset of attributes possessed by them rather than gathering an equivalent amount of information about each alternative and analyzing a substantial number of attributes of each (Verplanken, 1993).

Gilbert (2002) provides empirical evidence of the decision-making effects of concurrent involvement in multiple cognitive tasks, particularly with respect to correction of initial categorizations. His research was based on the premise that “conscious attention is a scant resource” (p. 169). As a result, concurrent involvement in multiple cognitive tasks reduces the ability of an individual to use information in decision-making. He offers evidence of the effect that initial categorization uses fewer cognitive resources than subsequent corrections to that categorization. His research has shown that information relevant to the correction of an initial categorization is often noticed but not utilized. He has found evidence that self-regulation by the individual involved in routine everyday tasks can create enough cognitive busyness to limit the amount of information that is utilized in correction of initial categorizations.

Many events, relationships or roles may be both a source of time pressure and concurrent cognitive involvement for a decision-maker over extended periods of time. While experimental research may manipulate the effects of time pressure and concurrent cognitive involvement separately, the field research may face a much more difficult task in assessing the individual effect of these factors. One can easily envision the limitations on logic-based reasoning that might result
when the entrepreneur is immersed in a multitude of ambiguous and uncertain situations while facing decision deadlines during the startup and initial operation of a new venture. Family matters or other employment or business commitments could be examples of factors that enhance both a state of cognitive busyness and perception of time pressure that limit the decision maker’s ability to engage in logic-based reasoning.

The field researcher investigating the effects of these factors on decision-making would be well advised to engage in preliminary qualitative research to develop an understanding of what roles, events or activities serve as sources of time pressure or cognitive busyness to the extent that they are likely to impact the reasoning method employed in making significant decisions. For example, if the decision maker’s family or occupational role is found to be a common source of time pressure and cognitive busyness, measures relating to family-work conflict (e.g. Netemeyer, Boles & McMurrian, 1996) or family functioning (e.g. Olson, 1991) might be considered for inclusion in the survey instrument.

The measurement of predictor variables in testing relationships with criterion variables reflective of the type of reasoning system employed may perhaps present a lesser challenge to field researchers that the measurement of the criterion variables themselves. Many measures of these likely predictors have been previously operationalized and used in field studies performed in other contexts.

**CONCLUSION**

Much of the content of this discussion was derived from efforts to perform an earlier exploratory study (Leaptrott, 2006) that was designed to gain a perspective on how frequently each type of reasoning was employed in an important decision-making sequence by examining the decision processes involved. The study tested the significance of the relationship of between predictor variables and the use of logic-based reasoning in that reasoning sequence. While reporting specific results of the study are beyond the scope of this discussion, the general findings are of interest in providing a context for the present discussion and future theory development. The study included responses from 187 childcare entrepreneurs in Florida. Approximately 55% had no more than a high school education, 20% received an associates degree with the remaining 25% had received a bachelors or masters degree. About 50% had never taken a college level business class, about 23% had taken 4 or more classes, with the balance taking 1-3 classes.

Several typical startup decisions, such as the amount of money required for startup and which professional advisors to retain for the business, were selected as components of the decision sequence to be investigated and the decision process approach was selected to serve as the criterion method for determining the extent logic-based reasoning was employed. Four elements of each decision’s process were chosen to represent the extent the decision process reflected the reasoning method. These elements were the number of people that served as sources of information, the length
of time it took the decision maker to gather information and make a decision, the number of
alternatives considered and the number of factors the decision maker considered when choosing
between alternatives.

The frequency of responses displayed a consistent pattern that tended to reflect primarily
intuitive reasoning. About 1/3 of respondents did not seek information from anyone, made the
decision in a day or less, and considered no alternatives. Approximately 20% sought information
from one other person, took between one day and one week to make the decisions and only
considered one alternative. At the other end of the spectrum, less than 10% sought information from
more than 5 people, took more than 6 months to reach the decisions and considered four or more
alternatives.

These results have several possible implications for future research and theory building. If
we truly live in a world where intuitive decision-making is by far the predominant decision-making
method even for very important decisions, research priorities and methodologies should reflect that
reality. There appears to be little utility in engaging in much debate about the threshold for logic-
based reasoning. It may never be clear exactly when that threshold level is reached. However, there
appears to be much utility in improving the decision-making by the large numbers of
characteristically intuitive decision makers. This is certainly true for entrepreneurs. The new
business four year failure rates are approximately 50% (Phillips & Kirchhoff, 1989). The high new
business mortality rate demonstrates that even small improvements in otherwise intuitive decision-
making by entrepreneurs could have a tremendously positive social and economic impact.

In the present example, the great majority of the decisions that were assessed clearly should
be described as having been made intuitively. It is very unlikely that a childcare care entrepreneur
could reach a logic-based decision in a day, or even a week, and do so by getting information from
at most one person. It is also unlikely that a childcare entrepreneur would acquire knowledge about
business-related topics such as business plan preparation, accounting, new venture financing, or
marketing outside a formal higher education setting. In addition, it would be difficult for such an
entrepreneur to know what information to seek or where such information could be found without
possessing this foundation of knowledge. In this exploratory study, the correlation between the
number of college business courses taken and the degree logic-based reasoning was employed in
making those business decisions was approximately .30. Although the correlation was significant,
it is possible that the correlation wasn’t higher because the method of measuring the type of
reasoning employed criterion variable was not sufficiently refined. The criterion was operationalized
in this study as an interval scale with items reflecting the two methods of reasoning as anchors.
These scales represented intuitive-based reasoning as a speedy process with little or no information
search and analysis and a logic-based reasoning as an extended process utilizing many information
sources and substantially more analysis.

The issue of how best to represent the dual processes of reasoning in a field setting awaits
further development. In many field research settings, what would constitute a normative process
or outcome is not yet resolved. The issue of what constitutes a normative entrepreneurship model of new venture creation is far from resolved. This lack of consensus on what decision outcomes or processes are normative obviously limits the rate of progress of decision-making research in the field. However, there is much research that can be done while the nuances of defining normative outcomes or processes evolve. In many research settings, such as in the present example, it is possible to identify decision-making behavior that is clearly intuitive. It is also possible to identify behavior that constitutes a reasonable improvement over what is clearly intuitive. The current array of experimentally-supported predictor variable can be tested for significance in making modest decision-making improvements. Much future research is necessary to explore how exposure to specific analytic tools gained from a formal education, consultations with professional advisors, communications with members of social networks, or life experiences contribute to the use of logic-based reasoning either directly or indirectly through interaction with other individual-level or situational variables. Despite the challenges to executing field research programs in this research domain, the potential societal rewards justify the time and resources that it will take to overcome them.

REFERENCES


