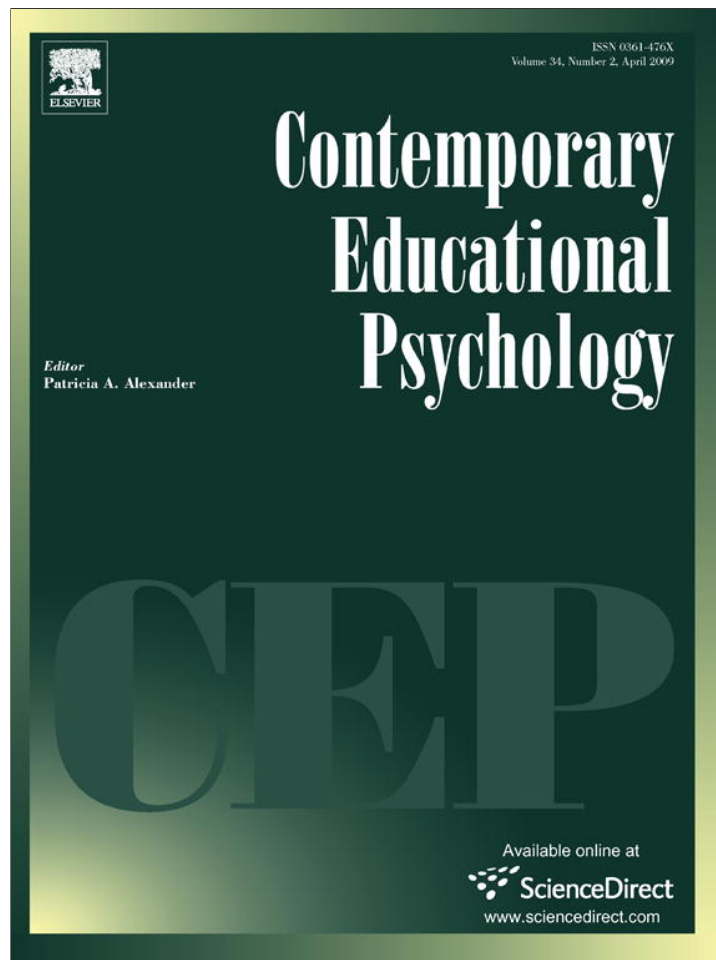


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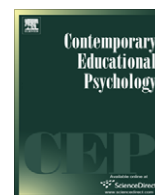
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Within-year changes in children's intrinsic and extrinsic motivational orientations: Contextual predictors and academic outcomes

Jennifer Henderlong Corpus*, Megan S. McClintic-Gilbert, Amynta O. Hayenga

Department of Psychology, Reed College, 3203 SE Woodstock Blvd., Portland, OR 97202, United States

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ABSTRACT

The present study was designed to investigate the nature, timing, and correlates of motivational change among a large sample ($N = 1051$) of third- through eighth-grade students. Analyses of within-year changes in students' motivational orientations revealed that both intrinsic and extrinsic motivations decreased from fall to spring, with declines in intrinsic motivation especially pronounced for the adolescents and declines in extrinsic motivation especially pronounced for the elementary students. These changes in motivation were explained, in part, by shifts in students' perceptions of the school goal context. Findings suggested that typical age-related declines in intrinsic motivation may be minimized by a school-wide focus on mastery goals. Finally, the potential academic consequences of students' motivational orientations were examined with a series of hierarchical multiple regressions. Intrinsic motivation and classroom achievement appeared to influence one another in a positive and reciprocal fashion. Poor classroom performance minimally predicted higher levels of extrinsic motivation, but extrinsic motivation was not a source of low classroom grades.

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In ancient times scholars worked for their own improvement;
nowadays they seek only to win the approval of others.

Confucius, *Analects* 14.24 (551–479 BCE)

1. Introduction

The question of what motivates children's behavior in achievement contexts is one of long-standing interest to psychologists and educators. Much of the research in this area has classified motivation as either *intrinsic* (i.e., inherent to the self or the task) or *extrinsic* (i.e., originating from outside of the self or the task). That is, students are often thought to be learning either for the sake of learning or as a means to some other end, whether it be praise, tangible rewards, or meeting the demands of powerful authority figures.

