

RELATIONS OF AUTONOMY, SELF-REFERENCED BELIEFS, AND SELF-REGULATED LEARNING AMONG JAPANESE CHILDREN¹

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Summary.—This study was designed to investigate relations among autonomy, self-referenced beliefs, and self-regulated learning for 356 elementary school children (180 boys and 176 girls) from Grades 5 and 6. They were asked to complete a questionnaire designed to measure four types of motivation, self-esteem, strategy beliefs, capacity beliefs, control beliefs, and values, three types of goal orientations, and three types of learning strategies. Four types of motivation (external, introjected, identified, and intrinsic regulations) were shown to conform to a simplex structure or ordered correlational structure. Correlations among scores on autonomy (four kinds of regulation) and on self-regulated learning and between scores on self-referenced beliefs and on self-regulated learning were examined. Finally, canonical correlation was used to investigate the relations between autonomy and learning and between beliefs and learning. Implications of the findings for the relations were discussed.

Recent research has emphasized the relation of motivation and cognition in learning. There are many different theoretical frameworks of this relationship. In this study, we examined how various motivations and individuals' beliefs and learning strategies interrelate within Japanese samples and tried to make a comprehensive framework on motivation and learning. Most variables in this study have been widely investigated in classrooms in western countries. We examined the generalizability of some frameworks for these variables which were developed in schools with the Japanese children.

Autonomy is found in children's regulations for engaging in activity. In the early research on intrinsic motivation, Deci (1975) suggested that intrinsically motivated behavior is the prototype of self-determined or autonomous activity and that extrinsically motivated behavior tends to undermine children's experience of self-determination. In subsequent discussions of self-determination theory, it was suggested that extrinsically motivated behaviors can vary according to children's self-determination. Deci and Ryan (1985) distinguished four types of extrinsic regulation along a continuum describing children's self-determination: external, introjected, identified, and integrated regulation. External regulation refers to behaviors regulated by contingencies

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which are overtly external to children. Introjected regulation yields behaviors that are motivated by internal prods and pressures such as self-esteem-relevant contingencies. Identified regulation occurs when a behavior or regulation is adopted by children's self as personally important. Integrated regulation is the most autonomous or self-determined form of extrinsic motivation and stems from the integration of separate identifications into children's coherent sense of self (Rigby, Deci, Patrick, & Ryan, 1992). Intrinsic regulation focuses on involvement in an activity with emphasis on the processes and not on the outcomes of the activity and is characterized by spontaneity, excitement, intense concentration, and joy.

In studies of self-efficacy and the effect of causal attribution on motivation, perceived control has had a strong influence on emotion and behavior. Children's beliefs about their control are thought to encourage or discourage their active engagement in school tasks and thus to influence their cognitive and academic performance. Skinner and Chapman (1984) and Skinner, Chapman, and Baltes (1988) introduced the notions of beliefs about agency and means-ends, which together constitute beliefs about control. In conceptualizing perceived control, the following distinction is made, that is, between children's beliefs about (1) the causes of success and failure and (2) the extent to which the self has access to particular causes. Later, Skinner, Wellborn, and Connell (1990) elaborated on the importance of perceived control, and called beliefs about agency and means-ends, respectively, beliefs about capacity and strategy. They empirically evaluated a motivational model describing the links between children's perceived control and their academic achievement. Patrick, Skinner, and Connell (1993) examined the contribution of perceived control and autonomy to children's self-reported behavior and emotion in the classroom. They identified unique effects of autonomy over and above the strong effects of perceived control by using multiple regression analysis.

Although there are a variety of definitions of self-regulated learning, it often refers to the effective regulation of actions towards academic learning. Zimmerman (1989) proposed a formulation of self-regulated learning on the basis of Bandura's triadic theory of social cognition (Bandura, 1986).

Zimmerman's definition of self-regulated learning hinges on the importance of three elements, students' self-regulated learning strategies, self-efficacy perceptions of performance skill, and commitment to academic goals. Pintrich, and De Groot (1990) also suggested three important components for classroom performance: (1) students' metacognitive strategies for planning, monitoring, and modifying their cognition, (2) students' management and control of their effort on classroom academic tasks, and (3) actual cognitive strategies that students use to learn, remember, and understand the material. In addition to these, they proposed three motivational components: (1) an

expectancy component which includes students' beliefs about their ability to perform a task, (2) a value component which includes goals and beliefs about the importance and interest of the task, and (3) an affective component which includes students' emotional reactions to the task. They examined correlational relationships between self-regulated learning and motivational components. Their results provided valid empirical evidence for the importance of considering both motivational and self-regulated learning components in classroom academic performance.

