

THE ROLE OF LEARNING VERSUS PERFORMANCE ORIENTATIONS
WHEN REACTING TO NEGATIVE OUTCOMES IN SIMULATION GAMES:
FURTHER INSIGHTS

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ABSTRACT

We study student reactions to negative outcomes from simulation games in order to investigate whether “trial and error” learning is in fact a positive learning experience. Drawing on Dweck’s (1990) body of work, we expect that students with learning orientations will react very favorably to negative outcomes, but that students with performance orientations will not. The possibility of learned helplessness resulting from game play is a dismal outcome for students with performance orientations. A study was conducted in 2005 using a simulation experience in an MBA Marketing class at the University of Windsor (n=33). The results showed a modicum of support for the contention that learning oriented students handle negative experiences with resilience; these results were presented at the ABSEL Conference in San Francisco. However, numerous measurement problems were encountered in attempting to classify students as learning oriented OR performance oriented. Alternative measurement instruments for the constructs were tested at three other academic institutions

(n=489) and a second simulation study was conducted at the University of Windsor. Partial results (measurement-oriented) are reported here and the results of the second study would be reported in San Antonio.

INTRODUCTION

Experiential learning is often described in terms of “trial and error.” “Error” implies failure and the essence of experiential learning is the presumption that individuals will change their behaviors (or cognitions) in similar situations in the future. But adjusting behavior does not always result in superior performance. For example, some people’s reactions to failure may result in reduced desire to put oneself in similar circumstances again. The term “learned helplessness” is common

in the ABSEL literature, yet there has been relatively little work done to investigate how students react to negative feedback. The authors dealt with these issues in a paper at last year’s conference and reported results not included in the Proceedings. Those results are included in this paper

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along with additional results from studies conducted subsequently. Since we cannot presume that the reader has read our paper from last year, we have retained its theoretical skeleton in this paper.

To frame research designed to investigate student reactions to negative feedback, we draw upon the work of Dweck (1990), who has developed a research stream investigating the differences between those with learning orientations (which have the aim to increase competence) and those with performance orientations (which aim to gain favorable judgments of competence and to avoid unfavorable ones). Dweck's body of work has been discussed in ABSEL (Gentry and Burns 1997; Gentry *et al.* 2001, 2002; Kwong and Thavikulwat 1988), but only in passing.

Dweck's work has found that learning-oriented students exhibit strong mastery orientations regardless of their confidence in their present ability, and failure does not keep them from the pursuit of knowledge. They do not perceive that intelligence is a fixed quantity; in fact, their continued growth proves otherwise. Performance-oriented students react very differently to failure, especially if they have little confidence in their abilities (in which case learned helplessness is a likely outcome). Those with performance orientations and high self-confidence may be mastery-oriented, but failure is not handled in the "trial and error" fashion implicitly assumed by most work on experiential learning.

LEARNING AND PERFORMANCE ORIENTATIONS

Research on motivational goals in an achievement context has identified two different types of underlying goals. One is learning goals, in which people are concerned with increasing their competence. Under learning orientation the aim is to increase competence by learning or mastering a new task (Dweck 1990). Under performance orientation people are concerned with gaining favorable judgments of their competence and to avoid unfavorable ones (Diener and Dweck 1978, 1980).

Performance-oriented students may not exert effort to change their study habits if they receive negative feedback because they may tend to attribute failure to the lack of their own ability. In contrast, learning-oriented students may exert effort to improve their study habits even when they encounter negative outcomes and the failure is attributed to their own fault. Learning-oriented people are less likely to stop learning when they obtain either satisfactory or unsatisfactory outcomes. Their actions are less influenced by the outcome of the previous actions. Perhaps the primary concern of learning-oriented people may be the learning process itself. They are more interested in the process of

improving themselves than in the immediate outcomes of a certain action (Dweck 1990). In contrast, performance-oriented people are likely to behave according to immediate outcomes. If they perform poorly, they would exhibit a pattern of helpless behaviors. If they perform well, they would show mastery-oriented behaviors (Dweck 1990). That is, the outcome appears to be the primary concern for performance-oriented people.

