THE EFFECTS OF GOAL ORIENTATION,
COMPETENCY CRITERIA, AND
EVALUATION SOURCE ON
ACADEMIC RISK TAKING

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The present study consisted of a $2 \times 2 \times 2$ design used to test the hypotheses that academic risk taking assessed with a mathematics measure would be differentially affected by goal orientation (practice goal vs test goal), competency criterion (mulit-level criterion vs minimum criterion), and evaluation source (self evaluation vs other evaluation). One hundred thirty-one college students who enrolled in an educational psychology and measurement course were systematically assigned to one of the eight experimental conditions. The Mathematics Risk Taking (MRT) measure yielded two dependent variables: difficulty and accuracy. High difficulty and low accuracy were viewed as evidence of high risk taking. Results indicated that multi-level criterion elicited higher self assessment motive than did a minimum criterion ; and self evaluation induced higher self-assessment motive than did other evaluation, whereas other evaluation promoted higher self-enhancement motive than did self evaluation. Data failed to support the proposed interaction effects between goal orientation and competency criterion on risk taking, and between evaluation source and competency criterion on risk taking. Explanations were offered for these findings and educational implications were discussed.

Key Words : motivation, academic risk taking, goal orientation, evaluation source, competency criteria

Theories of both cognitive development (e.g., Fischer, 1984; Hunt, 1961) and motivation (e.g., Csikszentmihalyi, 1975, 1978; Deci & Porac, 1978), as well as related research, strongly support the prediction that moderately challenging tasks (success probability approaching 50%) enhance cognitive development, and learning (Fischer, 1984; Hunt, 1961); maximize stisfaction (Atkinson, 1957); enhance intrinsic motivation (Csikszentimihalyi, 1978; Deci, 1980); and elicit constructive responses to failure and error making (Cliford, 1984; Kim & Clifford, 1988).

Despite the promising benefits of moderate risk taking, available evidence (Clifford, 1988; Clifford, Lan, Chou, & Qi, 1989) indicates (a) that academic risk taking is low and (b) that both risk taking and self-reported failure tolerance decrease significantly as grade level increases. In addition, it has been demonstrated that variable payoffs (the value for a correct solution increases as item difficulty increases) in contrast to fixed payoffs prompt significantly greater academic risk taking (Clifford & Chou 1991).

Research on goal orientation reveals that the pursuit of different types of goals elicits different achievement patterns (Dweck, 1989). Several contrasting models of goal orientation have been proposed, such as learning versus performance goal (Elliot & Dweck, 1988); individualistic versus competitive goals (Ames, 1984); and task-oriented versus ego-oriented goals (Nicholls, 1984). These goal types fall into two major categories which will be referred to as learning goals, implying a desire to assess and develop skill; and performance goals, implying a desire to protect one's ego, and demonstrate rather than increase skill or ability (Dweck, 1989). These goal orientation studies have shown that students who are directed toward "learning" goal prefer more challenging tasks, expend greater effort, and express greater task interest than students who are directed toward "performance" goals (Ames, 1984; Elliot & Dweck, 1988; Nicholls, 1984). However, goal-orientation research has been conducted primarily with the use of anagrams and puzzles; and seldom includes data on perceived probability of success or contained level of success. In a study (Zeon, 1990) recently conducted with a vocabulary task, little or no difference was observed between a learning goal group and a testing goal group on preferred level of item difficulty, percent of correct responses on selected items, and task interest. Two factors that might explain the absence of a goal orientation effect include the presence of item-by-item feedback and knowledge that the risk taking would be followed by a summary test containing the same item in a slightly modified form (i.e., future use factor). Thus, further investigations are needed to identify the conditions under which goal orientations affect academic risk taking.

Another factor postulated to influence risk taking is the nature of competency criterion. Motivation theories and relative research indicated that multi-level competency criterion which provided more ability information would lead to more optimal risk taking (i.e., match between challenging criterion and one's ability) than did a minimum competency criterion (Danner & Lonky, 1981; McMullin & Steffen, 1982). Recent academic risk taking research has indicated that multi-level competency criterion elicited higher risk taking than a minimum competency criterion, but only when feedback was absent (Lan, 1990). This criterion by feedback interaction was postulated to be a function of students' self-assessment motive and their self-enhancement motive. These two self-referent motives which were

rarely experimentally manipulated (e.g., Trope, 1975, 1980) will be assessed independently in the present study. I expected that subjects in the multi-level criterion would take greater academic risk taking and express more positive attitudes than those in the minimum competency criterion condition, and these effects would be more evidenced with a less constraint task context (i.e., a practice goal rather than a test goal).

