
Autonomy Support, Intrinsic Motivation, and Perceived Competence: Conceptual and Empirical Linkages

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The purpose of this study was to test three models with regard to the linkages among autonomy support, intrinsic motivation, and perceived competence. The first model is based on Cognitive Evaluation Theory and postulates that teachers' autonomy support influences changes in intrinsic motivation via changes in perceived academic competence. However, the second and the third model are based on the Diathesis Stress Model of Achievement Processes and posit, respectively, that intrinsic motivation could play a mediating and a moderating role in the relation between teachers' autonomy support and changes in perceived competence. A total of 215 fifth-grade children participated in a longitudinal study over a 1-year period. Results from regression analyses provided some support for the first model but stronger support for the second and third model.

Over the past 25 years, numerous studies have explored the intrinsic-extrinsic motivation dichotomy (see Vallerand, 1997, for a review). Intrinsic motivation refers to performing an activity for itself to experience pleasure and satisfaction inherent in the activity. On the other hand, extrinsic motivation involves engaging in an activity for external reasons such as receiving rewards or avoiding punishments (Deci & Ryan, 1985). In this article, we present and test three models based on cognitive evaluation theory (CET) (Deci & Ryan, 1985) and the diathesis-stress model of achievement processes (e.g., Boggiano, 1998a). These models represent how interpersonal style influences intrinsic-extrinsic motivational processes.

COGNITIVE EVALUATION THEORY

The first model is based on CET (Deci & Ryan, 1985). According to this theory (see Figure 1-1), individuals progressively develop intrinsic and extrinsic motivations through their self-evaluations of how competent they are. Therefore, contextual conditions such as autonomy supportive techniques (i.e., taking the other's perspective, acknowledging the other's feelings and perceptions, providing the other with information and choice, and minimizing the use of pressure and control) afford people the possibility to satisfy their sense of competence and thus lead to intrinsic motivation, whereas controlling techniques thwart perceived competence and produce extrinsic motivation. Therefore, CET posits the following causal sequence: autonomy support → changes in perceived competence → changes in intrinsic motivation. Although this theory also addresses other issues, such as relatedness and self-determination, these issues are not discussed in this study.

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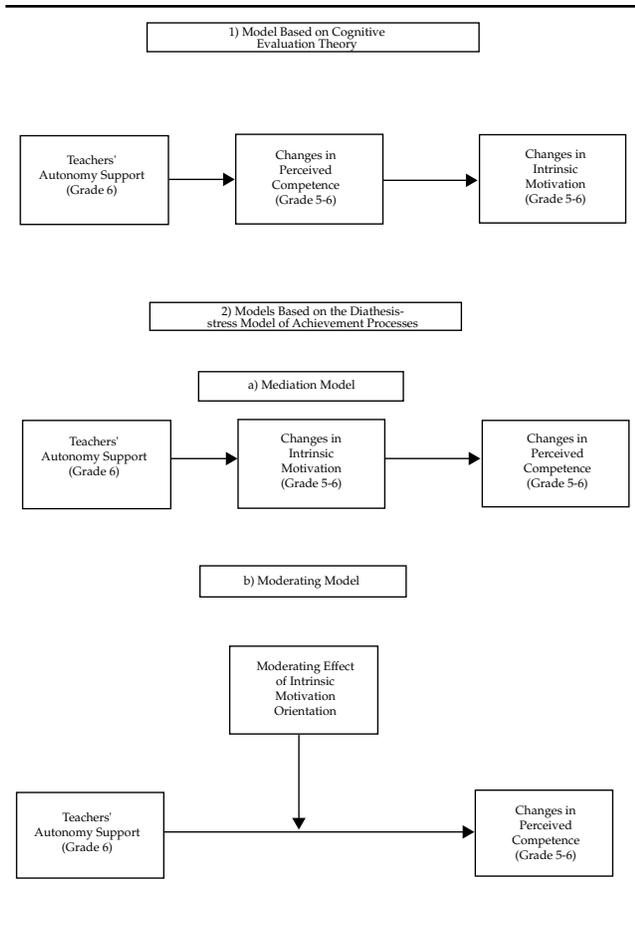


Figure 1 Motivational models to be tested.