Performance-oriented people focus only on their present performance relative to others, which is more likely to be inconsistent than performance relative to one's past performance. Meece *et al.* (1988) found that performance-oriented people tend to be ego-oriented, and are guided to protect their egos. Elliott and Dweck (1988) found that children who focused on performance goals rejected the chance to learn something new if it involved a risk of making errors. Sujana, Weitz, and Kumar (1994) extended this notion by suggesting that those with performance orientations will be reluctant to experiment with new approaches because of a fear that experimentation will result in poor outcomes and, subsequently, in negative evaluations of their abilities and performance. For those with performance orientations, experiencing failure cues low-ability judgments and poses a threat to self-esteem (Dweck and Leggett 1988). Thus, individuals may adopt a more defensive, self-protective posture, devaluing the task and developing disdain toward it (Berglas and Jones 1978; Tesser and Campbell 1983).

Henderson and Dweck (1990) tracked children during the transition to junior high school. At the beginning of the seventh grade, children's theories of intelligence and their confidence were measured. Children's grades and achievement test scores from the sixth grade were obtained from their school records. Children with learning orientations tended to match or exceed their projected grade point. Overall, those who had been achievers in sixth grade remained so, and many of those who had been relatively low achievers became high achievers. Of particular interest is that many learning-oriented children with low confidence who had not done especially well in the past were now earning many of the highest grades.

In contrast, performance-oriented children who had been low achievers in the past remained so, and many of those who had been high achievers in sixth grade were now among the lowest achievers. High-confidence performance-oriented children showed the most pronounced decline of any group. Dweck (1990) argues that the challenge and confusion are most threatening to performance-oriented people who believe intelligence is fixed and have been accustomed to thinking of themselves as having it. The Dweck model is summarized in Table 1.

TABLE 1: Goals and Behavior Patterns in Achievement Situations

Goal Orientation	Ability	Behavior Pattern
PERFORMANCE Goal is to gain positive judgements/avoid negative judgments of competence.	LOW Negative feedback on one's competence.	HELPLESS Avoid challenge; low persistence.
	HIGH Positive feedback on one's competence.	MASTERY-ORIENTED Seek challenge; high persistence.
LEARNING Goal is to increase competence.	HIGH OR LOW Negative or positive feedback on one's competence.	MASTERY-ORIENTED Seek challenge that fosters learning; high persistence.

Source: Dweck and Leggett (1988, p. 259)

GOAL ORIENTATIONS AND SIMULATION GAMING

The previous discussion is relatively free of context, but it may be interfaced with simulation gaming. Most gaming experiences offer students the opportunity to face negative feedback, especially given the bias toward depressed early starting conditions. In fact, Ralph Day, at the first ABSEL Conference, noted that one true advantage of simulation gaming in a pedagogical sense is that it is the only approach that makes students live with their decisions. A student can do a poor job on one case, and then start over fresh on the next one. A very poor simulation decision leaves the student facing an extremely different (and more difficult) set of conditions. The positive implication of this observation is that students need to get down and dirty and overcome the negative conditions, and that in doing so they encounter a tremendous learning experience. This is no doubt a likely scenario for those students with learning orientations; however, that well may not be case for those with performance orientations. Anyone who administered a game has encountered very frustrated students who do in fact give up; learned helplessness is a reality in this context.

The Henderson and Dweck (1990) findings discussed earlier indicate that those with learning orientations but poor prior academic performances were able to handle and grow from challenging experiences associated with the transition to junior high. Those with performance orientations, even if they had excellent prior academic records, fared far less well in handling those challenges. One might infer that students with performance orientations would have been filtered out of the system by the time they reach undergraduate education. However, all of us have encountered many students who evaluate themselves on

their performances and downplay issues of personal growth. Given the timing of many first-time simulation experiences (at the transition from large lecture classes focusing on general knowledge to smaller, focused business courses), it is likely that the skills learned in a lecture/test environment may yield a performance orientation unsuited for the need-to-experiment environment found in simulation games.

HYPOTHESES

The theorized effects of the learning and performance orientation constructs presented above may be distilled into the following four hypotheses:

- H1: Learning (trend) is influenced more greatly by learning orientation than by performance orientation.
- H2: For negative outcomes, learning (trend) is more greatly influenced by learning orientation than for positive outcomes.
- H3: For positive outcomes, learning (trend) is more greatly influenced by performance orientation than for negative outcomes.
- H4: The interaction of learning orientation (H2) with outcome is greater than the interaction of performance orientation with outcome (H3).