Evaluation source is yet another factor thought to have an impact on risk taking. Theories of intrinsic motivation predict that external constraints including other evaluation and imposed surveillance decrease persistence, and achievement-related behavior, such as intrinsic motivation (Deci & Ryan, 1987), creativity (Amabile, Dejong, & Lepper, 1976; Zuckerman, Porac, Lathin, Smith, Deci, 1978), and preference for challenge (Boggiano, Main, & Katz, 1988). However, the related studies examining the effects of self evaluation versus other evaluation on continuing motivation yield mixed results and offer only partial support for the prediction that other evaluation reduces intrinsic motivation (Hughes, Sullivan &Mosley, 1985; Maehr & Stalling, 1972; Salili, Maehr, Sorensen & Fyans, 1976).

The present study was designed to test the prediction (a) that a practice goal in contrast to a test goal will increase academic risk taking and positive affective responses; (b) that a multi-level competency criterion in contrast to a minimum competency criterion will increase academic risk taking and positive attitudes; these effects will be more evidenced with a practice goal than with a test goal; (c) that self evaluation in contrast to other evaluation will increase academic risk taking and positive attitudes; these effects will be more evidenced with a multi-level competency criterion than with a minimum competency criterion.

Method

Subjects

One hundred and thirty-one college students (26 males and 105 females) enrolled in an educational psychology and measurement course volunteered to participate in this study. Subjects received course credit for their participation.

Materials

The materials used in the study were (1) the Academic Failure Tolerance (AFT) scale, (2) the Mathematics Risk Taking (MRT) booklet, and (3) an attitude measure which assessed self-assessment (SA), self-enhancement (SE), intention-to-learn (IL), and task liking (TL).

The Academic Failure Tolerance (AFT) scale is a 27-item self-report measure with a 6-point, agree-disagree Likert scale. It yields a composite score and three subscales scores: behavioral response to failure (Behavr), affect following failure (Affect), and preferred level of task difficulty (predif).
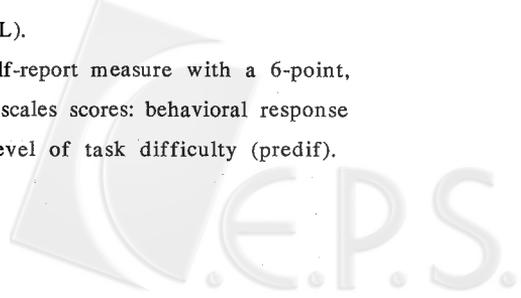
Mean item scores for the full scale and each subscale are calculated; a value below the midscale point of 3.5 signifies intolerance for failure, and a value above 3.5 signifies tolerance. Alpha reliability estimates for the composite AFT and subscales of Affect, Behavr, and Predif for a college student sample (n=71) was .84, .77, .76, and .81 respectively (Clifford, Maneesri, & Mao, 1989).

Mathematics Risk Taking (MRT) booklet consists of four one-page, multiple-choice mathematics risk taking tasks. The problems constituting these four one-page tasks range in difficulty from simple operations taught in middle school to advanced college algebra. Each one-page task contains five rows with four problems per row, and a final row with three problems. Rows of items are arranged in order of difficulty. Item difficulty judgments were based on a survey of mathematics textbooks and subsequently confirmed by consultants including a mathematics curriculum professor and graduate students majoring in mathematics who served as independent raters.

The nature and the organization of items across the four pages are similar or "near-parallel." Rows are numbered sequentially, and row numbers signal the payoff value or points-to-be-earned for a correct response for an item in the respective row. (e.g., A correctly solved problem in the third row earns three points.) Thus, variable payoffs (i.e., the value of a correct response increases with item difficulty) in contrast to fixed payoffs (i.e., the value of a correct response is held constant regardless of item difficulty) were used in this study. Furthermore, in the process of assembling the MRT booklets, the four one-page tasks were counterbalanced.

The MRT cover sheet includes a discussion of the arrangement of items by difficulty, an explanation of the variable payoffs available for correctly solved problems, sample problems, and task completion instructions. The cover sheet also includes the experimental manipulations for goal orientation, competency criterion, and evaluation source. Thus, eight versions of the cover sheet were used to create the eight experimental conditions.