DIATHESIS-STRESS MODEL OF ACHIEVEMENT PROCESSES

The diathesis-stress model of achievement processes (Boggiano, 1998a) proposes a different causal system than CET and a more complex picture about the role of intrinsic motivation processes. The diathesis-stress model of achievement processes thus leads to the specification of two complementary but distinct models. These two models are respectively based on the mediating and moderating role of motivation between teachers' autonomy support and changes in perceived competence.

The mediational model (see Figure 1-2a) posits that the frequent and consistent use of autonomy supportive techniques should produce an intrinsic motivational orientation, which in turn should engender adaptive achievement patterns such as perceived competence. Thus, contrary to CET, this model proposes the following sequence: Autonomy support → changes in intrinsic motivation → changes in perceived competence. That is, having autonomy supportive teachers would lead to

intrinsic motivation, which in turn contributes to the formation of perceptions of competence in students.

Although intrinsic motivation in school could be developed through the use of teachers' autonomy supportive techniques, it is also possible that once intrinsic motivation is implemented (i.e., a motivational orientation), this self-regulation process buffers the adverse effect of controlling strategies used by subsequent teachers. That is, the moderation model (see Figure 1-2b) makes a diathesis-stress assumption with regard to the role of a more stable motivational orientation. Teachers' use of controlling techniques (the stress) lowers perceived competence for those children who are extrinsically motivated (the diathesis; see Boggiano, 1998a; Boggiano et al., 1992) but not for those who are intrinsically motivated (i.e., a buffer effect). This is so because extrinsic children rely more on external evaluations and less on self-initiated and regulated effort than intrinsic children when faced with evaluative cues or difficult academic conditions (Boggiano, 1998a; Harter, 1978).

In sum, the diathesis-stress model of achievement processes acknowledges the possibility that intrinsic motivation processes could play not only a mediating but also a moderating role in the teachers' autonomy support changes in perceived competence relation. Thus, from a developmental perspective, we believe that acting in an autonomy supportive way with young children may plant the seed of an intrinsic motivational orientation, which later immunizes children from the negative effects of the subsequent use of controlling techniques. In the next section, we review empirical studies that provided some support for the models presented above.

EMPIRICAL STUDIES ON THE MODELS

Much research has provided support for the model based on CET. Correlational studies have reported results on the mediating role of perceived competence between some contextual conditions and motivation (e.g., Vallerand, Fortier, & Guay, 1997). For example, Vallerand et al. have shown that the use of autonomy supportive techniques by parents and teachers predicted school motivation through perceptions of competence. However, because most of these studies were based on a cross-sectional design (e.g., Vallerand et al.), it is difficult to determine if perceived competence is in fact a determinant of intrinsic motivation.

To the best of our knowledge, only one longitudinal study has provided partial support for the notion that perceived competence precedes intrinsic motivation. Losier and Vallerand (1994) have shown in a field study that Time 1 perceived competence marginally ($p < .11$) predicts changes in motivation over time (i.e., 5-month period), whereas Time 1 motivation does not predict

changes in perceived competence. However, the possibility that motivation influences perceived competence was not entirely ruled out given the small number of participants ($n = 64$) and the marginal significant effect obtained ($p < .11$).

Experimental studies have shown that the impact of feedback from a supervisor (Harackiewicz & Larson, 1986) or the experimenter (Reeve & Deci, 1996; Vallerand & Reid, 1984, 1988) on intrinsic motivation is mediated by individuals' perceptions of competence. Nevertheless, findings from these studies are difficult to interpret. That is, the alternative hypothesis that verbal feedback affects perceived competence by altering intrinsic motivation processes was not tested and may well have been a viable explanation of the data obtained. However, Jussim, Soffin, Brown, Ley, and Kohlhepp (1992) have tested both models in an experimental study (i.e., Study 3) and showed that the model feedback \rightarrow perceived competence \rightarrow intrinsic motivation represents more adequately the data than the feedback \rightarrow intrinsic motivation \rightarrow perceived competence model. Nevertheless, results of this study need to be corroborated in a field study using a longitudinal design.