STUDY ONE

DATA COLLECTION. Data were gathered from 34 Master's of Business Administration enrolled in a first-year introductory marketing course. (Data for one of the students were discarded on the basis of the midpoint of each scale being selected for every item.) By design of the MBA program, none of the students had a business undergraduate

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degree. The simulation competition used the well-known *Marketing Management Experience* (MME, Dickinson 2002). In the MME students are assigned to manage the marketing function of a simulation company, specifically a company marketing digital cameras. As is typical, companies are grouped into industries, with a company competing only against other companies in its same industry. Individual students managed their own company, students having been assigned to companies and industries at random. The competition, then, comprised six industries of four companies each and two industries of five companies each. The competition lasted nine periods preceded by an initial trial period. Students were evaluated on the basis of cumulative earnings.

OPERATIONAL DEFINITIONS. The constructs of learning orientation and performance orientation were originally measured using multi-item scales adapted from Ames and Archer (1998), nine items for learning orientation and six items for performance orientation. Each Likert-type item was measured on a seven-point Strongly Agree (1) to Strongly Disagree (7) scale. Data were reversed scored so that a higher value indicates a greater level of the orientation. This self-report survey was conducted in class prior to any introduction of the simulation competition.

To enhance internal consistency, some items were removed from the original respective sets, resulting in a four-item scale for learning (Cronbach's $\alpha=.74$) and a five-item scale for performance (.81). The specific items are presented in Table 2. Correlation between the two scales is .32.

One implication of the moderate correlation between the two orientation scales is that many subjects were not either learning oriented or performance oriented, but not both. Based on median splits of the two orientation scales, only 15 of the 33 subjects were below the median on one construct and above the median on the other. Accordingly, it is the learning and performance constructs for each subject that were analyzed.

Over the course of a competition, MME industries generally evolve into varying sizes in terms of absolute sales, profits, and expenditures. To put the industries on a common scale, each of the criterion variables was standardized within industry across companies and competition periods. This approach preserves relative comparisons of both companies and competition periods.

Learning generally, and in longitudinal simulation games specifically, is a dynamic construct. That is, learning implies *change* in behavior over the course of the simulation competition. To capture change in each criterion for each subject, it was regressed against time, i.e., the first through ninth periods of the simulation competition. The slope of that simple regression is an estimate of the trend in learning and that trend served to operationalize learning.

Finally, a key construct theorized to moderate the roles of learning and performance orientations is the outcome-positive or negative-experienced by subjects in the early periods of the simulation competition. That experience was operationalized by a median-split of the subjects on after tax earnings over the first four periods of the competition, an experience made all the more prominent for its also being the sole basis of students' scores.

ANALYSIS. Multiple regression was the main form of analysis. The model comprised four independent variables:

- the 1-7 multi-item scale for the learning orientation construct (hypothesized to have a positive coefficient)
- the 1-7 multi-item scale for the performance orientation construct (positive coefficient)
- an outcome dummy variable (1=negative, 0=positive) multiplied by the learning orientation scale (positive coefficient, i.e., a synergistic interactive effect)
- the outcome dummy variable multiplied by the performance orientation scale (negative coefficient, i.e., a crossover interactive effect)

TABLE 2: Learning and Performance Orientation Scale Items

Learning Orientation	Performance Orientation
An important part of being a good student is continually improving your skills.	It is very important to me that my professors see me as a good student.
Sometimes I put a great deal of effort into learning something new	I very much want my fellow students to consider me to be a good student.
Learning a complicated concept is very satisfying.	I always try to communicate my accomplishments to my professors.
Making mistakes is just part of the learning process.	I feel very good when I know I have outperformed other students in my class.
	I spend a lot of time thinking about how my performance compares with other students.

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Four regression models were estimated, one for each of our criterion variables (profit, market share, inventory management, and sales-stimulating expenditures).

RESULTS. For all four criterion variables the regression coefficient for the learning construct was negative. Further, for all four criterion variables the coefficient for the learning construct was less than the coefficient for the performance construct. A statistical test of H1, then, is moot and there is no evidence in this study that learning orientation has a greater influence on learning than does performance orientation.

