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SELF-REGULATED LEARNING: THE ROLE OF ENVIRONMENTAL PERCEPTIONS AND MOTIVATIONAL BELIEFS[1]

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Summary.—To examine the correlations among environmental perceptions, motivational beliefs, and self-regulated learning of Tehran third-year high school boys based on a proposed model, multistage cluster-sampling method gave a sample of 685 students. The Motivated Strategies for Learning Questionnaire (Pintrich & De Groot, 1990), Students' Achievement Goal Orientations (Midgley, Kaplan, Middleton, Maehr, Urdan, Anderman, *et al.*, 1998), Students' Perceptions of Classroom Activities (Gentry, Gable, & Rizza, 2002), and Perceptions of Parents Scales (Grolnick, Deci, & Ryan, 1997) were administered. Analysis showed relations among components of self-regulated learning, family environmental perceptions, perceptions of classroom activities, and motivational beliefs. Structural equation modeling indicated the proposed model had an acceptable fit to the data. All paths or structural coefficients of the proposed model were statistically significant.

The purpose of this study was to assess a comprehensive model of self-regulated learning and its relationships with perceptions and motivational beliefs. The various theories of self-regulation are reviewed below, and a model is proposed for testing in a large group of Iranian high school students.

Cognitive Processes

Self-regulation of learning has been studied using the definition of strategies for regulating cognitive processes with which students may control and monitor their learning, including goal-setting, planning, executing, managing, monitoring, self-evaluating, and modifying incorrect information (Pintrich, 1999). The components of self-regulated learning according to this definition would be cognitive, metacognitive, and resource-management strategies.

Social Learning and Influences

Environments and social situations have important effects in reinforcing and shaping self-determination and self-regulation (Reeve, 1998). In this respect, researchers have tried to study factors relating to or affecting self-regulation, including autonomy, support, involvement, and warmth (Grolnick, Deci, & Ryan, 1997) which are critical variables affecting perceptions and motivational beliefs of students, and thus, their self-regulat-

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activities are critical variables and include interest, choice, challenge, and joy (Anderman & Midgley, 1997). According to other researchers, these include perceptions of the tasks and authorities, how performance is evaluated (Ames, 1992), the difficulty of the tasks, and the type of evaluation system used (Church, Elliot, & Gable, 2001). In particular, studies show that there are positive correlations between students' perceptions of class constructs and their chosen goal orientations (Anderman & Midgley, 1997). Research indicates some potential causal relationships: students' perceptions of environmental constructs affect their goal orientations, and in turn, their self-regulated learning and other related cognitive and motivational components.

Eccles and Wigfield (2002) reported that high school students who perceive their teachers as controlling, giving them little opportunity for creativity, would have lower self-efficacy and motivation. Ames (1992), in reviewing studies about goal orientations, points to class constructs (perceptions of class activities) and their effects on goal orientations, and mastery goals which may lead to self-regulated learning and other academic performances. Class constructs include designing tasks and evaluations, experiential opportunity, and teachers' use of authority.

Parenting Styles

Parents' perceptions are affected by their beliefs, behaviors, and parenting styles (Grolnick, *et al.*, 1997). These include autonomy support, structure, involvement, and warmth (Grolnick & Ryan, 1989; Grolnick, *et al.*, 1997). Grolnick and Ryan (1989) have indicated that motivational styles of parents and their support are related to self-regulated learning and self-efficacy.

Proposed Model

The present study focused on the role of environmental perceptions in motivational beliefs and self-regulated learning. Although families and schools and other factors and processes are critical to academic achievement and self-regulated learning (for example, Hill, 2001), children's perceptions of those environments are important (Ames, 1992; Grolnick, *et al.*, 1997; Church, *et al.*, 2001). In the present study, the focus is children's perceptions of parents and aspects of the classroom. These perceptions have effects on self-regulated learning, goal orientations, and self-efficacy as proposed by Pintrich (1999).

It has also been argued that goal orientations and self-efficacy are two mediators between environmental perceptions and self-regulated learning (Schunk & Zimmerman, 1997). Therefore, relations among self-regulated learning, goal orientations, and self-efficacy with respect to perceptions of parents and classrooms are not simple, but involve direct and

indirect relationships and effects. Therefore, structural equation modeling was chosen as the analysis method. Based on the model derived from various theories, the relations among environmental perceptions and self-regulated learning were examined with an emphasis on the mediating roles of goal orientations and self-efficacy. Although the theoretical foundations of the proposed model have been developed and partly examined by other researchers, these have not been examined simultaneously.