Achievement goal theory posits that students pursue two contrasting achievement goals. Dweck and Leggett (1988) suggested that students who pursue learning-oriented goals seek to improve their abilities and understanding, whereas students who pursue performance-oriented goals seek to demonstrate a high ability or to gain favorable judgments of their abilities. Learning-oriented students are more likely to believe that effort is the basis for success or failure and they engage in deep strategy processing, while performance-oriented students are interested in demonstrating their ability and they engage in surface-strategy processing (Pintrich & De Groot, 1990; Ames, 1992). Furthermore, Duda and Nicholls (1992) added the third type of goal, namely, a work-avoidance goal which is defined as trying not to work hard. The strategy of self-handicapping grows out of the realization of a link between effort and ability in which the evaluations of highest ability are attached to success paired with low effort, and the evaluations of lowest ability are linked to failure paired with high effort. Therefore, self-handicapping by withdrawing effort ensures a safe outcome whether in success or failure: a failure may be attributed to low effort, but a success following low effort maximally enhances students' ability (Pintrich & Garcia, 1994). Most goal theorists suggest that learning by students with differing goal orientations may depend on their perceived ability. In school achievement, these different types of goal orientation will result from students' varied self-esteem. Thus this leads to an assumption that students with high self-esteem would be most willing to acknowledge the role of effort and pursue learning goals in achievement situations, while those low in self-esteem would avoid the risky goal of investing effort and attempting to improve their abilities.

Niemivirta (1996) presented motivational-cognitive patterns of a heuristic model which consisted of three distinct learning modes: an intentional learning mode, an adaptive or self-enhancing learning mode, and an adaptive or self-protective learning mode. These modes were hypothesized to embody different kinds of self-perceptions, motivational belief structures, and self-regulated learning strategies. According to Niemivirta (1996), the different learning modes may be summarized. (1) The intentional learning mode is characterized by an intrinsically motivated and task-oriented learning activity which has its goals in construction of personal knowledge. (2) The adaptive learn-

ing mode has two separate forms depending on the adaptive function of the activity itself. When the basic motive for self-regulation is to promote personal well-being by trying to demonstrate one's competence in the self-enhancing mode or to protect the self against esteem-threatening situations in the self-protective mode. In Niemivirta's study, students with different goal orientations differed with respect to their self-referenced beliefs, their beliefs about the determinants of learning, and their self-reported use of learning strategies.

The present investigation was undertaken to examine the relations among autonomy, self-referenced beliefs, and self-regulated learning, using data from Japanese children. To examine the nature of relations, canonical analysis was carried out to identify associations of autonomy with self-regulated learning and of self-referenced beliefs with self-regulated learning. As in the work of Niemivirta (1996), a self-report questionnaire was used in the present study, the only difference being that the subscales for autonomy were added in the current study. Some parts of the associations for Japanese children were compared with those for Finnish children as reported by Niemivirta (1996).

METHOD

Subjects

Children (180 boys and 176 girls) were sampled from the fifth and the sixth grades of six elementary schools (one private and five public schools) in Kyoto, Japan. They were 10- to 12-yr.-olds from predominantly middle-class backgrounds.

Questionnaires

Two self-report questionnaires were administered, one designed to measure children's autonomy for schoolwork and the other to assess children's beliefs for schoolwork such as self-esteem and perceived control, and also self-regulated learning such as values, goal orientations, and strategies.

To the question "Are you doing it?" or "Do you think so?", children were asked to rate each item on a 5-point scale anchored by (1) not at all, (2) seldom, (3) sometimes, (4) usually, and (5) always.

Autonomy scale.—To assess children's autonomy, four subscales were used. They are based on four types of motivation that Ryan and Connell (1989) have developed: external, introjected, identified, and intrinsic regulations. For each type, we created 10 situations on the basis of individual levels of autonomy in schoolwork, hence four 10-item subscales. The items of external regulation concern the situation in which behavior is explained in terms of external authority, fear of punishment, or rule compliance, e.g., "I want to get a good grade on the test because my parents will yell at me if I

don't." The items of introjected regulations are related to internal, esteem-based pressures to act such as avoidance of guilt and shame or concerns about self- and others' approval, e.g., "I raise my hand because I want my friends to think I'm smart." The items of identified regulation are concerned with reasons involving action from one's own values or goals, e.g., "I ask the teacher questions about things I don't understand because I think it is important to understand them." The items of intrinsic motivation deal with such behavior that takes place simply because of its inherent enjoyment or fun, e.g., "I try to solve difficult questions because it is fun to solve them."

