What It Takes to Do Well in School and Whether I’ve Got It: A Process Model of Perceived Control and Children’s Engagement and Achievement in School

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A new conceptualization of perceived control was used to test a process model describing the contribution of these perceptions to school achievement for students in elementary school (N = 220). Three sets of beliefs were distinguished: (a) expectations about whether one can influence success and failure in school (control beliefs); (b) expectations about the strategies that are effective in producing academic outcomes; and (c) expectations about one’s own capacities to execute these strategies. Correlational and path analyses were consistent with a process model which predicted that children’s perceived control (self-report) influences academic performance (grades and achievement test scores) by promoting or undermining active engagement in learning activities (as reported by teachers) and that teachers positively influence children’s perceived control by provision of contingency and involvement (as reported by students). These results have implications for theories of perceived control and also suggest one pathway by which teachers can enhance children’s motivation in school.

Several decades of research have demonstrated that an important contributor to school performance is an individual’s expectations about whether he or she has any control over academic successes and failures. A robust body of empirical findings has been produced using a variety of constructs, such as locus of control, causal attributions, learned helplessness, and self-efficacy. Beginning with the examination of beliefs about whether reinforcements are under internal or external control (Rotter, 1966), empirical evidence has accumulated indicating that children who believe that doing well in school is contingent on their own actions perform better than those who do not (Seligman, 1975). Similarly, children who believe that good grades are caused by internal and controllable causes (like effort; Weiner, 1979), who believe that they can produce the responses that lead to desired outcomes (Bandura, 1977), or who believe that they possess high ability (Harter, 1981; Stipek, 1980) perform better academically. These children score higher on tests of intelligence and achievement and earn better grades in school than children who do not hold these beliefs (see Findley & Cooper, 1983; Stipek & Weisz, 1981, for reviews).

Experimental (e.g., Dweck, 1976) and field research (e.g., Nolen-Hoeksema, Girgus, & Seligman, 1986) indicates that the relations captured by these correlations are bidirectional. When children believe that they can exert control over success in school, they perform better on cognitive tasks. And, when children succeed in school, they are more likely to view school performance as a controllable outcome. The cyclicity implied by these relations suggests that children who are not doing well in school will perceive themselves as having no control over academic successes and failures and that these beliefs will subsequently generate performances that serve to confirm their beliefs (Seligman, 1973; Skinner, in press).

In this study, a new conceptualization of perceived control was used first to distinguish among related constructs in the existing literature and then to organize these constructs into an integrated system. This integration allowed us to predict the unique and interactive effects of key beliefs on children’s academic performance. The new conceptualization of perceived control is situated within a process model of motivation which holds that perceived control contributes to school performance by promoting or undermining children’s engagement in learning activities and that the social context, in this case teacher behavior, can have an important impact on children’s perceptions of control.

A Process Model of Perceived Control and School Performance

As a framework for this study, a general motivational model of relations among context, self, and action proposed by Connell and his colleagues was used (Connell, in press; Connell & Wellborn, in press). The motivational model explains linkages among individuals’ experience of the social context, their self-system processes (e.g., control beliefs), their patterns of action, and the actual outcomes of performance (e.g., grades and achievement test scores, see Figure 1.) According to this model, a student’s perceived control is influenced by the contingency and involvement experienced by the child and results in engaged or disaffected patterns of action that then
have an impact on school performance (see also Skinner, 1986).

A New Conceptualization of Perceived Control

The cornerstone of this study was a new conceptualization of perceived control. The first step in creating this conceptualization was to depart from constructs, such as locus of control, in which internal and external causes are assumed to be inversely related to each other and are thus assessed as a single, bipolar dimension. Instead, separate dimensions of children's beliefs about internal (e.g., effort) and external (e.g., powerful others) factors were considered as sources of control (Connell, 1985; Lachman, 1986; Levenson, 1973). At the same time, a new feature of children's beliefs was introduced, namely, unknown source of control. Derived from open-ended interviews with children, unknown control is defined as the extent to which children report that they do not know the causes of school performance (Connell, 1985).

The second step was to argue that in addition to analyzing children's beliefs about the causes of good school performance, it is useful to investigate children's beliefs about whether they themselves can execute those causes. The distinction between beliefs about the effectiveness of causes and beliefs about the person's role in accessing those causes is also present in other recent conceptualizations of perceived control (Abramson, Seligman & Teasdale, 1978; Bandura, 1977; Gurin & Brim, 1984; Weisz, 1983; Weisz & Stipek, 1982).