In the proposed model (see Fig. 1), self-regulated learning includes cognitive, metacognitive, and resource management strategies. Motivational beliefs include goal orientations and self-efficacy. Environmental perceptions include perceptions of parents and of classroom activities. The perceptions of parents include support for autonomy, involvement, and warmth; the classroom perceptions include interest, choice, challenge, and joy.

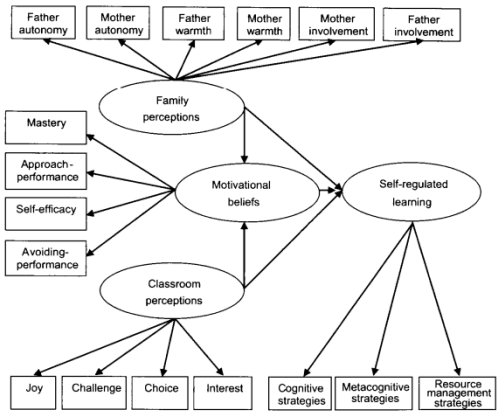

FIG. 1. Proposed model for the structural relations between environmental perceptions, motivational beliefs, and self-regulating learning

METHOD

Participants

Participants were 685 boys between 14 and 18 years old, from Tehran high schools, selected from a population of 36,723 students, using a multistage cluster-sampling method. In terms of the participants' socioeconomic status (SES), they were selected from three different areas with high, low, and middle incomes. Boys were registered in public ($n = 146$) or private ($n = 539$) schools; the latter group had higher SES.

Measurement

Several paper-and-pencil inventories were administered to the participants in groups of 20 to 25: Motivated Strategies for Learning Questionnaire (Pintrich & De Groot, 1990), Students' Achievement Goal Orientations (Midgley, *et al.*, 1998), Students' Perceptions of Classroom Activities (Gentry, Gable, & Rizza, 2002), and Perceptions of Parents Scales (Grolnick, *et al.*, 1997). These scales were translated and used by other Iranian researchers, and their validities confirmed (Hosayni Nasab & Ramshe, 2000; Khademi & Nowshadi, 2006; Sobhani Nejad & Abedi, 2006). To ensure that the theoretical components of other scales were tapped and the face validity of their items was applicable to the Iranian culture, four Iranian psychologists examined the scales' items and approved them. Also, confirmatory factor analysis was run for each scale to confirm its factor structure, and therefore, its validity. According to standards, if the goodness-of-fit index (GFI) is above .90, $\chi^2/df < 3$, and root mean square of approximation (RMSEA) < .05, the confirmatory factor analysis of the subscale structure is considered acceptable (Kline, 1994). Internal consistency reliabilities of all subscales were essentially the same as in the original scales and therefore considered satisfactory (see paragraphs for each measure below).

Perceptions of classroom.—The Students' Perceptions of Classroom Activities scale ($\alpha = .93$) is rated on a 5-point Likert-type scale (anchored by 1: Never and 5: Always), and has four subscales of Interest ($\alpha = .82$; 8 items), Choice ($\alpha = .66$; 9 items), Challenge ($\alpha = .76$; 7 items), and Joy ($\alpha = .87$; 7 items). The total scale has 31 items. Confirmatory analysis yielded fit indices of RMSEA = .048, GFI = .98, $\chi^2 = 85.93$ ($df = 33$, $p = .051$).

Perceptions of parents.—The Perceptions of Parents Scale ($\alpha = .93$) has three subscales, Autonomy Support ($\alpha = .84$; 18 items), Involvement ($\alpha = .64$; 12 items), and Warmth ($\alpha = .83$; 12 items), with a total of 44 items rated on a 7-point Likert-type scale, anchored by 1: Not at all true and 7: Very true. Confirmatory analysis yielded fit indices of RMSEA = .048, GFI = .97, $\chi^2 = 139.91$ ($df = 54$, $p = .06$).