The contrast between intrinsic and extrinsic motivations is meaningful, in part, because of their academic correlates. In achievement contexts, intrinsic motivation has been associated with a host of positive outcomes including positive affect (Gottfried, 1985, 1990; Harter, 1981; Harter, Whitesell, & Kowalski, 1992; Ryan & Deci, 2000), creativity (Amabile, 1996), adaptive cop-

ing strategies (Boggiano, 1998; Ryan & Connell, 1989), academic engagement (Otis, Grouzet, & Pelletier, 2005; Ryan & Connell, 1989), text comprehension and pleasure reading (Guthrie et al., 2006; Wang & Guthrie, 2004; Wigfield & Guthrie, 1997), deep conceptual learning strategies (Meece, Blumenfeld, & Hoyle, 1988; Pintrich & Garcia, 1991; Rijavec, Saric, & Miljkovic, 2003), and academic achievement as indexed by standardized tests and classroom grades (Boggiano, 1998; Gottfried, 1985; Lepper, Corpus, & Iyengar, 2005; Miserandino, 1996). Extrinsic motivation, on the other hand, has been associated with negative emotions (Dowson & McInerney, 2001; Harter et al., 1992; Ryan & Connell, 1989), maladaptive coping strategies (Boggiano, 1998; Ryan & Connell, 1989), and poor academic achievement (Lepper et al., 2005). It is not, however, a uniformly negative motivator. In fact, extrinsic motivation is predictive of both self-regulation (Miller, Greene, Montalvo, Ravindran, & Nichols, 1996) and positive adjustment to high school (Otis et al., 2005). Although it may not have the same sustaining power as intrinsic motivation, extrinsic motivation is arguably necessary at times and, at the very least, indicates some engagement with the learning process (see Lepper & Henderlong, 2000).

1.1. Developmental change

Given the predictive power of students' intrinsic and extrinsic motivational orientations, it is important to investigate how these forms of motivation might change with development (see Murphy & Alexander, 2000; Pintrich, 2003). There is a fairly strong consensus

* Corresponding author. Fax: +1 503 777 7785.

E-mail address: henderlj@reed.edu (J.H. Corpus).

across distinct theoretical traditions that intrinsic motivation tends to decline with increasing age (Bouffard, Marcoux, Vezeau, & Bordeleau, 2003; Eccles, Wigfield, & Schiefele, 1998; Gottfried, Fleming, & Gottfried, 2001; Harter, 1981; Otis et al., 2005). The developmental path of extrinsic motivation is less clear, with studies reporting increases (Anderman, Maehr, & Midgley, 1999; Harter, 1981), relative stability (Harter et al., 1992; Lepper et al., 2005), and even decreases (Otis et al., 2005; Ratelle, Guay, Larose, & Sénécal, 2004) over the childhood and adolescent years. Because of measurement issues, however, there remain several ambiguities about the nature and timing of developmental change in children's motivational orientations.

A first ambiguity arises because of the way in which intrinsic and extrinsic motivations have been operationalized. Much of the research on children's motivational orientations has been conducted with Harter's (1981) scale, which requires children to select *either* an intrinsic *or* an extrinsic reason for a variety of classroom behaviors (e.g., Boggiano, 1998; Ginsburg & Bronstein, 1993; Harter & Jackson, 1992; Meece et al., 1988; Newman, 1990).¹ The typical developmental pattern, therefore, could reflect decreasing intrinsic motivation, increasing extrinsic motivation, or some combination of the two. Because of this concern, Lepper et al. (2005) recently decomposed Harter's scale into separate measures of intrinsic and extrinsic motivations (cf. Ryan & Connell, 1989). They found a linear decline in intrinsic motivation from third to eighth grade, but few differences in extrinsic motivation across grade levels. Contrary to Harter's (1981) research, then, extrinsic motivation appears not to increase over the school years, although this finding should be replicated given that it was based on only a single cross-sectional study.

