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PEER GROUP INDICATORS OF THE EXTERNAL VALIDITY OF BUSINESS GAMES: A FIVE-YEAR LONGITUDINAL STUDY

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ABSTRACT

Relatively few studies have attempted to assess the external validity of business games. A five-year longitudinal study was conducted as a complement to the 1986 study conducted by Wolfe and Roberts.¹ Within-team peer assessments on various playing/behavioral factors were compared with self-reported career success data. Significant relationships were found between a player's influence on the team's decision making process, leadership skills, esteem and value to the team and total income or salary increases. All playing/behavioral factors were significantly related to the student's number of promotions. It was concluded that external validity exists for business gaming.

INTRODUCTION

Three recent comprehensive reviews of the business game evaluation literature have again generally confirmed the classroom validity of this approach to management education (Hsu, 1990; Keys and Wolfe, 1990; Wolfe, 1990). In the summary review by Keys and Wolfe (1990) eight of ten learning results studies reported positive findings and fifty additional examinations rigorously studied a wide range of elements associated with experiential learning environments. Moreover, the rate of rigorous publishing activity has accelerated over the past three decades with thirteen articles appearing in the 1960s, sixteen in the 1970s, and thirty-three emerging in the 1980s. As admirable as this publishing activity has been, however, studies of this technique's external validity are few in numbers and they have produced basically conflicting findings.

Norris and Snyder (1982) have attributed this research paucity of a failure to understand the meaning of external validity while Cooke (1986) and Wolfe (1990) have outlined the general hazards of conducting rigorous and meaningful pedagogical research. These general problems are exacerbated via the attendant problems of real world contamination and control over the experiment's design and subjects over the longer time periods required. External validity studies must be conducted, however, because external validity is the ultimate test of this learning technique's value. This study attempts to expand this relatively sparse literature by presenting a replication of the instruments and methods employed in the Wolfe and Roberts's (1986) longitudinal study after correcting for an artifactual and potentially invalidating feature of their research design. By substituting team play, and its attendant peer evaluations, for the single member play used in the Wolfe and Roberts study each participant's group decision-

making, leadership, and social skills were assessed--all skills empirically necessary for career success and skills that should be imparted or enhanced by a simulation experience if it is to be externally valid for business education purposes.

LITERATURE REVIEW

The business gaming literature has treated external validity studies in two basic fashions. One fashion is to compare the playing or personality attributes of those engaged in a simulation with those who have had successful business careers as measured by such criteria as job advancement, job satisfaction, or salary improvement over time. These have been termed "quasi-external validity" studies by Wolfe (1976) as they do not follow individuals from their game experience into their careers but instead investigate the statistical associations between those who play well in a game versus those types who do well in their real-world careers. Studies by Babb, Leslie and Van Slyke (1966), Cray (1972), McKinney and Dill (1966), Vance and Gray (1967), and Van Slyke (1964) are of this type where the traits of successful game players compared favorably with those of successful executives or the playing results obtained by executives generally conformed to their degree of career success. The studies by Babb and Eisgruber (1966a; 1966b) and Wolfe (1976) noted the playing styles of students versus those of practicing managers. In the Wolfe (1976) case the majority of behaviors or citations of effective actions were the same for the two groups while all studies in this set noted that real-world managers were more disciplined and practical in their orientations to the simulations they played. Although direct real-world comparisons were not made by Byrne (1979) he found eight of the ten Mintzberg (1973) managerial roles were required of players in a business game thus inferring that behaviors learned in a simulation could be transferred to real-world situations.

Only two true external validity studies have been conducted although a study by Kaufman (1976) employed an alumni survey of opinions about the value of their gaming experience -- their feelings were positive although real learning or comparative career success was not studied. The literature's first true external validity study was performed by Norris and Snyder (1982) and it was also an alumni-type study. Subjects' (n100) completed a Likert-type questionnaire five years after graduation and after having played the relatively simple *The Executive Game* (Henshaw and Jackson, 1972) in student teams within a capstone business policy course. A 54.0% response rate was obtained and career success was measured by the (1) number of promotions obtained, (2) hierarchical proximity to the respondent's chief executive officer (CEO), and (3) percent of salary increases obtained.

