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ABSTRACT

A study explored the development of self-efficacy and outcome expectancy beliefs for reading and writing--examining specifically (1) the structure of the relationships both within reading and within writing, and the influences of writing beliefs on reading and reading beliefs on writing; and (2) the development of writing beliefs. Subjects were 606 children in grades 4, 7, and 10 from a midwestern city school system. Self-efficacy for reading and writing, outcome expectancy (contingency beliefs and causal attributions), reading achievement, and writing achievement were measured with various instruments. Multiple regression analysis of the resulting data supported previous research that has found significant relationships between self-efficacy and outcome expectancy beliefs and reading and writing. Results also suggest that beliefs about reading and writing ability become increasingly important factors in predicting reading and writing skill as children age and master skills. To be fully effective readers and writers, children must develop the positive self-efficacy and outcome expectancies necessary to effectively organize and apply the cognitive reading and writing skills they possess. (Three tables of data are included; 14 references are attached.) (SR)

Development of Self-Efficacy and Outcome Expectancy for Reading and Writing: A Regression and Causal Modeling Approach

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Development of Self-Efficacy and Outcome Expectancy for Reading and Writing: A Regression and Causal Modeling Approach

Bandura (1982, 1986) has identified two aspects of self-evaluation that affect performance and motivation: self-efficacy and outcome expectancy. Self-efficacy is defined as personal confidence in one's ability to successfully perform a behavior. Outcome expectancy is defined as belief that performance and reinforcing outcomes are contingently related. Bandura proposed that efficacy and outcome expectancy constitute the processes through which persons interpret feedback from performance outcomes. Performance is self-evaluated from feedback about attained skill level, often in comparison to self or externally set criteria or goals, leading to self-efficacy beliefs about performance competence and from feedback about received reinforcement, leading to outcome expectancies about the probable reinforcers that will result from successful performance. Thus, self-efficacy is the mechanism through which persons understand their own skills and develop confidence in their performance abilities, and outcome expectancies are the mechanisms through which persons contingently relate their actions to the attainment of desired outcomes.

Research examining self-efficacy in a variety of domains (see Bandura, 1986 for an extensive review) has found that level of self-efficacy belief is related to level of performance, that self-efficacy change precedes behavioral change, and that high self-efficacy beliefs motivate performance by directing choice

of activity, increasing effort expenditure, and fostering greater task persistence. Outcome expectancies have been examined primarily within the contexts of locus of control (Rotter, 1966) and causal attribution theory (Weiner, 1979). Outcome expectancy has been found to be related to improved performance and to increased effort expenditure and persistence (Stipek & Weisz, 1981).

Bandura (1986) has proposed that self-efficacy and outcome expectancy mediate skilled performance, particularly for behaviors requiring the organization of cognitive, behavioral, or social sub-skills into integrated courses of action. Self-efficacy is seen as the generative mechanism through which persons organize and apply their existing skills to the performance of a task. Thus, self-efficacy is the belief structure through which persons translate their cognitive knowledge into behavioral action. Outcome expectancies mediate performance through beliefs about the causes of performance success and beliefs about relationships between performance and the realization of goals. Persons who believe that performance is related to their own skills and actions (e.g., ability or effort) are more likely to persist in the generative processes needed to translate cognitive skills into behavior and persons who see contingent links between behavior and desired outcomes are more likely to attempt and persist in behavior. Thus, self-efficacy and outcome expectancy are the primary belief systems through which persons understand their cognitive skills

and translate these skills into behavior.

Reading and writing have both been identified as behaviors requiring the organization and application of various subskills (e.g., Hayes & Flower, 1980; Paris & Oka, 1986; Perfetti & Roth, 1981; Shanahan & Lomax, 1986; Stanovich & West, 1981). Self-efficacy and outcome expectancy beliefs would, therefore, be expected to influence actual reading and writing performance levels. While research examining the relationship of self-efficacy and outcome expectancy to reading and writing performance has tended to support the conclusion that self-efficacy and outcome expectancy beliefs do influence reading and writing achievement (e.g., McCarthy, Meier, & Rinderer, 1985; Nicholls, 1979; Paris & Oka, 1986; Shell, Murphy, & Bruning, 1987), little is known about the structure of this relationship or its development, particularly for interactions between reading and writing.