Some support for the mediational model (see Figure 1-2a) based on the diathesis-stress model of achievement processes has been obtained through recent field studies. In a longitudinal study using two waves of data collection, Boggiano (1998a) has shown that Time 1 intrinsic motivation predicted an increase in perceived academic competence at Time 2. In contrast, Time 1 perceived academic competence was not a predictor of changes in intrinsic motivation. Boggiano's study has not, however, tested the mediating role of intrinsic motivation between autonomy support and perceived competence. To the best of our knowledge, only one study has tested this hypothesis. Williams and Deci (1996) showed in two studies that motivation accounted for the link between teachers' autonomy support and perceived competence. Williams and Deci (1996) have not, however, tested the reverse model (teachers' autonomy support \rightarrow perceived competence \rightarrow intrinsic motivation), which limits the conclusion that could be derived from their study.

Consistent with the moderating role of intrinsic motivation between teachers' autonomy support and perceived competence (see Figure 1-2b), Boggiano et al. (1992) have reported a study in which intrinsic motivation moderates the influence of contextual conditions on task performance. Specifically, under conditions in which stressful events or failure is encountered, intrinsics heighten mastery strivings, whereas extrinsics display maladaptive cognitions and performance (see also Boggiano & Barrett, 1985; Boggiano, Barrett, Duckitt, & Harackiewicz, 1998; Boggiano, Barrett, Silvern, & Gallo, 1991; Boggiano, Main, & Katz, 1991).

That is, intrinsic children with a stable sense of effort-outcome covariation interpreted evaluative/controlling cues as information that increased effort that was necessary to achieve successful solution, whereas extrinsic children characterized by a fragile sense of effort-outcome dependence interpreted this evaluative information as an indication of their inability to attain the desired outcome through heightened effort, thereby fostering amotivation.

The purpose of this study was thus to verify the three aforementioned models in a longitudinal design with a sample of fifth-grade students. To the best of our knowledge, this is the first study to attempt to compare CET and the diathesis-stress model of achievement processes as well as to look at the mediating and the moderating functions of intrinsic motivation within the same study. Testing these models might contribute to a better understanding of the processes involved among autonomy support, perceived competence, and intrinsic motivation.

METHOD

Participants

Participants were 215 fifth-grade children (94 boys, 94 girls, and 27 participants without sex identification) from Colorado public schools. Children's participation required parental consent. Of the 230 parents contacted, 215 accepted that their children participate in the study, leaving a parental participation rate of 93%.

Procedure

The study was conducted from 1991 to 1992 by the second author and was composed of two data points. Children completed self-report measures of perceived academic competence and intrinsic motivation in fifth and sixth grade at the end of the school year (i.e., during April or May). In addition, sixth-grade teachers completed a self-report scale assessing their orientations toward control versus autonomy in their interactions with children. Teachers were assessed at the beginning of the school year within 6 weeks after the term began and at least 6 months before the children were assessed.

Measures

Intrinsic motivation. Children completed the Harter's (1981) scale of intrinsic versus extrinsic motivation in the classroom. This scale consists of items tapping motivational (i.e., challenge, mastery, and curiosity) and informational dimensions (i.e., work independently and internal criteria for evaluation). The scale employs a structured alternative format. Each item presents two statements describing two kinds of children. Children select the statement that is more true for them (e.g., "Some kids like hard work because it's a challenge but

other kids prefer easy work that they are sure they can do”) and subsequently indicate whether that is *really true* or *sort of true*. Harter has reported good internal consistency values across different samples and an adequate validity for the scale. Items are scored on a 4-point scale in which 4 indicates high levels of intrinsic motivation and 1 indicates high levels of extrinsic motivation. In this study, we used the informational and motivational dimensions to compute the intrinsic motivation score as it was done in previous studies (e.g., Boggiano, 1998a). Cronbach’s alpha values for this measure are presented in Table 1.

Perceived academic competence. Children completed the Academic Perceived Competence subscale from the Perceived Competence Scale for Children (Harter, 1982). This scale employs the same structured alternative format as the intrinsic motivation scale (e.g., “Some kids wish it was easier to understand what they read but other kids don’t have any trouble understanding what they read”). Items are scored on a 4-point scale in which a score of 1 indicates low perceived academic competence and a score of 4 reflects high perceived academic competence. Harter reports KR-20 reliability of .76 for the Perceived Academic Competence subscale across different samples. Cronbach’s alpha values for this measure are presented in Table 1.