For the practice goal condition, instructions are, "This booklet contains four one-page practice exercises with 23 mathematics problems per page. Choose problems that allow you to discover what mathematical skills you have." For the test goal condition, instructions are, "This booklet contains four one-page test exercises with 23 mathematics problems per page. Choose problems that allow you to demonstrate what methematical ability you have." For the minimum competency criterion condition, instructions include the statement that the minimum level of mathematics competency for college students completing this task is approximately 7 points per page or 28 points for four pages. For the multi-level competency criterion condition, instructions include a list of 8 competency levels (i.e., No competency, Minimum competency, Low competency, Moderate competency, Moderately high competency, High competency, Superior competency, and Mastery), and the points needed to attain each competency level. Subjects in the self evaluation condition had color-coded answer keys posted on the walls; these were used to check subjects' responses after they had completed each page. Subjects in the other evaluation condition were instructed to have the experimenter check their responses after completing each page.

The Task Attitude Measure is a 12-item, 6-point Likert-scaled questionnaire which includes four subscales, namely, task liking (TI), intention-to-learn (IL), self-enhancement (SE), and self-assess-

ment (SA). Items for the four subscales are interspersed throughout the questionnaire. Values above the midscale point of 3.5 represent acknowledgment of the attitude; whereas, values below 3.5 represent denial of the attitude. The mean item rating are used as the individual's scores. Two of the attitude items assess intention-to-learn. (e.g., If I could keep this booklet, I would try to work some of the difficult problems.) Two items assess task liking. (e.g., This booklet was more enjoyable than most school work.) These four task interest items were selected as a result of factor analysis conducted on responses to similar items embedded in a task interest measure presented to a high school sample (N=143) participating in a risk taking study (Clifford, 1990). The correlation between Intention-to-learn and task liking for this high school risk taking study was .51.

The SA and SE subscales each consist of 4 newly developed items designed to assess the self-referent motives which Trope and colleagues contend are major determinants of choice behavior in achievement situations. The SA subscale assesses the strength of the motive to seek ability information; the SA and SE measure was examined by having eight graduate students, majoring in educational psychology and knowledgeable about relevant theory, classify the eight items as either SA- or SE-relevant. Two items which were inconsistently classified were revised.

Procedure

This experiment was group-administered in a large auditorium. Packaged materials were systematically distributed to subjects to ensure that every eighth subject received materials appropriate for a given condition, and every four subjects sequentially assigned to a given condition received a different ordering of the four risk taking tasks. Subjects were encouraged to work independently and ignore the activities of subjects participating in other experiments. Subjects followed written instructions contained on the cover of the envelope and complete the instruments in the following order: (1) Academic Failure Tolerance Scale (with subscales of Behavr, Affect, and Predif); (2) Mathematics Risk Taking booklet; (3) Attitude questionnaire (including the subscales of task liking, intention-to-learn, self-assessment and self-enhancement). No time limit was set for the completion of any of these instruments.

Design and Analyses

The experiment design was a 2 (practice goal vs. test goal) by 2(multi-level criterion vs. minimum criterion) by 2 (self evaluation vs. other evaluation) factorial design. The dependent meausres were two achievement risk taking variables (i.e., accuracy and difficulty) and four attitudinal variables (intention-to-learn, task liking, self-assessment, and self-enhancement. The achievement risk taking variables, derived from the Mathematics Risk Taking measure, were analyzed with a covariate (i.e., ACT Mathematics scores) to control for mathematics achievement. Previous academic risk taking research, demonstrating a positive correlation between these dependent measures and content relevant standardized achievement scores (e.g., Clifford, 1988), indicates that the use of such a covariate is warranted.

No covariate was used for the attitudinal variables, for there is no empirical or theoretical basis for postulating that these attitudinal variables are reliably correlated with mathematics achievement.

Results

Preliminary Analyses

Table 1 contains the descriptive statistics for the major dependent and independent variables. The risk-taking achievement variables of accuracy (ACC), defined as the percentage of correct item response, yielded cell means ranging from 0.73 to 0.85. ACC means are markedly above the theoretically optimal level of .50. The relatively high levels of response accuracy in this study suggest that subjects were unwilling to take moderate academic risks. Mean difficulty (DIF) scores (average row level from which problems were selected) range from 4.03 to 4.75. (The fourth row and fifth row of problems contain sets of items requiring mathematics skills typically acquired in the seventh and eighth grades.)

