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THE RELATIONSHIP OF LOCUS OF CONTROL AND VIVIDNESS OF IMAGINATION MEASURES TO SIMULATION PERFORMANCE

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ABSTRACT

This research project investigated the relationship of locus of control and vividness of imagination measures on simulation performance criteria. It was hypothesized that an internal locus of control and a vivid imagination measure would have a positive relationship with simulation performance, group, peer evaluations, and team quality. Utilizing a large sample size and controlling for the demand characteristic bias the research design did not produce results which would support the hypotheses. However, an unexpected finding of the study suggests that gender differences may significantly impact simulation performance.

INTRODUCTION

Researchers have known for some time that particular aspects of thinking and personality that differ between people influence the mannerisms in which they tackle business related situations. For example, in developing strategic plans, the roles of individuals along with their decision making styles and their judgements, will greatly influence how they prepare their plans for the future (Loveridge, 1979). Two aspects of thinking and personality which have received a great deal of attention in the Management literature are locus of control (Miller, Kets de Vries, and Touhouse, 1982) and vividness of imagination (Anthony, Wheatley, and Maddox, 1985). These two particular cognitive aspects greatly impact the behaviors of today's executives. According to the Management literature an internal locus of control facilitates innovation and more dynamic strategies while a vivid imagination provides for a greater level of creative decisions. In addition, there is more than ample evidence existing in the literature that states that these cognitive aspects can be enhanced through training and practice in the business management classroom. Thus, the purpose of this piece of research was to gain a better understanding of the relationship of locus of control and vividness of imagination measures to business simulation performance. A discussion of the theoretical underpinnings of these two cognitive aspects are presented next followed by a presentation of the research project and its findings.

LOCUS OF CONTROL

The locus of control notion states that work behavior can be explained by whether employees perceive outcomes as controlled internally or externally (Luthans, 1981). It has practical implications for business management practices because those individuals who have an internal locus of control are more likely to engage in more innovation than their counterparts who exhibit an external locus of control (Miller, Kets de Vries, and Touhouse, 1982).

The roots of locus of control theory can be traced to the writings of F. Heider (1958) who believed that both internal forces (ability, effort, and fatigue) and external forces (rules, weather, etc.) combine to determine behavior. He stressed

that it is the perceived, not the actual determinants, that are important to behavior. The actual development of the locus of control theory is attributed to J. B. Rotter (1966) who developed the Locus of Control instrument. Rotter formulated his theory around the role of reinforcement in determining behavior because he felt that an individual could perceive reinforcement as a consequence to his/her own behavior (internal) or as a function of factors beyond his/her control (external).

Weiner (1972) developed Rotter's theory further by suggesting that individuals act as "naive psychologists and are motivated to examine the causes of an event to obtain a cognitive explanation of the causal structure of their environment" (p. 356). Building upon these works, many important aspects of the locus of control theory have developed in order to better understand human behavior in the workplace.

First, there is the tendency of individuals to attribute success to internal causes (ability and effort) and to attribute failure to external causes (Fitch, 1970; Weiner and Kubla, 1970). Secondly, high achievers will attribute task success more to ability than will low achievers and, conversely, low achievers will attribute failure more to ability than will high achievers (Kubla, 1972). Finally, there are some serious implications for future behavior. An individual is more likely to believe that he/she will succeed in the future if present success is attributed to a stable cause (ability or an easy task) or if present failure is attributed to an unstable cause (insufficient effort or bad luck). Failure attributed to a stable factor, on the other hand, has been found to result in the person not attempting the task again, because he/she has no reason to expect to do any better in the future (Frieze, Kubla, Reed, and Rosenbaum, 1971).

The importance of locus of control to business management behavior is that internals are more likely to exhibit those entrepreneurial qualities that are necessary for the survival and growth of a business enterprise than are externals (Durand and Shea, 1975; Shapern, 1975). Studies conducted by Miller, Kets de Vries, and Toulouse (1982) have revealed that internals will more often introduce new products and services, invent more production technologies, and make more dramatic changes to product lines than will externals. Therefore, it was a hypothesis of this study that those students with an internal locus of control would perform better in a business simulation than would those students with an external locus of control.

VIVIDNESS OF IMAGINATION

One of the major deficiencies currently existing in the business management process is the lack of imagination (Steiner, Kunin, and Kunin, 1983; Wilson, 1981; Bennis, 1981). Thus, a strong capacity for imagination would have practical implications for the business management process. Although imagination means many things to many people, for purposes of this study imagination is defined as divergent

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thinking, i.e., the ability to entertain many different and diverse ideas and concepts. Imagination is considered to be one of the highest of mental functions (Rhodes, 1982). Many researchers accord creative greatness to imagination (Parnes, 1977; Arieti, 1976; Khatena, 1976; Leonard and Lindauer, 1973). In writing on the relationship of creativity to imagination Leuner (1977) states that imagination is the basic element of the creative process.