Teachers’ autonomy support. Deci, Schwartz, Sheinman, and Ryan’s (1981) questionnaire was used to measure teachers’ autonomy supportive style. This questionnaire is composed of eight short vignettes describing typical kinds of problems that occur in schools. Following each vignette are four possible ways of dealing with the problem, ranging from highly controlling to highly autonomous responses. Deci et al. reported good internal consistency values for the four subscales as well as adequate temporal stability and validity. In the current research, we selected only four of the original eight vignettes. These four selected vignettes have been shown to be strongly correlated ($r = .86$) with observations of four judges on dimensions assessing teachers’ autonomy supportive style (i.e., high autonomy, low control, positive affect, and no competition; see Boggiano, 1998b). Cronbach’s alpha value for this measure is presented in Table 1.

RESULTS

Overview of the Statistical Procedure

The Baron and Kenny (1986) procedure was used to test our two mediational models based on CET and the diathesis-stress model of achievement processes (see Figure 1-1 and Figure 1-2a). According to Baron and Kenny, mediation is established only if four conditions can be

TABLE 1: Correlations Among All Variables and Descriptive Statistics ($N = 215$)

Measure	PAC5	PAC6	IM5	IM6	TAS6	M	SD
PAC5	—					2.86	.68
PAC6	.42	—				2.81	.67
IM5	.53	.48	—			2.83	.45
IM6	.36	.66	.62	—		2.79	.47
TAS6	.12 ^a	.23	.21	.30	—	3.09	1.10
Cronbach’s alpha	.81	.88	.84	.86	.78		

NOTE: PAC5 = Grade 5 perceived academic competence, PAC6 = Grade 6 perceived academic competence, IM5 = Grade 5 intrinsic motivation, IM6 = Grade 6 intrinsic motivation, TAS6 = Grade 6 teachers’ autonomy support.

a. All correlations are significant at $p < .01$ except for this value, where $p > .05$.

b. Means are based on 4-point scale except the teachers’ autonomy support measure, which ranged between 1 and 7.

met. The first two conditions require a demonstration in two separate regression equations that independent variables are related to both the dependent variable (first condition) and the mediator (second condition). The third condition demands that the mediator has an effect on the dependent variable after the effects of independent variables on the dependent variable are taken into account. The fourth condition involves a comparison between results obtained under Conditions 1 and 3. Empirical support for mediation is provided if the effect of the independent variable on the dependent variable is reduced when the effect of the mediator on the dependent variable is accounted for. However, it should be noted that “from a theoretical perspective, a significant reduction demonstrates that a given mediator is indeed potent, albeit not both a necessary and a sufficient condition for an effect to occur” (Baron & Kenny, 1986; p. 1176).

In this study, we assessed intrinsic motivation and perceived competence in Grades 5 and 6. Thus, we tested the two models using changes in intrinsic motivation and perceived competence rather than the original single variable. This will offer to verify, for example, if teachers’ autonomy support predicts an increase in perceived competence or in intrinsic motivation during a 1-year period as proposed by CET and the diathesis-stress model of achievement processes.

To test the two mediational models using changes in perceived competence and changes in intrinsic motivation, we used a variant of Baron’s and Kenny’s (1986) procedure. Specifically, to test the first two conditions, the dependent variable and the mediator were regressed onto Grade 5 assessments to predict changes in the dependent variable (first condition) and the mediator (second condition). That is, controlling for Grade 5 assessments creates a “residualized” variance in Grade 6

assessments, and this residualized variance is called *changes*. In addition, to test the third condition, we enter in the same equation Grade 5 and Grade 6 assessments of the mediator to predict changes in the dependent variable. This introduction of both assessments of the mediator in the same regression equation offers to compute changes in the mediator because the effect of the Grade 5 score has been removed from the Grade 6 score.

A Test of CET

Correlations among all variables, Cronbach's alpha, and descriptive statistics are presented in Table 1. This first set of analyses tested the mediational model proposed by CET. That model proposes that teachers' autonomy support leads to changes in perceived competence, which in turn is related to changes in intrinsic motivation. To this end, three regression equations (see Table 2) would be performed to meet the conditions proposed by Baron and Kenny (1986).

