Journal of Educational Psychology
2003, Vol. 95, No. 2, 347–356

0022-0663/03/$12.00 DOI: 10.1037/0022-0663.95.2.347

A Motivational Model of Rural Students' Intentions to Persist in, Versus Drop Out of, High School

Patricia L. Hardre and Johnmarshall Reeve
University of Iowa

Using self-determination theory, the authors tested a motivational model to explain the conditions under which rural students formulate their intentions to persist in, versus drop out of, high school. The model argues that motivational variables underlie students' intentions to drop out and that students' motivation can be either supported in the classroom by autonomy-supportive teachers or frustrated by controlling teachers. LISREL analyses of questionnaire data from 483 rural high school students showed that the provision of autonomy support within classrooms predicted students' self-determined motivation and perceived competence. These motivational resources, in turn, predicted students' intentions to persist, versus drop out, and they did so even after controlling for the effect of achievement.

Nationwide, policy makers generally set a goal of a 90% high school completion rate (Goal 7.2 of *Healthy People 2010*; United States Department of Health and Human Services, 2000). The most recent data places the current national high school dropout rate at just over 12%, though dropout rates for rural high school students are about 20% and as high as 40% in the most remote schools (Colangelo, Assouline, & New, 1999; D'Amico, Matthes, Sankar, Merchant, & Zurita, 1996; McGranahan, 1994; National Center for Educational Statistics [NCES], 2001; Stern, 1994).

External resources provide students with academic and social opportunities that contribute positively to their achievement and school retention, such as school–business partnerships, field trips, and secondary and higher education collaborations (Colangelo et al., 1999; D'Amico et al., 1996; Stern, 1994). When schools face severe limitations in external resources (e.g., socioeconomic constraints), as is common with geographically remote rural schools, they must rely on other kinds of resources to support the goals of achievement and persistence. Although some rural students have at-home resources to support positive academic outcomes, many face at-home and community resource deficits associated with low achievement and dropout risk (e.g., low socioeconomic status, single-parent families, low parental education, low parental and community valuing of education; Fowler & Walberg, 1991; Haller & Virkler, 1993; Murray & Keller, 1991).

Although teachers do not control students' out-of-school circumstances, they can nevertheless provide classroom contexts that foster situational engagement, nurture interest, and promote the development of internal motivational resources (Deci, 1995; Hidi & Harackiewicz, 2000; Reeve, 1996; Sansone & Morgan, 1992). When teachers support their students' interests (rather than control their behavior), students are more likely to find value in their schooling and are less likely to formulate dropout intentions (Steinberg, Elmen, & Mounts, 1989; Vallerand & Bissonnette, 1992; Vallerand, Fortier, & Guay, 1997). Once nurtured and developed in the classroom, motivation can therefore function as a student-owned internal resource that contributes significantly to the decision to persist in school. One promising theory to understand the motivational influences underlying students' intentions to continue versus dropout of school is self-determination theory (Deci & Ryan, 1985; Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2000; Vallerand et al., 1997).

Self-determination theory, when applied to education, is about fostering in students an interest in learning, a valuing of education, and a confidence in personal capabilities (Deci et al., 1991). According to this theory, students become actively engaged in educational activities to the extent that classroom endeavors affirm their competencies and prove themselves to be interesting and relevant to students' lives. The basic needs of competence and self-determination explain the motivational source underlying students' experiences of becoming interested in school and internalizing school-related values. As needs, both competence and self-determination represent energizing states that, if nurtured, facilitate interest enjoyment, engagement, and well-being (Ryan & Deci, 2000). Competence represents the need for seeking out optimal challenges and for perceiving oneself as efficacious in mastering those challenges; self-determination represents the need to experience choice in the initiation and regulation of one's behavior such that the student's choices rather than environmental events determine his or her actions (Deci & Ryan, 1985; Ryan & Deci, 2000). Thus, to promote an interest in learning, a valuing of education, and an affirmation of personal capabilities, educational climates need to find ways to support students' needs for competence and self-determination.

Environments that support students' needs for competence and self-determination constitute autonomy-supportive environments, whereas those that neglect and frustrate these needs constitute controlling environments (Deci & Ryan, 1987; Reeve, Bolt, & Cai,

Patricia L. Hardre and Johnmarshall Reeve, Division of Psychological and Quantitative Foundations, University of Iowa.

This study was funded in part by University of Iowa Student Government Grant 99-082 awarded to Patricia L. Hardre. We thank William Matthes for his significant contribution to this research project.

Correspondence concerning this article should be addressed to Patricia L. Hardre, who is now at the Department of Educational Psychology, University of Oklahoma, 820 Van Vleet Oval, 321 Collings Hall, Norman, Oklahoma 73019-2041. E-mail: hardre@ou.edu

1999). When students have autonomy supportive teachers (Deci, Schwartz, Scheinman, & Ryan, 1981; Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982) or when students perceive their teachers to be relatively autonomy supportive (Grolnick & Ryan, 1987; Rigby, Deci, Patrick, & Ryan, 1992), students report relatively high levels of self-determination (Deci & Ryan, 1985; Vallerand et al., 1997), competence (Deci, Nezlek, & Sheinman, 1981; Ryan & Grolnick, 1986), and valuing of school (Ryan & Connell, 1989). These motivational resources, when supported and nurtured in the classroom, provide students with the motivational foundation they need to become highly engaged in school and committed to graduating (Vallerand et al., 1997). Such a conclusion, however, is based fully on research with urban student samples (deCharms, 1972; Deci, Nezlek, et al., 1981; Deci, Schwartz, et al., 1981; Flink, Boggiano, & Barrett, 1990; Grolnick & Ryan, 1987; Reeve et al., 1999; Ryan & Grolnick, 1986; Vallerand et al., 1997). Recognizing this, we felt it particularly useful that our study is the first to investigate the beneficial effects of teachers' autonomy support on students' motivation with a rural sample.

A motivational model of high school dropout—based on self-determination theory—appears in Figure 1. Both environmental and personal factors contribute to students' motivation for, achievement in, and completion of school, and both should be considered in motivation research, as school-related motivation continues to be a complex and critical issue for research in education (Hidi & Harackiewicz, 2000). In the model, students' perceptions of the extent to which their classroom climates are relatively autonomy supportive predicts the extent to which they harbor motivational resources, as represented by perceived self-determination and perceived competence. These motivational resources, in turn, predict the subsequent formulation of students' intentions to continue versus drop out of school, and they do so in a way that is over and above the influence that school performance exerts on the formulation of these intentions.