A second ambiguity about the nature of developmental change arises because of the prevalence of cross-sectional studies which confound age and cohort differences (e.g., Harter et al., 1992, Study 2; Lepper et al., 2005; Newman, 1990). In order to document true developmental change, longitudinal research is necessary. Unfortunately, extrinsic motivation has been largely neglected in longitudinal research, with the exception of a few recent studies that have revealed developmental decreases during high school and over the transition to college (Otis et al., 2005; Ratelle et al., 2004). A larger body of longitudinal research has revealed developmental decreases in intrinsic motivation (Bouffard et al., 2003; Gottfried et al., 2001; Otis et al., 2005) and related constructs, such as values (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Wigfield et al., 1997), learning motivation (Spinath & Spinath, 2005), and mastery goals (Anderman & Midgley, 1997; Anderman et al., 1999). Nearly all of this research, however, has focused on motivational shifts that occur over a school transition or across different academic years.

A final ambiguity about the timing of developmental change arises, then, because motivation is typically measured only once each academic year. In these cases, theoretically important school experiences that occur during the academic year are confounded with those that result from moving up a grade, working with

new teachers, being exposed to a new curriculum with different grading practices, and often entering a new school (see Bong, 2005; Eccles & Midgley, 1989; Gentry, Gable, & Rizza, 2002). In short, relying exclusively on between-year comparisons in motivation may obscure the temporal location of change. No research to date has examined children's intrinsic and extrinsic motivational orientations over the course of a single academic year, but some work has examined changes in similar constructs. Pajares and Graham (1999), for example, found fall-to-spring decreases in sixth graders' interest, enjoyment, effort, and persistence in their math courses. Moreover, studies comparing between- and within-year changes have shown that the majority of change in children's achievement goals (Meece & Miller, 2001) and interest in school (Nurmi & Auola, 2005) takes place during the academic year.

The present study builds upon this work by using a short-term longitudinal design to assess third- through eighth-grade students' motivation in both the fall and the spring of a single academic year. Moreover, we address the limitations of previous research by measuring both intrinsic and extrinsic motivations using the separate scales for each construct from Lepper et al. (2005). The intrinsic motivation scale assesses students' challenge-seeking, curiosity-driven engagement, and desire for independent task mastery. These components represent a rich set of intrinsic motives aligned with those of classic motivational theories (e.g., Berlyne, 1960; Deci & Ryan, 1985; Hunt, 1965; White, 1959), although Lepper et al. found that they functioned as a single higher-order intrinsic factor among primary school children. The extrinsic motivation scale, on the other hand, includes both a higher-order extrinsic factor and three distinct component dimensions: the desire for easy work, the desire to please authority figures, and a dependence on one's teacher. The desire to please authority figures may have the greatest face validity as an extrinsic motive in that it explicitly addresses behavior as a means to a separable end, and is largely analogous to introjected extrinsic motivation in self-determination theory. In a less direct fashion, the desire for easy work and dependence on teacher serve as markers or symptoms of extrinsic motivation in children. That is, students who seek to complete their schoolwork as a means to some other more valued end will desire a quick path to completion with a minimal investment of mental effort (Kruglanski, Stein, & Riter, 1977). Likewise, when students approach their work in an instrumental fashion, they will look to the teacher for guidance to ensure that tasks are being completed in a way that will garner the desired approval and/or tangible benefits.²

Based on prior research that has documented developmental declines in intrinsic motivation, we expected to find a within-year decrease in intrinsic motivation. We expected that this decrease might be especially pronounced for adolescents as compared to elementary students because the middle school environment tends to be a suboptimal learning context for early adolescents (Anderman & Maehr, 1994; Eccles & Midgley, 1989). Indeed, we also expected to replicate Lepper et al.'s (2005) finding of higher levels of intrinsic motivation among younger as compared to older students. We did not have strong developmental predictions regarding extrinsic motivation because cross-sectional work has suggested relative stability (Harter et al., 1992; Lepper et al., 2005), but longitudinal work with high school students has found decreases across academic years (Otis et al., 2005). We also considered the extent to which each of the three dimensions of extrinsic motivation might have distinct developmental pathways. In part because of the age-related decline in intrinsic motivation, we expected students to increasingly want to take the quickest, easiest