Shell, Murphy, and Bruning (1987) have examined relationships between self-efficacy and outcome expectancy beliefs and reading and writing in college students. They found that efficacy and outcome expectancy beliefs were significant predictors of both reading and writing performance and that these believes generalized across both domains with reading efficacy predicting writing performance and writing efficacy predicting reading achievement. Additionally, they found that the structure of the relationships followed Bandura's (1986) proposed model, with self-efficacy beliefs accounting for the

most variance and outcome expectancy beliefs accounting for less, but still significant, variance. They also, found that the relationships were stronger for reading than for writing. The results of the Shell, Murphy, and Bruning study indicate that the relationship between self-efficacy and outcome expectancy beliefs and reading and writing are consistent with those identified in other domains (see Bandura, 1986) for adult subjects. Self-efficacy and outcome expectancy beliefs do not, however, appear fully developed. They develop over time from the self-evaluation of performance and experienced outcomes (Bandura, 1982, 1986). Studies of the development of efficacy and outcome expectancy indicate that children do not initially exhibit adult relationships; rather, they show changes in both the structure of the relationship and in their ability to accurately self-assess and judge their own abilities (e.g., Weisz & Stipek, 1982). Research examining self-efficacy and outcome expectancy relationships to reading have found that as children age these beliefs become increasingly better predictors of performance and the structure of the relationship becomes more adultlike (e.g., Nicholls, 1979; Paris & Oka, 1986).

The purpose of the present study is to further examine the development of self-efficacy and outcome expectancy beliefs for reading and writing. Specific purposes were to (a) examine the structure of the relationships both within domain for reading and writing individually and cross domain for the influences of reading beliefs on writing and writing beliefs on reading at

different levels of development and (b) examine the development of writing beliefs to shed light on the relatively weak relationship between self-efficacy and outcome expectancy beliefs and writing identified in adult readers by Shell, Murphy and Bruning (1987).

Method

Subjects

Subjects were 606 children, 168 fourth graders (72 male, 83 female, 13 unknown), 199 seventh graders (88 male, 93 female, 18 unknown), and 239 tenth graders (100 male, 112 female, 27 unknown) from a midwestern city school system. Each grade level comprised a separate experimental group for analysis. Due to incomplete school records not all subjects were included in all analyses.

Measurement of Variables

Self-Efficacy. Self-efficacy instruments for reading and for writing were developed by the researchers based on the method outlined by Bandura (1982). For each instrument activities of varying difficulty were provided and subjects were asked to indicate how sure they were that they could do each activity on a 5-point Likert scale as follows: 1 (I'm sure I can't), 2 (Don't think I can), 3 (Maybe I can), 4 (Pretty sure I can), 5 (I'm sure I can). Both instruments contained two subscales. One subscale contained general reading or writing tasks of varying difficulty and the other consisted of component skills involved in reading or writing. Self-efficacy scores were

computed by averaging the items in each subscale and all items.

In each instrument, five items comprised the task subscale and four items comprised the component skill subscale. Reliability computed with coefficient alpha for the reading scales was: (a) total efficacy .78, (b) task subscale .75,and (c) component subscale .70). Reliability for the writing scales was: (a) total efficacy .84, (b) task subscale .75, and (c) component subscale .71.

Outcome Expectancy. In separate instruments for reading and writing, outcome expectancy was measured in two scales. The first scale assessed contingency beliefs by asking subject to rate the importance of reading or writing for achieving various goals on a 5-point Likert scale as follows: 1 (Not important at all), 2 (Not very important), 3 (Kind of important), 4 (Pretty important), 5 (Very important). Contingency scores were obtained by averaging subject ratings across all items. Reliability computed with coefficient alpha was: (a) reading scale .62 and (b) writing scale .61.

The second scale assessed causal attributions by asking subjects to rate the importance of six different causes (effort, intelligence, enjoyment, luck, task difficulty, and teacher help) for being a good reader or writer on a 5-point Likert scale as follows: 1 (Not important at all), 2 (Not very important), 3 (Kind of important), 4 (Pretty important), 5 (Very important). Each of the six causes was retained as an individual score for analysis.

Reading Achievement. Reading achievement was measured with the California Achievement Test (CAT). The Reading Comprehension sub-test was used as the overall measure of reading achievement. Standard scores for each grade level were used in the analysis.