The motivational model depicted in Figure 1 is similar to the one proposed by Vallerand et al. (1997). Both models are motivational mediation models, as they argue that (a) the more autonomy supportive teachers are, the more positive will be students' perceptions of self-determination and competence, and (b) levels of students' self-determined motivation and perceived competence predict their behavioral intentions to continue versus drop out of school. What is different between the two models is that we added the effect of school performance on students' intentions to drop out, because we wanted to test the prediction that students' motivational resources could explain significant variance in intentions to drop out, even after parceling out the variance in dropout attributable to poor academic performance.

In adding school performance into our model as a predictor of dropout intentions, we benefited from prior work showing that perceptions of self-determination and competence both predict school performance (Fortier, Vallerand, & Guay, 1995; Miserandino, 1996). Thus, as shown in Figure 1, we proposed that (a) perceived teacher autonomy support would predict intentions to drop out indirectly, through its effects on students' self-determined motivation and perceived competence, (b) self-determined motivation and perceived competence would directly predict intentions to drop out, (c) self-determined motivation and perceived competence would directly predict school performance, and (d) even though school performance would predict intentions to drop out, self-determined motivation and perceived competence would explain additional (unique), significant, and theoretically meaningful variance in students' intentions to persist in, versus drop out of, high school.

Method

Participants

Participants were 483 students from four rural, public high schools in four different Iowa school districts. The sample consisted of a similar number of girls (n = 249, 52%) and boys (n = 234, 48%) and a similar number of students from each of the four grades: 9th grade (n = 116, 24%), 10th grade (n = 138, 29%), 11th grade (n = 115, 24%), and 12th grade (n = 112, 23%). Our 483 participants represented 91% of all the students enrolled in these four rural schools (according to school records), with the missing 9% representing students who were either absent from school that day, off school grounds for a class project, or declined to complete the

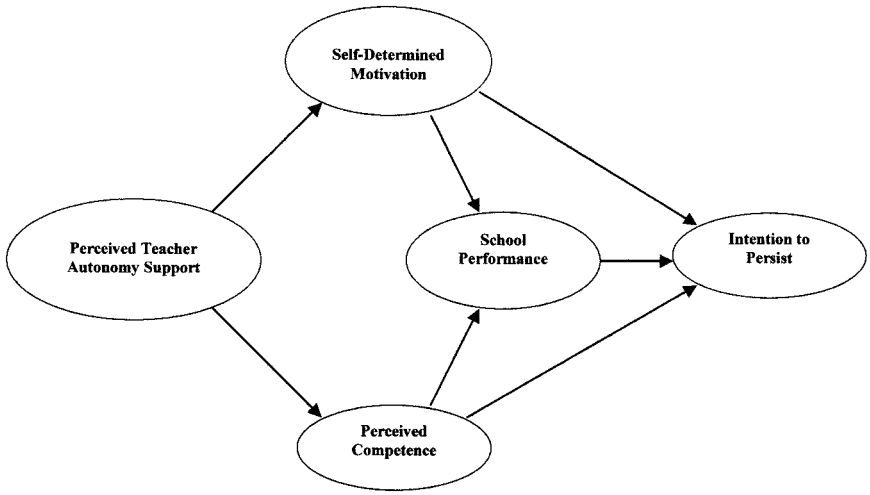

Figure 1. Hypothesized motivational model to explain rural high school students' dropout intentions.

questionnaire. Most students identified themselves as Caucasian–White (n = 458, 95%), whereas the rest were from one of four other ethnic groups. We chose not to collect socioeconomic status data at the individual level, partly because we wanted to minimize the intrusiveness of the questions we asked and partly because school personnel told us that, as a rule, students could not accurately self-report their household income. Instead, we selected to sample from four rural schools we knew in advance represented socioeconomically challenged rural schools. Each school verified that more than half of their students were from low socioeconomic households in that they qualified for governmental programs such as the free and reduced school lunch programs. We did ask students to self-report their parents' highest level of education attained, and more than half at each school reported that their parents attained an educational level that was high school or less.

We invited students from these four schools to participate because the characteristics of these schools and their local communities aligned with the designations of rurality used by the NCES (2001; see also Colangelo et al., 1999; Stern, 1994): community population is less than 5,000; school draws students from neighboring communities of under 1,500 residents; school district population is less than 2,500 students; high school population is less than 800 students; school is at least 50 miles from a metropolitan area; and school is located at least 25 miles from a state or regional university. No significant differences among the four schools emerged on any dependent measure (using a series of one-way analyses of variance [ANOVAs]), so we collapsed the data from all 483 rural students into a single sample.

Within each school we sampled across the full range of grades, because we wanted to explore if our model applied equally well to understanding early dropout intentions (e.g., 9th grade) as it did to understanding dropout intentions in the later grades. No significant differences among the four grade levels emerged for either the predictor variable (perceived teacher autonomy support) or outcome measure (intention to continue vs. dropout). A few significant differences emerged across grade level, however, for the motivation and achievement measures, which is a point we will return to in the Results section.

Measures

The questionnaire assessed the variables needed to reflect five latent constructs—perceived teacher autonomy support, self-determined motivation, perceived competence, school performance, and intention to persist versus drop out. Each questionnaire item used a 7-point response scale, ranging from 1 (*not at all true*) to 7 (*extremely true*).

Perceived teacher autonomy support. We assessed perceived teacher autonomy support with a modified version of the Learning Climate Questionnaire (LCQ; Williams & Deci, 1996). The LCQ asks students to think about the teachers they have taken classes from in their school, with the following eight questions: "My teachers provide me with choices and options," "My teachers convey their confidence in my ability to become what I want to become," "My teachers try to understand how I see things before they suggest to me how they would handle a particular situation," "When I offer suggestions to my teachers, they listen carefully and consider my suggestions seriously," "My teachers show me respect," "My teachers encourage me to ask questions," "I am able to share my feelings with my teachers about what I want to become," and "I feel understood by my teachers." The scale's internal consistency in the present investigation (α = .92) was similar to that found in other investigations (Black & Deci, 2000; Williams & Deci, 1996; Williams, Weiner, Markakis, Reeve, & Deci, 1994).