Although there are many aspects of imagination, one measure that has been empirically tested is vividness of imagination (Rhodes, 1982; Freidman and Krus, 1983). Vividness of imagination is the richness of detail imagined by the individual or the amount of information imagined (Klinger, 1978). The notion of vividness of imagination can be traced to Galton's breakfast table questionnaire (1880), however, major credit for developing a method of measurement is attributed to G. H. Bett's (1909). Bett's scale for measurement contains seven dimensions of vividness of imagination ranging from perfectly clear and as vivid as the actual experience (vivid) to recognizable but dim to no image present at all; you only know that you are thinking of the object (vague).

Like locus of control vividness of imagination differs in degree from individual to individual ranging from high to low (Rader and Telligen, 1981). "The ability to translate stimuli into vivid images is indicative of a continuously rather than typologically distributed skill" (p. 155). On the high side, Wilson and Barber (1981) found that some individuals imagined images as vivid as reality "... they appear to experience what they fantasize in the same way that they experience reality" (p. 141). However, not everyone has this degree of vividness of imagination and unfortunately, the absence of vivid imagination does not lend itself to efficient processing (Stroksahl and Ascough, 1981) or to effective business management behavior. Therefore it was hypothesized by this study that students with a vivid imagination would perform better in the business simulation than would students with a vague imagination.

RESEARCH DESIGN

Sample Population

Data were collected from 196 graduate students seeking a Masters of Business Administration degree from a medium, Southeastern university. All students who happened to enroll in the Fall 1986 and Spring 1987 sections of Business Policy and Planning took part in the research project.

The simulation employed in this research project is a modified version of the original Carnegie-Mellon game. It is one of the most complex simulations of business enterprises in a competitive industry known to exist today. It is designed to provide students with a compressed and integrative, but realistic experience in the management and operations of a medium sized, multinational, publicly held corporation. In this two semester, intensive course, the students are exposed to the problems, uncertainties, stress and opportunities which arise in managing a company for a simulated period of two years. The simulation program duplicates not only the actual manufacturing, marketing, and financial transactions encountered in competitive business operations, but also the internal problems of operating in a management group under conditions of limited time and resources, rewards and penalties, and high stress. The students who complete this Management simulation should possess a far higher level of skill in the management of organization than could ever be acquired through traditional classroom work.

Performance Variables

Three performance variables were employed in this study: firm ranking, firm quality, and firm internal peer performance evaluations. Firm rankings were determined by a composite of firm financial performance criteria which included traditional measurements such as return on sales, return on investment, dividend policy, market share, etc. An overall score incorporating all of these measures was determined and assigned to each firm at the end of the competition. Firms finished first, second, etc.

Firm quality was a measure of the firms ability to submit correct input, to meet deadlines, to accurately prepare statements, etc. Quality points were awarded for these activities and again firms finished first, second, etc.

Finally, all members of each firm completed a peer performance evaluation form where they assigned evaluation points for the performance of each of their firm members. Those members whose performance was deemed very good received high scores while those whose performance was deemed to be poor received lower scores. These scores were collected and an average evaluation of performance was obtained for each student.

Control for the Demand Characteristic

In this type of research, a common cause of serious bias comes from respondents telling researchers the things the researchers seem to want to hear (Rosenthal, 1976). This "demand characteristic" poses a special threat when using students as subjects. Students love to play games and will try to "win" if they can figure out the objective of the exercise. To minimize the effects of demand, the Rotter's locus of control questionnaire and the Bett's vividness of imagination instruments were administered along with other "bogus pipeline" instruments to eliminate any demand compliant responses (Rosnow and Davis, 1977). In addition, at no time was the true intent of the study revealed to the students.

RESULTS

Analysis

Figure 1 reflects the distributions resulting from the administration of the locus of control and vividness of imagination Instruments. These distributions appear to be quite normal and of the same magnitude of prior research projects utilizing these instruments. The locus of control sample was divided into Internals and externals and the vividness of imagination sample was divided into vivid and vague. This process is also congruent with research projects utilizing these instruments.