Table 1. Means（Adjusted and Unadjusted）and Standard Deviations for Dependent Variables and Individual-Difference Variables by Experimental Conditions

| Measursd | Practice-Goal | | | | | | Test-Goal | | | | | |
| | Multi-level | | | Minimum | | | Multi-level | | | Minimum | | |
	Adj.M／	M	SD	Adj.M／	M	SD	Adj.M／	M	SD	Adj.M／	M	SD
Self-Evalustion	（n=16）			（n=16）			（n=13）			（n=14）		
ACC	.74／	.75	.13	.85／	.85	.10	.76／	.76	.08	.73／	.73	.14
DIF	4.44／	4.57	1.01	4.19／	4.03	1.13	4.53／	4.73	.89	4.66／	4.75	1.17
IL		3.88	1.70		3.94	1.62		4.31	1.55		3.57	1.33
TL		3.94	1.25		4.56	1.05		4.62	1.10		3.54	1.18
SE		2.47	1.11		2.86	1.12		2.27	1.02		2.63	.95
SA		4.23	1.17		4.20	.98		5.00	.68		4.25	.88
AFT		3.68	.52		3.76	.43		3.76	.56		3.67	.52
AFFECT		3.01	.82		2.84	.76		2.72	1.13		2.61	.56
BEHAVR		4.08	.75		4.40	.66		4.31	.70		4.18	.66
PREDIF		3.94	.66		4.03	.54		4.26	.75		4.21	.82
ACT-M		24.00	4.16		21.31	6.47		24.62	5.98		23.57	4.69
Other-Evalustion	（n=16）			（n=16）			（n=13）			（n=14）		
ACC	.80／	.80	.14	.76／	.75	.13	.75／	.75	.15	.79／	.79	.16
DIF	3.89／	4.16	.90	4.34／	4.04	.92	4.40／	4.29	.74	4.27／	4.15	.75
IL		3.78	1.45		3.75	1.44		3.67	1.29		4.20	1.18
TL		4.19	1.06		4.29	1.22		3.77	1.05		4.23	.88
SE		3.14	1.07		3.23	.75		2.52	1.05		3.23	.72
SA		4.33	.82		3.59	.80		4.05	1.02		3.63	1.04
AFT		3.53	.53		3.47	.43		3.86	.50		3.63	.42
AFFECT		2.81	.91		2.53	.55		2.90	.43		2.75	.65
BEHAVR		4.03	.70		3.97	.84		4.62	.57		4.32	.53
PREDIF		3.76	.56		3.90	.65		4.07	.83		3.81	.55
ACT-M		25.19	3.71		19.93	6.78		21.73	6.22		21.60	3.92

ACC=Accurary; Dif=Difficulty; IL=Intention-to-Learn; Tl=Task Liking;
SE=Self-Enhancement; SA=Self-Assesment; AFT=Academic Failure Tolerance;
AFFECT=Affect Following Failure; PREDIF=Preferred Difficulty;
BEHAR=Behavior Response to Failure; ACT-M=ACT Mathematics.

The IL and TL scores were each obtained from the two item, six-point, agree-disagree Likert scale embedded in the task-attitude questionnaire. Mean IL scores range from 3.57 to 4.31; standard deviations range from 1.18 to 1.70. Mean TL scores range from 3.54 to 4.62; standard deviations range from .88 to 1.25. All group means for both scales are above the scale midpoint of 3.5, reflecting positive affect. However, in several cells the mean is just slightly above 3.5, implying that nearly half of the subjects expressed negative attitudes.

The SA and SE measures were each obtained from four agree-disagree Likert-scaled items. Mean SA scores range from 3.59 to 5.00; standard deviations range from .68 to 1.17. Mean SE scores range from 2.27 to 3.23; standard deviations range from .72 to 1.12. Given that the scale midpoint was 3.5, these means imply that the experimental conditions aroused low to moderate levels of the self-assessment motive (interest in discovering ability level) and evoked an avoidance or resistance to the self-enhancement motive (interest in demonstrating ability and protecting self-worth).

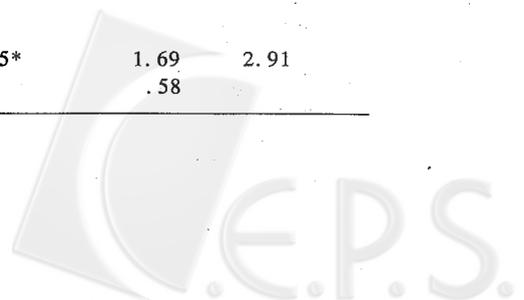## ANCOVA for Achievement Variables

Tests for slope homogeneity across experimental conditions were made to examine the appropriateness of ANCOVA procedures with ACT Mathematics scores (ACT-M) as the covariate. The assumption for slope homogeneity was met for both ACC and DIF. Therefore, despite the fact that ACT-M was not significantly correlated with ACC, the ANCOVA procedure was judged to be appropriate and was used for both achievement risk taking variables. The Scheffé test and a significant level of $p < .05$ were used to examine all simple effects.