In the new conceptualization of perceived control, three qualitatively different sets of beliefs are distinguished: (a) beliefs about the extent to which certain potential causes are effective in producing outcomes, (b) beliefs about the extent to which the person has access to the potential known causes, and (c) beliefs about the extent to which the person can produce desired outcomes, without reference to any explicit categories of causes (Skinner, Chapman, & Baltes, 1988).

The three sets of beliefs are referred to as follows: (a) Strategy beliefs are expectations about "what it takes for me to do well in school" (such as effort, ability, powerful others, luck, and unknown factors); (b) capacity beliefs are expectations about whether "I have what it takes" (i.e., Can I exert effort? Am I smart? Liked by powerful others? Lucky?);1 and (c) control beliefs are expectations about "whether or not I can do well in school" without reference to specific means. In the present study, the new conceptualization was used to provide a more differentiated picture of the aspects of perceived control that would predict children's cognitive performance (see also Chapman, Skinner, & Baltes, in press).

The Effects of the Social Context on Perceived Control

According to this process model of motivation, the learning environment and, specifically, teachers' behavior toward students, is a major determinant of children's perceived control in the academic domain (see Crandall & Crandall, 1983; Deci, Schwartz, Sheinman, & Ryan, 1981; Lamb & Easterbrooks, 1981; Skinner, 1985, for reviews). Two aspects of teachers' behavior were examined in the present study: contingency and involvement. Contingency refers to the relation between an individual's actions and outcomes (Abramson & Alloy, 1980; Seligman, 1975). In this study, children were asked to rate how much their teacher provided clear expectations and consistent feedback for their behavior in school activities (see also Ryan & Grolnick, 1986). The harmful consequences of noncontingent environments for both engagement and performance have been documented in laboratory and field settings (e.g., Gunnar, 1979; Seligman, 1975; Watson, 1979).

Although contingency is a necessary condition for the perception of control, it is not considered to be sufficient; the content of caregiver behavior is important as well (Lamb & Easterbrooks, 1981; Skinner, 1985; Skinner & Connell, 1986). That is, two teachers may respond with high contingency to a child's requests for help, but one may respond by helping, the other by chastising. Hence, a second dimension of teacher behavior was examined: involvement, defined as children's perceptions about the extent to which the teacher shows positive interest in knowing more about them and also takes their opinions into consideration when making decisions.

Although both contingency and involvement should influence children's perceived control, they should differentially predict specific sets of perceived strategies and capacities. A lack of clear and consistent contingencies from teachers was expected to predict strategy beliefs about powerful others and luck and especially children's unknown strategy beliefs. Teacher involvement was hypothesized to be especially important for the development of capacity beliefs about effort and ability. Contingency and involvement were both predicted to relate positively to overall control beliefs.

The Effects of Perceived Control on Engagement in School

Almost all researchers interested in perceived control have examined the effects of children's expectations on their level of cognitive performance. However, theories of perceived control almost never predict a direct relation between children's beliefs and how successful they are in actually solving cognitive tasks. Instead, most theories hypothesize that perceived control influences children's motivated behavior— for example, their effort, persistence, and coping attempts (e.g., Abramson et al., 1978; Bandura, 1977; Weiner, 1979). Reduced effort should produce decrements in subsequent cog-

1 In the Skinner, Chapman, and Baltes (1988) conceptualization, strategy beliefs are referred to as means-ends beliefs, and capacity beliefs are referred to as agency beliefs. The items composing the Wellborn, Connell, and Skinner (1989) measure are completely different from those included in the Skinner et al. measure. However, the only conceptual difference between the two is that in the former measure, the items referring to beliefs about causes are self-related, whereas in the latter, they are for children in general.
nitive performances; and increased efforts, given the relevant capabilities, should produce better actual performance. As a result, level of cognitive performance should not be the only, or even the primary, outcome of perceived control. According to these accounts, a more proximal and direct outcome of perceived control is engagement or the effort children exert in performing cognitive tasks.

Consistent with this formulation, children's active engagement in learning activities is considered to be the mediator between perceived control and actual accomplishments. The term engagement encompasses children's initiation of action, effort, and persistence on schoolwork, as well as their ambient emotional states during learning activities (Connell, in press; Connell & Wellborn, in press). In this study, engagement was assessed by asking teachers to act as expert raters for each child in their class. Children's beliefs about control were expected to promote or undermine their active engagement in school-related tasks and thus to influence their levels of actual cognitive performance, as assessed by school grades and achievement tests (see also Fincham & Cain, 1986).