Self-determined motivation. We assessed self-determined academic motivation with the Academic Self-Regulation Questionnaire (ASRQ; Ryan & Connell, 1989), a measure that can predict 9th-grade students' level of academic achievement (Fortier et al., 1995). The ASRQ has been widely used in educational settings and has shown itself to be highly reliable and valid (Grolnick & Ryan, 1987, 1989; Grolnick, Ryan, & Deci, 1991; Miserandino, 1996; Patrick, Skinner, & Connell, 1989; Ryan & Connell, 1989; Vallerand et al., 1997). The questionnaire begins with the stem, "The reason I go to school is . . . ," and provides a list of 15 different reasons to go to school, each with its own 1–7 response scale. Three response items (classified a priori) assessed intrinsic motivation: "Because I really enjoy the experience," "Because it's so interesting," and "Because there are a lot of interesting things to do" (α = .81). Three response items assessed identified regulation: "Because I see the importance of learning," "Because I really appreciate and understand the usefulness of school," and "Because, to me, education is just so important–so valuable" (α = .87). Four response items assessed the lack of self-determined motivation (i.e., "amotivation"): "Because, basically, I have to—it's required," "To just get through it," "I wouldn't go if I really had a choice about it," and "Because, if I didn't go, I'd get in trouble–be punished" (α = .66). Another scale assessed introjected regulation (e.g., "So I won't let down the important people in my life"), but we followed Guay, Vallerand, and Blanchard's (2000) procedural lead and did not use this scale, because its scores do not discriminate between persistent students and dropout students (see Vallerand et al., 1997, Table 1, p. 1,166). Hence, we used the intrinsic motivation scale to reflect self-determined intrinsic motivation, the identified regulation scale to reflect self-determined extrinsic motivation, and the nonself-determined motivation scale to reflect the lack of self-determined motivation.

To link our measure of self-determined extrinsic motivation to other motivational constructs in the research literature, we also included a three-item "perceived value" of education measure. Its three items were as follows: "Most of what I learn in school is valuable," "I value school-related activity and work," and "It is very clear to me how valuable and how useful what I am learning in school will be in my career." This three-item scale was internally consistent (α = .80), and it correlated significantly with scores from the ASRQ's identified regulation scale (r = .69, $p < .01$), a result we interpret as support for our claim of convergent validity for the identified regulation scale—both scales assess students' valuing of education, which is the prototype of self-determined extrinsic motivation (Deci et al., 1991).

Perceived competence. We assessed perceived competence with the three-item perceived competence scale from the Activity–Feelings States Scale (AFS; Reeve & Sickenius, 1994). The AFS begins with the stem, "When engaged in school-related tasks, I feel . . . ," and lists items to assess four different motivational states. The items assessing perceived competence include the following: "capable," "achieving," and "competent." The three-item scale had an internal consistency in the present study (α = .79) that was comparable with that found in other studies (e.g., Reeve & Sickenius, 1994). A conceptually similar scale to the AFS's perceived competence scale has been shown to predict 9th-grade students' academic achievement (Fortier et al., 1995), an adapted version of Harter's (1982) Perceived Competence Scale.

School performance. We assessed school performance with two indicators. The first was self-reported grade point average (GPA). A single item asked students to "estimate your grade point average," using a 0.0 to 4.0 scale. Previously, others found student-reported GPA to correlate highly with school-reported GPA (r = .68, $p < .01$; Battin-Pearson et al., 2000) and with a standardized test score (r = .46, $p < .001$, using the California Achievement Test; Battin-Pearson et al., 2000). The second indicator was a scale to assess anticipated academic performance (α = .79), which used the following three items: "In terms of academic performance, I expect to do well," "In terms of academic performance, I expect to do better than most of my classmates," and "My expectancies for career success are very, very high."

Intentions to persist versus drop out. We assessed intentions to persist in, versus drop out of, school by beginning with the same two items used by Vallerand et al. (1997), which were "I sometimes consider dropping out of school" and "I intend to drop out of school." We asked these items using

a 7-point Likert-type scale that ranged from 1 (*not at all*) to 7 (*very much so*). In the Vallerand et al. investigation, the two items correlated highly with one another, predicted actual dropout behavior 1 year later, and were sensitive to students' motivational states. Although we considered the Vallerand et al. measure to be adequately reliable and valid, we also wanted to add an item to ask about intentions to continue one's schooling. So, we added the item "I sometimes feel unsure about continuing my studies year after year." Students' scores on the original two-item Vallerand et al. measure correlated so highly with students' scores on our adapted three-item measure ($r = .97$, $p < .01$) that we used our three-item measure, because it allowed us to increase both the scope and reliability of our outcome measure ($\alpha = .79$).

Procedure

During the spring semester, Patricia L. Hardre (the administrator) visited each school and asked students to complete the study's questionnaire. Each school had a relatively small student body, so we collected data from all students in school on the day of our study. Hardre administered the questionnaire during students' regular class periods and in their regular classrooms. The administrator used standardized instructions, and she explained that the purpose of the study was "to understand students' perspectives on school." She explained the types of questions included on the questionnaire, and she ensured students that all of their responses would remain confidential. After answering students' questions, the administrator asked the students to complete the questionnaire, and she later thanked them for their participation. Students with learning disabilities and special resource needs had the items explained to them by their resource room teachers.

Data Analyses

We tested the hypothesized motivational model using structural equation modeling (using LISREL 8; Joreskog & Sorbom, 1993). The model (see Figure 1) featured one exogenous variable (perceived teacher autonomy support) and four endogenous variables (self-determined motivation, perceived competence, school performance, and intention to persist versus drop out). The latent construct of autonomy support was measured by the eight-item LCQ; the latent construct of self-determined motivation was measured by three scales from the ASRQ (i.e., intrinsic motivation, identified regulation, and nonself-determined motivation); the latent construct of perceived competence was measured by the three items from the AFS; the latent construct of school performance was assessed by self-reported GPA and the scale for anticipated school performance; and the latent construct of intention to dropout was assessed by three items (which we reverse-scored to reflect intention to persist). Means, standard deviations, and the correlation matrix for the 19 observed variables that served as the database for the analyses appear in Table 1.

