# Intrinsic and Extrinsic Motivational Orientations in the Classroom: Age Differences and Academic Correlates

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Age differences in intrinsic and extrinsic motivation and the relationships of each to academic outcomes were examined in an ethnically diverse sample of 797 3rd-grade through 8th-grade children. Using independent measures, the authors found intrinsic and extrinsic motivation to be only moderately correlated, suggesting that they may be largely orthogonal dimensions of motivation in school. Consistent with previous research, intrinsic motivation showed a significant linear decrease from 3rd grade through 8th grade and proved positively correlated with children's grades and standardized test scores at all grade levels. Extrinsic motivation showed few differences across grade levels and proved negatively correlated with academic outcomes. Surprisingly few differences based on children's sex or ethnicity were found. Causes and consequences of the disturbingly low levels of motivation for older, relative to younger, children are discussed.

*Keywords:* intrinsic motivation, extrinsic motivation, age differences, academic achievement, cultural differences

> I am always ready to learn although I do not always like being taught.
> —Winston Churchill

For the past half century, researchers have sought to study intrinsic motivation—the desire to engage in behaviors for no reason other than sheer enjoyment, challenge, pleasure, or interest (e.g., Berlyne, 1960; Hunt, 1965; White, 1959). This concept emerged in the heyday of Skinnerian thought and research, partially as a contrast to the motivation produced by the popular behavior modification programs of that era, which featured a heavy reliance on more extrinsic incentives and contingencies. Indeed, many early experimental studies on this topic demonstrated that functionally superfluous, but salient and contingent, extrinsic rewards can undermine existing intrinsic motivation (e.g., Deci, 1971; Kruglanski, Friedman, & Zeevi, 1971; Lepper, Greene, & Nisbett, 1973). Under specific conditions in these controlled experiments (e.g., Deci, Koestner, & Ryan, 1999; Lep-

per & Henderlong, 2000; Sansone & Harackiewicz, 2000), intrinsic motivation and extrinsic motivation appeared antithetical.

As other researchers moved from the study of situational manipulations to the study of individual differences in motivational orientations, intrinsic and extrinsic motivation continued to be characterized as opposing poles of a single dimension. Indeed, arguably the most famous of these individual difference scales—that of Harter (1980, 1981)—assesses intrinsic motivation solely in opposition to extrinsic motivation. On this scale, for example, children are provided with an example of some academic activity (e.g., reading books) and are asked to indicate the extent to which they typically engage in that activity for intrinsic (e.g., enjoyment) versus extrinsic (e.g., pleasing the teacher) reasons. Although it is a considerable strength of Harter's measure that children are explicitly asked about the reasons for their behaviors, there is no way for them to indicate that both or neither of these reasons may apply. Children can indicate only the degree to which they endorse one reason over the other.[1]

Harter's (1981) scale can be divided into motivational and informational components, and the former component has been used in numerous studies examining the relationships between intrinsic versus extrinsic motivation and children's academic behaviors (e.g., Ginsburg & Bronstein, 1993; Guay, Boggiano, &

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[1] Within the attribution and self-determination traditions, the distinction between intrinsic motivation and extrinsic motivation depends on individuals' perceived reasons for their behaviors. In more recent years, however, the concept of intrinsic motivation has been taken more generally as a measure of liking, enjoyment, interest, curiosity, and challenge seeking, which we discuss briefly below. The other widely cited scale of intrinsic motivation, Gottfried's (1985) Children's Academic Intrinsic Motivation Inventory, takes this latter approach.

Vallerand, 2001; Newman, 1990; Tzuriel, 1989; Wong, Wiest, & Cusick, 2002). This motivational component comprises three subscales. The first measures a preference for challenging schoolwork versus a preference for assignments that can be accomplished successfully with little effort. The second measures the extent to which behavior is motivated by curiosity or interest versus a desire to please the teacher or to obtain good grades. The third measures a preference for mastering academic material independently versus depending heavily on the teacher for guidance.

## Intrinsic Versus Extrinsic Motivation

Harter (1980, 1981) deliberately designed these three subscales to represent intrinsic versus extrinsic motivation as contrasting ends of a single dimension, but one might imagine that this opposition is not always necessary or appropriate in the average classroom. The first subscale arguably could represent two opposing poles of a single dimension: As the desire for challenging work increases, the desire for easy work likely decreases. It is certainly possible, however, that one's desire for either challenging or easy work might depend on the particular activity in question. The second subscale, representing motivation based on curiosity or interest versus motivation based on pleasing the teacher or receiving good grades, more clearly seems to represent two potentially orthogonal motivations. Many children may engage in an academic task both because it interests them and because it will please their teacher or help them to earn a good grade. Finally, the third subscale of independent mastery versus dependence on the teacher may also involve potentially orthogonal constructs, in that children may prefer to solve problems independently up to some point, beyond which they may need to turn to the teacher for guidance. Thus, children may be motivated by both independent problem solving and assistance from the teacher depending on the stage in the learning process and the particular problem in question. Across all three subscales, therefore, intrinsic and extrinsic motivation may not necessarily be polar opposites.

Of course, with Harter's (1981) scale, it is simply not possible for children to report themselves as simultaneously intrinsically and extrinsically motivated. A perfect negative correlation between these two constructs has been built into the scale. As Harter herself has noted, however, "one can also imagine situations in which intrinsic interest and extrinsic rewards might collaborate, as it were, to motivate learning" (Harter, 1981, p. 311). Indeed, Harter and Jackson (1992) found that a full 50% of their third-grade through sixth-grade participants endorsed a *both* option added to her original scale. This leads to an interesting question: Given an instrument that allowed an independent assessment of both intrinsic and extrinsic motivation, would a perfect (or even a strong) negative correlation necessarily result? A first aim of the present research, therefore, was to examine the relationship between intrinsic and extrinsic motivation using independent measures of these two constructs.

## Age Differences

Harter's (1981) scale has nonetheless proved an extremely important addition to the field, largely because of the striking developmental trends it has revealed. Specifically, Harter and others using her scale have consistently found a progressive and significant decline in intrinsic versus extrinsic motivation across the elementary and middle school years (e.g., Harter, 1981; Harter & Jackson, 1992; Newman, 1990; Tzuriel, 1989).

Of course, because of the construction of this scale, it is possible that the real phenomenon demonstrated in these studies involves a progressive increase in extrinsic motivation rather than a decrease in intrinsic motivation. Such an increase would hardly be surprising given the heavy use of extrinsic contingencies and incentives in many American classrooms and the increasing importance attached to grades and test scores by American schools as students get older (e.g., Eccles & Midgley, 1989; Kohn, 1993). The origin of these age trends, therefore, remains unclear: Does extrinsic motivation increase, or does intrinsic motivation decrease, as children progress through school? If intrinsic motivation is decreasing, this suggests that the solution may involve increasing the challenge, interest, and relevance of the curriculum. However, if extrinsic motivation is increasing, this suggests that the solution may involve minimizing the reward systems and extrinsic contingencies prevalent in American school systems. A second aim of the present research, therefore, was to examine age differences using independent measures of intrinsic and extrinsic motivation.