Equation 1. This regression equation tested the first condition for mediation. Specifically, this equation tested if teachers' autonomy support (Grade 6) predicted changes in intrinsic motivation (i.e., the dependent variable). Grade 6 intrinsic motivation was thus regressed onto Grade 5 intrinsic motivation ($\beta = .58, p < .001$) and onto teachers' autonomy supportive style ($\beta = .18, p < .01$). Teachers' autonomy supportive style had a unique contribution in predicting an increase in intrinsic motivation.

Equation 2. This regression equation tested the second condition for mediation. Specifically, this equation tested if teachers' autonomy supportive style (Grade 6) predicted changes in perceived academic competence (i.e., the mediator). Grade 6 perceived academic competence was regressed onto Grade 5 perceived academic competence ($\beta = .39, p < .001$) as well as onto teachers' autonomy support ($\beta = .18, p < .01$). Teachers' autonomy supportive style had a unique contribution in predicting an increase in perceived academic competence.

Equation 3. This equation tested the third condition for mediation. That is, this equation assessed whether changes in perceived academic competence mediated the relationship between teachers' autonomy support and changes in intrinsic motivation. Grade 6 intrinsic motivation was regressed onto Grade 5 intrinsic motivation ($\beta = .40, p < .001$), Grade 5 perceived academic competence ($\beta = -.06, ns$), Grade 6 perceived academic competence ($\beta = .47, p < .001$), and teachers' autonomy support ($\beta = .11, p < .01$).

As pointed out previously, the fourth condition involves a comparison between results obtained under Equations 1 and 3. The small reduction of the relation between teachers' autonomy support and Grade 6

TABLE 2: Regression Analyses Testing Cognitive Evaluation Theory ($N = 215$)

Measure	β	t
Equation 1		
Intrinsic motivation (Grade 6)		
IM5	.58	10.81***
TAS6	.18	3.29**
Equation 2		
Perceived academic competence (Grade 6)		
PAC5	.39	6.38***
TAS6	.18	2.97**
Equation 3		
Intrinsic motivation (Grade 6)		
IM5	.40	7.06***
PAC5	-.06	-1.18
TAS6	.11	2.44*
PAC6	.47	8.79***

NOTE: PAC5 = Grade 5 perceived academic competence, PAC6 = Grade 6 perceived academic competence, IM5 = Grade 5 intrinsic motivation, IM6 = Grade 6 intrinsic motivation, TAS6 = Grade 6 teachers' autonomy support.

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

intrinsic motivation indicated that changes in perceived academic competence partially mediate the relation between teachers' autonomy support and changes in intrinsic motivation (see Table 2).

Complementary analyses. Although this mediational analysis revealed some support for CET, it did not offer the possibility to verify if perceived competence is a determinant of intrinsic motivation. To test the model more rigorously, we performed a regression analysis where Grade 5 perceived competence predicted changes in intrinsic motivation. Grade 5 perceived competence was not significantly related to changes in intrinsic motivation ($\beta = .04, ns$). Results of a second analysis, however, revealed that Grade 5 intrinsic motivation was significantly related to changes in perceived competence ($\beta = .36, p < .001$). More important, this effect was not an artifact resulting from the different reliabilities of our measures (i.e., similar reliabilities were obtained for motivation and perceived competence for the two data points).

Even if these analyses provided weak support for the perceived competence \rightarrow intrinsic motivation relation, it is possible that experiences in sixth grade would have a far stronger association with changes in intrinsic motivation than do experiences in fifth grade. To this end, we performed a regression analysis whereby Grade 6 perceived academic competence predicted changes in intrinsic motivation. Results revealed that Grade 6 perceived competence significantly predicted ($\beta = .48, p < .001$) changes in intrinsic motivation. We also performed another regression analysis whereby Grade 6 intrinsic motivation predicted changes in perceived academic competence. Results revealed that Grade 6 moti-

vation significantly ($\beta = .59, p < .001$) predicted changes in perceived competence. Thus, both variables in sixth grade predicted a significant amount of changes in perceived competence and in intrinsic motivation.

In sum, regression analyses based on Grade 5 predictors of changes provided some support for the temporal precedence of intrinsic motivation on perceived competence. Nevertheless, analyses based on Grade 6 predictors of changes supported reciprocal effects.