To evaluate the extent to which the hypothesized model fit the observed data, we relied on two chi-square statistics, the critical-N statistic, and three indices of fit. Traditionally, a nonsignificant chi-square serves as the basic test whether a model adequately describes the data (Bollen & Long, 1993), though other statistics typically provide a better indicator of model fit when the sample size is large (Bentler & Bonett, 1980). Accordingly, we supplemented the chi-square test by reporting the χ^2/df ratio and the critical-N statistic. A χ^2/df ratio of 2 or less indicates a good fit (Carmines & McIver, 1981; Newcomb, 1990), as does a critical-N value that exceeds 200 (Hoelter, 1983). We included three fit indices because a broad consensus has emerged that no single model of overall fit should be relied on exclusively (Marsh, Balla, & Hau, 1996; Marsh, Balla, & McDonald, 1988; Tanaka, 1993): goodness-of-fit index (GFI), comparative fit index (CFI), and root-mean-square residual (RMR). GFI and CFI compare the lack of fit of the hypothesized model with the independence model, so the higher the number the better (i.e., $> .90$, up to a possible high of 1; Hu & Bentler, 1999), whereas RMR is a summary statistic for the residuals, so the lower the number, the better the model (i.e., $< .05$, down to a possible low of 0; Hu & Bentler, 1999). So, overall, we provide a set of six statistics to evaluate our model's fit to the observed data: chi-square, χ^2/df ratio, critical-N, GFI, CFI, and RMR.

We further tested the hypothesized model against a series of possible alternative models (Bentler, 1990). The hypothesized model can be considered nested within an alternative model to the extent that the alternative model includes an additional path(s) not included in the hypothesized model (e.g., a path linking autonomy support directly to intentions to dropout). The difference in chi-squares between the two models can be tested statistically, and this test of statistical significance provides information that one model fits the data significantly better than does the other.

Results

Structural Model

According to the hypothesized motivational model (see Figure 1), students' perceptions of how autonomy supportive their teachers are predict students' levels of self-determined motivation and perceived competence, which in turn predict their intentions to persist, even after controlling for the effect of school performance on intention to persist. The hypothesized model fit the observed data adequately. The chi-square statistic was significant, $\chi^2(135, N = 483) = 262.70$, $p < .01$, which was largely expected given the number of indicators and size of the sample. The χ^2/df ratio was 1.95 (i.e., under 2.00), and the critical-N value was 324.26 (i.e., over 200), two statistics that indicate our model fit the observed data well. Like the χ^2/df ratio and the critical-N statistic, the set of goodness-of-fit indicators all showed that the hypothesized model fit the data well: GFI = .94, CFI = .97, RMR = .04.

The path diagram showing the fully standardized parameter estimates within the hypothesized motivational model appears in Figure 2. All seven hypothesized paths in the model between latent variables were positive and statistically significant ($t > 2.00$). As shown in the figure, eight errors involving the interrelationships of items assessing the latent construct of autonomy support were allowed to correlate freely. This change was performed following an examination of the LISREL-generated modification indices. Adding the interrelationships between these items did not alter the associations among the latent constructs, as the correlation between the critical factor intercorrelations and the factor intercorrelations in the final model was .99, a result showing that these model modifications did not alter the factor intercorrelations (Newcomb & Bentler, 1988). The correlations between the five latent factors appear in Table 2.

Supplemental Analyses

To determine whether the hypothesized model was the best fitting possible model, we conceptualized the motivational model as nested within a pair of more complex models in which we added paths from autonomy support to, first, intention to persist, and, second, to school performance. The model with the added direct-effect path from Autonomy Support to Intention to Persist did not fit the data significantly better than the hypothesized model, $\Delta\chi^2(\Delta df = 1, N = 483) = 0.38$, *ns*, and the added standardized path was nonsignificant ($B = -.04$). The model with the added path from autonomy support to school performance also failed to fit the data significantly better than the hypothesized model,

Table 1
Correlation Matrix, Means, and Standard Deviations for the 19 Observed Variables in the Motivational Model to Predict Dropout Intentions

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. AS 1: Provides choices	—																		
2. AS 2: Conveys confidence	.65	—																	
3. AS 3: Tries to understand	.58	.59	—																
4. AS 4: Listens carefully	.63	.61	.61	—															
5. AS 5: Shows me respect	.60	.64	.55	.66	—														
6. AS 6: Encourages questions	.52	.52	.45	.53	.59	—													
7. AS 7: Able to share feelings	.64	.69	.58	.57	.51	.45	—												
8. AS 8: Feel understood	.54	.57	.49	.57	.63	.57	.52	—											
9. IM scale	.40	.43	.38	.42	.43	.37	.39	.48	—										
10. ID scale: Identified regulation	.38	.43	.37	.40	.44	.40	.43	.49	.71	—									
11. NSDM scale	−.21	−.13	−.11	−.17	−.27	−.19	−.15	−.28	−.38	−.34	—								
12. PC 1: Capable	.17	.24	.19	.18	.19	.13	.25	.27	.23	.31	−.15	—							
13. PC 2: Achieving	.28	.37	.32	.33	.34	.30	.34	.38	.38	.47	−.22	.66	—						
14. PC 3: Competent	.15	.21	.12	.18	.18	.13	.19	.22	.19	.27	−.05	.47	.53	—					
15. Intent 1: Consider dropping*	.14	.20	.19	.20	.27	.14	.22	.30	.32	.37	−.27	.31	.33	.18	—				
16. Intent 2: Intend to drop out*	.11	.16	.14	.19	.19	.13	.20	.28	.29	.34	−.24	.31	.29	.14	.72	—			
17. Intent 3: Unsure continuing*	.08	.14	.13	.07	.15	.07	.11	.19	.19	.25	−.17	.19	.21	.15	.51	.45	—		
18. GPA: Self-reported GPA	.02	.14	.05	.06	.14	.02	.11	.21	.20	.29	−.22	.28	.33	.25	.30	−.22	.23	—	
19. AP scale	.18	.32	.21	.25	.30	.24	.24	.33	.32	.46	−.15	.42	.50	.39	.33	−.31	.18	.57	—
M	4.67	4.60	4.13	4.44	4.93	4.99	4.27	4.56	3.80	4.96	4.01	5.32	5.18	4.94	1.70	1.84	1.11	3.06	5.11
SD	1.62	1.63	1.59	1.51	1.64	1.68	1.94	1.48	1.37	1.48	1.39	1.31	1.38	1.50	1.40	1.50	0.53	0.60	1.27

Note. $N = 483$. Variables 1–8 are indicators for autonomy support; Variables 9–11 are indicators for self-determined motivation; Variables 12–14 are indicators for perceived competence; Variables 15–17 are indicators for intention to persist; Variables 18 and 19 are indicators for school performance. An asterisk indicates that the item was reverse scored. Any correlation greater than $r = .10$, $p < .05$; any correlation greater than $r = .12$, $p < .01$; and any correlation greater than $r = .15$, $p < .001$. AS = autonomy support; IM = intrinsic motivation; NSDM = nonself-determined motivation; PC = perceived competence; GPA = grade point average; AP = anticipated performance.