Table 2. Summary of ANCOVA for Risk-Taking Achievement Variables

Source	df	ACC MS	F	DIF MS	F
Covariate					
ACT-M	1	.01	.45	40.09	69.12***
Main Effects					
Goal	1	.03	1.98	1.97	3.39
Source	1	.001	.04	1.67	2.89
Criterion	1	.02	.95	.04	.06
2-Way Interactions					
Goal X Source	1	.02	1.14	.03	.06
Goal X Criterion	1	.01	.49	.06	.11
Source X Criterion	1	.014	.83	.42	.73
3-Way Interactions					
Goal X Source X Criterion	1	.084	4.95*	1.69	2.91
Error	110	.017		.58	

*p < .05   ***p < .001
ACC=Accuracy; DIF=Difficulty.

The ANCOVA results for the achievement risk taking variables revealed that only one of the two three-way interactions reached significance (see Table 2); that is, the Goal by Source by Criterion interaction for accuracy, $F(1,110)=2.9$, $MSe=.017$, $p<.05$. Follow-up tests revealed that a Criterion by Goal interaction for accuracy was significant at the .05 level in the self evaluation condition but not in the other evaluation condition. This three-way interaction for ACC was not predicted. The observation, that minimum competency criterion leads to significantly lower risk taking than multi-level competency criterion, is consistent with emergent motivation theory (Csikszentmihalyi, 1975), cognitive evaluation theory (Deci, 1971, 1980) and self-referent theory (Trope, 1975, 1980, 1986), but why this relationship is obtained only under self evaluation and in a practice condition is not easily explained. No other ANCOVA results for either DIF or ACC were significant.

ANOVA for Attitudinal Variables

The ANOVA procedue was used to analyze the attitudinal variables of intention-to-learn (IL), task liking (TL), self-assessment (SA), and self-enhancement (SE). Table 3 contains the summary statistics for these analyses. Only one significant three-way interaction was observed; namely, the Goal by Source by Criterion interaction for TL, $F(1.111)=6.52$, $MSe=1.22$, $p<.05$. A follow-up test revealed a significant Goal by Criterion interaction for TL in the self evaluation condition; no such interaction was observed in the other evaluation condition. Follow-up tests indicated that, given self evaluation, subjects with multi-level competency criterion reported significantly higher task liking than did those with a minimum criterion (4.62 vs. 2.54), but only in the test goal condition. Again, while this simple effect test is consistent with diagnosticity theory (Trope, 1975, 1979, 1980), there is no explanation for this three-way interaction. Neither is there an explanation for the simple effect test indicating that task liking is significantly greater when minimum criterion is used in a practice in contrast to a testing situation.

Table 3. Summary of ANOVA for Attitudinal Variables

Source	df	IL MS	F	TL MS	F	SE MS	F	SA MS	F
Main Effects									
Goal	1	.27	.13	1.38	1.13	2.16	2.21	.54	.60
Source	1	.15	.07	.03	.03	6.91	7.06**	7.52	8.48**
Criterion	1	.02	.01	.13	.11	4.51	4.60*	6.60	7.45**
2-Way Interactions									
Goal X Source	1	.13	.06	.04	.03	.07	.07	2.05	2.32
Goal X Criterion	1	.09	.04	3.19	2.62	.66	.66	.27	.31
Source X Criterion	1	2.32	1.09	1.61	1.32	.002	.002	.32	.37
3-Way Interactions									
Goal X Source X Criterion	1	3.44	1.62	7.95	6.52*	.81	.82	2.00	2.26
Error	111	2.12		1.22		.98		.89	

*p<.05   **p<.01
IL=Intention-to-Learn; TL=Task Liking; SE=Self-Enhancement; SA=Self-Assessment.