In spite of this ambiguity in Harter's (1981) original scale, other evidence suggests that there is indeed likely to be a developmental decrease in intrinsic motivation even when measured apart from extrinsic motivation. Previous studies have revealed progressive declines in children's commitment to their class work (Epstein & McPartland, 1976), their enjoyment of academic—but not nonacademic—activities (Sansone & Morgan, 1992), their pursuit of learning goals (e.g., Anderman & Midgley, 1997; Maehr & Anderman, 1993; Midgley, Anderman, & Hicks, 1995), their valuing of effort (e.g., Covington, 1984), their perceived competence (Eccles, Roeser, Wigfield, & Freedman-Doan, 1999; Nicholls, 1978; Stipek & MacIver, 1989), their ratings of the usefulness and importance of school (Wigfield et al., 1997), and their mastery behaviors in the face of challenging tasks (Rholes, Blackwell, Jordan, & Walters, 1980). Similarly, the most recent studies using Gottfried's (1985, 1990) more content-specific scales of academic intrinsic motivation likewise have revealed a developmental decrease in overall academic intrinsic motivation, with particularly marked decreases in the critical content areas of math and science (Gottfried, Fleming, & Gottfried, 2001).

By contrast, there is little evidence on which to base predictions about age differences in extrinsic motivation. On the one hand, given the increasing prevalence of rewards and other extrinsic contingencies in the middle school years (Eccles et al., 1993), one might expect extrinsic motivation to be higher for older children. On the other hand, the rewards and contingencies that teachers and parents provide may lose their power over time, as adolescents may increasingly value the peer group and decreasingly value authority figures. Clearly, it would be useful to examine age differences in extrinsic, as well as intrinsic, motivation.

## Links to Achievement

What are the consequences of a potential decrease in intrinsic motivation as children progress through school? Several studies have shown positive correlations between intrinsic motivation and academic achievement (e.g., Gottfried, 1985, 1990; Harter & Connell, 1984; Henderlong & Lepper, 1997; Lloyd & Barenblatt, 1984), suggesting that a decline in intrinsic motivation may signify a decline in achievement. It is certainly not surprising that children

might perform better in school to the extent that they seek challenges, are curious or interested in their schoolwork, and desire to master tasks. Hence, we expected a positive correlation between intrinsic motivation and academic outcomes.

How might extrinsic motivation relate to academic achievement? On the one hand, it may be that children who are particularly focused on the extrinsic consequences of their behaviors do particularly well on objective indicators of performance. Indeed, recent research conducted with college-student populations has revealed that performance goals—which arguably have a strong extrinsic component—can predict positive achievement outcomes (Barron & Harackiewicz, 2001; Elliot & McGregor, 2001; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002). On the other hand, such a performance orientation may be less adaptive for elementary and middle school populations (Midgley, Kaplan, & Middleton, 2001), as shown in research linking performance goals with decreased cognitive engagement (Meece, Blumenfeld, & Hoyle, 1988), a focus on ability rather than effort (Ames & Archer, 1988), self-handicapping (Midgley & Urdan, 2001), and avoidance of challenge (Dweck, 1999). A third aim of the present research, therefore, was to examine the relationship between indicators of both intrinsic and extrinsic motivation and student achievement.

## Ethnicity

A final aim of the present research was to examine these constructs and their relationships in a diverse population of students. Most intrinsic motivation research to date has involved largely middle-class participants of European descent. More recent research in the motivational literature, however, has begun to examine cultural differences, particularly between more independent Western cultures and more interdependent Eastern cultures (Elliot, Chirkov, Kim, & Sheldon, 2001; Iyengar & Lepper, 1999; Salili, Chiu, & Hong, 2001). For example, the classic Western finding that providing choices is beneficial to intrinsic motivation has proved more complicated than previously thought among Asian American populations. Thus, in studies with second-grade through fifth-grade children, Iyengar and Lepper (1999) found that intrinsic motivation was maximized for Asian American children when choices were made for them by their mother or by a group of their peers but was maximized for European American children when they personally made their own choices.

In particular, in cultures where the self has been hypothesized to be more interdependent and intertwined with significant others (see Fiske, Kitayama, Markus, & Nisbett, 1998; Markus & Kitayama, 1991), it may be less clear exactly what constitutes intrinsic and what constitutes extrinsic motivation. Is working to please one's mother extrinsic—as has been traditionally assumed in Western research—or intrinsic—as might be the case when mother constitutes a significant part of the self? We were therefore interested in examining the relationship between intrinsic and extrinsic motivation in both Asian American and European American groups. Specifically, we anticipated that intrinsic and extrinsic motivation would be less negatively correlated in Asian American than in European American children.

In summary, the present study was designed to address four primary questions: (a) What is the relationship between intrinsic and extrinsic motivation, (b) are there significant age differences in intrinsic and extrinsic motivation when these two constructs are measured independent of one another, (c) how are these two motivational orientations related to academic outcomes, and (d) with respect to the previous three questions, are there significant differences between European American and Asian American children?

## Method

### Participants

Participants were 797 third-grade through eighth-grade students from two public school districts in the San Francisco Bay Area of California. The first district ($n = 577$) was in a large urban area, and the second district ($n = 220$) was in a suburban area known for its academic excellence. Overall, participants in this cross-sectional study were roughly equally divided across the grade levels from three to eight, and there were approximately equal numbers of girls ($n = 401$) and boys ($n = 395$), with one child not reporting sex. In terms of ethnic identification, the total sample was primarily Asian American (42%) and Caucasian (34%), with a small percentage of African American (2%), Hispanic (5%), and children from other ethnic groups (10%). The Asian American group was largely Chinese American (76%) but also included students who identified themselves as Indian American, Korean American, Japanese American, Vietnamese American, and Filipino American, in order of decreasing frequency. A small group of children (7%) did not report their ethnic backgrounds.

### Measures

*Motivational orientation.* Harter's (1980, 1981) scale of intrinsic versus extrinsic orientation in the classroom provided the basis for our separate measures of students' reported intrinsic and extrinsic motivation. The original scale seeks to assess the extent to which students see themselves as either more intrinsically or more extrinsically motivated in school by asking them to report on their usual motivations for a variety of diagnostic classroom behaviors. Specifically, this scale asks students to indicate whether they see the reasons behind a number of their everyday classroom actions as more like one group of students described to them as extrinsically motivated or another group of students described to them as intrinsically motivated—as illustrated in the top panel of Figure 1.[2] In particular, Harter (1981) sought to assess three major dimensions in students' reported intrinsic versus extrinsic motivational orientations: preference for challenge (i.e., a desire for challenging vs. easy tasks), curiosity (i.e., a focus on personal curiosity/interest vs. a focus on pleasing the teacher and/or getting a good grade), and independent mastery (i.e., a desire for independent mastery vs. a dependence on the teacher for guidance and direction). As noted above, this scale has been widely used to assess student motivation across the elementary and middle school years.