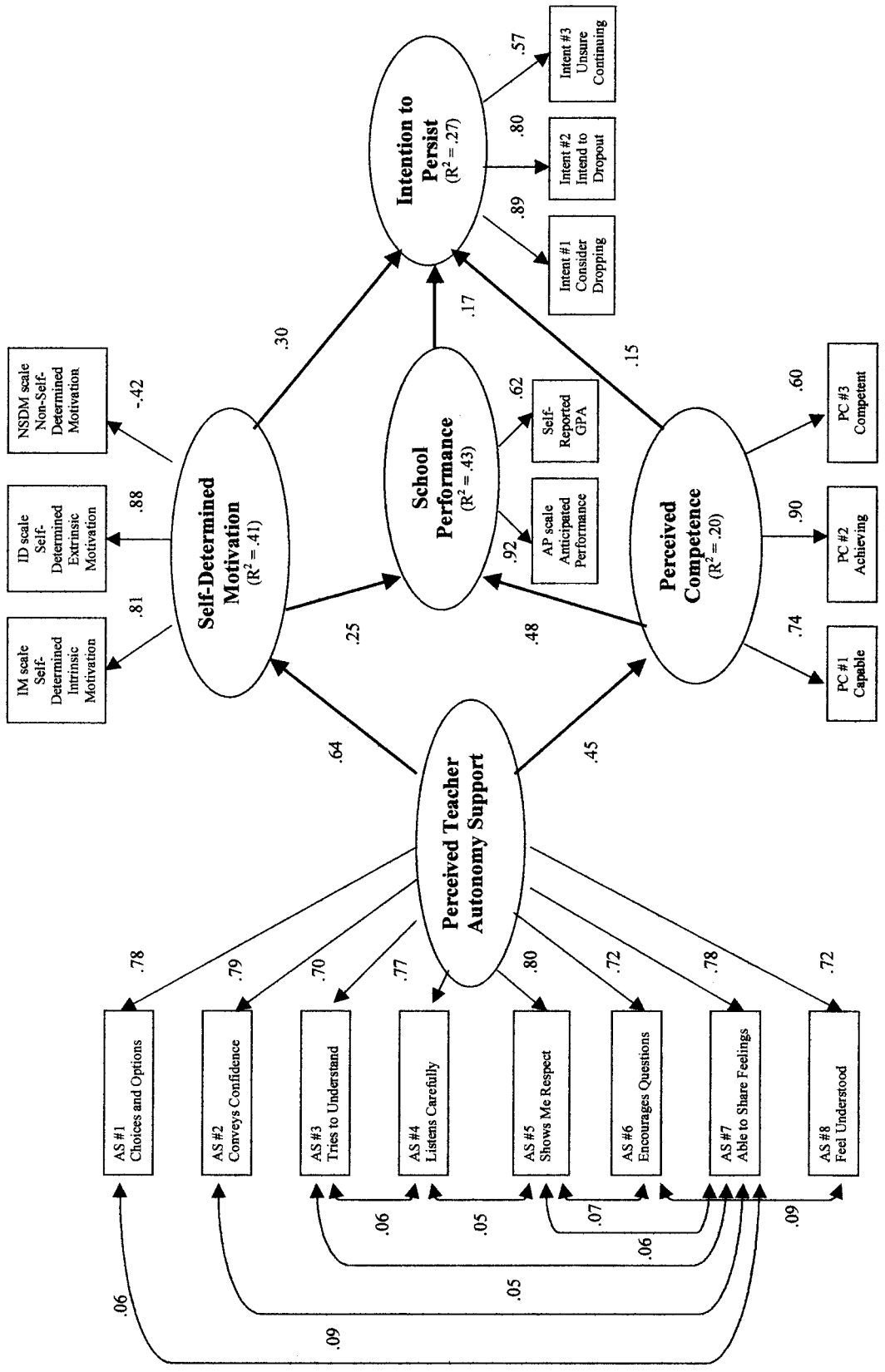

Figure 2. Fully standardized solution for the motivational model to predict dropout intentions. AS = autonomy support; IM = intrinsic motivation; ID = identified regulation; NSDM = nonself-determined motivation; AP = anticipated performance; GPA = grade point average; PC = perceived competence.

Table 2
Intercorrelation Matrix for the Five Latent Factors in the Motivational Meditation Model

Latent factor	1	2	3	4	5
Perceived teacher autonomy support	—	.64	.45	.38	.32
Self-determined motivation		—	.54	.51	.47
Perceived competence			—	.62	.41
School performance				—	.41
Intention to persist (vs. dropout)					—

$\Delta\chi^2(\Delta df = 1, N = 483) = 0.35$, *ns*, and the added standardized path was nonsignificant ($B = -.03$). We also checked the viability of an alternative model with reciprocal effects between school performance and perceived competence. The model with the added path from school performance to perceived competence also failed to fit the data significantly better than the hypothesized model (which included the path from perceived competence to school performance), $\Delta\chi^2(\Delta df = 1, N = 483) = 0.35$, *ns*, and the added standardized path was nonsignificant ($B = .22$). Given these findings, we rejected the pair of direct effects models and we further rejected the reciprocal effects model in favor of the hypothesized model.

Grade-Level Effects

Descriptive statistics and *F* ratios from one-way ANOVAs for students' reports of perceived teacher autonomy support, motivation, school performance, and intentions to persist by grade level appear in Table 3. Across grade level, students did not differ significantly from each other on either perceived teacher autonomy support, $F(3, 479) = 2.32$, *ns*, or any of the three items to assess intentions to persist (Fs < 2). One of the three scales to assess self-determined motivation—nonself-determined motivation—differed as a function of grade, $F(3, 479) = 4.22$, $p < .01$, with 9th graders showing higher nonself-determined motivation than either 11th or 12th graders. One of the three items to assess perceived competence—capable—differed as a function of grade, $F(3, 479) = 4.67$, $p < .01$, with 9th graders reporting a lower sense of being academically capable than students in the higher three grades, who did not differ significantly from one another. In addition, one of the two items to assess school performance—self-reported GPA—differed as a function of grade, $F(3, 479) = 4.64$, $p < .01$, with 9th graders reporting a lower GPA than students in the higher three grades, who did not differ significantly from one another. We tested the hypothesized model separately for 9th graders, 10th graders, 11th graders, and 12th graders, but results from the various indices of fit were almost identical and showed the same extent of fit, using the same set of six statistics (chi-square, χ^2/df ratio, critical-N, GFI, CFI, and RMR). Overall, these findings supported the invariance of the model across grade level.