¹ Another dominant approach to the study of motivational orientations is self-determination theory, which proposes a continuum of extrinsic motives ranging from those wholly externally regulated (e.g., seeking rewards; avoiding punishments) to those regulated by the self but oriented around others (e.g., avoiding guilt; seeking self-worth via approval by others) to those highly autonomously chosen but not fully intrinsic (e.g., pursuing tasks of personal value even if not inherently pleasurable) (see Deci & Ryan, 1985; Ryan & Deci, 2000, 2002). According to research in this tradition, highly autonomous forms of regulation tend to promote well-being to a greater extent than the more externally regulated forms. The extrinsic motives represented in Harter's scale are largely rooted in obedience and other-approval, corresponding to self-determination theory's less autonomous forms of extrinsic motivation – forms that arguably resonate most with the daily experiences of schoolchildren. Indeed, unlike the self-determination tradition, the majority of research using Harter's scale has focused on age differences and developmental trends among primary school children.

² Of course, help-seeking is considerably more complex than such an analysis might suggest (e.g., Ryan, Patrick, & Shim, 2005), and its meaning may depend, in part, on the classroom climate established by the teacher.

path to completion of their schoolwork. Thus, we anticipated that the desire for easy work might increase over the academic year and that it would be higher for adolescents than elementary school students. On the other hand, we anticipated that the desire to please authority figures and students' dependence on teachers might decrease over the year because of typical age-related increases in autonomy-seeking and a focus on peers rather than authority figures (Berndt, 1979; Steinberg & Silverberg, 1986). Likewise, we expected that levels of both of these constructs would be higher among elementary school than adolescent students.

1.2. Contextual predictors of motivational change

A second aim of the present study was to examine the extent to which the educational context might account for these developmental shifts. A long history of research has shown that intrinsic and extrinsic motivations are affected by a variety of social forces including autonomy support, environmental structure, and the quality of interpersonal relationships (see Deci & Ryan, 2002; Sansone & Harackiewicz, 2000; Schweinle, Meyer, & Turner, 2006). More recently, the educational context has been conceptualized in terms of achievement goal theory, which focuses on the extent to which schools or classrooms promote mastery goals or performance goals (see Kaplan, Middleton, Urdan, & Midgley, 2002; Meece, Anderman, & Anderman, 2006). A *mastery goal context* emphasizes conceptual understanding over test scores and focuses on effort and improvement. This type of environment tends to predict adaptive motivational outcomes, including self-efficacy, effective learning strategy use, task value, and a preference for challenge (Ames & Archer, 1988; Bong, 2005; Kaplan & Maehr, 1999; Roeser, Midgley, & Urdan, 1996; Wolters, 2004; Young, 1997). A *performance goal context*, on the other hand, emphasizes social comparisons of ability, uses competitive grading practices, and rewards error-free learning. This type of environment tends to predict less adaptive motivational outcomes, including negative affect, procrastination, and self-handicapping (Anderman et al., 1999; Kaplan & Maehr, 1999; Urdan, Midgley, & Anderman, 1998; Wolters, 2004).

These school and classroom goal contexts have been clearly linked to students' personally-held mastery and performance goals, which are related to – yet distinct from – their intrinsic and extrinsic motivational orientations. Personal achievement goals and motivational orientations are similar in that both describe the reasons underlying individuals' behaviors and both represent a contrast between activity-driven (i.e., working in order to learn or enjoy) and instrumental (i.e., working as a means to a separable end) engagement (Lepper, 1988; Marsh, Craven, Hinkly, & Debus, 2003). However, unlike personal achievement goals, which are largely cognitive and serve to *direct* motivational energy, intrinsic and extrinsic motivational orientations are the affective source of motivational energy itself (Elliot, McGregor, & Thrash, 2002; Pintrich & Garcia, 1991). Motivational orientations are also considerably broader constructs than personal achievement goals. Intrinsic motivation goes beyond the mastery goal focus on building competence to include the concepts of interest, enjoyment, and the internal origin of behavior. Likewise, extrinsic motivation goes beyond the performance goal focus on demonstrating competence relative to others to include a variety of instrumental motives, such as the desire to please others, avoid punishment, or obtain material rewards (Lepper, 1988). Both constructs, however, are presumably affected by the goal orientation of the achievement context – a claim that has been substantiated for personal achievement goals but not for intrinsic and extrinsic motivational orientations to date.