In the present study, Harter's (1980, 1981) original scale of intrinsic versus extrinsic motivational orientation was modified to allow for an independent assessment of both intrinsic and extrinsic motivation by eliminating the assumption that these two constructs are necessarily polar opposites. Rather than forcing students to choose between one intrinsic and one extrinsic reason for performing each given behavior, this modified scale asked students to rate the degree to which both intrinsic and extrinsic reasons independently accounted for their academic behaviors in the classroom (see Lepper, Sethi, Dialdin, & Drake, 1997). For example, Harter's original item that asked children to choose whether they were more like kids who "work on problems to learn how to solve them" or kids who

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[2] Harter (1981) adopted this format to address concerns that self-report measures often capture socially desirable responses rather than accurate responses. Embedding examples of extrinsically motivated students as well as intrinsically motivated students in the response format implies that both types of students exist and that either choice is legitimate. Our findings suggest that this strategy was effective.

Sample Item from Harter's (1981) Scale of Intrinsic vs. Extrinsic Motivational Orientation:

| Really True for Me | Sort of True For Me | | | | Sort of True for Me | Really True for Me |
|---|---|---|---|---|---|---|
| ☐ | ☐ | Some kids work on problems to learn how to solve them | *BUT* | Other kids work on problems because you're supposed to | ☐ | ☐ |

Sample Item Above Decomposed into Separate Scales for Intrinsic and Extrinsic Motivation:

Intrinsic Item:

I work on problems to learn how to solve them.

☐   ☐   ☐   ☐   ☐

Extrinsic Item:

I work on problems because I'm supposed to.

☐   ☐   ☐   ☐   ☐

*Figure 1.*    Sample item from Harter's (1981) original scale and the decomposed scales used in the present study.

"work on problems because you are supposed to" was decomposed into two separate items, each with its own 5-point Likert-type scale, ranging from *not at all true for me* to *very true for me,* as presented in the lower panel of Figure 1. Thus, Harter's original 18 items assessing intrinsic versus extrinsic motivation were decomposed into 36 items—half of which assessed intrinsic motivation and half of which assessed extrinsic motivation. As with Harter's original measure, our new intrinsic motivation scale was initially based on subscales measuring preference for challenge, focus on curiosity, and desire for independent mastery, whereas our new extrinsic motivation scale was initially based on subscales measuring preference for easy work, focus on pleasing the teacher and getting good grades, and dependence on the teacher for guidance.

To examine the cohesion of these new scales, item–whole correlations were computed for each item with both the overall intrinsic motivation and the overall extrinsic motivation scales, excluding of course the particular item itself. These correlations revealed three items that proved problematic in our new format. First, the two items that assessed the importance students attached to grades (i.e., "I work really hard because I like to get good grades" and "I do extra projects so I can get better grades"), which represented an extrinsic motivational orientation in Harter's (1980, 1981) original items, proved correlated with both scales—and, surprisingly, more

highly correlated with the intrinsic than the extrinsic motivation scale. Additionally, a third item asking about students' desire to choose what to do next (i.e., "I like to make my own plans for what to do next"), which represented intrinsic motivation in Harter's scale, proved minimally related to either scale. These three items were therefore eliminated from our scales.

The remaining 17 intrinsic items and 16 extrinsic items were then subjected to separate principal-components factor analyses to examine the internal structure of these two new scales. Both varimax and oblique rotations were tested, but oblique rotations are emphasized because the subscales proved highly intercorrelated—though more so in the case of the three intrinsic subscales ($r$s of .67, .55, and .52) than in the case of the three extrinsic subscales ($r$s of .45, .36, and .33).

For the intrinsic motivation scale, examination of the eigenvalues and scree plot suggested that a one-factor solution was most appropriate. The first factor accounted for 40.0% of the variance, whereas the second and third factors accounted for only 8.7% and 6.7% of the variance, respectively. Therefore, we conducted a subsequent principal-components analysis of the intrinsic motivation items with a one-factor solution. Each of the 17 intrinsic items loaded .40 or higher on this one factor (see Appendix A), and all were therefore retained in the final scale for subsequent analyses. Items were internally consistent ($\alpha = .90$), and test–retest data collected

from participants in the second school district ($n = 208$) 6 weeks after the initial administration revealed a strong positive correlation between the two test administrations ($r = .74$, $p < .001$).

For the extrinsic motivation scale, examination of the eigenvalues and scree plot revealed that a three-factor solution was most appropriate and interpretable. All six of the items representing a desire for easy work loaded on the first factor, which accounted for 26.9% of the variance. Five of the six items representing a dependence on the teacher loaded on the second factor, which accounted for 11.4% of the variance, and three of the four items representing a desire to please the teacher loaded on the third factor, which accounted for 9.4% of the variance. Therefore, we conducted a subsequent principal-components analysis of the extrinsic items with a three-factor solution (see Appendix B). One item originally designed to represent a desire for easy work (i.e., "I like to just learn what I have to in school") was dropped both because it loaded on multiple factors and because of children's comments that it was difficult to understand. Two additional items (i.e., "I ask questions because I want the teacher to notice me" and "When I do not understand something right away I want the teacher to tell me the answer") were removed because they did not load on the factor they had been designed to represent. Therefore, the 13 remaining items were combined to form an overall extrinsic motivation scale ($\alpha = .78$) as well as three component scales: desire for easy work (5 items; $\alpha = .77$), desire to please the teacher (3 items; $\alpha = .73$), and dependence on the teacher (5 items; $\alpha = .67$). Test–retest reliability was adequate for the extrinsic motivation composite ($r = .74$, $p < .001$) as well as for the three extrinsic subscales (easy work $r = .71$, $p < .001$; please the teacher $r = .65$, $p < .001$; dependence on teacher $r = .65$, $p < .001$).

The validity of the intrinsic and extrinsic motivation measures was substantiated by findings that intrinsic and extrinsic motivation showed significant and differential correlations with two objective indices of academic achievement, as discussed in greater detail below. In addition, these new measures also showed some meaningful correlations with ratings of students' classroom motivation made on 7-point Likert-type scales by teachers in the first school district ($n = 299$). Thus, teachers' ratings of intrinsic motivation proved positively correlated ($r = .26$, $p < .001$) with students' reported intrinsic motivation and negatively correlated with students' reported overall extrinsic motivation ($r = -.19$, $p < .01$) and desire for easy work, ($r = -.29$, $p < .001$).