1

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Developments In Business Simulation & Experiential Exercises, Volume 19, 1992

Game success was ranked and measured by combining the company's ending return on investment (ROI) with a general game participation measure with ROI dominating the two criteria. An analysis of variance found no relationship between the team's performance within the simulation and team member career success.

The literature's only other external validity study was conducted by Wolfe and Roberts (1986) where they placed their subjects (n142) in single member companies within the fairly complex The Business Management Laboratory (Jensen & Cherrington, 1973). Single member companies were employed to (1) directly measure the outcomes obtained by the student in isolation, and (2) avoid having differential individual effort disguised by small group or team leadership effects (Comrey, 1953). Game results were recorded by ROI, total earnings, and rate of return on equity (ROE) for 55.0% course credit. Annual surveys with an eventual retention rate of 80.4% obtained each participant's career success as measured by salary levels and percents of salary change, promotions, and expressed career satisfaction. Weak yet significant relationships were found between a player's ROI and salary, cumulative profits and salary increases, and ROE and the number of promotions received. Other college-related career factors, such as the student's major, grade-point-average and aptitude score however, were more strongly related to salary improvements and absolute salary levels. The authors felt a degree of external validity had been established but noted their "...study's design did not consider the participant's group decision-making, leadership, or social skills..." and recommended "...these factors should be explored for a more complete investigation of business gaming's external validity" (Wolfe and Roberts, 1986, p. 58).

METHODOLOGY

Graduating seniors (n159) from five sections of a medium-sized, southwestern private university's capstone strategic management course played the same simulation employed by Wolfe and Roberts (1986). The games parameters and grading rules and weights were the same as used in that original study. Table 1 displays various characteristics associated with the student population employed. Because team-based social and leadership effects were this study's object, students were randomly assigned to 4-5 member companies in six separate industries rather than in single-member companies. After simulation play had ended all players independently rank ordered their teammates on the following dimensions

- Contribution to the team's economic needs
- Contribution to the team's social needs
- Influence on the team's ultimate decisions
- Leadership abilities
- Admiration and esteem
- Desire for continued association
- Estimated ultimate career success

The dimensions surveyed tap those personal and interpersonal variables empirically associated with both career success and success in-group decision making situations. See, for instance Bass (1960; 1982), Bowers and Seashore (1966), McGrath (1960, McGrath and Altman (1966), Steiner (1972), and Yukl (1981) amongst many others. The general peer assessment technique was employed for its ability to draw data from the intimate interactions of company personnel involved in business working situations (Hollander, 1954, 1957) while the peer ranking method was specifically employed due to its greater reliability and validity when compared to those obtained through peer nominations

and peer ratings (Borg & Hamilton, 1956; Hollander, 1954;

TABLE 1

STUDENT CHARACTERISTICS

ACT/SAT percentile	70.2
Grade point average (A=4.00)	3.1
Proportion male	48.2%
Outside employment (in hours)	16.7
Extra-curricular activities (in hours)	11.1
Expected starting salary	\$21,685.1
Distribution of academic majors:	
Accounting	36.7%
Finance	20.6
Marketing	13.2
Management	14.0
MIS/Quantitative Methods	15.4

Kane & Lawler, 1978; Lawler, 1967; Love, 1981; Tucker, Cline & Schmitt, 1967).