Because of its focus on learning and improvement, a mastery goal context would likely promote an intrinsic orientation. Consistent with this hypothesis, both students and teachers perceive

grade-related decreases in the emphasis on mastery goals that parallel the grade-related declines in intrinsic motivation (Anderman & Midgley, 1997; Midgley, Anderman, & Hicks, 1995). A performance goal context, on the other hand, would likely promote an extrinsic orientation because of its focus on test scores and competitive grading practices. Indeed, performance-oriented environments have been associated with a desire for correct answers and good grades (Anderman et al., 1999; Young, 1997). Moreover, Harter et al. (1992) found strong extrinsic orientations to the extent that middle school students perceived their academic environment to be highly performance-oriented. Taken together, these studies raise the intriguing possibility that the predicted changes in students' motivational orientations may be explained, in part, by systematic shifts in the school goal context.

We addressed this possibility in the present study by measuring students' perceptions of the school goal context both in the fall and in the spring. We expected that within-year shifts in perceptions of the school as mastery-focused would predict within-year changes in intrinsic motivation. Likewise, we anticipated that within-year shifts in perceptions of the school as performance-focused would predict within-year changes in extrinsic motivation. These hypotheses are bolstered by a host of research documenting changes in similar constructs as a result of the transition from elementary to middle school (see Eccles & Midgley, 1989). Even more supportive are recent longitudinal studies that have shown changes in students' self-efficacy, positive affect, and personal mastery goals to be predicted by shifts in their perceptions of the learning context during middle school (Urdan & Midgley, 2003) and within a single academic year in high school (Bong, 2005).

1.3. Motivation and achievement

A final issue concerns the relationship between motivation and achievement. Several investigations have revealed a positive association between intrinsic motivation and students' classroom grades and standardized test scores (Boggiano, 1998; Gottfried, 1985, 1990; Harter & Connell, 1984; Lepper et al., 2005; Miserandino, 1996). The direction of this relationship, however, is unclear. Intrinsically motivated learners tend to engage the material, enjoy the process of discovery, and employ deep learning strategies – all of which are likely to result in learning and achievement (Deci & Ryan, 1985; Meece et al., 1988; Nurmi & Aunola, 2005). Conversely, students who receive high marks likely experience a sense of efficacy and receive competence-enhancing feedback, both of which promote intrinsic motivation (Harter & Connell, 1984; Ryan, Mims, & Koestner, 1983; White, 1959). Perhaps the most likely explanation is that the relationship between intrinsic motivation and achievement is synergistic and bidirectional – a hypothesis that we tested in the present study.

The negative association between extrinsic motivation and various indicators of academic achievement is perhaps even more interesting to consider (Lepper et al., 2005; Ryan & Deci, 2000; Wolters, Yu, & Pintrich, 1996). On the one hand, extrinsically motivated students may be distracted from the learning process by their focus on performance outcomes. Indeed, external orientations have been linked with the use of superficial learning strategies (Meece et al., 1988; Stipek & Gralinski, 1996), which certainly do not promote achievement. It is equally plausible, however, that students become more extrinsically motivated as result of receiving poor marks. In the face of poor performance, concerned authority figures may offer rewards, threats, and other extrinsic contingencies which could easily increase students' desire to please adults and to seek easy work that guarantees better performance in the future. A final aim of the present study, therefore, was to examine whether motivational orientations are best characterized as predictors or outcomes of achievement.