All analyses are reported using the 17-item scale of intrinsic motivation and 13-item scale of extrinsic motivation, as well as the three component scales of extrinsic motivation when they yielded results that differed from the overall composite. Analyses are not reported for the original subscales of intrinsic motivation because the subscale structure was not supported by our factor analysis. It is interesting to note that most subsequent researchers who have made use of Harter's (1980, 1981) scale also seem to have focused their analyses on the overall composite rather than the three component scales (e.g., Boggiano, 1998; Boggiano & Barrett, 1985; Ginsburg & Bronstein, 1993; Harter & Jackson, 1992; R. M. Ryan & Connell, 1989; Tzuriel, 1989).

*Social desirability.* For students in the second school district ($n = 219$), the Children's Social Desirability Scale (CSDS; Crandall, Crandall, & Katkovsky, 1965) was also administered to assess the degree to which children were motivated by a need for approval or a fear of disapproval in their responses to questions about intrinsic and extrinsic motivation, following the procedure of Harter (1981). The CSDS consists of 48 true–false items that describe everyday experiences of children (e.g., "Sometimes I do not like to share my things with my friends," "I never shout when I feel angry") and has been widely used with children in the elementary and middle school years. Because of the very high split-half reliabilities reported by Crandall and colleagues, our participants were asked to complete only half of the original scale, for a total of 24 items.

*Academic achievement.* Objective measures of academic achievement included both standardized achievement tests and annual report cards. Students' scores on the math and reading portions of the California Achievement Test were collected for the new academic period following

the year of the survey administration. Grades on report cards were collected for the year concurrent with the survey administration. Grade point averages (GPAs) were computed by transforming grades to a standard 4-point numerical scale (that is, A grades received a weight of 4.0, B grades a weight of 3.0, etc.) and averaging scores for language arts, math, social studies, science, and an elective course. As noted below, each of these measures was available for students in only one of the school districts studied.

## Procedure

A questionnaire including the separate indices of intrinsic and extrinsic motivational orientation, as well as basic demographic questions about sex, age, and ethnicity, was administered to students with parental consent in each of the participating classrooms. For students in the second school district, the measure of social desirability was also included in this questionnaire packet.

Classrooms were visited by one of seven (four female, three male) questionnaire administrators, who were often accompanied by other research assistants to aid in handing out and collecting the measures. The administrator gave instructions for completing the measures and, in particular, using the 5-point Likert-type scale. Students were told that they could indicate how true each item was for them by placing a check mark in one of five boxes of increasing size. They were provided with several unrelated sample statements (e.g., "I like to watch TV," "I do not like to get birthday presents"), and the administrator initiated class discussion about these statements to ensure that all students understood the meaning behind each of the five boxes that could be checked. Students were then asked to complete the questionnaire packets silently at their desks while the administrator remained in the room the entire time to answer any questions. When the last student finished, the administrator gave students another opportunity to ask questions and thanked them for their participation. This procedure lasted approximately 30 min in each classroom.

Several months later, measures of academic achievement were collected from students' records. Standardized test data were available for only a subset of students in the first school district ($n = 136$) and were not available in the second school district. Report-card grades were collected in the only second school district, where data on this measure were available for all but four of the students ($n = 216$).

## Results

### Preliminary Analyses

Because of our interest in age differences, the data for our measures of intrinsic and extrinsic motivational orientations were first examined for possible interactions between the grade level of the students and their school, sex, and ethnicity. There were no significant interactions with grade level for either motivational measure as a function of either school or sex. Data were therefore collapsed across the two school districts, wherever possible, and across boys and girls for all subsequent analyses.

For ethnicity analyses, comparisons were made only between Asian American and Caucasian participants because there were too few members of other ethnic groups to allow for meaningful analyses. Analyses are reported both for the entire group of Asian American children and for the Chinese American children only because they constituted the large majority (76%) of the Asian American sample. The few significant differences associated with ethnicity are discussed below. Unless otherwise stated, it should be assumed that there were no differences based on ethnicity and that the data were collapsed across the various ethnic groups.

## Relationship Between Intrinsic and Extrinsic Motivation

Our first main question, then, concerned the relationship between intrinsic and extrinsic motivation when the two are measured separately. The data indicated that, when assessed independently, intrinsic and extrinsic motivation were only moderately negatively correlated ($r = -.24$, $p < .01$). Although this correlation is statistically significant, the effect explains less than 6% of the variance, suggesting that children's intrinsic and extrinsic motivation in these classrooms can be viewed as two largely orthogonal constructs rather than as opposite ends of a single dimension. Indeed, further evidence of the lack of inherent opposition between the two is evident from the fact that the strength and direction of the relationship between intrinsic and extrinsic forms of motivation varied across the three subscales of extrinsic motivation. Thus, there was a strong negative correlation between intrinsic motivation and preference for easy work ($r = -.47$, $p < .01$), no significant correlation between intrinsic motivation and desire to please the teacher ($r = -.06$, $ns$), and a statistically significant but quite modest positive correlation between intrinsic motivation and dependence on the teacher ($r = .08$, $p < .05$). Table 1 presents the full correlation matrix.

There was also a significant relationship between intrinsic versus extrinsic motivation and children's ethnicity. In particular, the negative correlation between intrinsic and extrinsic motivation proved significantly stronger for Caucasian ($r = -.30$, $p < .01$) than for Chinese American ($r = -.11$, $p < .10$) students ($z = 2.32$, $p < .05$). The correlation for Caucasian students was also marginally stronger when compared with the entire group of Asian American students ($r = -.18$, $p < .01$; $z = 1.65$, $p < .10$). Analyses using the three component scales of extrinsic motivation revealed that the largest difference between ethnic groups was in the relationship between intrinsic motivation and the subscale representing a desire to please the teacher, which was negative for Caucasian students but positive for Asian American students. There was a significant difference between the correlation for Caucasian ($r = -.14$, $p < .05$) versus Chinese American ($r = .15$, $p < .05$) students ($z = 3.37$, $p < .01$) and between Caucasian versus the entire group of Asian American ($r = .06$, $ns$) students ($z = 2.48$, $p < .05$). Correlations were similar across the ethnic groups between intrinsic motivation and a desire for easy work ($rs = -.40$ to $-.52$) and between intrinsic motivation and a dependence on the teacher ($rs = .08$ to $.11$).

## Age Differences

Given the substantial independence of our measures of intrinsic versus extrinsic motivation, a second major issue concerns the

### Table 1
*Intercorrelations Between Intrinsic Motivation and Extrinsic Motivation Composites and Extrinsic Subscales*

| Scale | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Intrinsic motivation | — | | | | |
| 2. Extrinsic motivation | −.24*** | — | | | |
| 3. Easy work | −.47*** | .80*** | — | | |
| 4. Pleasing teacher | −.06 | .68*** | .37*** | — | |
| 5. Depending on teacher | .08* | .69*** | .27*** | .22*** | — |

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

changes that may occur as children grow older and progress through school. To examine age differences in both intrinsic and extrinsic motivation, therefore, we conducted one-way analyses of variance across the six grade levels studied (i.e., third through eighth grades).