Motivational beliefs.—Because of the motivational nature of self-efficacy, it was separated from learning strategies as Pintrich (1999) recom-

mended. Therefore, Self-efficacy and Goal Orientation (Midgley, *et al.*, 1998) were used to assess motivational beliefs. *Goal orientations* were measured using the Students' Achievement Goal Orientations scale ($\alpha = .88$), which has three subscales, Mastery ($\alpha = .84$; 6 items), Approach Performance ($\alpha = .87$; 6 items), and Avoidance Performance ($\alpha = .76$; 6 items) goals, for a total of 18 items rated on a 7-point Likert-type scale, anchored by 1: Not at all true and 7: Very true. Confirmatory analysis yielded fit indices of RMSEA = .05, GFI = .94, $\chi^2 = 366.83$ ($df = 115$, $p < .001$). However, *Self-efficacy* was measured using one of the subscales of the Motivated Strategies for Learning Questionnaire (Pintrich & De Groot, 1990). The scale measures motivational beliefs such as test anxiety, external motivation, internal motivation, and self-efficacy, from which only the self-efficacy subscale was used ($\alpha = .63$; 9 items).

Self-regulated learning.— The Motivated Strategies for Learning Questionnaire (Pintrich & De Groot, 1990; $\alpha = .95$) has two sections of learning strategies and motivation, each with 22 items. The learning strategies section was strengthened with 14 more items (total 36 items) and used to measure self-regulated learning. Self-regulated learning includes several dimensions. Cognitive strategies were measured on four subscales: Rehearsal, Elaboration, Organization, and Critical thinking ($\alpha = .86$; 11 items); Metacognitive strategies ($\alpha = .89$; 13 items). Resource Management was measured on four subscales, Managing time and study environment, Effort management, Peer learning, and Help-seeking ($\alpha = .90$; 12 items). All items were rated on a 7-point Likert-type scale, anchored by 1: Not at all true and 7: Very true. Confirmatory analysis yielded fit indices of RSMA = .055, GFI = .97, $\chi^2 = 767.71$ ($df = 751$, $p = .055$).

Data Treatment and Confirmation of Suitability for SEM

In addition to examining the zero-order correlation coefficients, the relations represented in the proposed model were also examined using structural equation modeling (Fig. 1). Structural equation modeling is a statistical method for studying causal nonexperimental relations in situations where several variables including mediating variables are involved. In the present study, four latent variables (parents and classroom perceptions, self-regulated learning, and motivational beliefs as mediating variable) were examined. There is a well-established theoretical background for this model, as described in the introduction of this paper (Bandura, 1986, 1997; Schunk & Zimmerman, 1997).

To refine the data, the missing data were changed to the means, and outliers to the nearest data point. To make sure that there were no similarities between variables of the research, multicolinearity indexes (Eye & Schuster, 1998) and other related characteristics of the data were obtained, and colinearity problems were not found (Table 1). Regression for predict-

TABLE 1

CORRELATIONS AMONG OBSERVED VARIABLES IN ENVIRONMENTAL PERCEPTIONS MODEL (N=685)

Measure	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Mastery Goals	24.67	9.27																
2. Approach Performance	31.37	9.36	.44															
3. Avoidance Performance	27.22	8.98	.33	.41														
4. Self-efficacy	42.22	11.29	.49	.51	.39													
5. Cognitive Strategies	51.34	14.70	.53	.42	.22	.66												
6. Resource Management	34.29	8.11	.52	.41	.30	.59	.68											
7. Metacognition	26.94	6.64	.58	.47	.20	.67	.76	.81										
8. Class Interest	22.48	6.13	.47	.29	.19	.35	.24	.28	.41									
9. Class Challenge	25.39	5.53	.55	.40	.21	.48	.49	.45	.51	.54								
10. Class Choice	21.28	6.89	.29	.28	.19	.41	.29	.24	.28	.48	.44							
11. Class Joy	19.26	7.16	.62	.22	.17	.44	.42	.44	.49	.64	.55	.46						
12. Mother Involvement	24.06	3.95	.09	.09	.03	.06	.00	.06	.03	.03	.01	.00	.01	.09				
13. Father Involvement	24.58	3.88	.00	−.05	.02	.02	.02	.02	−.02	−.03	.01	.02	−.02	.20	.11			
14. Mother Autonomy	40.20	7.88	.19	.22	.19	.22	.21	.27	.29	.26	.19	.16	.17	.17	.25	.05		
15. Father Autonomy	39.53	8.49	.12	.12	.12	.23	.20	.28	.21	.22	.15	.16	.16	.07	.13	.71	.43	
16. Mother Warmth	30.34	7.34	.20	.86	.18	.26	.26	.37	.26	.24	.20	.18	.19	.20	.13	.49	.76	.54
17. Father Warmth	28.95	7.82	.18	.14	.14	.26	.28	.22	.24	.24	.19	.16	.18	.11	.25	.49	.76	.54

ing self-regulated learning show that variance inflation factors were lower than 10. Therefore, variables are different from each other and no colinearity was observed, and the results of regression or structural equation modeling analysis should be robust (Eye & Schuster, 1998).