In summary, the present study was designed to address three central questions: (a) How do intrinsic and extrinsic motivations change over the course of a single academic year, (b) do shifts in students' perceptions of the school goal context predict changes in their motivational orientations, and (c) how do motivational orientations and academic achievement predict one another over time? We hypothesized that intrinsic motivation would decrease over the course of the school year, that this decline would relate to students' changing perceptions of the school mastery context, and that intrinsic motivation and achievement would predict one another in a positive and reciprocal fashion. Predictions regarding extrinsic motivation were less certain given conflicting trends in the extant literature, but we expected that any changes in extrinsic motivation would relate to students' changing perceptions of the school performance context.

2. Method

2.1. Participants

Participants were 1117 third- through eighth-grade students drawn from eight schools in Portland, Oregon. Students were recruited from several different types of schools in order to increase the generalizability of the findings: three K-8 Catholic schools ($n = 256$), one K-8 public school ($n = 133$), three K-5 public elementary schools ($n = 349$), and one 6–8 public middle school ($n = 379$).³ One of the participating public elementary schools fed into the participating public middle school; the other two fed into neighboring middle schools. The public schools spanned the socioeconomic spectrum, with the percentage of students eligible for free or reduced-price lunch ranging from 21% to 74%. The Catholic schools drew students from largely middle-class neighborhoods.

All students in the relevant grade levels at each school were invited to participate except those in special education programs. The positive return rate on consent forms was 64%. Overall, participants were fairly equally divided among the third through eighth grades with each grade level comprising between 14% and 21% of the total sample. Slightly more girls ($n = 618$) than boys ($n = 499$) participated in the study and the majority of participants self-identified as Caucasian (78%), with smaller groups of Hispanic (11%) and Asian (11%) participants. Sixty-six of the original participants were unavailable to complete the second survey and therefore were dropped from the study. Thus, the final sample consisted of 1051 participants, which was 94% of the original sample.

2.2. Measures

For both fall and spring administrations, surveys included items for each of the measures described below as well as additional items unrelated to the present investigation. Students were also asked to report their age, grade, gender, and ethnicity on the fall survey. Reliability and descriptive statistics for each measure are reported in Table 1.

2.2.1. Motivational orientations

Students' intrinsic and extrinsic motivational orientations were assessed with reliable and valid scales from Lepper et al. (2005), which students responded to using five-point Likert scales ranging from *not like me at all* (1) to *exactly like me* (5).

³ Motivational processes are undoubtedly affected by whether or not students are required to transition to a new school during early adolescence (see Harter et al., 1992; Simmons & Blyth, 1987). Although the present study included both K-8 and transition schools, the participating schools were not selected to be matched in such a way to permit meaningful comparisons based on school type.

Table 1
Reliability and descriptive statistics of scales.

Scale	T1: fall 2005			T2: spring 2006		
	M (SD)	α	n	M (SD)	α	n
<i>Elementary</i>						
Motivational orientations	–	–	507	–	–	507
Intrinsic motivation	3.60 (.74)	.90	–	3.54 (.70)	.90	–
Extrinsic motivation	3.22 (.72)	.85	–	3.07 (.74)	.87	–
Easy work	2.84 (1.11)	.87	–	2.67 (1.09)	.88	–
Pleasing others	3.64 (.93)	.83	–	3.45 (.98)	.85	–
Teacher dependence	3.09 (.86)	.73	–	3.04 (.83)	.75	–
Perceived school context	–	–	436	–	–	436
School mastery	4.15 (.58)	.49	–	4.16 (.56)	.49	–
School performance	1.90 (.86)	.68	–	1.85 (.87)	.74	–
<i>Adolescent</i>						
Motivational orientations	–	–	544	–	–	544
Intrinsic motivation	3.29 (.71)	.90	–	3.13 (.72)	.91	–
Extrinsic motivation	3.14 (.64)	.82	–	3.08 (.65)	.84	–
Easy work	2.91 (.99)	.84	–	3.00 (1.01)	.87	–
Pleasing others	3.37 (.84)	.78	–	3.24 (.84)	.79	–
Teacher dependence	3.08 (.81)	.73	–	2.98 (.83)	.76	–
Perceived school context	–	–	543	–	–	544
School mastery	3.95 (.66)	.63	–	3.88 (.73)	.69	–
School performance	2.14 (.89)	.74	–	2.45 (.99)	.75	–