*Intrinsic motivation.* Would Harter's (1981) finding of decreasing intrinsic motivation across grade levels still emerge when intrinsic motivation was measured independently of, rather than in opposition to, extrinsic motivation? Figure 2 presents a plot of students' self-reported intrinsic and extrinsic motivation as a function of their grade level. Consistent with Harter's original results, levels of reported intrinsic motivation were highest for the youngest students (third grade, $M = 4.07$, $SD = .67$) and lowest for the oldest students (eighth grade, $M = 3.42$, $SD = .75$), $F(5, 791) = 19.27$, $p < .001$. A weighted polynomial contrast assessing the linear trend across grade levels proved highly significant, $F(1, 791) = 92.58$, $p < .001$, and accounted for 96% of the between-groups variance.

Although in the original forced-choice version of her scale, Harter (1981) reported only a modest negative correlation ($r = -.15$) between social desirability (as assessed by the CSDS) and intrinsic motivational orientation, in the present decomposed version of this scale, children's scores on the CSDS proved both positively correlated with their intrinsic motivation scores ($r = .42$, $p < .001$) and negatively correlated with their extrinsic motivation scores ($r = -.24$, $p < .001$). In addition, the results of the CSDS indicated that social desirability pressures were higher for younger (third grade, $M = 11.74$, $SD = 4.06$) than older (eighth grade, $M = 7.46$, $SD = 4.62$) students, $F(5, 213) = 4.99$, $p < .001$.

Hence, one potential alternative explanation for the lower levels of reported intrinsic motivation with increasing age observed in the present study is that it is the need to appear socially desirable, rather than intrinsic motivation per se, that differs across grade levels. To test this, we used an analysis of covariance procedure to assess age differences in intrinsic motivation using social desirability as a covariate. This analysis indicated that the pattern of lower levels of intrinsic motivation with increasing grade remained significant, $F(5, 212) = 3.00$, $p < .05$, and a weighted contrast continued to indicate a strong linear trend, $F(1, 212) = 13.69$, $p < .001$, even after controlling for social desirability. Thus, age differences in social desirability do not appear to provide a sufficient alternative explanation for the lower levels of reported intrinsic motivation found with increasing grade levels in the present study.

*Extrinsic motivation.* Given the age differences in intrinsic motivation, how might extrinsic motivation have varied across grade levels for these same students? Although an omnibus test revealed significant age differences, $F(5, 791) = 5.05$, $p < .001$, inspection of the means, as shown in Figure 2, suggested that this was best described not by a linear trend but rather by a difference between the third and fourth grades, with little change thereafter. Indeed, Student-Newman-Keuls comparisons of all possible pairs of means revealed a significant ($p < .05$) difference between the extrinsic motivation scores of third-grade students and those of students at all other grade levels, which were not significantly different from one another.

A subsequent analysis of grade-level differences in extrinsic motivation excluding third-grade students confirmed no overall effect of grade level, $F(4, 645) = 1.34$, $ns$. Analyses testing for grade-level differences across the three component scales of extrinsic motivation revealed inconsistent patterns of data. With the
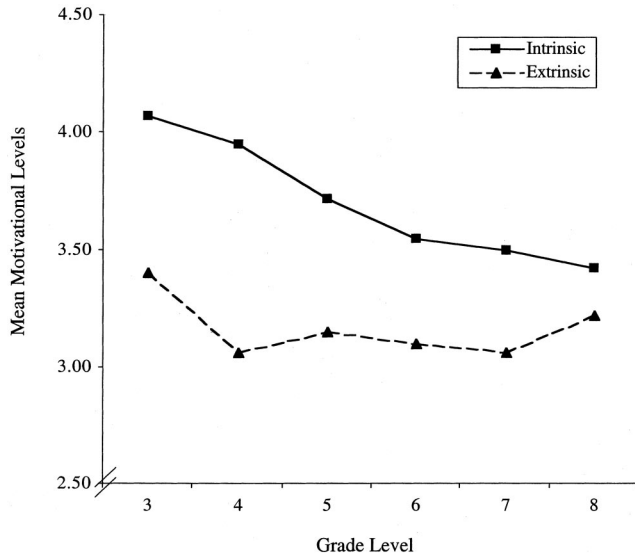
*Figure 2.* Mean levels of intrinsic and extrinsic motivation by grade level.

third-grade students excluded, age differences in the component scale of preference for easy work were significant, $F(4, 645) = 4.23$, $p < .01$, but the weighted contrast testing for a linear trend revealed that older children actually preferred easy work more than younger children, $F(1, 645) = 11.03$, $p < .01$. There were no significant differences across grade level in the desire to please the teacher, $F(4, 645) = 1.58$, *ns*, or dependence on the teacher, $F(4, 645) = 1.26$, *ns*.

In addition, for extrinsic motivation, there was a significant interaction between grade and ethnicity, suggesting that the trend of lower levels of reported extrinsic motivation with increasing age was slightly stronger for Chinese American than for Caucasian students, $F(5, 515) = 3.54$, $p < .01$. This same interaction between grade level and ethnicity was also significant using the full Asian American sample, $F(5, 610) = 2.59$, $p < .05$. Once again, however, these significant interactions disappeared when the third-grade children were excluded: Chinese American comparison, $F(4, 409) = 1.77$, *ns*; Asian American comparison, $F(4, 486) = 1.83$, *ns*.

### Relationship to Achievement

Finally, because the present results suggest that intrinsic motivation and extrinsic motivation are potentially orthogonal constructs, a third major question concerns the implications of these two motivational orientations for academic achievement. Might both forms of motivation enhance performance, for example, or would intrinsic and extrinsic sources of motivation show different relationships to school or test performance? Recall that in the two school districts in which the present study was conducted, different measures of academic performance were available—children's grades in one case and their scores on later standardized achievement tests in the other—thus providing an opportunity for testing the generality of any relationships observed with our motivational measures.

*Grades.* The relationships between our motivational measures and children's grades in the second school district are shown in the

upper half of Table 2. As one would expect from the extensive literature documenting the benefits of intrinsic motivation, there was a significant positive correlation between overall GPA and intrinsic motivation ($r = .34$, $p < .001$). It is interesting to note that the correlation between extrinsic motivation and overall GPA was also significant but, in this case, negative ($r = -.23$, $p < .01$).[3] Correlations computed separately for the math and language arts components of GPA and the three subscales of extrinsic motivation revealed largely similar patterns. Specifically, five of the six correlations between the extrinsic motivation subscales and the math and language arts grades were negative, and four of the six were at least marginally significant, with the weakest relations emerging for the subscale measuring dependence on the teacher. There were no differences in the patterns of relationships based on ethnicity or sex. Finally, although small sample sizes precluded meaningful formal comparisons of grade-level differences, the patterns of correlations appeared similar across the six grades. The correlation between intrinsic motivation and GPA was positive at all six grade levels, and the correlation between extrinsic motivation and GPA was negative at five of the six grade levels, with third grade being the exception.