H2 posits that learning orientation will have a greater effect on learning when a negative outcome has been experienced, i.e., below median profit over the first four periods of the competition, than when a positive outcome has been experienced. For all four of the criterion variables, the outcome*learning orientation interaction coefficient was positive, as hypothesized, but only for the profit criterion was the effect statistically significant ($p=.095$), though for the market share criterion it was marginally significant ($p=.13$). For the inventory management and sales-stimulating expenditures criterion variables, the outcome*performance orientation was negative, as hypothesized (H3), but for none of the criterion variables was the coefficient statistically significant. These results provide limited support for our expectations concerning how learning versus performance-oriented students will handle negative outcomes.

For three of the criterion variables—profit, market share, and sales-stimulating expenditures—the absolute value of the standardized outcome*learning orientation interaction coefficient was greater than the absolute value of the standardized outcome*performance orientation coefficient. However, for none of the criterion variables was the former coefficient significantly greater than the latter coefficient and H4 was, thus, not supported.

LIMITATIONS IN STUDY ONE. The core theory underlying this study comprised interactions between outcome experience—negative or positive—and the two

constructs of learning and performance orientations. Despite the few statistically significant results, nine of twelve interaction effects were in the hypothesized direction. The paucity of statistically significant results may reflect low power due to the small sample size and the general result of the study might better be deemed inconclusive than negative.

Learning was operationalized as the trend in a given criterion over all nine periods of the competition. This is appropriate for the respective main effects of learning and performance orientations (H1). For hypotheses incorporating the outcome experience moderating variable (H2, H3, H4), though, that operationalization is slightly inaccurate. The outcome effect could only begin to be experienced after the first period of the competition was complete. Thus, any effect on the learning trend commenced in the second period of competition. Against this, specifying all of the hypothesized effects in a single regression model allows for important intercorrelations among the predictor variables to be reflected in estimates and hypothesis tests.

The lack of clear delineation between learning-oriented and performance-oriented students was a matter of concern. We tried numerous approaches to categorize the students, including the eyeball method, and then looking at the patterns of performance. Regardless of how we categorized the students, we found that the learning-oriented students did improve their performances after negative outcomes were encountered. We also found a similar pattern of results with performance-oriented students, reinforcing the earlier observation that the measurement of learning orientation and performance orientation are not very clean. Thus, we went back to the drawing board to look at measurement issues, while at the same time conducting another simulation-based study in hopes of generating more statistical power.

ADDITIONAL MEASURES. The dichotomous measures are given below:

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| 1. I like courses where I can learn from my mistakes | or | I like courses where I can perform very well. |
| 2. A good course is one in which I impress my professor and fellow students with my performance | or | A good course is one in which I learn a lot regardless of my performance. |
| 3. I like facing challenges that I cannot always master | or | I like situations where I am confident that I can perform well |
| 4. Negative feedback is hard for me to handle | or | Negative feedback spurs me to do better |
| 5. When I get negative feedback on performance, I try to use it to help me improve in the future | or | When I get negative feedback on performance, I seek other tasks where I can perform at a higher level |

STUDY TWO

OVERVIEW. Given the problems in categorizing students as learning oriented or performance oriented, we developed dichotomous measures in addition to the seven-point Likert-type measures used in Study One. The learning/performance orientation measures were included on a short survey that also asked about some pedagogy preferences and demographic variables. Nearly 500 students (n=489) at three universities were asked to complete the survey electronically using the WebSurveyor software.

Meanwhile, a study replicating study one is being conducted with the same class at the University of Windsor during the Fall of 2006. The results from this study will not be available in this manuscript, but will be presented in San Antonio if the paper is accepted.

The full scales from Ames and Archer (1988), and not the purified ones derived in Study One, were used in this study as the two-factor solution indicated that the performance and learning items constitute orthogonal dimensions and the two scales have acceptable reliabilities (Cronbach alphas of .91 for Learning Orientation and .78 for Performance Orientation). The five dichotomous items did not yield particularly clean splits or consistent ones.