A Test of the Diathesis-Stress Model of Achievement Processes

In this section, we performed two regression analyses (see Table 3). The first analysis tested the mediational model proposed by the diathesis-stress model of achievement processes. This model posits that teachers' autonomy support predicts changes in intrinsic motivation, which in turn is associated with changes in perceived competence. The second analyses tested the moderation model proposed by the diathesis-stress model of achievement processes. The moderation model posits that teachers' use of controlling techniques (the stress) lowers perceived competence for those children who are extrinsically motivated but not for those who are intrinsically motivated.

Mediation model. This analysis tested the model presented in Figure 1-2a. The information necessary to test Condition 1 and 2 for mediational model was already provided in Equations 1 (second condition) and 2 (first condition) of Table 2. Consequently, only one regression equation was performed to meet the third condition for mediational models (see Table 3). Grade 6 perceived academic competence was regressed onto Grade 5 perceived academic competence ($\beta = .20, p < .01$), Grade 5 intrinsic motivation ($\beta = .02, ns$), Grade 6 intrinsic motivation ($\beta = .57, p < .001$), and teachers' autonomy support ($\beta = .03, ns$).

A comparison between results obtained above and those under Equation 2 of Table 2 indicated that the relation between teachers' autonomy support and changes in perceived academic competence was nonsignificant. Consequently, it is possible to conclude that changes in intrinsic motivation completely mediate the relationship between teachers' autonomy support and changes in perceived competence.

Moderation model. This analysis tested the model presented in Figure 1-2b. To test this model, we calculated a global score of motivation by computing together Grade 5 and Grade 6 motivational scores. This was done to integrate the information of both assessments in a single construct reflecting the general motivational orientation of participants.

TABLE 3: Regression Analyses Testing the Mediation and Moderation Models From the Diathesis-Stress Model of Achievement Processes ($N = 215$)

Measure	β	t
Mediation model		
Perceived academic competence (Grade 6)		
PAC5	.20	3.36***
IM5	.02	0.23
TAS6	.03	0.62
IM6	.57	8.79***
Moderation model		
Perceived academic competence (Grade 6)		
PAC5	.13	2.24*
GIM	.54	8.66***
TAS6	.08	1.39
GIM \times TAS6	-.13	-2.46*

NOTE: PAC5 = Grade 5 perceived academic competence, IM5 = Grade 5 intrinsic motivation, IM6 = Grade 6 intrinsic motivation, GIM = Global score of intrinsic motivation (Grades 5 and 6), TAS6 = Grade 6 teachers' autonomy support.

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

Results from a regression analysis revealed that the interaction term involving teachers' autonomy support and the global score of motivation was significant ($p = .02$; see Table 3). To interpret this interaction effect, which involved continuous variables, simple slopes were derived for high (+1 SD), medium (0 SD), and low levels (-1 SD) levels of the moderator, motivational orientation (Aiken & West, 1991). As expected, teachers' autonomy support was not significantly related to changes in perceived competence at high levels ($\beta = -.08, ns$) and medium levels ($\beta = .08, ns$) of motivational orientation but significantly related for low levels ($\beta = .23, p = .01$). These results thus revealed that perceptions of competence of extrinsic children are predicted (or reduced) by the use of controlling techniques by teachers whereas those of intrinsic children are not predicted by the use of controlling techniques by teachers.

The possible moderating role of perceived competence between teachers' autonomy support and changes in intrinsic motivation was also tested. We thus performed another regression equation with the Perceived Competence \times Teachers' Autonomy Support product term to predict changes in intrinsic motivation. Results revealed that the product term was nonsignificant. The fact that perceived competence did not moderate the relation between teachers' autonomy support and changes in intrinsic motivation is consistent with results of past research (e.g., Harackiewicz & Elliot, 1993)

DISCUSSION

The purpose of this study was to test three models with regard to the linkages among teachers' autonomy support, perceived competence, and intrinsic motivation.

The first model was based on CET (Deci & Ryan, 1985) and posits that perceived competence mediates the teachers' autonomy support/intrinsic motivation relation. In contrast, the other two models are based on the diathesis-stress model of achievement processes (Boggiano, 1998a). One of these models (a) proposes that intrinsic motivation mediates the teachers' autonomy support/perceived competence relation, whereas the other one (b) postulates that motivational orientation moderates the influence of teachers' autonomy support on perceived competence.