For better fit of the model, however, the three variables of father and mother involvement and avoidance goals were deleted because of their small correlations and their theoretical inconsistency. Having refined the data, to test the proposed model, LISREL 8.53 was used.

RESULTS

Research findings are presented here in two formats: descriptive and correlation analysis and testing of proposed model. Table 1 represents the means, standard deviations, and Pearson correlations for students' perceptions of parents (Autonomy Support, Involvement, and Warmth), students' perceptions of classroom activities (Interest, Choice, Challenge, and Joy), motivational beliefs (Self-efficacy, Mastery, Approach Performance, and Avoidance Performance), and self-regulated learning (Cognitive, Metacognitive, and Resource Management strategies).

Structural Equation Model

Structural equation modeling was accomplished using the LISREL package. The fit indexes of the proposed model were acceptable and the obtained χ^2 was not statistically significant (GFI = .97, AGFI = .95, RMSEA = .044, χ^2 = 123.98, χ^2/df = 2.10, df = 59, p = .01). Standard references suggest that if GFI and AGFI are above .90, χ^2/df < 3, RSMEA < .05, fit indexes of the model are acceptable (Kline, 1994). See Fig. 2 for path coefficients and other results.

The fit indexes showed that the proposed model fit the data. Perceptions of the environment were related to self-regulation of learning and predicted it through mediating motivational beliefs. In other words, relations among environmental perceptions and self-regulated learning were affected by motivational beliefs. When motivational beliefs were low or high, the relationship of environmental perceptions with self-regulated learning was affected.

Structural equation modeling indexes also contain standard regression coefficients or structural relations with sizes from 0.00 to 1.00 (β or γ in Fig. 2). β is the standard regression coefficient (path coefficient) from exogenous variables to endogenous variables, and γ is the standard regression coefficient from endogenous variables to other endogenous variables. The β coefficient from motivational beliefs to self-regulated learning (.41) was statistically significant (p < .01). The γ coefficient from perceptions of parents to motivational beliefs (.10) and self-regulated learning (.28) were high and statistically significant (p < .01). The γ coefficient from percep-

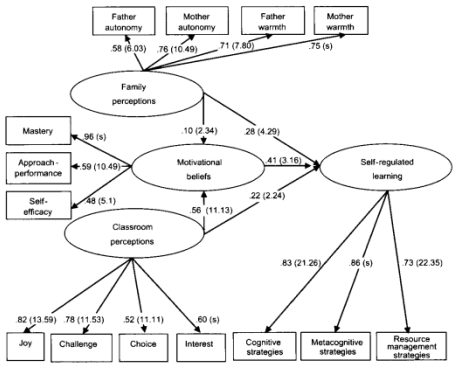

FIG. 2. Tested model of the structural relations between environmental perceptions, motivational beliefs, and self-regulating learning. (s) indicates the closest observed variable to the latent variable in the structural equation model. Model fit parameters: χ^2 = 123.98, df = 59, χ^2/df = 2.10, RMSEA = .044, GFI = .97, AGFI = .95, R^2 = 52%. The numbers before the parentheses are path coefficients, and the numbers inside parentheses are t values showing the significance of path coefficients.

tions of classroom activities to motivational beliefs (.56) and to self-regulated learning (.22) were high and statistically significant (p < .01). Coefficients from latent variables to observed variables are shown in Fig. 2; all path coefficients are statistically significant. Path coefficients from self-regulated learning to its components were high and statistically significant (all ts > 2, p < .05). Path coefficients from motivational beliefs to its components were high and statistically significant (all ts > 2, p < .05), except from motivational beliefs to avoidance goals, for which the correlation coefficients with other variables were low and statistically nonsignificant (rs < .07). Path coefficients from family perceptions to its components were high and statistically significant (all ts > 2, p < .05) except from family perceptions to father's and mother's involvement, which their correlation coefficients with other variable were low and statistically nonsignificant (rs < .09).

TABLE 2

MULTICOLINEARITY INDEXES IN PREDICTED VARIABLES OF SELF-REGULATED LEARNING

Multicolinearity Index	Mastery Goals	Appr. Perf.	Avoiding Perf.	Self-efficacy	Mother Auton.	Father Auton.	Mother Warmth	Father Warmth
VIF	1.40	1.61	1.24	1.62	2.31	2.60	2.35	2.81
Tolerance	.70	.62	.81	.62	.43	.39	.43	.36

Note.—VIF: variance inflation factors.