Writing Achievement. In an untimed assessment, subjects were given t e following writing task: "Write two paragraphs describing your favorite TV program. In the first paragraph, name the program and write about who is in it, what they do in the program, and why they do the things that they do. In the second paragraph, write about why you like the show and why someone else would enjoy watching it." Writing samples were scored blind by one of the researchers and a trained judge using a holistic scoring method. Scoring categories were realization, logic clarity, organization, density, and language usage. A score of 0 - 20 was assigned for each category and a total score was derived by summing the five categories giving an overall score of 0 - 100.

Procedures

Subjects were administered a questionnaire containing the self-efficacy and outcome expectancy instruments and the writing task in their regular school classrooms. Administration was done by classroom teachers or by the researchers.

Data Analysis

Multiple regression analysis was used to examine relationships between self-efficacy and outcome expectancy

beliefs and reading and writing achievement. Within domain models were developed for reading and writing using only their respective efficacy and outcome expectancy measures. Cross domain models for reading and writing then were developed using efficacy and expectancy scores from both areas in the analysis. For all models stepwise selection was utilized to generate the most parsimonious, empirically generated model. Separate analyses were conducted for each grade level to identify distinct developmental patterns in the regression equations.

Because outcome expectancy beliefs have been found to be curvilinearly related to reading (Shell, Murphy, & Bruning, 1987). All self-efficacy and outcome expectancy variables were tested for curvilinear relationships for each grade level. The curvilinear equation was used in analysis when a significant curvilinear relationship was identified. Because both the variable and the square of the variable must be entered simultaneously into the regression to reflect a curvilinear relationship, these variables were entered after stepwise regression was done on the other variables and significance was tested by the increase in variance accounted for beyond the final stepwise model.

To assess the independent effects of the self-efficacy and outcome expectancy variables, multiple regression equations were developed entering subskill scores from the CAT for vocabulary, spelling, and language mechanics prior to the entry of the efficacy and expectancy variables. These models control for the

effects of subskill abilities. The subskills entered for each within and cross domain model were identified from the models developed by Shanahan and Lomax (1986).

A final analysis tested for the overall structure of the relationships between the variables and the dimensionality of the reading and writing relationship through a canonical analysis. For this analysis the reading score, holistic writing score, vocabulary, spelling, and language mechanics were treated as dependent variable and all self-efficacy and outcome expectancy variables were treated as independent variables. Curvilinear relationships were entered using predicted scores generated from the curvilinear equations.

Results

Within and cross domain models for the self-efficacy and outcome expectancy variables are provided in Table 1. For fourth and seventh grade, the within and cross domain models were identical. For grade ten, within and cross domain reading models differed with writing efficacy and outcome expectancy being the most significant predictors of reading, indicating considerable cross domain generalization. The tenth grade within and cross domain writing models were identical. For reading models, the pattern of results follows the theoretical model of self-efficacy being the strongest predictor followed by outcome expectancy beliefs. Within outcome expectancy variables, causal attribution scores were stronger predictors than contingency relationships. Causal attribution scores

indicated a strong effect for internal attribution pattern being related to performance, with negative correlations identified for all external causes (luck, task difficulty, teacher help). Total variance accounted for increased at each grade level for reading indicating a stronger relationship between belief structure and performance across age and grade. The grades seven and ten within domain models were consistent with models identified previously for college students (Shell, Murphy, & Bruning, 1987).

Writing models did not reflect the same consistency of structure and did not account for as much variance at the fourth and tenth grade level. Efficacy was not significant at the fourth grade but became the most significant predictor at grades seven and ten. Like college students examined previously (Shell, Murphy, & Bruning, 1987) less variance was accounted for by writing models than by reading models at grades four and ten and outcome expectancy variables were not as important in writing models as in reading models.