The ANOVAs also yielded four main effects: a significant source main effect for both SE, $F(1,111)=7.06$, MEe=.98, $p<.01$, and SA, $F(1,111)=8,48$, MSe=.89, $p<.01$; and a significant criteria main effect for both SE, $F(1,111)=4.60$, MSe=.98, $p<.05$, and SA, $F(1,111=7.45$, MSe=.89, $p<.01$. The means indicate, consistent with prediction, that self evaluation in contrast to other evaluation induced a stronger self-assessment motive (4.40 vs. 3.91) and a weaker self-enhancement motive (2.57 vs. 3.03). Means for the Criteria main effect are also consistent with prediction; a multi-level competency criterion, in contrast to a minimum criterion, produced a stronger self-assessment motive (4.38 vs. 3.92) and a weaker self-enhancement motive (2.62 vs. 2.99). The findings of both the evaluation source and competency criterion main effects for SA and SE are consistent with general principle that as imposed constraint decreases, intrinsic motivation, which includes an interest in ability information, increases.

According to Trope's (1980, 1986) self-referent motive theory, self-assessment and self-enhancement motives mediate risk taking behavior. To examine the mediation role of the two self-referent motives (SA and SE) and their relationship with other dependent variables, a median-split (High-Low) classification was established and subjects were categorized into one of the four resulting motive groups: (Lo SA-Lo SE, Hi SA-Hi SE, Hi SA-Lo SE, Lo SA-Hi SE). ANCOVA procedures were then used to analyze ACC and DIF, for the resulting 2×2 design (Hi-Lo SA by Hi-Lo SE). ANOVA procedures were used to analyze IL, and TL. Significant main effects of SA were found for Dif, $F(1,114)=12.72$, MSe=.51, $p<.001$, and TL, $F(1,115)=9.65$, MSe=1.16, $p<.01$ (see Table 4). Consistent with the self-referent motive theory (Trope, 1986), subjects with a high self-assessment motive, in contrast to high self-enhancement motive, had significantly higher scores for DIF (4.83 vs. 3.93) and TL (4.54 vs. 3.83) scores. An SE main effect for ACC, $F(1,114)=7.01$, MSe=.017, $p<.01$, was also observed. Again, consistent with self-referent motive theory, subjects with a high self-enhancement motive had significantly higher accuracy scores than subjects with a low self-enhancement motive (.81 vs. .75).

Table 4. Summary of ANCOVA AND ANOVA for Dependent Variables by
Categorized Self-Assessment (SA) and Self-Enhancement (SE)

Source	df	ACC MS	F	DIF MS	F	df	IL MS	F	TL MS	F
Covariate										
ACT-M	1	.01	.46	40.09	78.11***					
Mian Effect										
SA	1	.002	.14	6.53	12.72***	1	3.63	1.77	11.16	9.65***
SE	1	.12	7.01**	1.78	3.46	1	.43	.21	.82	.71
Interactions										
SA X SE	1	.006	.36	.003	.006	1	.006	.003	.90	.78
Error	114	.017		.51		115	2.06		1.16	

*p<.05   **p<.01   ***p<.001
ACC=Accuracy; DIF=Difficulty; IL=Intention-to-learn; TL=Task Liking.
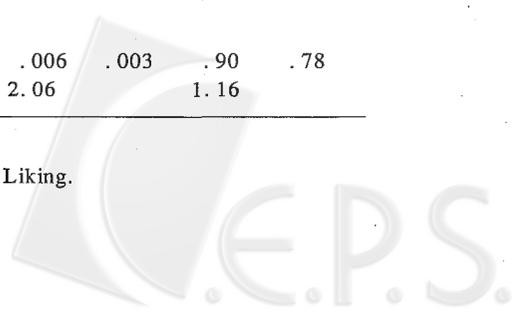
Post Hoc Analyses on Risk Scores

In the absence of risk taking effects from the primary analyses, additional post hoc analyses were conducted. In an attempt to examine whether the treatment effects differ with level of item difficulty, the Mathematics Risk Taking (MRT) measure was divided into three sets of items, designated as easy, moderately difficult, and difficult. Easy items were defined as those contained in the first two rows of each page; moderately difficult items were thos econtained in the middle two rows of each page; difficult items were those contained in the last rows of each page. For each of the three sets of items, separate ANCOVA procedures were used to examine treatment effects on (a) the frequency with which items were selected, and (b) the percentage of correct responses observed. No significant interaction or main effects were observed for the easy items. For the other two sets of items, there were only two main effects; namely, the evaluation source effect for frequency on moderately difficult items $F(1,110)=13.49$, $MSe=18.18$, $p<.001$, and the source effect for frequency on difficult items $F(1,110)=7.95$, $MSe=19.50$, $p<.01$. Consistent with cognitive evaluation theory (Deci & Porac, 1978), subjects under self evaluation in contrast to other evaluation chose significantly more difficult items (9.22 vs. 6.98) and significantly fewer moderately difficult items (5.21 vs. 8.07). These findings coupled with the findings from the primary analyses indicate, while that level of response accuracy was unaffected by the independent variables, the ratio of difficult to moderately difficult items selected was greater under self evaluation.