*Test scores.* Similar relationships emerged when academic achievement was assessed in the first school district by students' performance on standardized tests, as shown in the lower half of Table 2. Thus, standardized test scores proved both positively correlated with intrinsic motivation ($r = .27$, $p < .01$) and negatively correlated with extrinsic motivation ($r = -.32$, $p < .001$).[4] Correlations computed separately for the math and reading portions of the standardized test and for the three subscales of extrinsic motivation revealed largely similar patterns. All six correlations between the subscales of extrinsic motivation and the math and reading portions of the test were negative, and three of the six were significant, with the weakest relations again emerging for the subscale measuring dependence on the teacher. There were no significant differences based on ethnicity or sex for this measure. Too few test scores were available to allow a meaningful comparison of correlations by grade level.

### Discussion

In the classroom, it seems, intrinsic and extrinsic motivation can and do coexist. When measured separately, these two orientations proved only moderately correlated, suggesting that they represent two somewhat orthogonal dimensions of motivation rather than simply the opposite ends of a single dimension. The present study suggests that the critical issue is not whether a child is intrinsically

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[3] To test the simultaneous effects of intrinsic and extrinsic motivation, we conducted a regression analysis using intrinsic and extrinsic motivation as the predictor variables and GPA as the outcome variable. Similar to the correlational analyses, intrinsic motivation significantly and positively predicted GPA ($\beta = .29$, $p < .01$), and extrinsic motivation negatively but not significantly predicted GPA ($\beta = -.10$, *ns*).

[4] To test the simultaneous effects of intrinsic and extrinsic motivation, we conducted a regression analysis using intrinsic and extrinsic motivation as the predictor variables and standardized test score as the outcome variable. Similar to the correlational analyses, intrinsic motivation significantly and positively predicted test scores ($\beta = .21$, $p = .01$), and extrinsic motivation significantly and negatively predicted test scores ($\beta = -.27$, $p < .01$).

Table 2
*Correlations Between Motivational Orientations and Achievement Measures*

| Achievement measure | Motivational orientation | |
| --- | --- | --- |
| | Intrinsic motivation | Extrinsic motivation |
| GPA—Overall | .34*** | −.23** |
|   GPA—Language arts | .23*** | −.17* |
|   GPA—Math | .25*** | −.15* |
| CAT5—Overall | .27** | −.32*** |
|   CAT5—Reading | .21* | −.30*** |
|   CAT5—Math | .28** | −.28** |

*Note.* GPA = grade point average; CAT5 = California Achievement Test.
*** $p < .001$. ** $p < .01$. * $p < .05$.

or extrinsically motivated but how much intrinsic and how much extrinsic motivation that child displays (Lepper & Henderlong, 2000; Lepper et al., 1997).

From a functional perspective, this makes perfect sense. In fact, it may be quite adaptive for students to seek out activities that they find inherently pleasurable while simultaneously paying attention to the extrinsic consequences of those activities in any specific context. Seeking only immediate enjoyment with no attention to external contingencies and constraints may substantially reduce a student's future outcomes and opportunities. Conversely, attending only to extrinsic constraints and incentives can substantially undermine intrinsic interest and the enjoyment that can come from learning itself. Certainly, the present results confirm the value of independent assessments of both intrinsic and extrinsic motivations.

### Assessing Student Motivation

Our modified version of Harter's (1980, 1981) scale is an initial step toward this end. Indeed, intrinsic and extrinsic motivations were assessed independently in the present study with instruments that have been shown to be both reliable and valid and that add to the literature in several meaningful ways. Thus, our decomposed version of Harter's original scale provides the first independent measure of extrinsic motivation for elementary and middle schoolchildren (for a somewhat comparable adult measure, see Amabile, Hill, Hennessey, & Tighe, 1994). Although scales tapping similar constructs exist, they do not address the range of extrinsic motives included in Harter's analysis. For example, the Self-Regulation Questionnaire (R. M. Ryan & Connell, 1989) assesses a continuum of self-regulatory tendencies, ranging from external to intrinsic, but focuses exclusively on autonomy, which captures only one dimension of extrinsic motivation as conceptualized in the present study. Moreover, although this self-regulation measure has been used with elementary and middle schoolchildren (Miserandino, 1996; Patrick, Skinner, & Connell, 1993; R. M. Ryan & Connell, 1989), no analyses of developmental trends or age differences have been reported to date.

A second advantage of our measures of intrinsic and extrinsic motivation relates to the removal of several items from Harter's (1980, 1981) original scale that were either psychometrically or conceptually problematic in the new format. In particular, the two

items assessing children's desire to achieve good grades proved especially problematic. Harter's original scale defined engaging in a task to receive good grades as inherently extrinsic, but the situation is arguably more complex (e.g., Deci & Ryan, 1985; Lepper & Henderlong, 2000). In the sense intended by Harter's original measure, desiring good grades can indicate that children are engaging in academic behaviors merely as a means to some extrinsic end. In another sense, however, grades can also provide useful information about competence and mastery, and desiring this sort of feedback may reflect an intrinsic interest in the material or activity rather than an extrinsic orientation. This latter interpretation, in fact, is supported by the data in the present study. By removing the items dealing with a desire for good grades, our decomposed scale moves toward assessing extrinsic motivation with greater precision.

Third, the predictive validity of the instrument was demonstrated by significant correlations between the intrinsic motivation composite and teacher reports of intrinsic motivation, as well as by substantial relationships between both the intrinsic and extrinsic composites and two separate objective measures of academic achievement. The correlations observed in this study with students' grades and their achievement test scores, in particular, are as high as or higher than those reported for any other such scales.

Fourth, the present scale permitted a demonstration of potentially important age differences in intrinsic motivation, as is discussed in more detail below. Finally, both the original and decomposed versions of Harter's (1980, 1981) scale explicitly address the reasons behind students' actions and choices and thus provide an important complement to other measures of intrinsic motivation that assess students' attitudes toward particular activities or content domains (e.g., Gottfried, 1985, 1990). We believe that both types of assessment have merit and that some combination of the two may, in fact, be optimal. Thus, it would be useful to ask children not just if they like to read books because they are curious and if they like to read books because they want to please the teacher but also if they simply like to read books.