Results of the tests for independent effects indicated that self-efficacy and outcome expectancy beliefs are unique from subskill abilities. Models for testing independent effects are presented in Table 2. Within and cross domain models were distinct for each grade level. For reading models at all grade levels, a significant increase in variance explained was attributable to outcome expectancy beliefs; however, self-efficacy was no longer significant in any model. The

within domain writing models retained similar independent effects as those identified in the self-efficacy and outcome expectancy only models. The cross domain writing models were similar to the efficacy and expectancy only models; however, reading outcome expectancies were significant in fourth and tenth grade models suggesting some cross domain generalization of beliefs. Cannonical analysis results are presented in Table 3. There was no significant cannonical correlation for grade four Wilks' λ = .389, Rao's F = 1.18, p = .093 indicating no underlying dimensionality to fourth grade performance or belief structure. For seventh grade a single significant cannonical variate was identified Wilks' λ = .299, Rao's F = 1.77, $p < .0001$. The cannonical correlation was .658 accounting for 43% of the variance in the linear combination of the performance variables. For tenth grade a single cannonical variate was also identified Wilks' λ = .403, Rao's F = 1.79, $p < .0001$. The cannonical correlation was .638 accounting for 39% of the variance in the linear combination of the performance variables.

The cannonical variates were similar at both seventh and tenth grade. All dependent performance variables were positively correlated to the single significant variate, however, writing was less strongly represented in the tenth grade correlation. The structure of the independent self-efficacy and outcome expectancy variables was virtually identical for both grades. Self-efficacy beliefs for both reading and writing were most strongly correlated with the

cannonical variate. Causal attribution variables reflecting an internal locus of control (positive correlations for effort and enjoyment· negative correlations for luck, task difficulty, and teacher help) were the second most highly correlated variables. Contingency beliefs were also strongly correlated but at slightly lower levels, w_ .1 linear effects being negatively correlated and curvilinear effects being positively correlated.

The identified pattern for the self-efficacy and outcome expectancy variables is consistent with the theoretical model of Bandura (1986). Efficacy contributes the most to the relationship with lesser effects for outcome expectancy variables. The single dimensionality of the relationship is consistent with results from Shell, Murphy, and Bruning (1987) for college students. For seventh and tenth graders, reading, writing and their component subskills are linked by a single underlying dimension and predicted by a single dimension of self-efficacy and outcome expectancy beliefs. The magnitude of the self-efficacy correlations with the cannonical variate indicate that efficacy is related both to terminal performance (reading comprehension and holistic writing score) and to the subskills underlying these performance areas. The lack of efficacy effects in the independent test readi.g models (Table 2) may, therefore, be due to efficacy beliefs exerting most of their influence at the subskill level rather than directly on terminal performance.

Discussion

The results support previous research that has found significant relationships between self-efficacy and outcome expectancy beliefs and reading and writing (e.g., McCarthy, Meier, & Rinderer, 1985; Nicholls, 1979; Paris & Oka, 1986; Shell, Murphy, & Bruning, 1987). Self-efficacy and outcome expectancy are strongly related to terminal performance as measured by reading comprehension and a holistic writing score and their effects are independent of abilities on subskills such as vocabulary knowledge, spelling, and language mechanics that affect terminal performance. According to Bandura (1986) self-efficacy and outcome expectancies affect performance by providing mechanisms through which persons organize and apply existing skills. The results found support this theoretical formulation. Language subskills strongly predicted performance in reading and writing; however, efficacy and outcome expectancy beliefs predicted performance beyond the effects of subskill abilities. In addition, cannonical analysis indicated that efficacy and outcome expectancy beliefs were significant predictors of subskill performance as well as terminal performance. Self-efficacy and outcome expectancies are related to performance because they affect the organization and use of cognitive knowledge and skills and differentiate between persons with the same actual skill levels (Bandura, 1986); thus, they allow prediction beyond skill level itself.

The developmental pattern identified also corresponds to previous studies of the development of self-efficacy and outcome

expectancy beliefs (e.g., Nicholls, 1979; Paris & Oka, 1986; Weisz & Stipek, 1982). This research has shown that young children do not have well defined efficacy or causal attribution beliefs and that changes in belief structure occur as children age. In the present study fourth graders did not have a unitary reading and writing structure as indicated by the lack of a significant canonical correlation. The regression results also suggested that fourth graders do not have adult like beliefs as the regression models differed considerably from seventh and tenth graders and from college students (see Shell, Murphy & Bruning, 1987). Also, the magnitude of effects for fourth graders was lower than for seventh or tenth graders. The regression models of seventh and tenth graders show more significant variables, a higher amount of variance accounted for self-efficacy and outcome expectancy, and a pattern more closely resembling adult college students. Also, the cannonical correlations for seventh and tenth graders indicate a single structural dimension for reading, writing and belief variables similar to previously identified adult structure.