Results of the present study did provide some support for the model based on CET but stronger support for the second as well as the third model based on the diathesis-stress model of achievement processes (see Figure 1-2a and Figure 1-2b; Boggiano, 1998a). These results lead to a number of theoretical implications that are detailed below. Moreover, we also underscore some of the limitations of this study and further research directions.

Theoretical Implications

The present findings provided some support for CET (Deci & Ryan, 1985) because changes in perceived academic competence partially mediated the relation between teachers' autonomy support and changes in intrinsic motivation. In addition, perceived academic competence in Grade 6 ($\beta = .48$) was related to changes in motivation. Nevertheless, it is important to bear in mind that results based on the diathesis-stress model of achievement processes revealed that changes in intrinsic motivation completely mediated the relation between teachers' autonomy support and changes in perceived competence. Furthermore, Grade 5 motivation was related to changes in perceived competence, whereas Grade 5 perceived academic competence was not related to changes in motivation. In addition, motivation in Grade 6 was related to changes in perceived competence ($\beta = .59$). This set of results leads us to conclude that there is some support for CET, although not as much for the second mediation model based on the diathesis-stress model of achievement processes.

Regression analyses based on Grade 5 predictors of changes seem to provide some support for the temporal precedence of intrinsic motivation on perceived competence as suggested by the diathesis stress model of achievement processes. Although this result is conceptually sound and interesting, it is nevertheless possible that this effect depends on the level of self-representations. For instance, Vallerand (1997) distinguished between motivation at contextual and situational levels. Contextual motivation refers to one's usual intrinsic motivation toward a specific context (i.e., school). Situational motivation refers to the motivation individuals experience

when they are currently engaging in an activity. It is thus possible that competence feedback at the situational level influences motivation through changes in perceived competence as shown in previous experimental studies (e.g., Harackiewicz & Larson, 1986; Jussim et al., 1992; Reeve & Deci, 1996; Vallerand & Reid, 1984, 1988), but this effect may be quite different at the contextual level, as shown in this study and other studies (e.g., Williams & Deci, 1996). Specifically, these different effects might occur because motivation at the contextual level is less subject to variations than situational (i.e., state) motivation. Further research is thus needed to test these hypotheses.

The present results are consistent with the mediating and moderating models derived from the diathesis-stress model of achievement processes (Boggiano, 1998a). Evidence for a mediating model is found when we predict changes in intrinsic motivation. Evidence for a buffering model is obtained when we used an aggregate score of intrinsic motivation reflecting a somewhat stable motivational orientation. This result stimulates the following question: How do we conciliate both roles that intrinsic motivation plays in the relation between teachers' autonomy support and changes in perceived competence?

We believe that both conceptualizations of intrinsic motivation (i.e., stability and change) are correct and can be conciliated. Specifically, we believe that a cycle may exist in which interacting with elementary school children in an autonomy supportive way promotes children's intrinsic motivation, which in turn enables them to cope with a controlling/evaluative and perhaps aversive school context. That is, intrinsic but not extrinsic motivational set immunizes students from some of the negative effects of teachers' use of controlling strategies (i.e., low levels of autonomy support). This is so because extrinsic children rely more on external evaluations and less on self-initiated and regulated effort than do intrinsic children when faced with evaluative cues or difficult academic conditions (Boggiano, 1998a). This explanation is also in line with Harter's (1978) model, which posits that extrinsically oriented children have a greater dependence on external approvals and goals, whereas intrinsically oriented children rely on a self-reward system and mastery goals.

Limitations and Further Research Directions

Although the present results provided some support for the second and the third models, three limitations should be taken into consideration when interpreting these findings. First, even though we used a longitudinal design, it is nevertheless inappropriate to make strong causal inferences. Additional longitudinal studies over

several years may provide a clearer picture about the mediating and moderating role of motivation in the relations between teachers' autonomy support and perceived competence. Second, shared method variance may exist between self-report measures. Thus, stronger support for the models could be obtained by using a multitrait, multimethod approach to evaluate these constructs. However, our use of self-report measures enabled us to evaluate children's phenomenal view of their internal states. Furthermore, using a longitudinal design with different informants (i.e., children and teachers) alleviated possible confounding effects between some measures. Third, teachers' autonomy support is not the sole predictor that will account for all the variance in a complex set of responses (i.e., motivation processes and perceived competence). Other elements in children's context such as parents and peers may affect children's intrinsic motivation and perceptions of competence and need to be assessed in further work.