After receiving an agreement to cooperate in a "study of career mobility patterns" students completed and returned a mailed questionnaire on a semi-annual basis for five years after their graduation. Because of lagging graduating classes and various graduation dates data was collected from November, 1985 to May, 1991. Of the original student group 10.7% or 17 of the original 159 subjects were lost thus resulting in an ending group of 142 subjects. The low rate of subject attrition or mortality for a longitudinal study of this type could be attributed to the (1) use of telephone interviews of those not responding to the questionnaire within one month after its estimated receipt, and (2) tracing of temporary non-respondents or laggard respondents through their more permanent parent's telephone numbers and addresses. An analysis of the demographic characteristics of the initial versus ending student groups by sex, age, grade-point-averages and aptitude test scores found no significant differences between them thus indicating a lack of a response or self-selection bias in this study. As in the Wolfe and Roberts study data was also collected on self-reported salaries, three measures related to job satisfaction, job or responsibility changes and an indication of the respondent's true degree of hierarchical advancement through the solicitation of job titles and occupational codes, and the use of graduate degree work as a strategy for accelerating long-term career or salary advancement. As a check on the veracity and stability of annual self-reported salaries participants were asked to state their current salary as well as recalling what their salary was the previous year. A one-year lagged R0.66 ($p<.0001$) was obtained.

HYPOTHESES

In a sense this study's business game served as a device for assessing potential managerial talent with the assessors being relatively naive students but ones who were operationally close to the subjects being assessed. The simulation's external validity would be

Developments In Business Simulation & Experiential Exercises, Volume 19, 1992

established if those assessed as superior performers within the confines of the simulation also obtained superior results in their real-world careers. While the Wolfe and Roberts study examined relationships between an individual's bottom line economic decision making results with career success this study examined those personal and socially desirable attributes closely associated with interpersonal competence in-group decision making situations. Accordingly for the assessed attributes of the individual's social and economic contribution to the team's results, the individual's leadership skills and influence on the team's decision making process, the degree to which the individual was considered to be valuable and was held in high esteem, and the individual's predicted career success it was hypothesized:

- H₁ Income levels are positively related to the individual's assessed degree of social and economic contribution, leadership and team influence skills, and the receipt of predicted success, value and esteem from fellow players.
- H₂ Salary increases are positively related to the individual's assessed degree of social and economic contribution, leadership and team influence skills, and the receipt of predicted success, value and esteem from fellow players.
- H₃ The number of promotions an individual receives is positively related to the assessed degree of social and economic contribution, leadership and team influence skills, and the receipt of predicted success, value and esteem from fellow players.
- H₄ Career satisfaction is positively related to the assessed degree of social and economic contribution, leadership and team influence skills, and the receipt of predicted success, value and esteem from fellow players.

RESULTS

The seven peer evaluation measures were first analyzed independently to test their relationships to career success as defined in this study. Table 2 shows the number of promotions received correlated consistently with each peer evaluation measure ranging from $r=0.20$ to $r=0.35$ ($p < .10$). Income after five years correlated with five of the evaluation measures ranging from $r=0.16$ to $r=0.21$; change in income or salary improvement from the subject's starting salary correlated with three evaluation measures and these ranged from $r=0.20$ to $r=0.21$. The subject's degree of overall job satisfaction five years after graduation was unrelated to any of the peer measures collected.

For further insight into this study's results the individual peer evaluation components were averaged to produce an overall by subject mean evaluation score. As shown again in

Table 2 this measure correlated with income levels ($r=0.22$) and the number of promotions received ($r=0.32$). Using stepwise regression Table 3 shows significant levels of career success variance explained by the total peer evaluation score. Peer group evaluations were reasonably effective in predicting the number of promotions ($R^2=0.27$), but only fair in predicting income or changes in income in five years ($R^2=0.20$ and $R^2=0.09$ respectively). While not of central interest in this study the student's (1) CPA was a weak and inversely related predictor of changes in income, and (2) aptitude scores were unrelated to any of the career success measures employed in this study.

DISCUSSION

TABLE 3
ASSOCIATIONS BETWEEN AVERAGE EVALUATION
SCORE AND SIGNIFICANT CAREER SUCCESS MEASURES

Income Level	Income Change	Number of Promotions
$R^2=0.20$ $p=.006$	$R^2=0.09$ $p=.069$	$R^2=0.27$ $p=.001$