Discussion

According to self-determination theory, students become engaged in school-related activity when instructional activities are interesting, relevant to their lives, and affirm their competencies. That is, perceptions of self-determination and competence constitute students' internal motivational resources that support their engagement and persistence in school. One important role teachers play in helping students develop these internal motivational resources is through the provision of autonomy-supportive classrooms, which we define as those that support and nurture students' needs for self-determination and competence. Like those before us (Vallerand et al., 1997), we found that when students perceived that these needs are being neglected or frustrated, then they become vulnerable to begin formulating dropout intentions. Our essential finding was that an autonomy supportive climate, as perceived by students, nurtured critical motivational variables (i.e., self-determined motivation, perceived competence) that predicted

Table 3
Means, Standard Deviations, and F Ratios for the Perceived Teacher Autonomy Support, Motivation, School Performance, and Intention to Continue Measures for Each of the Four Grade Levels

		Grade level								
		9th graders		10th graders		11th graders		12th graders		
Measure	Actual range	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*(3, 479)
Perceived teacher autonomy support	1–7	4.32	1.25	4.61	1.25	4.67	1.24	4.73	1.37	2.32
Intrinsic motivation	1–7	3.81	1.37	3.80	1.34	3.91	1.33	3.67	1.47	0.49
Identified regulation	1–7	4.76	1.45	5.05	1.48	5.16	1.44	4.88	1.52	1.74
Nonself-determined motivation	1–7	4.36_a	1.21	$4.03_{a,b}$	1.45	3.77_b	1.34	3.85_b	1.46	4.22*
Capable	1–7	4.95_a	1.44	5.36_b	1.25	5.51_b	1.23	5.48_b	1.25	4.67*
Achieving	1–7	4.94	1.46	5.25	1.26	5.28	1.28	5.27	1.48	1.65
Competent	1–7	4.75	1.54	4.92	1.45	5.07	1.42	5.05	1.59	1.14
Anticipated performance	1–7	4.87	1.35	5.20	1.20	5.24	1.18	5.15	1.31	2.05
Self-reported GPA	0.9–4.0	2.90_a	0.66	3.07_b	0.60	3.19_b	0.52	3.09_b	0.55	4.64*
Consider dropping	1–7	1.85	1.53	1.74	1.41	1.72	1.48	1.48	1.11	1.43
Intend to drop out	1–6	1.11	0.45	1.13	0.56	1.17	0.75	1.02	0.13	1.76
Unsure about continuing	1–7	2.01	1.53	1.83	1.56	1.84	1.62	1.68	1.21	0.93

Note. Means with different subscripts are significantly different from one another ($p < .05$) using Student–Newman–Keuls. GPA = grade point average.
* $p < .01$.

students' intentions to persist in high school, and they did so in a way that was above and beyond the effect perceived school performance had on intention to persist.

Poor achievement is an especially strong predictor of dropout intentions (e.g., Battin-Pearson et al., 2000). We agree strongly that poor achievement forecasts and helps shape students' intentions to drop out of school. We further agree that focusing dropout prevention efforts on improving students' academic success is a promising strategy, especially when prevention strategies focus on the academic achievement of children at earlier ages. What is important about our findings, however, is that a unique and substantial portion of dropout intentions also arise from the two important motivational resources of self-determined motivation and perceived competence. Hence, much can be gained in both theory and practice by thinking about dropout as not only an achievement issue but also as a motivation issue. All three predictors—perceived self-determination, perceived competence, and school performance—accounted for unique variance in dropout intentions, and the motivational model as a whole accounted for 27% of the variance in dropout intentions. By itself, our latent variable of school performance explained 17% of the variance in dropout intentions (17% represents the square of the .41 correlation between school performance and intention to persist reported in Table 2). Adding the latent motivational variables of self-determined motivation and perceived competence allowed us to explain an additional 10% of the variance in dropout intentions.

In offering this conclusion (i.e., dropout is not only an achievement issue, but it is also a motivation issue), we recognize the possible importance of additional motivational constructs as well. For instance, the perceived value of schooling appears to be a motivational process associated with both self-determined motivation and intention to continue (Wigfield & Eccles, 1992, 2000). As a case in point, students' perceived value of math is a strong predictor of their intentions (and actual behaviors) to continue taking math courses in the future (Meece, Wigfield, & Eccles, 1990). The high correlation we found between our identified regulation (i.e., self-determined extrinsic motivation) and perceived value scales helps substantiate the interrelationships among self-determined motivation, perceived value, and intentions to continue. Similarly, self-efficacy expectations (Bandura, 1997; Bandura & Schunk, 1981) and outcome expectations (Pekrun, 1993; Wigfield, 1994) contribute to student motivation in some of the same ways as does perceived competence. The concept of "possible selves" might also explain some of the motivational underpinnings of students' decision to continue their schooling (Cross & Markus, 1994; Day, Borkowski, Punzo, & Howsepian, 1994). Even within self-determination theory, a third psychological need is emphasized in addition to self-determination and competence, namely relatedness, which also explains some of the motivational underpinnings of students' engagement and commitment to school (Goodenow, 1993; Ryan & Powelson, 1991; Skinner & Belmont, 1993). Noting this potential, we encourage further investigations to use these additional motivational constructs in ways that supplement the constructs we included in our motivational mediation model. That notwithstanding, we find self-determination theory to be a particularly useful perspective on dropout intentions because the theory identifies not only two key motivational resources (i.e., self-determined motivation, perceived competence) but also the key teacher-provided climate variable that affects these motivational resources (i.e., teacher's motivating style as autonomy supportive vs. controlling).

Our investigation specifically focused on rural students. It is interesting to compare our findings on the beneficial effects of teachers' autonomy support on students' motivation across urban and rural samples, and we highlight two comparisons. First, all the hypothesized effects proposed in our motivation model (see Figure 1) were confirmed with our sample of rural high school students, just as these effects had been previously confirmed with samples of urban students (Vallerand et al., 1997). Therefore, what research on self-determination theory found to be true with urban students appears also to be true for rural students. Second, the magnitude of these effects can be compared across the two samples. Across both the urban and rural samples, the effects of self-determined motivation and perceived competence on intentions to persist were similar in magnitude. However, the effect of teachers' autonomy support on students' motivation (self-determined motivation, perceived competence) appears to be noticeably stronger for rural students than for urban students. Although we offer this impression tentatively, we are intrigued by the possibility that rural students' academic motivation may be relatively more embedded in the quality of their teachers' motivating styles.