Self-references beliefs scale.—With the kind permission and supervision of Markku Niemivirta, we translated into Japanese the questionnaire that Niemivirta (1996) had developed. It consists of several subscales, self-esteem and perceived control, including control beliefs, strategy beliefs, and capacity beliefs. The scale of self-esteem is concerned with individuals' general self-acceptance, and consists of 5 items, e.g., "I am altogether quite satisfied with myself." There are 14 items for the scale of strategy beliefs, designed to measure the following four potential causes which children think are effective in producing desired outcomes: the effort subscale has 4 items, e.g., "You succeed in school if you just try hard enough," the ability subscale of four items, e.g., "If one does not learn things in school, it is due to the lack of abilities," the teacher subscale of three items, e.g., "It is the teacher's fault if you don't learn in school," and the luck subscale of three items, e.g., "It totally depends on luck how one succeeds in school." The scale of beliefs in capacity is designed to measure the extent to which students believe they possess the effort and ability: the effort subscale of four items, e.g., "I concentrate on lessons well enough to succeed," and the ability subscale of four items, e.g., "I am a bright and talented student." The scale of control beliefs has five items and is designed to measure the extent to which students believe they are capable of producing positive results, while minimizing negative outcomes in the school domain, e.g., "To succeed in school is not a problem for me if I just decide to do so."

Self-regulated learning scale.—We also translated into Japanese the questionnaire that Niemivirta (1996) had developed. The scale of value assesses importance of the task with six items, e.g., "In my opinion things to be learned in school are important." The scale of goal orientation assesses three types of orientations: learning orientation, e.g., "I like most tasks I can learn new things from," performance orientation, e.g., "It is important to me that other students and teachers consider my schoolwork good," and work-avoidance orientation, e.g., "I try to finish my schoolwork with as little effort as possible." Each subscale has five items. Three types of strategies are used to assess students' use of learning strategies: deep processing with five items, e.g., "When studying for a test I try to understand "the theme" or the cen-

tral idea of the subject," surface processing with five items, e.g., "When I prepare for a test I try to learn new things by memorizing them as they are in the material," and self-handicapping with four items, e.g., "I have realized that I give up easily when school tasks are difficult."

Procedure

The subjects were administered two kinds of self-reporting questionnaires. They were asked to complete booklets of materials and tested in their classrooms by their teachers.

RESULTS AND DISCUSSION

Subjects' scores for each subscale were calculated by adding item values they have chosen. There were no significant differences between the sexes and grades on any measure obtained in this study so data were analyzed for combined grades and sex. Means, standard deviations, and the Cronbach alphas for subscales are shown in Table 1. As is clear in Table 1, the Cronbach alpha of the teacher as causal in strategy beliefs is very low, meaning it shows poor internal consistency. The correlations of responses to the item, "It depends on the teachers how well one learns and succeeds in school," to the item, "It is the teacher's fault if you don't learn in school," and the item, "Achievement in school is mainly due to the teacher," are .39 and .01, respectively, and the correlation between ratings for the last two items is -.21. Because correlations were low, we omitted this subscale from the following analysis.

TABLE 1
MEANS, STANDARD DEVIATIONS, AND CRONBACH ALPHAS FOR SUBSCALES OF
AUTONOMY, SELF-REFERENCED BELIEFS, AND SELF-REGULATED LEARNING

Subscale	<i>M</i>	<i>SD</i>	α
Autonomy			
External Regulation	2.25	0.66	0.78
Introjected Regulation	2.35	0.66	0.79
Identified Regulation	3.11	0.67	0.77
Intrinsic Regulation	2.80	0.72	0.80
Self-referenced Beliefs			
Self-esteem	2.89	0.67	0.68
Strategy Beliefs			
Effort	3.57	0.79	0.61
Ability	2.43	0.87	0.76
Teacher	2.23	0.70	0.14
Luck	1.60	0.68	0.62
Capacity Beliefs			
Effort	3.20	0.49	0.68
Ability	2.26	0.52	0.59
Control Beliefs	3.34	0.80	0.77

(continued on next page)

TABLE 1 (CONT'D)
 MEANS, STANDARD DEVIATIONS, AND CRONBACH ALPHAS FOR SUBSCALES OF
 AUTONOMY, SELF-REFERENCED BELIEFS, AND SELF-REGULATED LEARNING