Conclusion

The present research contributes to the extant literature by directly comparing CET (Deci & Ryan, 1985) with the diathesis stress model of achievement processes (Boggiano, 1998a) and showing stronger support for the later model. Results of the present investigation also have practical implications for classroom practice. More precisely, classroom practice (i.e., autonomy supportive teachers) that produces an increase in intrinsic motivation would produce, in turn, an increase in perceived competence. Consequently, if the techniques designed to improve perceived academic competence are not accompanied by an improvement in intrinsic motivation, then the effects of these techniques are likely to be short-lived. This is especially important because results of the present investigation indicated that, once intrinsic motivation is implemented, this self-regulation process may, in turn, buffer the adverse effects of controlling strategies on perceived academic competence.

REFERENCES

- Aiken, L. S., & West, S. G. (1991). *Multiple Regression: Testing and interpreting interaction*. Newbury Park, CA: Sage.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical consideration. *Journal of Personality and Social Psychology, 51*, 1173-1182.
- Boggiano, A. K. (1998a). Maladaptive achievement patterns: A test of a diathesis-stress analysis of helplessness. *Journal of Personality and Social Psychology, 74*, 1681-1695.
- Boggiano, A. K. (1998b). Unpublished raw data. University of Auckland.
- Boggiano, A. K., & Barrett, M. (1985). Performance and motivational deficits of helplessness: The role of motivational orientation. *Journal of Personality and Social Psychology, 49*, 1753-1761.
- Boggiano, A. K., Barrett, M., Duckitt, J., & Harackiewicz, J. M. (1998). *Maladaptive achievement patterns and helplessness: The role of students' motivational orientation*. Manuscript submitted for publication.
- Boggiano, A. K., Barrett, M., Silvern, L., & Gallo, S. (1991). Predicting emotional concomitants of learned helplessness: The role of motivational orientation. *Sex Roles, 25*, 577-593.
- Boggiano, A. K., Main, D. S., & Katz, P. A. (1991). Mastery motivation in boys and girls: The role of intrinsic versus extrinsic motivation. *Sex Roles, 25*, 511-520.
- Boggiano, A. K., Shields, A., Barrett, M., Kellam, T., Thompson, E., Simons, J., & Katz, P. A. (1992). Helplessness deficits in students: The role of motivational orientation. *Motivation and Emotion, 16*, 271-296.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., Schwartz, A. J., Sheinman, L., & Ryan, R. M. (1981). An instrument to assess adults' orientations toward control versus autonomy with children: Reflections on intrinsic motivation and perceived competence. *Journal of Educational Psychology, 73*, 642-650.
- Harackiewicz, J. M., & Elliot, A. J. (1993). Achievement goals and intrinsic motivation. *Journal of Personality and Social Psychology, 65*, 904-915.
- Harackiewicz, J. M., & Larson, J. R. (1986). Managing motivation: The impact of supervisor feedback on subordinate task interest. *Journal of Personality and Social Psychology, 51*, 547-556.
- Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental model. *Human Development, 1*, 34-64.
- Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivational and informational components. *Developmental Psychology, 17*, 300-312.
- Harter, S. (1982). The perceived competence scale for children. *Child Development, 53*, 87-97.
- Jussim, L., Soffin, S., Brown, R., Ley, J., & Kohlhepp, K. (1992). Understanding reactions to feedback by integrating ideas from symbolic interactionism and cognitive evaluation theory. *Journal of Personality and Social Psychology, 62*, 402-421.
- Losier, G. A., & Vallerand, R. J. (1994). The temporal relationship between perceived competence and self-determined motivation. *Journal of Social Psychology, 134*, 793-801.
- Reeve, J., & Deci, E. L. (1996). Elements of the competitive situation that affect intrinsic motivation. *Personality and Social Psychology Bulletin, 22*, 24-33.
- Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 271-360). New York: Academic Press.
- Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology, 72*, 1161-1176.
- Vallerand, R. J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. *Journal of Sport Psychology, 6*, 94-102.
- Vallerand, R. J., & Reid, G. (1988). On the relative effects of positive and negative verbal feedback on males' and females' intrinsic motivation. *Canadian Journal of Behavioral Sciences, 20*, 239-250.
- Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology, 70*, 767-779.

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