Table 1 reflects the results of the analysis of variance performed on the three main performance variables and the three dependent variables of locus of control, vividness of imagination, and gender. Gender was included due to the researchers ongoing research on gender differences in business education. There is no evidence to suggest that an internal locus of control has any effect upon any of the main performance variables (firm performance - p-value .409; firm quality p-value .687; firm peer performance evaluation p-value .214). There is also no evidence to suggest that a vivid imagination has any effect upon any of the main performance variables (firm performance - p-value .436; firm quality p-value .623; firm peer performance evaluation p-value .197). However while there is no evidence to suggest that gender has any effect on the firm performance (p-value .379); there is evidence to suggest that gender does have an effect upon firm quality (p-value - .096) and firm peer performance evaluation (p-value .094).

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Discussion

Discussion It was an obvious surprise to these researchers to find that two very well accepted and tested cognitive aspects of Management theory had no significant effect upon the performance variables defined for the simulation employed. One possible answer may be the team influence. The synergism generated by the teams may overcome individual proclivities such as locus of control and vividness of imagination. Thus in team situations it may be necessary to examine other types of performance variables in order to isolate the effect of locus of control and vividness of imagination. Other possible answers may lie in some theoretical and/or methodological limitations to this study which are currently unknown to the researchers.

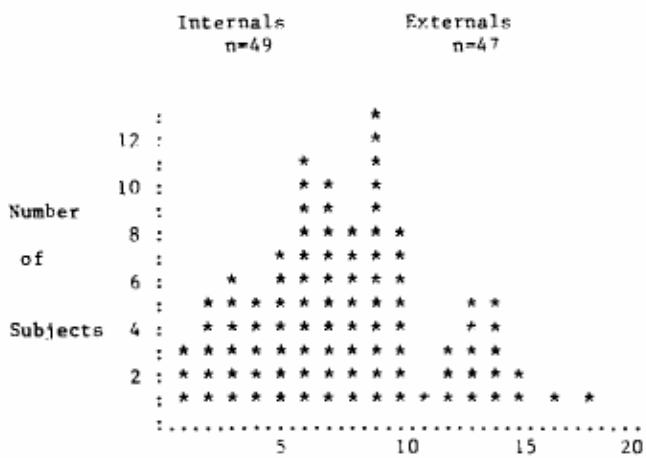
The somewhat serendipitous finding of the effect of gender on both firm quality and firm peer performance evaluation is of interest to all involved in the utilization of simulations. Those teams that had a majority of females in their composition did a significantly better job of meeting deadlines, correctly entering their input data, and in insuring the accuracy of their work. However, on a less brighter side, there was a significant tendency for females to score other female team member much lower on the peer performance evaluation than they scored their male team members. Both of the areas are in dire need of future research to explain these gender related phenomenon.

CONCLUSION

The purpose of this study was to investigate the relationship of locus of control and vividness of imagination measures to simulation performance variables. The study, utilizing a large sample size and controlling for demand bias, was unable to detect a significant relationship of either cognitive aspect on the simulation performance variables. However, the study did find a significant effect of gender differences in the team quality and peer performance evaluation variables.

Future studies, of this nature, should examine other types of team performance variables that take into account team synergism. In addition, the gender differences must certainly be pursued if we are to fully understand the efficacy of team participation in business simulations.

FIGURE 1



Vividness of Imagination Distribution

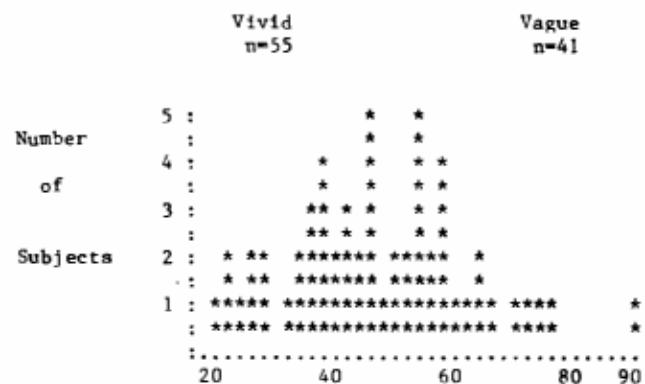


Table 1

Analysis of Variance Firm Performance with Locus of Control, Vividness of Imagination, and Gender

Source of Variation	F-ratio	p.-value
Locus of Control	0.69	.409
Vividness of Imagination	0.61	.436
Gender	0.78	.379

Analysis of Variance Firm Quality with Locus of Control, Vividness of Imagination, and Gender

Source of Variation	F-ratio	p.-value
Locus of Control	0.16	.687
Vividness of Imagination	0.14	.623
Gender	2.84	.096*

Analysis of Variance Firm Peer Performance Evaluation with Locus of Control, Vividness of Imagination, and Gender

Source of Variation	F-ratio	p.-value
Locus of Control	1.57	.214
Vividness of Imagination	1.69	.197
Gender	2.83	.094*

* Significant at $P = .10$

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