Note: Minimum tolerance = 0.79

Despite the positive results found in this study a number of invalidating features should be considered. As pointed out by Norris (1986) a number of complications are involved in studies of this type. Different careers feature disparate salary levels and salary advancements follow different patterns, various industries feature different salary levels and career risks, and certain careers are more amenable to progress through organizationally-related "good works" versus increased stature and accelerated financial rewards obtained through advanced degrees. This study's graduates dispersed themselves throughout the United States and several overseas locations where local executive labor market conditions and living costs undoubtedly impacted on the salaries necessary for an acceptable standard of living. Unfortunately in this study these differentials were not controlled. Norris has suggested that sample sizes large enough to compare progress within industries or similar career paths be generated. While not statistically tested this study found that its accounting and management information systems majors experienced higher starting salaries than those obtained by its marketing and management majors. Additionally their career progressions, when viewed both hierarchically and monetarily, were much more orderly in their earliest years. It should be noted that forty-one of this study's subjects pursued additional degrees, mostly MBAs and law degrees, while only one of Wolfe and Roberts' subjects received an eventual post-graduate degree. This dropping out of the income and career advancement stream added to the variability of the salary histories exhibited in the present study.

Wolfe and Roberts also noted the five-year time horizon they employed, while typical of many longitudinal studies, did not allow most participants to reach the middle and top management levels where the behaviors required of The Business Management Laboratory could be more appropriately used. In this study, based on an examination of the job titles and occupational codes collected, a few did reach the middle management level within medium-sized firms while four others were heads of their own small firms. Although

TABLE 2
CORRELATIONS BETWEEN CAREER
SUCCESS AND PEER GROUP ASSESSMENTS*

Assessment Factors	Income Level	Income Change	Promotions	Satisfaction
Economic contribution	--	--	0.27	--
Social contribution	--	0.21	0.20	--
Decision influence	0.20	--	0.35	--
Leadership ability	0.19	--	0.25	--
Admired and esteemed	0.21	0.20	0.27	--
Highly valued	0.16	0.20	0.21	--
Predicted career success	0.17	--	0.24	--
Average Ranking	0.22	--	0.32	--

*All correlations significant $p \leq 0.10$

Developments In Business Simulation & Experiential Exercises, Volume 19, 1992

five years is a relatively short time for most careers to develop those first five years may be quite indicative of eventual progress. Certainly additional follow-up work is in order here.

This study's use of student assessors of managerial talent is both novel and potentially hazardous. It is possible that trained observers of the type used in the typical assessment center (Boehm, 1985; Gaugler, Rosenthal, Thornton and Bentson, 1987; London, 1985) or behavioral laboratory situation (Lombardo, McCall and DeVries, 1979; VanVelsor, Ruderman and Phillips, 1989) would be even more accurate in their perceptions regarding ultimate career success. Their dispassionate view and deeper understanding of the dynamics involved in-group decision-making situations might make their predictions more valid. Alternatively this study has demonstrated that faith may be placed in the use of student peer evaluations within both course-related team projects and as predictors of career success if the assessment environment contains features strategically related to those associated with those needed for real-world, organizationally related career success. Relatively young and uninformed students, with no specific training in evaluating each other's skills, produced data generally related to the subjects' five-year career success.

While this study concluded the nonexistence of a response bias the question of questionnaire honesty was not resolved. Norris noted this problem and recommended its solution be the gathering of more objective success measures such as performance appraisals, supervisory ratings, and the independent archival verification of salary increases and promotions. Owing to the problems of confidentiality and the possession of proprietary information by a large number of organizations, none of these measures could be employed. Instead the study attempted to judge the "honesty quotient" by asking participants to recall their previous year's salary. This may be an accurate measure of the respondent's honesty subject to the ability to recall the amount of the original deception or the ability to recall any salary accurately.

CONCLUSION

Further and even more dramatic evidence has been produced regarding at least the external validity of the simulation and learning conditions employed in this study. Based on their own experiences and perceptions within the game's environment the ranked performance of participants within the business game team predicted with some degree of accuracy their later degree of career success. Taken in tandem with the Wolfe and Roberts study upon which this project was based, an amount of external validity has been established. Students who perform well both economically in isolation and as members of a task oriented decision making group experience higher long-term salaries, larger increases in their salaries, and a greater number of promotions.

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Developments In Business Simulation & Experiential Exercises, Volume 19, 1992

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