Hypotheses focused separately on control-related beliefs expected to undermine engagement in learning activities and those expected to promote it. First, the sets of beliefs that should undermine engagement and lead to decrements in cognitive performance were identified. In terms of strategy beliefs, three sets of beliefs suggest that success and failure in school are "out of my hands," namely, beliefs that school performances are determined by powerful others (i.e., the teacher), luck, or unknown factors. In terms of capacity beliefs, two sets of beliefs would indicate that school success is beyond one's reach, namely, perceiving oneself as unable to exert effort or as lacking ability. Hence, negative correlations with engagement were predicted (a) for strategy beliefs about powerful others, luck, and unknown factors and (b) for perceived incapacity to exert effort or perceived lack of ability. The predictions for strategy beliefs are analogous to predictions about the detrimental effects of an "external" locus of control (Nowicki & Strickland, 1973). The predictions for capacity beliefs are consistent with results showing detrimental effects of low self-efficacy and low perceived competence on school performance (Harter, 1982; Schunk, 1984).

Second, an interaction was predicted for the effects of strategy and capacity beliefs about both powerful others and luck. At the same time that beliefs in these strategies were predicted to be sufficient to undermine engagement, these "main effects" were hypothesized to be more salient (and more devastating for engagement) for children who also believe that they do not have the capacities to execute these strategies. This prediction is unique to the present conceptualization.

Third, the aspects of beliefs that should promote active engagement and boost school achievement were specified. It was predicted that children who believe that academic outcomes are under their own personal control (high control beliefs) would be more engaged in school and earn better grades and achievement scores. This prediction is consistent with almost all expectancy models of motivated behavior (e.g., Nicholls, 1984).

Counter to predictions about the salutary effects of an "internal" locus of control, effort strategy beliefs were hypothesized to be unrelated (as main effects) to engagement. Believing effort to be an effective strategy would not be sufficient to produce engagement; children must also believe that they themselves can produce the required effort (see also Bandura, 1977). Hence, an interaction between beliefs about effort strategies and capacities was hypothesized.

Finally, because ability is a cause that is both internal and potentially uncontrollable, it was predicted (a) that main effects of capacity beliefs about ability would resemble those for effort capacity, such that lack of ability would predict low engagement and (b) that main effects for strategy beliefs about ability would be similar to those of powerful others and luck strategies, such that high strategy beliefs about ability would lead to low engagement. Finally, an interaction between ability capacity and strategy beliefs was predicted such that the optimal combination would be low strategy beliefs and high capacity beliefs. ("Being smart isn't all that counts, but I am smart.") These predictions are consistent with theories of explanatory style that focus on the consequences of internal, global, and stable attributions of performance (Abramson et al., 1978).

This admittedly complex set of hypotheses may be clarified by distinguishing conceptually between the interactions predicted for beliefs about effort and ability and those predicted for beliefs about powerful others and luck. For effort, high strategy beliefs are thought to augment the already enhancing effects of positive capacity beliefs on student engagement. For ability, low strategy beliefs should enhance positive capacity beliefs. In contrast, for powerful others and luck, lack of capacity beliefs should exacerbate the detrimental effects of high strategy beliefs on students' engagement.

A second point of clarification involves the predicted effects for unknown strategy beliefs. If it is assumed that not knowing the causes of school performance cannot be ameliorated by any capacity beliefs, then unknown strategies would be predicted to have strong negative relations with engagement and school performance.

In sum, a study was conducted to test a motivational model of the links between children's perceived control and their academic achievement. A process model was examined in which teacher involvement and contingency was hypothesized to influence children's perceived control, which in turn would have an impact on children's academic performance (grades and achievement) through its effects of their engagement in school. Path analytic techniques were used to test the direct and indirect linkages in the process model as well as the possibility of nonrecursive linkages among the variables. A new conceptualization of perceived control made it possible to test a set of specific hypotheses about the aspects of children's control-related beliefs that promote or undermine their engagement in school. These were examined using correlational and multiple-regression procedures.

Method

Subjects

Subjects were all the children in a suburban elementary school (N = 200, ages 9–12) who were present on the day of testing. The sample
SPECIAL SECTION: PERCEIVED CONTROL AND ENGAGEMENT IN SCHOOL

Perceived control. Perceived control was assessed using a 50-item measure in which children answered items pertaining to three constructs, using four-point rating scales (from not at all true to very true). Strategy beliefs were measured using 25 items in which children endorse five potential means or causes for success and failure in school: (a) effort (e.g., The best way for me to get good grades is to work hard), (b) ability (e.g., If I'm not smart in a school subject, I won't do well at it), (c) powerful others (e.g., To do well in school, I need my teacher to like me), (d) luck (e.g., Getting good grades for me is a matter of luck), and (e) unknown factors (e.g., When I don't do well in school, I usually can't understand why).