Subscale	<i>M</i>	<i>SD</i>	α
Self-regulated Learning			
Value	4.03	0.76	0.81
Goal Orientation			
Learning Orientation	3.47	0.85	0.74
Performance Orientation	3.24	0.90	0.78
Work-avoidance Orientation	2.46	0.81	0.72
Learning Strategies			
Deep Process	2.99	0.62	0.73
Surface Process	2.48	0.62	0.51
Self-handicapping	2.12	0.79	0.78

Analysis of a Theoretically Specified Continuum of Autonomy

The Pearson correlations among four subscales of autonomy are presented in Table 2. These correlations show a simplex structure because the subscales are ordered according to the continuum of autonomy. Ryan and Connell (1989) hypothesized that subscales which are closer to each other on the continuum are more highly correlated, and they subsequently corroborated that hypothesis. Our data also show a definite simplex structure on the autonomy scale (see Table 2).

Relations Between Autonomy and Self-regulated Learning

The correlations for scores on autonomy with self-referenced beliefs and for autonomy with self-regulated learning are also presented in Table 2. It appears that, as the motivational types change from external to intrinsic regulation, the self-regulated learning becomes more closely related to the better self-regulated learning, namely, scores on both identified and intrinsic regulations are positively correlated with ratings of value, learning orientation, and deep-processing strategy and negatively correlated with scores on work-avoidance orientation and self-handicapping strategy.

To explore further the relations between scores on autonomy and self-regulated learning, the data were subjected to canonical correlation analysis, using CANCELL from SAS. The likelihood ratios for all canonical correlations, canonical R^2 , and multivariate redundancy indexes were criteria for the number of variables to retain. The canonical structures for the first two variates and canonical R^2 are presented in Table 3.

Only those loadings greater than or equal to .30 are shown in the table. For the autonomy domain, intrinsic and identified regulations show salient loadings and in the domain of self-regulated learning, value, learning orientation, and deep processing have noticeable loadings on the first canonical variate.

TABLE 2
PEARSON CORRELATION COEFFICIENTS AMONG AUTONOMY, SELF-REFERENCED BELIEFS, AND SELF-REGULATED LEARNING

Subscale	External	Introjected	Identified	Intrinsic
Autonomy				
External Regulation				
Introjected Regulation	.62‡			
Identified Regulation	.26‡	.50‡		
Intrinsic Regulation	.08	.35‡	.68‡	
Self-referenced Beliefs				
Self-esteem	-.02	.03	.18‡	.17‡
Strategy Beliefs				
Effort	.12	.28‡	.41‡	.28‡
Ability	.25‡	.28‡	.18‡	.02
Luck	.18‡	.06	-.19‡	-.14‡
Capacity Beliefs				
Effort	.18‡	.28‡	.37‡	.32‡
Ability	.23‡	.25‡	.21‡	.19‡
Control Beliefs	-.05	.16‡	.37‡	.41‡
Self-regulated Learning				
Value	-.02	.24‡	.49‡	.58‡
Goal Orientation				
Learning Orientation	.15†	.37‡	.58‡	.62‡
Performance Orientation	.28‡	.50‡	.33‡	.16‡
Work-avoidance Orientation	.19‡	-.02	-.37‡	-.42‡
Learning Strategies				
Deep Process	-.04	.27‡	.54‡	.56‡
Surface Process	.38‡	.40‡	.16†	.13*
Self-handicapping	.21‡	.06	-.27‡	-.26‡

* $p < .05$. † $p < .01$. ‡ $p < .001$.

On the second canonical variate, introjected and external regulations for the autonomy domain, performance orientation and surface processing for the self-regulated learning show salient loadings. Other variables have positive or negative high loadings on the first or second canonical variate.

Relations Between Self-referenced Beliefs and Self-regulated Learning

Table 4 presents the correlations between scores on self-referenced beliefs and self-regulated learning. According to Niemivirta's learning mode as mentioned earlier, correlation coefficients in Table 4 show interesting relations: (1) learning orientation and deep strategy processing in the intention learning mode are positively correlated with control beliefs and effort as bases for strategy and capacity beliefs. (2) In the adaptive self-enhancing mode, scores on performance orientation are positively correlated with those for effort and ability as a basis for strategy and capacity beliefs. Scores on surface strategy processing are also positively correlated with ability as a ba-

sis of strategy and capacity beliefs. (3) Scores on Work-avoidance orientation and self-handicapping strategy in the adaptive self-protective mode are positively associated with those for luck as a basis of strategy beliefs and negatively correlated with control beliefs.