Despite the advantages of our modified measure, however, we do not present this initial effort as a finished product. First, in our simple decomposition of Harter's (1980, 1981) measure, it appears that some of the extrinsic motivation subscales are less clearly independent of intrinsic motivation than others. In particular, the subscale assessing a desire for easy work was substantially negatively correlated with intrinsic motivation, suggesting that these constructs may approximate opposite ends of a single dimension. Of course, it is possible simultaneously to seek challenge and be guided by natural curiosity for some activities while desiring easy work for others or to exhibit intrinsic motivation for certain aspects of a given activity but seek a quick and easy solution for other aspects; however, we are not convinced that these are independent constructs in our current scale. On the other hand, it is easy to imagine that the degree to which one engages in a behavior out of curiosity, interest, or a desire to confront challenges can be independent of the degree to which one engages in that same behavior out of a desire to please a teacher. An argument for the coexistence of intrinsic and extrinsic motivation is far more intuitive in this case, as corroborated by the absence of a correlation between intrinsic motivation and the subscale measuring a desire to please the teacher in the present study.

A second hesitation arises because Harter's (1980, 1981) scale—in both its original and its decomposed form—defines

extrinsic motivation largely in terms of the goals of pleasing and depending on one's classroom teachers. In a more comprehensive measure, one might want to include other relevant motives, such as pleasing or depending on one's parents and family, one's class-mates and friends, and the like (Urdan & Maehr, 1995; Wentzel & Wigfield, 1998). This may be especially critical for measuring extrinsic motivation in the middle school years when students may work (or fail to work) to please their peer group (A. M. Ryan, 2000). Constructing additional items along these lines may also help increase the reliability of the extrinsic motivation subscales, some of which now consist of only three items.

Finally, it is worth considering why extrinsic motivation consists of three factors but intrinsic motivation consists of only one. It is certainly possible that extrinsic motivation is inherently a more multifaceted construct than intrinsic motivation. Although intrinsic motivation generally involves a desire to engage in behaviors for their own inherent rewards, extrinsic motivation generally involves a desire to engage in behaviors for a variety of other reasons. Indeed, Ryan, Deci, and their associates proposed only one true form of intrinsic motivation but a continuum of extrinsic motivations ranging from more externally to more internally regulated behaviors (for an overview, see R. M. Ryan & Deci, 2000). In our particular scales as well, the intrinsic items are oriented around approach motivations, whereas the extrinsic items represent a mixture of approach (e.g., desire to please one's teacher) and avoidance (e.g., desire for easy work) motivations. At present, it is unclear whether the complex nature of extrinsic motivation is due to the particular items in our scale or to the inherent nature of the construct. At issue is whether we might have oversimplified the nature of intrinsic motivation. Future work could explore this interesting possibility by considering a more extensive set of intrinsic motivations (e.g., Malone & Lepper, 1987) in the process of scale construction.

### Age Differences

Recall Harter's (1981) provocative finding of a continuous developmental decrease in intrinsic motivation from third through ninth grades. One clear benefit of the present decomposed measure is that it allowed us to determine whether this original finding truly represented a decrease with age in students' intrinsic motivation or instead represented a significant increase with age in students' extrinsic motivation. Given the different theoretical and practical implications that would follow from these two interpretations, measuring intrinsic and extrinsic motivation independently was a critical step.

Adding to the evidence that the two orientations are largely independent, intrinsic motivation declined across the grade levels tested whereas extrinsic motivation changed very little, if at all. The decrease in intrinsic motivation across age groups, of course, is consistent with an abundance of prior research suggesting that positive academic beliefs and behaviors gradually erode as chil-dren progress through the school system (e.g., Anderman & Maehr, 1994; Nicholls, 1978; Sansone & Morgan, 1992). It is also consistent with more recent findings by Gottfried et al. (2001) that showed decreases on intrinsic motivation measures assessing 9-year-old through 17-year-old students' liking of reading, math, science, and school in general.

What, then, accounts for this troubling decrease in intrinsic motivation? The decline is almost certainly overdetermined, but

several key explanations have repeatedly emerged in the literature. It may be that these decreases are the cumulative result of the constant imposition of extrinsic constraints and contingencies on children's learning in school (Deci & Ryan, 1985; Kohn, 1993). Indeed, schools appear to tighten controls and reduce choices just as students' autonomy needs begin to increase (e.g., Eccles et al., 1993; Midgley & Feldlaufer, 1987). It is clear from the results of the present study, however, that intrinsic motivation is certainly not being supplanted by extrinsic motivation in the middle school years. It may also be that learning becomes increasingly decon-textualized, such that students find increasingly little that is di-rectly relevant or useful in their daily lives (e.g., Brown & Cam-pione, 1998; Bruner, 1962, 1966, 1996), or that students' ability beliefs (e.g., Nicholls, 1978) and goal orientations (e.g., Dweck, 1999) shift from being positive and task focused to being more pessimistic and performance focused. These forces and others may contribute to the troubling trend that the more time children spend in American schools, the less pleasure they seem to take in classroom learning and achievement.

In spite of this decrease in intrinsic motivation, extrinsic moti-vation changed very little across the grade levels. Indeed, the only measurable difference after third grade was a linear increase in the desire for easy work, suggesting that children may be gradually adopting a work-avoidance orientation as they progress through school (Eccles, Wigfield, & Schiefele, 1998; Nicholls, Cobb, Wood, Yackel, & Patashnick, 1990). Much like extrinsic motiva-tion, such an orientation has been linked to negative performance outcomes (Meece et al., 1988). Future research should more sys-tematically address the diverging developmental paths across the component scales of extrinsic motivation, as well as the extent to which these components may map onto other motivational con-structs, such as work-avoidance goals.

### Motivation and Achievement

Our separate measures of intrinsic and extrinsic motivation also allowed for an examination of the achievement outcomes associ-ated with these two motivational orientations. Not surprisingly, there was a positive relationship between intrinsic motivation and performance both in class and on standardized tests. As intrinsic motivation theorists have long argued, being interested and en-gaged in the process of education results in better learning and achievement (e.g., Cordova & Lepper, 1996; Deci & Ryan, 1985; Gottfried, 1985). Perhaps more interesting is the negative relation-ship between both indices of performance and extrinsic motiva-tion, which was seen for both the composite measure and the individual subscales, with the exception of the subscale assessing dependence on the teacher. That is, to the extent that children reported a desire for easy work and an aim to please their teachers, they performed worse both on standardized tests and in regular classroom assessments (see also Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987; Ginsburg & Bronstein, 1993). This demonstration of the adaptive value of intrinsic motivation relative to extrinsic motivation is particularly informative in light of recent debates about the impact of tangible rewards and other forms of extrinsic motivation on intrinsic interest and creativity (e.g., Deci et al., 1999; Eisenberger & Cameron, 1996; Eisenberger, Pierce, & Cameron, 1999; Lepper, Henderlong, & Gingras, 1999).