Dichotomous Items	Percentage Selecting
1. LO learn from my mistakes PO perform very well	24% 76%
2. LO learn regardless of performance PO impress professor and peers	77% 23%
3. LO facing challenges can't master PO confident can perform well	25% 75%
4. LO negative feedback spurs me PO hard to handle negative feedback	75% 25%
5. LO use negative feedback to improve PO seek other tasks	88% 12%

Thus, items 2, 4, and 5 would classify the vast majority of the students as learning oriented. On the other hand, items 1 and 3 would classify the vast majority of the students as performance oriented. There are multiple possible interpretations. One is that the first author, who created these items, writes horrible questions. A more preferable interpretation, at least to the first author, is that all learning is good and that the context in which one considers learning has major implications. After all, the responses to the Likert-type questions did not yield clean splits either. And, to be sure, there are possible concerns here about social desirability. That 88% say they would use the feedback to improve rather than to seek other arenas in which to compete just does not resonate with observations from our combined 120+ years of college teaching. In

general, the mean ratings on the performance-orientation items were substantially lower (4.5 on a 7-point scale) versus the learning-orientation ones (5.3); we would suggest that a learning orientation would be the preferred response to an academic survey (in terms of meeting professorial hopes). If we were to perform splits on the data base using the mid-point of 4.0 as the basis for the split (not a process we advocate, by the way), the vast majority of the students would be in the high learning / high performance category, as only 7% of the means on learning orientation items were below 4.0 and only 30% of the means on the performance orientation items were. Adding further to the possible support for social desirability is the result that females were significantly ($p < .001$) more likely to rate the learning items higher for both learning and performance orientation. Further, unlike Dweck's stream of research which used younger (elementary and middle school) students, our study used college students, and hopefully the failures, dropouts, and low scorers were culled from the population.

We conducted t-tests of the groups formed by their responses to the dichotomous questions on both the performance and learning-orientation scales. For dichotomous items 1-3, there were no significant differences for learning orientation but significant differences in the expected direction for performance orientation. For dichotomous question 4, there were no significant differences for either scale. This is disconcerting, as this measure was probably the most appropriate for the specific simulation-based context under study here. For item 5, there were no significant differences for performance orientation, but marginally significant ones ($p < .10$) for learning orientation. This too is a bit disconcerting, as would appear on the surface that the few people selecting the 'switch to something easier' option would have hard-core performance orientations. At least, we can claim that they are very low on learning orientation.

We performed further comparisons by using difference scores (Learning Orientation – Performance Orientation) to relate to our dichotomous items. The difference scores were significantly larger ($p < .02$) for learning-oriented as opposed to performance-oriented students as judged by the first three dichotomous measures. No significant differences existed for the last two dichotomous measures.

Thus, it would seem that we have further verified that measuring performance and learning orientations are problematic, as most students represent a mix. We can the answer raised by the audience in last year's presentation, as to whether the fact that the MBA students in Study One all were non-business undergraduates affected the results. When we investigated the differences in learning and performance orientations between business undergraduates and those with other majors, we found no significant differences.

CONCLUSIONS

The results from Study One provide very modest support for the conclusion that learning-oriented students will respond better to negative feedback in a simulation game (obviously a very common occurrence in most games) than performance-oriented students. We find the learning-oriented and performance-oriented constructs to be rich in terms of their potential to explain why some students quit during a simulation and why others are able to dig themselves out of a hole. However, we must acknowledge that the apparent simplicity associated with the dichotomy does not exist empirically; most students see themselves as being a mix of the orientations as opposed to being one or the other. This does offer an intriguing possibility: instructors may be able to cue one's learning orientation in those instances when negative feedback is forthcoming.

Given that negative feedback is rampant in academe (just think back to your last manuscript's review), helping students to handle it in a positive way should be a topic dealt with more frequently. One of the beauties of ABSEL is its supportive atmosphere; presenters discuss endeavors that failed to generate positive learning outcomes and still receive encouragement to continue in the effort. That has been our personal experience. If ABSEL as an organizational culture can foster that type of support for our fellow colleagues, maybe we can also systematize the provision of support to our students in order for them to respond in a proactive way to the negative feedback we provide. The political correctness of No Student Left Behind removes one's freedom to fail. Failing, scrambling back, and moving forward are possibly the most important lessons to be learned in life. Simulation games provide exquisite formats for such behavior to be learned. It would seem very possible that we can facilitate the learning of those behaviors by appealing to the students' learning orientations more effectively.

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