TABLE 3
CANONICAL STRUCTURE BETWEEN AUTONOMY AND SELF-REGULATED LEARNING

Subscale	C1	C2
Autonomy		
External Regulation		.82
Introjected Regulation	.50	.85
Identified Regulation	.88	
Intrinsic Regulation	.91	
Self-regulated Learning		
Value	.78	
Goal Orientation		
Learning Orientation	.84	
Performance Orientation	.37	.75
Work-avoidance Orientation	-.58	.46
Learning Strategies		
Deep Process	.81	
Surface Process		.75
Self-handicapping	-.39	.47
Canonical R^2	.60	.29

To provide more information on the relations of self-referenced beliefs with self-regulated learning, canonical correlation analysis was also applied. The canonical structures for the first two variates and canonical R^2 are presented in Table 5. The loadings shown are those greater than or equal to .30. Effort as a basis of both strategy and capacity beliefs, and control beliefs for the self-referenced beliefs show salient loadings, and value, learning orientation, work avoidance (negative), and deep process for the self-regulated learning domain yield salient loadings on the first canonical variate. On the second canonical variate, ability as a basis for both strategy and capacity beliefs and luck as the basis for the self-referenced beliefs show salient loadings. Also, performance orientation, work-avoidance orientation, surface process, and self-handicapping for the self-regulated learning present salient loadings.

One of the reasons for the lack of internal consistency on the teacher variable in strategy beliefs (Table 1) is perhaps due to the problematic tendency for causal attributions among Japanese children. Children's beliefs concerning powerful persons such as teachers may influence the causal attributions for success or failure in children's schoolwork. When they succeed in their schoolwork, they attribute their success to the teacher, i.e., external

TABLE 4
PEARSON CORRELATION COEFFICIENTS BETWEEN SELF-REFERENCED BELIEFS AND SELF-REGULATED LEARNING

Subscale		1	2	3	4	5	6	7	8	9	10	11	12	13	
Self-referenced Beliefs															
1	Self-esteem														
2	Strategy Beliefs	Effort	.09												
3		Ability	-.05	.38‡											
4		Luck	-.06	-.09	.25‡										
5	Capacity Beliefs	Effort	.10	.31‡	.16†	-.06									
6		Ability	.05	.18‡	.40‡	.23‡	.23‡								
7	Control Beliefs		.11*	.62‡	.14†	-.11*	.27‡	-.01							
Self-regulated Learning															
8	Value		.28‡	.17†	-.14†	-.39‡	.30‡	.03	.27‡						
Goal Orientation															
9	Learning Orientation		.19‡	.33‡	.07	-.19‡	.39‡	.23‡	.31‡	.66‡					
10	Performance Orientation		.09	.34‡	.44‡	.09	.31‡	.31‡	.18‡	.14†	.32‡				
11	Work-avoidance Orientation		.16‡	-.10	.15†	.36‡	-.24‡	.13*	-.36‡	-.53‡	-.31‡	.12*			
Learning Strategies															
12	Deep Process		.15†	.36‡	.07	-.20‡	.35‡	.12*	.47‡	.43‡	.48‡	.17†	-.47‡		
13	Surface Process		-.03	.19‡	.21‡	.14†	.12*	.32‡	.07	.04	.24‡	.31‡	.14†	.04	
14	Self-handicapping		-.17†	-.05	.09	.29‡	-.15†	.18‡	-.25‡	-.34‡	-.15†	.13*	.56‡	-.34‡	.28‡

* $p < .05$. † $p < .01$. ‡ $p < .001$.

source, and attribute their failure to themselves, i.e., internal source. Thus children may exercise their causal attributional judgments based on whether they have internal or external responsibility for school outcomes rather than on how they feel the teacher is instrumental in their school outcomes.

TABLE 5
CANONICAL STRUCTURE BETWEEN SELF-REFERENCED BELIEFS AND SELF-REGULATED LEARNING

Subscale	C1	C2
Self-referenced Beliefs		
Self-esteem	.36	
Strategy Beliefs		
Effort	.58	.45
Ability		.81
Luck	-.44	.59
Capacity Beliefs		
Effort	.69	
Ability		.62
Control Beliefs	.73	
Self-regulated Learning		
Value	.72	-.40
Goal Orientation		
Learning Orientation	.74	
Performance Orientation	.44	.74
Work-avoidance Orientation	-.67	.54
Learning Strategies		
Deep Process	.80	
Surface Process		.54
Self-handicapping	-.47	.45
Canonical R^2	.46	.33

Relations of Self-regulated Learning with Autonomy

Correlation coefficients among four types of motivation as shown in Table 2 demonstrated a definite simplex structure. The results corroborate the hypothesis of autonomy such as motivational regulation lying along an extrinsic-intrinsic continuum describing children's self-determination as suggested by self-determinant theorists.