The patterns of development in this study mirror those found by Paris and Oka (1986). As children age, self-efficacy and outcome expectancy variables become increasingly more important in predicting performance. This developmental pattern is understandable given the mechanisms through which efficacy and outcome expectancy operate (Bandura, 1986). Efficacy and outcome expectancy affect organization and application of

skills. When skill are relatively undeveloped, as the reading and writing subskills are for young children, organizational effects exert less influence. As skill levels improve, differences in performance are more dependent on organizational and application abilities. Thus, as subskills are mastered, efficacy and outcome expectancy beliefs exert greater influence on terminal performance.

The results of this study suggest that beliefs about reading and writing ability become increasingly important factors in predicting reading and writing skill as children age. Essentially, to be fully effective readers and writers, children must develop the positive self-efficacy and outcome expectancies necessary to effectively organize and apply the cognitive reading and writing skills they possess. Bandura (1982, 1986) notes that self-efficacy beliefs are developed from the self-evaluation of actual performance and that outcome expectancy beliefs develop from actual experienced outcomes. For persons to develop positive self-efficacy, they must experience performance success and for persons to develop positive outcome expectancies, they must receive positive outcomes and believe that outcomes result from personal (internal) actions. Therefore, to develop positive self-efficacy and outcome expectancies for reading and writing children must have positive experiences with reading and writing activities and must understand that they can be successful in these activities through their own efforts.

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Table 1

Self-efficacy and Outcome Expectancy Within and Cross Domain Stepwise Regression Models by Grade

Step	Variable	Cum. R	Cum. R^2	R^2 Change	F Change
	Grade 4				
Reading Model					
1	Reading Task Efficacy	.289	.084	.084	12.88**
2	Reading Attribution Smart (N)	.388	.150	.067	10.99**
3	Reading Attribution Teacher (N)	.439	.193	.043	7.33**
Writing Model					
1	Writing Attribution Luck (N)	.273	.075	.075	12.82**
	Grade 7				
Reading Model					
1	Reading Total Efficacy	.485	.236	.236	46.36**
2	Reading Attribution Task (N)	.524	.275	.040	8.51**
3	Reading Contingency (N)	.544	.296	.021	4.52*
Writing Model					
1	Writing Component Efficacy	.381	.145	.145	31.66**
2	Writing Attribution Enjoyment	.417	.174	.029	6.58*
3	Writing Attribution Luck (N)	.447	.299	.026	6.02*
	Grade 10				
Reading Models Within Domain					
1	Reading Total Efficacy	.301	.090	.090	19.87**
2	Reading Attribution Luck (N)	.395	.156	.065	15.44**
3	Reading Attribution Smart (N)	.432	.187	.031	7.50**
4	Reading Attribution Enjoyment	.467	.218	.031	7.84**
5	Reading Contingency (curv.)	.547	.299	.081	11.26**
Cross Domain					
1	Writing Component Efficacy	.392	.153	.153	35.12**
2	Writing Attribution Luck (N)	.453	.205	.051	12.49**
3	Reading Attribution Smart (N)	.479	.229	.024	6.07*
4	Reading Attribution Enjoyment	.503	.253	.024	6.07*
5	Writing Attribution Teacher (N)	.521	.271	.019	4.77*
6	Reading Contingency (curv.)	.579	.335	.064	9.10**

Step	Variable	Cum. R	Cum. R^2	R^2 Change	F Change
Writing Model					
1	Writing Total Efficacy	.302	.091	.091	23.10**

Note: N indicates a negative relationship, curv. indicates a curvilinear relationship.

$p < .05$ **$p < .01$

Table 2

Self-efficacy and Outcome Expectancy Within and Cross Domain Stepwise Regression Models by Grade Controlling for Skill