The intrinsic motivation scale included 17 items focusing on challenge-seeking (e.g., “I like hard work because it's a challenge”), independent mastery (e.g., “I like to do my schoolwork without help”), and curiosity-driven engagement (e.g., “I ask questions in class because I want to learn new things”). Scores were averaged across items to create a composite variable of intrinsic motivation, which was internally consistent with the present sample (α s from .90 to .91). Hierarchical confirmatory factor analysis indicated that this single-second order factor provided an acceptable fit to the data, $\chi^2 = 738.01$ ($df = 117$), CFI = 0.93, RMSEA = 0.07 (CI: .07–.08), $p < .0001$.

Three separate dimensions of extrinsic motivation were assessed: a preference for easy work (five items, e.g., “I like easy work that I am sure I can do”), an orientation toward obedience and pleasing authority figures (six items, e.g., “I work on problems because I'm supposed to”), and a dependence on the teacher (five items, e.g., “I like to have the teacher help me with my schoolwork”). The items assessing a desire to please others included Lepper et al.'s three items as well as three items constructed for the present study but based on Harter et al. (1992). The three new items were added to increase the reliability of the scale and to include parents (in addition to teachers) as authority figures students may wish to please. The new items were: “I answer questions because the teacher will be pleased with me,” “I work hard because my parents want me to get good grades,” and “I do my schoolwork because it makes my parents happy.” Scores were averaged across items to create three extrinsic subscales of easy work, pleasing others, and teacher dependence, each of which was internally consistent with the present sample (α s from .73 to .88). Finally, an internally consistent (α s from .82 to .87) 16-item composite variable of extrinsic motivation was created by averaging items from each of the three dimensions. Hierarchical confirmatory factor analysis indicated an acceptable fit of the second-order model, $\chi^2 = 811.50$ ($df = 101$), CFI = 0.88, RMSEA = 0.08 (CI: .08–.09), $p < .0001$.

2.2.2. School context perceptions

Because students may experience the same learning environments in different ways, we assessed their perceptions of the school goal context rather than collecting objective measures (see Ames, 1992; Kaplan et al., 2002; Ryan & Grolnick, 1986). Based on Roeser et al. (1996), a perceived school mastery goal context was assessed with four items (e.g., “In this school, understanding

the work is more important than getting the right answers”) and a perceived school performance goal context was assessed with four items (e.g., “In this school, teachers treat kids who get good grades better than other kids”). Students responded to all school context items using five-point Likert scales ranging from *not true at all* (1) to *really true* (5). Scores were averaged across items to create composite variables of school mastery context (α s from .49 to .69) and school performance context (α s from .68 to .75).⁴ Because of concerns about the length of the survey for the youngest participants, only about half of the third graders at each school received the school context measures ($n = 91$, 60%), while the other half received measures unrelated to the present investigation; measures were assigned randomly by classroom.

2.2.3. Academic achievement

Academic achievement was measured by report card grades and standardized test scores, which we had parent permission to access for all but 8% of the sample. Report card grades were collected for the final grading period of the previous academic year (spring 2005; $n = 899$), the first grading period of the current academic year (fall 2005; $n = 965$), and the final grading period of the current academic year (spring 2006; $n = 968$). Missing data beyond the small number of parent denials was based on incomplete school records, primarily due to recent transfers from other schools. Students' grades were transformed to a standard four-point numerical scale (i.e., “A” grades received a weight of 4.0, “A–” grades a weight of 3.7, “B+” grades a weight of 3.3, etc.); unconventional grading systems (e.g., Exceeds/Meets/Close To Meeting/Not Yet Meeting) were similarly converted. Grade point averages (GPAs) were computed by averaging scores for language arts, math, social studies, and science. Standardized test scores were collected for the spring of the previous academic year (spring 2005; $n = 478$) and the spring of the current academic year (spring 2006; $n = 961$). Test scores from the previous academic year were missing from all third-grade children and from all students in the large public middle school because of school and district policies not to administer tests at those particular grade levels that particular year. Students in the three private schools took the Stanford Achievement Test (10th edition); students in the five public schools took the Oregon Statewide Assessment. In both cases, percentile scores on the math and reading portions of the tests were averaged together and this composite score was used for analyses.