Correlations between scores on autonomy and self-regulated learning as shown in Table 3 indicate an interesting relation. The better self-regulated learning such as reflected in scores on learning orientation, deep strategy processing, and the value of learning, is positively correlated with the motivation of intrinsic regulation. In contrast, work-avoidance orientation and self-handicapping are negatively correlated with scores on intrinsic motivation and positively correlated with external regulation. Rigby, *et al.* (1992) reviewed several studies to examine the relations of autonomy with learning outcome, and concluded that higher-quality conceptual learning was pro-

moted by relatively self-determined forms of motivation. Correlations shown in Table 2 clearly confirmed the relation previously reported in many studies.

It is also interesting to see the canonical structure between autonomy and self-regulated learning (see Table 3). On the first canonical variate, intrinsic, identified, and introjected regulations in the autonomy domain show positive loadings, .91, .88, and .50, respectively. Therefore, the first canonical variate in the autonomy domain can be interpreted as representing relatively more self-determined forms of motivation. In the domain of self-regulated learning, the better self-regulation in school such as learning orientation, deep strategy processing, and the value of learning have positive loadings, .84, .81, and .78, respectively, while work-avoidance orientation and the strategy of self-handicapping have negative loadings, $-.58$ and $-.39$. These variables can be defined as self-regulated learnings of higher quality. Thus the results from the first canonical variate identified the relationships between the self-regulated learning of higher quality and the more self-determined types of motivation which were discussed and reported in many other studies.

On the second canonical variate, external and introjected regulations in the autonomy domain show a high positive loading. Performance with work-avoidance orientations and surface with self-handicapping processing strategies in the domain of self-regulated learning also show high positive loadings. Therefore, the second canonical variate in the autonomy domain can be defined as the more external or controlled types of motivation, while in the domain of self-regulated learning, this variate can be interpreted as the ego-oriented or ego-defensive learning strategies.

Relations of Self-regulated Learning with Self-referenced Beliefs

To compare with Niemivirta's learning modes (1996) as mentioned earlier, we examined correlations between self-referenced beliefs and self-regulated learning which is shown in Table 4. According to his three learning modes, the relations of dependent variables are predicted. (1) The intentional learning mode will show a linkage with high self-esteem, effort as a cause, high control beliefs, learning orientation, and deep strategy processing. (2) The adaptive self-enhancing learning mode will present a linkage with mid-self-esteem, ability as a cause, mid-control beliefs, performance orientation, and surface strategy processing. (3) The adaptive self-protecting learning mode will reveal a linkage with low self-esteem, external as a cause, low control beliefs, work-avoidance orientation, and a self-handicapping processing strategy. Although there are some slight exceptions, correlations in this study provide the evidence for patterns similar to the three learning modes described by Niemivirta.

The canonical structure between self-referenced beliefs and self-regulated learning, shown in Table 5, also indicates an interesting feature. Both of the first and the second canonical variates in the domain of self-regulated learning show a pattern similar to those defined as the higher-quality self-regulated learning and the ego-oriented learning strategy, respectively, in Table 3. In the domain of self-referenced beliefs, the first canonical variate has salient positive loadings on the control beliefs and effort as causes in both of strategy and capacity beliefs and a negative loading on luck (external) as a cause in beliefs about strategy. On the other hand, the second canonical variate presents salient loadings on ability as a basis for both strategy and capacity beliefs and luck as a cause.

In general, these results suggest (1) the first canonical variate represents the intentional learning mode and this mode is opposed to the adaptive self-protecting learning mode. There are two motivational components related to self-regulated learning of higher quality, that is to say, the more self-determined form of motivation and beliefs of effort contribute to higher achievement outcomes. (2) The second canonical variate is related to the adaptive learning modes, including two separate forms. Motivational components of these learning modes are more controlled types of motivation and beliefs of ability are directly related to the success or failure of subjects' performance.

In conclusion, there was no unique characteristic of learning process for Japanese children. It could be considered that the results of this investigation were similar to the studies performed in Western countries.

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