Capacities beliefs were measured using 20 items tapping the extent to which children believe they can enact the four "known" strategies: (a) effort (e.g., I can't seem to try very hard in school), (b) ability (e.g., I think I'm pretty smart in school), (c) powerful others (e.g., I can get the teacher to like me), and (d) luck (e.g., I am unlucky when it comes to school work).

Control beliefs were assessed using five items in which children indicate the extent to which they are able to produce positive and prevent negative outcomes in the school domain (e.g., I can do well in school if I want to; I can't get good grades no matter what I do). The split-half reliabilities for the scales ranged from .75 to .85 (average .79). Most important, reliability did not differ appreciably across the three scales. (For information about factor structure and measurement properties, see Skinner et al., 1988; for the current version of the scale, see Wellborn, Connell, & Skinner, 1989).

Teacher-rated student engagement and dissatisfaction. Engagement was assessed by means of a 10-item scale in which teachers, acting as expert raters, reported for each child (a) the extent to which that student actively participated in class (e.g., When in class, this student participates in class discussions; When in class, this student just acts like he/she is working) and (b) the student's emotional tone when in class (e.g., When in class, this student seems happy; When in class, this student seems bored). For both action and emotion, positive and negative instances were included. Positive and negative items were averaged separately and subtracted from each other to form an engagement score ranging from −3 to 3, with higher scores indicating more engagement. Split-half reliability for the scale was .82.

Grades. Children's school grades from the end of the previous year were recorded for math, reading, science, social studies, spelling, and language. For purposes of this study, children's grades in math and verbal subjects (spelling and reading combined) were used. Grades were converted to an 11-point scale, corresponding to ratings from excellent to needs to improve. It should be noted that, in this study, the teachers who rated children's engagement were not the same teachers who awarded children grades.

Achievement test scores. Children's scores from the most recent math and reading subtests of the Stanford Achievement Test (Psychological Corporation, 1970) were recorded. Each child's percentile score (ranging from 0 to 99) was used.

Perceived teacher context. Children rated their current teachers, using 4-point scales, on the extent to which they provided (a) contingency (9 items), defined as clear and consistent guidelines and feedback (e.g., When I do well on a test, I never know how my teacher will react. My teacher always does what he/she says he/she is going to do) and (b) involvement (10 items), defined as interest in and dedication of resources to the child (e.g., My teacher enjoys hearing about what I'm interested in. I feel like my teacher enjoys the time he/she spends with me). Cronbach alphas for the two scales were .54 and .88, respectively. It should be noted that the low internal consistency for contingency sets an upper bound limit on its correlation with other variables; hence, these relations may be attenuated.

Procedure

Children completed the RAPS in their regular classroom in groups of 15 to 25 under the supervision of two trained administrators. One administrator read the questions aloud as children filled out their own questionnaires. The other administrator was present to answer children's questions. Children completed the RAPS in two 40-min sessions.

Results

Data analyses focused on four central issues: (a) bivariate relations between aspects of perceived control and its hypothesized consequences, namely, engagement, grades, and achievement; (b) the bivariate relations between perceived control and its hypothesized antecedents, namely, teacher contingency and involvement; (c) interactions among perceived strategies and capacities in predicting engagement; and (d) the plausibility of direct and indirect relations hypothesized among the variables. Of interest was whether beliefs about control, strategies, and capacities would be differentially related to hypothesized antecedents and consequences. Because the interpretation of findings depends on an understanding of the mean levels and interrelations among the constructs themselves, the results of these analyses will be presented first.

Initial Analyses

Mean levels. The means and standard deviations of all the dimensions of perceived control, engagement, academic performance, and teacher context are presented in Table 1. As can be seen, for the measures of perceived control, neither floor nor ceiling effects were apparent, even though the full range of the 4-point scale was used.