Step	Variable	Cum. R	Cum. R^2	R^2 Change	F Change
	Grade 4				
	Reading Models				
	Within Domain				
1	Vocabulary	.675	.456	.456	117.97**
2	Reading Attribution Luck (N)	.689	.475	.019	5.30*
	Cross Domain				
1	Vocabulary, Spell, Lang. Mech.	.696	.484	.484	41.64**
2	Reading Attribution Smart (N)	.707	.499	.015	3.93*
	Writing Models				
	Within Domain				
1	Spelling, Language Mechanics	.380	.144	.144	11.80**
2	Writing Attribution Luck (N)	.424	.180	.035	6.01*
	Cross Domain				
1	Vocabulary, Spell, Lang. Mech.	.408	.166	.166	8.85**
2	Writing Attribution Luck (N)	.442	.196	.029	4.82*
	Grade 7				
	Reading Models				
	Within Domain				
1	Vocabulary	.787	.620	.620	256.29**
2	Reading Task Efficacy	.804	.647	.027	11.89**
3	Reading Attribution Task (N)	.812	.659	.012	5.23*
	Cross Domain				
1	Vocabulary, Spell, Lang. Mech.	.815	.664	.664	93.40**
2	Reading Attribution Task (N)	.826	.682	.019	8.39**
	Writing Models				
	Within Domain				
1	Spelling, Language Mechanics	.526	.277	.277	29.51**
2	Writing Component Efficacy	.595	.353	.076	18.08**
3	Writing Attribution Luck (N)	.612	.375	.022	5.31*
4	Writing Attribution Enjoyment	.627	.394	.018	4.58*

Step	Variable	Cum. R	Cum. R^2	R^2 Change	F Change
	Cross Domain				
1	Vocabulary, Spell, Lang. Mech.	.539	.290	.290	19.33**
2	Writing Component Efficacy	.587	.345	.055	11.84**
3	Reading Attribution Enjoyment	.611	.374	.029	6.45*
4	Writing Attribution Luck (N)	.626	.391	.017	3.98*
	Grade 10				
	Reading Models				
	Within Domain				
1	Vocabulary	.777	.604	.604	306.29**
2	Reading Attribution Task (N)	.792	.627	.024	12.68**
3	Reading Attribution Smart (N)	.798	.636	.009	4.79*
4	Reading Attribution Enjoyment	.806	.649	.013	7.50**
5	Reading Attribution Effort	.811	.657	.008	4.40*
6	Reading Contingency (curv.)	.819	.671	.014	4.02*
	Cross Domain				
1	Vocabulary, Spell, Lang. Mech.	.801	.642	.642	113.33**
2	Reading Attribution Task (N)	.811	.658	.016	8.97**
3	Reading Attribution Enjoyment	.817	.667	.010	5.50*
4	Reading Attribution Smart (N)	.821	.675	.008	4.51*
6	Reading Contingency (curv.)	.828	.686	.010	3.06*
	Writing Models				
	Within Domain				
1	Spelling, Language Mechanics	.363	.132	.132	14.80**
2	Writing Total Efficacy	.388	.150	.019	4.23*
	Cross Domain				
1	Vocabulary, Spell, Lang. Mech.	.343	.118	.118	8.49**
2	Writing Total Efficacy	.370	.137	.019	4.07*
3	Reading Contingency (curv.)	.409	.167	.031	3.43*

Note: N indicates a negative relationship, curv. indicates a curvilinear relationship.

$p < .05$ **$p < .01$

Table 3

Correlations Between Original Variables and the First Cannonical Variate

Variable	Correlation		
	Grade 4	Grade 7	Grade 10
Dependent			
Reading Comprehension	.82	.82	.94
Writing Score	.53	.83	.28
Vocabulary	.92	.75	.75
Spelling	.51	.52	.42
Language Mechanics	.73	.82	.76
Independent			
Reading			
Total Efficacy	.68	.78	.55
Task Efficacy	.68	.75	.49
Component Efficacy	.49	.64	.45
Attribution Effort	.02	.17	.03
Attribution Luck	-.38	-.49	-.41
Attribution Task	-.34	-.41	-.39
Attribution Intelligence	-.33	-.20	-.49
Attribution Teacher	-.46	-.12	-.20
Attribution Enjoyment	.09	.45	.13
Contingency	-.11	-.24	.42
Writing			
Total Efficacy	.49	.73	.68
Task Efficacy	.46	.50	.49
Component Efficacy	.44	.74	.69
Attribution Effort	.04	.01	-.05
Attribution Luck	-.48	- 44	-.49
Attribution Task	-.20	-.34	-.41
Attribution Intelligence	-.08	-.17	-.33
Attribution Teacher	-.36	-.11	-.29
Attribution Enjoyment	.08	.37	.13
Contingency	-.10	.40	-.33