Multiple correlations squared (R^2) indicate that the proposed model explains 52% of the variance in self-regulated learning by means of perceptions of classroom activities, parents' perceptions, motivational beliefs, and mediating motivational beliefs.

DISCUSSION

These findings are consistent with social-cognitive theory (Bandura, 1986, 1997; Schunk & Zimmerman, 1997), social-cultural theory (Vygotsky, 1978), and especially self-determination theory (Grolnick, *et al.*, 1997). Self-determination theoreticians believe that environments, relationships, and social situations have important effects in reinforcing and shaping of self-determination and self-regulated learning (Reeve, 1998). In developing self-regulated learning, self-efficacy has a critical role (Schunk & Zimmerman, 1997). Perceptions are affected by the environment, which in its turn affects self-efficacy (Bandura, 1986, 1997), and self-efficacy leads to self-regulated learning (Schunk & Zimmerman, 1997). In the social-cultural perspective of Vygotsky (1962, 1978), the emphasis is on social foundations and the language of self-regulated learning, as provided by parents, teachers, and adults in the family and schools.

The observed correlations (self-efficacy with self-regulated learning and mastery goals, and mastery goals with self-regulated learning) are consistent with the findings of Pintrich and De Groot (1990), Schraw, Horn, Thorndike-Christ, and Buring (1995), Greene and Miller (1996), Pintrich (1999), and Elliot, McGregor, and Gable (1999). However, while Pintrich (1999) found a negative correlation between performance goals and components of self-regulated learning, the present research indicated that this correlation was weak, but positive, for avoidance performance goals. In fact, Pintrich's findings (1999) and our finding fit with multiple goals perspective (Pintrich, 2000a, 2000b; Elliot & Thrash, 2001; Midgley, *et al.*, 2001; Harackiewicz, *et al.*, 2002; Kaplan & Middleton, 2002; Smith & Sinclair, 2005). In regards to other findings, approach performance goals were related to self-regulation strategies (Elliot, 1997; Elliot & Church, 1997) and mastery goals were related to self-regulation strategies (Pintrich, 1999). These findings show that having a goal, regardless of its type, results in self-regulation, but different goals have different outcomes. This finding

does not fit with the classic theory of achievement motivation: adopting a task goal orientation (similar to mastery goal) is associated with adaptive patterns of achievement motivation and adopting a performance goal orientation is associated with maladaptive patterns of achievement (Dweck, *et al.*, 1997).

In the current study, parents' involvement was not correlated with perceptions of parents and classroom, self-regulated learning, or achievement goals. This is inconsistent with the findings of Kohl, Lengua, McMahon, and the Conduct Problems Prevention Research Group (2000). Based on that study, parental involvement affects the children's success in school. Brody and Flor (1998) also reported that parenting strategies are positively related with children's self-regulation and social competence in school. It can be argued that since the subjects of Brody and Flor were chosen from a different culture (rural African-American families), the results of their study are inconsistent with this one. In those families, an authoritarian parenting style was exercised and was associated with higher achievement and social competence (Hill, 2001). Furthermore, the self is conceived differently in American culture, being more individualistic, compared to Iranian culture which is more collectivistic.

The difference between prior research and this study was the mediating relationship of motivational beliefs. Mediating variables such as self-efficacy beliefs and goal orientations have important effects on the relations between environmental perceptions and self-regulated learning. In the model tested here, cognitive, motivational, and behavioral dimensions of learning were integrated successfully, as has been suggested by Pintrich (2004). Correlations between self-regulation behaviors and perceptions are mediated by motivational beliefs.

A limitation of this research was the homogeneity of the participant pool, e.g., that no comparison was made between theoretically different groups. To generalize the findings of the present study, comparative studies across different groups and domains are needed. Comparison of boys and girls, young children and adolescents, high school and university students, varied cultural groups, etc., with respect to this model would be beneficial in generalization of the findings of the study and refinement of its theoretical foundations. It may be necessary to develop different models to study specific motivations or motivational goals. Future research should include more variables thought to be related to self-regulated learning (e.g., certain personality factors), to develop a more comprehensive model. In addition, mixed methods of qualitative and quantitative research would be more advisable for future studies because of the complexities of the issue and the potential for common methods bias when using questionnaires. Future research could investigate self-regulated learning in domains such as employment.

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