Pairwise comparisons using t tests for dependent samples revealed that elementary students perceived effort as the most effective strategy for influencing school performance (effort vs. ability, t = 14.62, p < .0001). The students perceived ability as the second most effective strategy (ability vs. powerful others, t = 23.90, p < .0001), and powerful others (powerful others vs. luck, t = −4.85, p < .0001) and luck (luck vs. unknown, t = −2.86, p < .0001) were not perceived as being very important causes of good grades. For capacity beliefs, children reported that effort was the easiest cause to enact and reported ability, powerful others and luck as less accessible to them, in descending order (effort vs. ability, t =...
Means and Standard Deviations of Children's Perceived Control, and Its Proposed Consequences and Antecedents

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<thead>
<tr>
<th>Variable</th>
<th>M</th>
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<tr>
<td>Perceived control</td>
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<tr>
<td>Control beliefs</td>
<td>3.51</td>
<td>0.64</td>
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<tr>
<td>Strategy beliefs</td>
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<tr>
<td>Effort</td>
<td>3.28</td>
<td>0.56</td>
</tr>
<tr>
<td>Ability</td>
<td>2.63</td>
<td>0.60</td>
</tr>
<tr>
<td>Powerful others</td>
<td>1.59</td>
<td>0.63</td>
</tr>
<tr>
<td>Luck</td>
<td>1.83</td>
<td>0.76</td>
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<tr>
<td>Unknown</td>
<td>1.95</td>
<td>0.70</td>
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Notes. N = 220, Grades 3–6. Scores for perceived control ranged from 1 (not at all true) to 4 (very true); scores for teacher-rated engagement ranged from -3 (disaffected) to 3 (engaged); scores for grades ranged from 1 (needs to improve) to 11 (excellent); achievement test scores ranged from 0 to 99.

Correlations. The correlations among beliefs about strategies and capacities are presented in Table 2. As can be seen, there is very little overlap between beliefs about capacities and strategies. The pattern of relations among strategy and capacity beliefs strongly suggests that the two aspects of perceived control are empirically distinguishable (see also Skinner et al., 1988, for a replication).

In terms of relations among strategy beliefs, it is interesting to note that effort (rated as the most important strategy) was positively related to ability strategies but was unrelated to powerful others, luck, and unknown strategies. In terms of relations among capacity beliefs, positive correlations were obtained especially for effort and ability capacities.

Unique Contribution of Aspects of Perceived Control

As discussed earlier, a more differentiated conceptualization of perceived control should enable us to identify the unique contribution of particular control-related constructs to student engagement.

Multiple regression procedures were used to examine (a) which of the five strategy beliefs and (b) which of the four capacity beliefs showed unique contributions to engagement. First, engagement was regressed onto the four known perceived strategy variables. The overall equation was significant ($R^2 = .141, p < .0004$). The significant unique strategy variables were ability ($\beta = -.17, p < .06$) and powerful others ($\beta = -.15, p < .04$). Second, engagement was regressed on the four capacity beliefs. This regression equation was also significant overall ($R^2 = .136, p < .001$). Ability and powerful others' capacity beliefs were significant unique predictors of engagement ($\beta = .22, p < .03; \beta = .13, p < .05$, respectively).

To examine the unique effects of strategy and capacity beliefs for the same cause on engagement, in a third set of...
analyses, both sets of beliefs were entered into regression equations for each cause. For effort, only capacity beliefs predicted engagement ($\beta = .27$, $p < .0002$). These regression findings provide further support for predictions from theories of self-efficacy, whereas they cast doubt on the predictive centrality of internal locus of control in this domain. For ability, both perceived capacity and strategy were significant unique predictors ($\beta = .30$, $p < .01$, and $\beta = -.14$, $p < .01$, for capacity beliefs and strategy beliefs, respectively). The findings are consistent with the notion that attributions about ability may undermine engagement because they imply expectations about both causes and capacities.

For powerful others, both capacity and strategy beliefs were significant predictors of engagement (ability, $\beta = .19$, $p < .0007$; strategy, $\beta = -.21$, $p < .002$). For luck, both capacity and strategy beliefs were also significant predictors of engagement (capacity, $\beta = .20$, $p < .0007$; strategy, $\beta = -.26$, $p < .0002$). These latter findings supplement research about the detrimental effects of an external locus of control and also direct attention to corresponding beliefs about capacities. Taken together, these analyses indicate not only that children's beliefs about strategies and capacities are conceptually and empirically distinct from each other, but also that each set of beliefs uniquely predicts children's engagement in school.