We acknowledge three limitations that pertain to our measures and three more limitations that pertain to the generalizability of our findings. In terms of measurement-related limitations, the first is that we assessed students' holistic perception of all their teachers, because our goal was to investigate students' intentions to drop out of school (rather than to drop out of a particular subject area). We nonetheless acknowledge that students will perceive varying levels of autonomy support from different teachers and in different subject areas (e.g., English, science), as teachers' motivating styles vary considerably even within the same school (see Deci, Schwartz, et al., 1981). The second measurement-related limitation is that we did not assess socioeconomic status as an individual difference characteristic. Instead, we selected our participating schools according to their community-level characteristics (using NCES's criteria). The third measurement-related limitation involved our outcome measure—self-reported intention to persist in school. That is, we did not assess students' actual dropout behaviors. We intentionally selected this particular outcome measure, however, because we wanted to investigate students' decision-making process as they formulate intentions to continue versus drop out. What made our reliance on the self-reported measure possible was that Vallerand et al. (1997) had already shown that this outcome measure predicts students' actual dropout behaviors 1 year later.

Three aspects of our research limit the generalizability of our findings. The first was our reliance on a common method (self-reported questionnaire data) to assess each variable. Past studies show that our self-report measures do predict their behavioral manifestations (school performance, Battin-Pearson et al., 2000; dropout, Vallerand et al., 1997), but our reliance on a common method might overestimate the magnitude of the effects we found among the latent constructs. A second factor that might artificially increase these estimated effects is time. That is, we collected our data using a cross-sectional, rather than a longitudinal, research design. Experiences like having one's autonomy supported and formulating an intention to drop out of school occur over time and in such a way that a longitudinal research design could estimate the

effects in our model more precisely. The third generalizability-related limitation is that we studied students' perceptions of only their teachers. In addition, students' perceptions of the school climate as autonomy supportive versus controlling are influenced by their relationships with their parents (Grolnick & Ryan, 1989) and school administrators (Vallerand et al., 1997).

Our findings have practical implications. When teachers provide their students with autonomy-supportive environments, they provide a classroom climate capable of nurturing motivation directly and nurturing achievement and persistence indirectly. As to a direct effect on motivation, as teachers find ways to support students' interests, connect lessons to students' lives, and affirm students' competencies, they nurture students' perceptions of self-determination and competence. As self-determination and competence are enhanced, these motivational resources in turn promote achievement and persistence. Looking at the contribution of the two motivational resources separately (in Figure 2) reveals an interesting pattern related to the magnitude of their effects. Looking at how motivation affected intention to persist, the self-determination effect ($B = .30$) was twice the magnitude of the perceived competence effect ($B = .15$). Looking at how motivation affected perceived school performance, the perceived competence effect ($B = .48$) was about twice the magnitude of the perceived self-determination effect ($B = .25$). Hence, our findings suggest that (a) both motivational resources significantly and uniquely predict achievement and persistence, (b) achievement has relatively deeper roots in perceived competence, and (c) the intention to persist has relatively deeper roots in perceived self-determination.

Small, rural, and socioeconomically challenged schools need valid and achievable ways of compensating for the constraints they face as they strive to graduate 90% of their students. External opportunities and support systems are important allies to improve high school completion rates. Lacking access to these external resources, rural schools can turn to the more controllable inner resources of their students, namely, achievement and motivation. Dropout interventions that focus on the goal of reversing poor achievement have been shown to be effective. Our study goes one step further in suggesting a second ally to improving high school graduation rates in that we were able to highlight the potential effectiveness the motivational intervention strategy of providing students with a learning climate that support students' autonomy. In practice, doing so means providing classroom climates in which teachers offer their students choices and options, respect students' agendas, acknowledge their feelings and questions, and offer learning activities relevant to students' goals and aspirations.

References

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 41,* 586–598.

Battin-Pearson, S., Newcomb, M. D., Abbott, R. D., Hill, K. G., Catalano, R. F., & Hawkins, D. J. (2000). Predictors of early high school dropout: A test of five theories. *Journal of Educational Psychology, 92,* 568–582.

Bentler, P. M. (1990). Comparative fit indices in structural models. *Psychological Bulletin, 107,* 238–246.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88,* 588–606.

Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education, 84,* 740–756.

Bollen, K. A., & Long, J. S. (Eds.). (1993). *Testing structural equation models.* Newbury Park, CA: Sage.

Carmines, E. G., & McIver, J. P. (1981). Analyzing models with unobserved variables: Analysis of covariance structures. In G. W. Bohrnstedt & E. F. Borgatta (Eds.), *Social measurement: Current issues* (pp. 63–115). Beverly Hills, CA: Sage.

Colangelo, N., Assouline, S. G., & New, J. K. (1999). *Gifted education in rural schools: A national assessment.* Iowa City: University of Iowa Press.

Cross, S. E., & Markus, H. R. (1994). Self-schemas, possible selves, and competent performance. *Journal of Educational Psychology, 86,* 423–438.

D'Amico, J., Matthes, W., Sankar, A., Merchant, B., & Zurita, M. (1996). Young voices from the rural Midwest. *Journal of Research in Rural Education, 12,* 142–149.

Day, J. D., Borkowski, J. G., Punzo, D., & Howsepian, B. (1994). Enhancing possible selves in Mexican American students. *Motivation and Emotion, 18,* 79–103.

deCharms, R. (1972). Personal causation training in the school. *Journal of Applied Social Psychology, 2,* 95–115.

Deci, E. L. (1995). *Why we do what we do: Understanding self-motivation.* New York: Penguin Books.

Deci, E. L., Nezlek, J., & Sheinman, L. (1981). Characteristics of the rewarder and intrinsic motivation of the rewardee. *Journal of Personality and Social Psychology, 40,* 1–10.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum Press.

Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology, 53,* 1024–1037.

Deci, E. L., Schwartz, A., Scheinman, L., & Ryan, R. M. (1981). An instrument to assess adult's orientations toward control versus autonomy in children: Reflections on intrinsic motivation and perceived competence. *Journal of Educational Psychology, 73,* 642–650.

Deci, E. L., Spiegel, N. H., Ryan, R. M., Koestner, R., & Kauffman, M. (1982). Effects of performance standards on teaching styles: Behavior of controlling teachers. *Journal of Educational Psychology, 74,* 852–859.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation in education: The self-determination perspective. *Educational Psychologist, 26,* 325–346.