Of course, these are only correlational findings, and it is unclear whether it is the type of motivation that drives achievement, the

level of achievement that drives the type of motivation, or some combination of the two. It is certainly plausible that children who do well in school might come to enjoy learning, feel capable of taking on challenges, and like to master the material independently as a result of receiving high marks and positive feedback. It is also possible that children who do poorly in school are more often subjected to lectures from teachers and parents about how and why they should be doing better, thus shifting their attention to more external sources of motivation. At least some evidence, however, suggests that democratic parenting practices are positively correlated with academic achievement even when controlling for previous academic achievement (Steinberg, Lamborn, Dornbusch, & Darling, 1992).

### Ethnicity

A final contribution of the present study is the examination of potential ethnic differences in the two motivational orientations and their correlates. Given the interdependence of the self and significant others in Asian cultures (e.g., Iyengar, Lepper, & Ross, 1999; Markus & Kitayama, 1991; Shweder et al., 1998), it is not surprising that there was a stronger negative correlation between intrinsic and extrinsic motivation for Caucasian than for Asian American children. Notably, the correlation between intrinsic motivation and a desire to please one's teacher was actually positive for Asian American children but—as expected—negative for Caucasian children. For children of Asian descent, pleasing others appears not to be inherently oppositional to seeking challenge, being curious, and desiring independent mastery. It is important to note that this suggests that intrinsic and extrinsic motivation may be more fluid and overlapping for Asian American than Caucasian children. Where children in the United States may see pressure from parents or teachers as externally imposed constraints, children in more interdependent contexts may see useful supports that serve the needs of the family and society (Iyengar & Lepper, 1999; Stevenson & Stigler, 1992).

Perhaps the most interesting finding with respect to both ethnicity and sex, however, was the relative lack of significant differences. Although this is consistent with several studies in the broader intrinsic motivation literature that have failed to reveal main effects of sex or ethnicity or interactions involving these demographic characteristics and age (e.g., Gottfried, 1985, 1990; Gottfried et al., 2001; Newman, 1990), few previous studies have included substantial Asian American samples. Given the many achievement-related differences reported between Asian and American students (Stevenson, Chen, & Lee, 1993; Stevenson, Lee, & Stigler, 1986) and between Asian American and Anglo American students (Eaton & Dembo, 1997; Iyengar & Lepper, 1999), one might have expected the present study to reveal more striking differences along ethnic lines. Although this may suggest a stronger role for the school environment than for the familial environment in shaping children's motivational beliefs and behaviors, it is important to remember that the Asian American participants in the present study were largely acculturated and were proficient in English. A similar study with Asian students living in their countries of origin might more accurately assess the effects of such cultures on the patterns of relationships between intrinsic and extrinsic motivations and academic behaviors.

### Conclusion

The lower levels of intrinsic motivation for older versus younger children reported here are troubling. Not only do children seem to be losing their enjoyment of the learning process itself but the systems of extrinsic incentives and constraints that American schools employ to keep students on track do not effectively compensate for the declines in intrinsic motivation. In our view, this is a real societal problem.

One issue not addressed by the present scales is the development of internalized motivation—those originally external motives that have over time become incorporated into one's personal goal or value systems. Although studying for an exam may not always hold intrinsic interest, for example, students could learn that it is indeed good for them and is a worthwhile—albeit not thoroughly enjoyable—pursuit. Given the present data, including a measure of these internalized sorts of motives could be potentially useful and informative. For, although intrinsic motivation appears to decrease developmentally, it is possible that it is supplanted by these more internalized forms of motivation. In fact, there is some suggestion in the literature that internalized reasons do gradually supplant extrinsic reasons for engaging in disliked behaviors (Chandler & Connell, 1987) and that there are specific teaching practices that facilitate internalization (Deci, Eghrari, Patrick, & Leone, 1994). Future research should develop motivational assessments that track intrinsic, extrinsic, and internalized motivations simultaneously (see R. M. Ryan & Connell, 1989). Working to enhance both intrinsic motivation and the internalization of extrinsic motivation may help to maximize—or, at least, to minimize the loss of—children's motivation to learn.

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*(Appendixes follow)*

## Appendix A

### Items and Factor Loadings for the Intrinsic Motivation Scale

| Original subscale/item description | Factor loading |
|---|---|
| **Challenge** | |
| I like hard work because it's a challenge. | .66 |
| I like to learn as much as I can in school. | .54 |
| I like to go on to new work that's at a more difficult level. | .67 |
| I like those school subjects that make me think pretty hard and figure things out. | .75 |
| I like difficult problems because I enjoy trying to figure them out. | .74 |
| I like difficult schoolwork because I find it more interesting. | .80 |
| **Curiosity** | |
| I ask questions in class because I want to learn new things. | .56 |
| I do extra projects because I can learn about things that interest me. | .63 |
| I read things because I am interested in the subject. | .41 |
| I do my schoolwork to find out about a lot of things I've been wanting to know. | .66 |
| I work really hard because I really like to learn new things. | .71 |
| I work on problems to learn how to solve them. | .68 |
| **Independent mastery** | |
| I like to try to figure out how to do school assignments on my own. | .56 |
| When I don't understand something right away I like to try to figure it out by myself. | .56 |
| When I make a mistake I like to figure out the right answer by myself. | .62 |
| If I get stuck on a problem I keep trying to figure out the problem on my own. | .62 |
| I like to do my schoolwork without help | .47 |

## Appendix B

### Items and Factor Loadings for the Extrinsic Motivation Scale

| Original subscale/item description | Factor 1 | Factor 2 | Factor 3 |
|---|---|---|---|
| **Easy work** | | | |
| I don't like to figure out difficult problems. | .58 (.56) | | |
| I like to learn just what I have to in school.[a] | .34 (.41) | | .49 (.54) |
| I don't like difficult schoolwork because I have to work too hard. | .74 (.71) | | |
| I like easy work that I am sure I can do. | .72 (.71) | | |
| I like to stick to the assignments which are pretty easy to do. | .74 (.73) | | |
| I like school subjects where it's pretty easy to just learn the answers. | .74 (.73) | | |
| **Pleasing teacher** | | | |
| I read things because the teacher wants me to. | | | .81 (.78) |
| I do my schoolwork because teacher tells me to. | | | .83 (.81) |
| I work on problems because I'm supposed to. | | | .68 (.70) |
| I ask questions because I want the teacher to notice me.[a] | | (.33) | |
| **Dependence on teacher** | | | |
| When I don't understand something right away I want the teacher to tell me the answer.[a] | .51 (.51) | | |
| I like to have the teacher help me with my schoolwork. | | .64 (.65) | |
| When I make a mistake I like to ask the teacher how to get the right answer. | | .66 (.65) | |
| If I get stuck on a problem I ask the teacher for help. | | .68 (.67) | |
| I like the teacher to help me plan what to do next. | | .55 (.56) | |
| I like to ask the teacher how school assignments should be done. | | .67 (.66) | |

*Note.* Loadings from the oblique rotation are presented above, with loadings from the varimax rotation following in parentheses. For clarity of presentation, only loadings of .32 or higher are included.
[a] Item not used in scale construction.