Interaction Between Strategy and Capacity Beliefs

As indicated earlier, both main effects and interactive effects of strategy and capacity beliefs were hypothesized to relate to student engagement. The previous sets of analyses revealed unique main effects of both strategy and capacity variables. In order to investigate interactive effects for each pair of strategy and capacity beliefs, a hierarchical multiple regression strategy was used. Each regression equation was constructed by first entering the main effects of strategy and capacity and then entering a cross-product term that reflected the combination of these two variables thought either to maximize or to minimize engagement. More specifically, effort cross-product scores were formed by multiplying capacity beliefs by strategy beliefs; ability cross-product scores were calculated by multiplying capacity beliefs by the additive inverse of strategy beliefs; and powerful others and luck cross-product scores were calculated by multiplying strategy beliefs by the additive inverse of capacity beliefs. Increments in variance accounted for in the regression equation by these cross-product calculations over the two main effects would support the hypotheses that (a) in the case of effort, strategy beliefs enhance the beneficial effects of positive capacity beliefs, (b) in the case of ability, low strategy beliefs enhance the positive effects of capacity beliefs, and (c) for powerful others and luck causes, low capacity beliefs exacerbate the deleterious effects of these strategy beliefs. Contrary to predictions, the interactive term was not significant in any of the regression equations.

It was reasoned that the hypothesized interaction effects, although not present for the entire sample, might be present for extreme groups of subjects. In order to explore this possibility, additional analyses were performed that would increase the statistical power for the significance test of the interaction terms.

High and low groups on each strategy and capacity belief were formed using approximately the top and bottom quarters of each variable's distribution. A 2 (strategy belief: high vs. low) x 2 (capacity belief: high vs. low) analysis of variance (ANOVA) was performed for each cause with engagement as the dependent variable. All four of the capacity by strategy interaction terms were significant: effort, $F(3, 111) = 5.93$, $p < .001$; ability, $F(3, 59) = 5.66$, $p < .001$; powerful others, $F(3, 66) = 3.31$, $p < .05$; and luck, $F(3, 73) = 8.15$, $p < .001$.

The interactions are plotted in Figure 2. As can be seen, two distinct patterns emerged. For effort, the hypothesized "booster effect" of high strategy beliefs on high capacity beliefs was evident (Figure 2, upper left). In addition, high strategy beliefs also appeared to exacerbate the negative effects of low capacity beliefs for effort. The second pattern of results held
for ability (Figure 2, upper right), powerful others (Figure 2, lower left), and luck (Figure 2, lower right) and confirmed the hypothesized exacerbatory effects of low perceived capacity accompanying the latter two perceived strategies. This exacerbatory effect was most pronounced for luck beliefs, where subjects reporting that “luck is what counts in school” and that “I am unlucky” clearly showed the lowest levels of engagement.

**Context, Self, and Action: Path Models**

Path analyses were performed in order to examine the hypothesized process model of teacher behavior, perceived control, engagement, and academic outcomes. According to the model, teacher context was expected to directly influence children’s perceptions of control, which were expected to either promote or undermine their engagement; engagement was then expected to contribute directly to children’s actual school performance.

Several summary variables were calculated for use in the model. Teacher contingency and involvement ($r = .51, p < .001$) were combined to form teacher context. Average verbal and math grades were combined with average reading and math achievement scores ($r = .55, p < .001$) to form one “academic outcome” score. For perceived control, two scores were formed, one in which the aspects of perceived control predicted to promote engagement were combined and one in which those predicted to undermine engagement were combined. The “positive” perceived control score belief consisted of control beliefs plus the interactive terms for effort and ability (calculated by multiplying positive capacity beliefs by strategy beliefs for effort or by the additive inverse of strategy beliefs for ability) plus positive capacity beliefs for powerful others and luck. The “negative” perceived control beliefs score consisted of unknown strategy beliefs plus the interactive terms for powerful others and luck (calculated by multiplying strategy beliefs by lack of capacity beliefs) plus effort and ability lack of capacity beliefs. The variance of each compo-
nent score going onto the two control composites was equal-
ized. It should also be noted that summary scores of beliefs
that promote and undermine engagement are not confounded
with causal category. That is, both positive and negative
perceived control contain beliefs about all causal categories.
The correlations among all the variables used in the composite
scores in the path analyses are presented in Table 4.

The results of the ordinary least-squares regression analysis
are presented in Figure 3. As can be seen, the predicted direct
relations between teacher context and both positive and neg-
ative aspects of child perceived control were obtained, as well
as the expected direct relations between engagement and
grades/achievement. Of special interest were the relations
between perceived control and engagement. The negative
perceived control composite was the primary predictor of
engagement (standardized path coefficient = -.28, p < .01).