Discussion

The limited evidence of treatment effects on the achievement risk taking variables of difficulty and accuracy is striking. Only one of the 14 primary ANCOVA tests yielded significance. Furthermore, the significant three-way interaction for accuracy was unpredicted and is not easily explained within the context of the motivational theories forming the basis of this study.

The only other achievement-related risk taking evidence emerged from a supplementary analysis which indicated a preference for difficult over moderately difficult items under self evaluation and a reverse preference under other evaluation. Here, again, is an unpredicted effect. It is, however, consistent with at least several studies which demonstrate the enhancing effects of self evaluation (e.g., Maehr & Stalling, 1972; Salili et al., 1976).

Taken at large, then, goal orientation, competency criterion, and evaluation source had very little effect on academic risk taking behavior. Furthermore, these factors had no effect on intention-to-learn and produced only a three-way interaction for task liking--an unpredicted interaction at that.

Despite this absence of supporting evidence there is little inclination to reject the hypotheses or to question the merit of the theoretical bases from which they were derived. The measures used in the

present study have, with one exception (i.e., accuracy), acceptable reliablility estimates; in addition, their intercorrelations provide encouraging evidence of construct validity.   Thus, the absence of treatment effects cannot readily be attributed to measurement limitations, as reflected by reliability estimates.

As for the manipulations, evaluation source was manipulated in a realistic and ecologically practical manner.   There is every reason to believe that the criterion manipulation was adequately processed by subjects who were required to record page scores following the completion of each task. The goal manipulation may have been relatively weak, but no weaker than those used in previous studies (e.g., Ames, 1984; Elliot & Dweck, 1988).   Furthermore, evidence from the self-referent motives suggests that both the evaluation source and competency criterion manipulations functioned in predictable ways.   Thus, faulty manipulations are probably not the most likely explanation for the absence of risk taking effects.

What seems to emerge as a more plausible explanation for the absence of treatment effects on achievement risk taking behavior and on task interest measures, is the nature of the risk taking task-- the MRT.   Hindsight suggests that the MRT task has at least one inherent limitation as a risk inducing instrument: feedback was relatively non-informative.   Subjects were told that a response was correct or incorrect, but offered no information relevant to subsequent problem-solving activities.   This feedback had little potential for influencing future behavior.   If the informational value of feedback was low, the incentive for selecting high-risk items was probably also low.   (The mean accuracy was about eighty percent in this study).   It is worth noting that an earlier risk taking study conducted with a highly similar version of MRT also produced limited findings related to accuracy (Maneesri, 1989).

On the other hand, in the two other risk taking studies conducted by Zeon (1990) using a vocabulary test and Maneesri (1990) using an educational psychology practice test, mean accuracy was between sixty and forty percent; the approaching .50 level theoretically identified as optimal for motivation.   Therefore, the nature of the Mathematics Risk Taking instrument itself might provide a clue to the near absence of findings for risk taking reported in this present study.   When subjects worked on a vocabulary test or an educational psychology test, they were more likely to gain usable information which enabled them to correct erroneous cognitions and improve knowledge and skills.   Therefore, it can be speculated that if the treatments devised for this study were applied to a risk taking task which included highly informational feedback, support for the initially proposed hypotheses might be obtained.   In short, informational feedback may be a prerequisite for effecting moderate academic risk taking.

Despite the absence of achievement risk taking effects and task interest effects, the present study makes a contribution to risk taking literature.   The relatively powerful evaluation source and competency criterion main effects on the self-enhancement and self-assessment motive--which are highly consistent with theory--indicate not only that these two manipulations (evaluation source and competency criterion) were functional, but also that these motives can rather easily be manipulated.   On the basis of supplementary analyses, one might argue that the self-referent motives of assessment and enhancement influence the achievement risk taking behaviors of difficulty and accuracy.   For high self-enhancement subjects had significantly higher accuracy scores than low self-enhancement subjects,
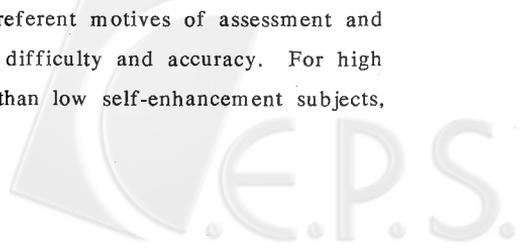
and high self-assessment subjects chose significantly more difficult items than low self-assessment sub-jects.   In other words, the present data offer a basis for speculating that the self-referent motives mediate the influence of the manipulated variables.