Flink, C., Boggiano, A. K., & Barrett, M. (1990). Controlling teaching strategies: Undermining children's self-determination and performance. *Journal of Personality and Social Psychology, 59,* 916–924.

Fortier, M. S., Vallerand, R. J., & Guay, F. (1995). Academic motivation and school performance: Toward a structural model. *Contemporary Educational Psychology, 20,* 257–274.

Fowler, W. J., Jr., & Walberg, H. J. (1991). School size, characteristics, and outcomes. *Educational Evaluation and Policy Analysis, 13,* 189–202.

Goodenow, C. (1993). Classroom belonging among early adolescent students: Relationships to motivation and achievement. *Journal of Early Adolescence, 13,* 21–43.

Grolnick, W. S., & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual differences investigation. *Journal of Personality and Social Psychology, 52,* 890–898.

Grolnick, W. S., & Ryan, R. M. (1989). Parent styles associated with children's self-regulation and competence in school. *Journal of Educational Psychology, 81,* 143–154.

Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology, 83,* 508–517.

Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the assessment of situational intrinsic and extrinsic motivation: The Situational Motivation Scale (SIMS). *Motivation and Emotion, 24,* 175–213.

Haller, E. J., & Virkler, S. J. (1993). Another look at rural–nonrural differences in students' educational aspirations. *Journal of Research in Rural Education, 9,* 170–178.

Harter, S. (1982). The Perceived Competence Scale for Children. *Child Development, 53,* 87–97.

Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research, 70,* 151–179.

Hoelter, J. W. (1983). The analysis of covariance structures: Goodness of fit indices. *Sociological Methods and Research, 11,* 325–344.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55.

Joreskog, K. G., & Sorbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language.* Hillsdale, NJ: Scientific Software International.

Marsh, H. W., Balla, J. R., & Hau, K. (1996). An evaluation of incremental fit indices: A clarification of mathematical and empirical properties. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation modeling: Issues and techniques* (pp. 315–353). Mahwah, NJ: Erlbaum.

Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indices in confirmatory factor analysis: Effects of sample size. *Psychological Bulletin, 103,* 391–411.

McGranahan, D. A. (1994, April). *Rural America in the global economy: Recent socioeconomic trends.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Meece, J. L., Wigfield, A., & Eccles, J. S. (1990). Predictors of math anxiety and its consequences for young adolescents' course enrollment intentions and performances in mathematics. *Journal of Educational Psychology, 82,* 60–70.

Miserandino, M. (1996). Children who do well in school: Individual differences in perceived competence and autonomy in above-average children. *Journal of Educational Psychology, 88,* 203–214.

Murray, J. D., & Keller, P. A. (1991). Psychology and rural America: Current status and future directions. *American Psychologist, 46,* 220–231.

National Center for Educational Statistics. (2001). *What's rural?* Retrieved February 22, 2001, from http://nces.ed.gov/surveys/ruraled/definitions.asp

Newcomb, M. D. (1990). What structural equation modeling can tell us about social support. In B. R. Sarason, I. G. Sarason, & G. R. Pierce (Eds.), *Social support: An interactional view* (pp. 26–63). New York: Wiley.

Newcomb, M. D., & Bentler, P. M. (1988). *Consequences of adolescent drug use.* Newbury Park, CA: Sage.

Patrick, B. C., Skinner, E. A., & Connell, J. P. (1989). What motivates children's behavior and emotion? Joint effects of perceived control and autonomy in the academic domain. *Journal of Personality and Social Psychology, 65,* 781–791.

Pekrun, R. (1993). Facets of adolescents' achievement motivation: A longitudinal expectancy-value approach. In P. Pintrich & M. Maehr (Eds.), *Advances in motivation and achievement* (Vol. 8, pp. 139–189). Greenwich, CT: JAI Press.

Reeve, J. (1996). *Motivating others: Nurturing inner motivational resources.* Needham Heights, MA: Allyn & Bacon.

Reeve, J., Bolt, E., & Cai, Y. (1999). Autonomy-supportive teachers: How they teach and motivate students. *Journal of Educational Psychology, 91,* 537–548.

Reeve, J., & Sickenius, B. (1994). Development and validation of a brief measure of the three psychological needs underlying intrinsic motivation: The AFS scales. *Educational and Psychological Measurement, 54,* 506–515.

Rigby, C. S., Deci, E. L., Patrick, B. P., & Ryan, R. M. (1992). Beyond the intrinsic–extrinsic dichotomy: Self-determination in motivation and learning. *Motivation and Emotion, 16,* 165–185.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology, 57,* 749–761.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55,* 68–78.

Ryan, R. M., & Grolnick, W. S. (1986). Origins and pawns in the classroom: Self-report and projective assessments of individual differences in children's perceptions. *Journal of Personality and Social Psychology, 50,* 550–558.

Ryan, R. M., & Powelson, C. (1991). Autonomy and relatedness as fundamental to motivation and education. *Journal of Experimental Education, 60,* 49–66.

Sansone, C., & Morgan, C. (1992). Intrinsic motivation and education: Competence in context. *Motivation and Emotion, 16,* 249–278.

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85,* 571–581.

Steinberg, L., Elmen, J. D., & Mounts, N. S. (1989). Authoritative parenting, psychosocial maturity, and academic success among adolescents. *Child Development, 60,* 1424–1436.

Stern, J. D. (Ed.). (1994). *The condition of education in rural schools.* Washington, DC: United States Department of Education, Office of Educational Research and Improvement.

Tanaka, J. S. (1993). Multifaceted conceptions of fit in structural equation models. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.

United States Department of Health and Human Services. (2000). *Healthy people 2010.* Retrieved February 22, 2001, from http://www.health.gov/healthypeople

Vallerand, R. J., & Bissonnette, R. (1992). Intrinsic, extrinsic, and amotivational styles as predictors of behavior: A prospective study. *Journal of Personality, 60,* 599–620.

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.

Wigfield, A. (1994). Expectancy-value theory of achievement motivation: A developmental perspective. *Educational Psychology Review, 6,* 49–78.

Wigfield, A., & Eccles, J. S. (1992). The development of achievement task values: A theoretical analysis. *Developmental Review, 12,* 265–310.

Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology, 25,* 68–81.

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychological values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology, 70,* 767–779.

Williams, G. C., Weiner, M. W., Markakis, K. M., Reeve, J., & Deci, E. L. (1994). Medical student motivation for internal medicine. *Journal of General Internal Medicine, 9,* 327–333.

Received June 18, 2001
Revision received December 20, 2001
Accepted January 4, 2002 ■