As hypothesized, the analysis revealed only indirect effects
of teacher context on student engagement and academic
outcomes. However, low but significant direct relations be-
 tween perceived control and grades/achievement were found
even with engagement partialed out. Consistent with the full
model of context, self, and action (Connell, in press; Connell
& Wellborn, in press; Skinner, in press), we interpret these
paths as reciprocal effects of actual school performance on
children's beliefs about their own capacities and strategies.

Discussion

This study examined the process by which children's per-
ceived control contributes to their engagement in school and
their academic performance. A new conceptualization of per-
ceived control that differentiates children's perceptions of
causal strategies from their beliefs about their own capacities
shows promise for identifying the unique contributions as
well as the interactive combinations of perceived strategies
and capacities that promote or undermine children's engage-
ment. Path analyses based on a process model of the relations
among context, self, and action revealed that data were con-
sistent with a model in which teacher behavior influences
child perceived control, which in turn promote or under-
mine engagement and thus affect children's academic per-
formance.

The New Conceptualization

For this suburban/rural elementary school sample (of chil-
dren ages 8–12), many aspects of children's perceived control
showed significant relations to teachers' ratings of their en-
gagement in classroom learning. As predicted, children's en-
gagement was undermined by beliefs in nonaction strategies
e.g., ability, powerful others, and luck) and especially by
children's reports of not knowing what strategies are effective.
The results of multiple regressions involving matched pairs of
strategy and capacity beliefs indicated that children's engage-
ment was predicted uniquely both by capacity (positive) and
strategy (negative) beliefs about ability, powerful others, and
luck. Furthermore, ANOVAs using extreme groups revealed
interactions between strategy and capacity beliefs for all four
sets of beliefs such that elementary children who held high
strategy and high capacity beliefs for effort showed the highest
levels of engagement, whereas children who reported high
strategy and low capacity for ability, powerful others, and
luck causes showed the lowest levels of engagement.

These results underscore the usefulness of the new concep-
tualization for integrating extant relevant constructs. On the
one hand, the study replicates other findings: beliefs analogous
to self-efficacy (capacity beliefs for effort), perceived compe-
tence (capacity beliefs for ability), attributional style (capacity
and strategy beliefs for ability), and external locus of control
(strategy beliefs for powerful others, luck, and unknown
causes) were related to engagement. On the other hand, the
results extend existing research to show that (a) these con-
structs uniquely predict teachers' ratings of motivated behav-
ior and (b) capacity and strategy beliefs interact, such that
particular combinations produce higher and lower levels of
engagement.

In terms of locus of control theories, this pattern of findings
implies that beliefs about internal causes do not seem to
promote motivation, although beliefs in external causes do
seem to undermine it. This would imply that correlations
between bipolar measures of locus of control and academic

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<th>Table 4</th>
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<tr>
<td><strong>Intercorrelations Among Engagement, Grades, Achievement, and Social Context Variables for an Elementary School Sample</strong></td>
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<table>
<thead>
<tr>
<th>Variable</th>
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<th>Grades</th>
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<th>Achievement</th>
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<td></td>
<td>Contingency</td>
<td>Involvement</td>
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<td>Social context</td>
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<tr>
<td>Contingency</td>
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<td>Involvement</td>
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<td>Engagement</td>
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* p < .01. ** p < .001.
achievement (see Findley & Cooper, 1983, for a meta-analysis of 98 studies) may be due primarily to a negative relation between the external pole of the measure and school performance.

At the same time, the results of this study highlight the direct unique contribution of self-efficacy and perceived ability to children's school engagement. However, these perceptions about personal capacities interacted with beliefs about whether these capacities are important in yielding desired outcomes, and thereby points out the importance of assessing both strategy and capacity beliefs (Bandura, 1977). Finally, these findings complement research on the detrimental effects of attributing failure to ability or other internal, stable, global causes (Abramson et al., 1978; Weiner, 1985). Evidence of the unique effects of both capacity and strategy beliefs about ability and their interaction imply that ability attributions for failure (e.g., My failure in school is due to ability) have two “psychoactive” components: beliefs about ability as a strategy (i.e., If I’m not smart, I won’t do well in school) and beliefs about one’s own capacities (i.e., I’m not very smart). If this finding is robust, it may necessitate a reinterpretation of previous research using measures of these attributions that confound perceived strategies and capacities (e.g., Connell, 1985; Seligman et al., 1984).