The self-referent motive findings of the present study also provide useful evidence for Trope's (1975, 1980. 1986) self-referent motive theory.   The present study included an independent assessment of these motives with scales yielding reasonably reliable scores. Few previously conducted studies have included such independent assessments of these motives.   Instead, a practice vs test or mastery- vs ego-orientation is typically manipulated and assumed to evoke the respective motives, which are then used to explain observed behaviors such as task interest or attribution for outcomes (Ames, 1984; Ames & Archer, 1988; Elliott & Dweck, 1988).   The absolute level of self-assessment and self-en-hancement and the interdependence of these motives has not been previously examined or reported. The present study suggests that, while these motives are negatively correlated, as is implied by theory, individuals can simultaneously score relatively high or low on both motives; about 33% of the subjects were so classified.   Furthermore, the present data suggest that no one combination--not even high as-sessment-low enhancement--appears to be any more "ideal" than another combination in a risk taking situation.

Although findings of the present study provide evidence for Trope's (1980, 1986) self-referent motive theory, they also rise a theoretical issue; namely, there may be a missing piece in Trope's self -referent motive theory, which will be labeled as self-improvement motive.   The present study showed that subjects did seek ability information; however, given that subjects encounter a difficult cognitive task which is likely to threaten their self-worth, then, the desire for self-assessment or self-enhance-ment itself is not sufficient to promote risk taking. Under such circumstances, unless informational feedback is available and subjects have strong desires to improve their ability or skills, their risk tak-ing behaviors will not likely be prompted.   This is also consistent with Bandura's (1977, 1982) self-ef-ficacy theory--as subjects' skills improved, their self-efficacy increase, which in turn predict their future risk taking behaviors.

In conclusion, evaluation source and criterion were found to have significant effects on the self-referent motive, which in trun were found to be predictive of risk taking behavior as defined by ac-curacy and difficulty.   However, little support was obtained for any of the major predictions and the most likely explanation appear to be in the nature of the risk taking task, and more specificatlly, in the low informational value of feedback thought to characterize the mathematics task used in the present study.   The present study also rise an issue in Trope's self-referent motive theory, that is, ex-cept self-assessment and self-enhancement motives, self-improvement motive should be included in or-der to thoroughly understand academic risk taking behaviors.

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目標導向、回饋的參照標準、及評量方式
對大學生選擇不同難度作業之影響

毛 國 楠

摘　　要

　　本研究旨在探討目標導向（目的在練習或是測量能力高低）、回饋的參照標準（賦予多重標準亦或單一的標準）、及評量方式（自評或是他評）對大學生選擇不同難度作業的影響。本研究採2×2×2因子設計。以131名修習教育心理與測量的美國大學生為對象，系統地分配到八個實驗情境。研究工具為含有不同難度和計分標準的數學測驗、挫折容忍度量表和態度量表（包括作答的喜好程度、學習意願、自我瞭解的需求，與自我表現的需求）。本研究的假設是(1)練習導向要比測量能力導向能夠產生較高的挫折容忍度（亦即選擇較難的試題）與正向的態度反應。(2)多重參照準比單一標準能引發較高的挫折容忍度與正向的態度反應，而此現象在練習導向的情境下愈明顯。(3)回饋的參照標準與評量方式會有交互作用，亦即在多重參照標準之下，自評比他評能產生較高的挫折容忍度和正面的態度反應，而在單一標準之下，此效果不明顯。

　　本研究結果發現：(1)回饋的參照標準和評量方式對態度反應發生作用。多重標準比單一標準更能引發自我瞭解的需求；自評比他評更能引起較高的自我瞭解需求，而他評則導致較高的自我表現需求。(2)目標導向與回饋的參照標準之間的交互作用，以及評量方式與回饋的參照標準對難度選擇的交互作用未獲支持。

　　文末對實驗處理未獲支持的可能原因加以討論，並闡釋本研究的發現在教育上的涵意。

關鍵詞：學業冒險偏向，動機目標導向，評量方式，參照標準