Path analyses of the correlational data supported the direct and indirect relations among teacher context, perceived control, student engagement, and academic outcomes predicted by the general process model of motivation. Both positive and negative perceived control were significantly related to elementary school children’s engagement in school, but primary relations were with negative perceived control. The direct effects from perceived control to children’s grades and achievement scores were interpreted as possible reciprocal effects of children’s academic accomplishments on their control-related beliefs.

Interpreting these findings in the context of the “cyclicity” view mentioned in the introduction yields the following picture: For elementary-school students, a relatively open system of beliefs and performance exists in which beliefs about control are calibrated on the basis of the teacher’s behavior and indications of academic performance. The feedback loops suggest that an ongoing task of children during these years is to form a map of the strategies that lead toward success and away from failure and to establish a sense of their own capacities to enact those strategies. Longitudinal studies of these constructs are underway to confirm these reciprocal effects as well as the other path analytic findings.

The results of the path analyses support the conceptual and empirical separation of the consequences of perceived control for motivation (i.e., its impact on engagement) from its consequences for academic performance. Studies in which correlations of perceived control with academic outcomes are used to draw conclusions about the importance of perceived control may underestimate its direct impact on motivation and its indirect effects on academic performance through engagement.

In addition to the need for longitudinal investigation of the relationships among these constructs, it is important to note that the measures of teacher context used in this study were children’s reports. Hence the relations of these variables to children’s control beliefs may also reflect the contributions of control beliefs to children’s perceptions of teacher’s behaviors.
Although the current results are consistent with studies in which actual behavior was assessed (e.g., Skinner, 1985), in future studies, in-class observations would provide a fuller picture of the contribution of teacher behavior to child perceived control (Dweck, Davidson, Nelson, & Enna, 1978).

The same caveat holds true for the measures of child engagement, which were reports by teachers for their students. On the one hand, teachers can be considered expert reporters of children's active involvement in learning activities. On the other hand, observer reports of children's affect and emotion in the classroom would add complementary information about their engagement. It is a strength of the present study that the teachers who rated children's engagement were not the same ones who gave them grades.

The study of teacher and child behaviors in an observational framework could also help researchers understand the dynamic interplay between teacher contingency and involvement and children's subsequent engagement in learning activities. Although no direct paths between teacher behavior and child engagement were found in the path model, microanalytic approaches would be more likely to detect the reciprocal effects between teacher and student behavior. Of course, children's perceptions of the context and their perceived control may be important mediators in these reciprocal relations (Skinner, in press).

**Educational Implications**

Because one central goal of educators is to optimize children's engagement in learning activities, the findings pertaining to predictors of child engagement are particularly relevant. Two tentative conclusions can be drawn from this study.

First, both teacher contingency and involvement seem to play a role in supporting children's engagement in learning activities. Contingency provides the structure within which children can learn "what it takes" to do well in school. The experience of highly contingent teacher behavior is associated with positive control beliefs regarding academic outcomes. Teacher noncontingency is related to beliefs organized around powerful others, luck, or unknown strategies. At the same time, teacher involvement is associated with children's beliefs about effort as an effective strategy and about the self's capacity to enact the most important strategies.

Second, this study pointed out the limitations of trying to explain engagement in terms of only one variable, in this case, perceived control. Although predicted relations between perceived control and engagement were found, the amount of variance in engagement explained remains relatively small. The small net effects of the promoting and undermining beliefs are due in part to their moderately negative correlation. However, other self-system processes may be essential for a full understanding of the dynamics of engagement. Two other processes that have been suggested by the larger model guiding this study are children's perceived autonomy (Connell & Ryan, 1984; Ryan & Connell, 1989) and their feelings of relatedness to others in the classroom, such as teachers (Connell, in press; Connell & Wellborn, in press). For example, one could postulate that all three sets of self-system processes must be maximized to produce optimal levels of engagement (Connell & Wellborn, in press). In this view, high perceived control would be a necessary but not sufficient condition for engagement in learning activities. Even when children have beliefs that should promote engagement, if they feel pressured to perform (have low perceived autonomy) or alienated from their teachers (have low relatedness), they may not fully engage in school.

By the same token, these other self-system processes may also buffer the effects of low perceived control. For example, even when children perceive that they have little control over academic success and failure, high perceived autonomy (feeling that school is important) and high relatedness (feeling closely connected to teachers) may nevertheless maintain engagement (Connell & Wellborn, in press). This may be especially important to children in environments that do not provide high contingency or during periods of failure or transition, when perceived control and competence may falter. If these potential negative effects of temporarily losing perceived control were buffered, continued high engagement would allow children to maximize their adaptation by figuring out what strategies and capacities may apply in new environments.

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