2.3. Procedure

Surveys were administered during regular school hours on two occasions during the 2005–2006 academic year. The first survey was administered in the fall (late October/early November) at least six weeks into the school year so that students were familiar with the school goal context. The second survey was administered in the spring (late April/early May), approximately six weeks before the end of the school year. Surveys were administered to approximately 20 students at a time by at least one of the authors and two to three trained research assistants. Prior to beginning the survey, students were given instructions for using the five-point Likert scale. Students were told that they could place a mark in one of five boxes of increasing size to indicate their agreement with each item (see Lepper et al., 2005). To ensure that students understood how

to use the response scale, several unrelated practice items were provided (e.g., “I like to watch TV”) and a class discussion of these items was initiated. Each survey item was then read aloud as students responded quietly at their desks; items were read aloud twice for third-grade participants. Explanations of potentially difficult vocabulary words were also provided for the elementary students. The research assistants circled the room throughout the survey administration and students were encouraged to raise their hands to ask questions if needed. Using these procedures, even the youngest students in the study appeared to comprehend the survey items. This was supported by informal conversations with the elementary school teachers, informal pilot testing with a small number of third-grade students prior to the study, and the behavior of the children themselves as they completed the survey (e.g., facial expressions, nods of agreement). Once surveys were completed, students were given a folder or a pencil as a token of appreciation. The session lasted approximately 30 min.

3. Results

There were very few missing data aside from the exceptions noted above. When children left particular items blank (which happened in less than 1% of cases), composite variables were created based on the average of completed items for each measure. For all analyses reported below, the criterion alpha was set at a conservative .01 to reduce the chances of a Type I error due to the large sample size.

3.1. Preliminary analyses

Data on motivational orientations were examined for possible interactions between the key developmental variables (grade level, time) and students' gender. Because there were no significant interactions involving gender, data were collapsed across boys and girls for all subsequent analyses.⁵

3.2. Cross-sectional age differences in motivational orientations

We first sought to replicate the cross-sectional age differences in children's motivational orientations from Lepper et al. (2005) using data from the fall survey administration. Fig. 1 displays students' reported levels of both intrinsic and extrinsic motivations by grade level. For each of the motivation composites, we conducted a one-way Analysis of Variance (ANOVA) with grade level (third through eighth) as the independent variable. Consistent with Lepper et al., there were significant differences among grade levels in students' intrinsic motivation, $F(5, 1045) = 13.74, p < .001, \eta_p^2 = .06$. As predicted, intrinsic motivation was highest among the younger students (third grade $M = 3.69, SD = .77$) and lowest

⁵ We also tested for possible interactions between the key developmental variables and school type, which was included as a dichotomous variable based on the school structure as either a K-8 model or a transition model. There were two small but significant interactions, both of which were consistent with the broader literature on school context effects (see Eccles & Midgley, 1989; Midgley, 2002; Simmons & Blyth, 1987). First, sixth- through eighth-grade students attending a traditional middle school reported higher levels of extrinsic motivation than those attending a K-8 school, $F(5, 1039) = 3.37, p < .01, \eta_p^2 = .02$. Second, among the sixth- through eighth-grade students, intrinsic motivation declined from fall to spring more sharply for those attending a traditional middle school than for those attending a K-8 school, $F(1, 1045) = 9.28, p < .01, \eta_p^2 = .01$. These interactions are difficult to interpret, however, because school type was largely confounded with the public/private status of participating schools. Students attending private K-8 schools most likely had resources available to them both at home and at school that the students in public middle schools did not. Any differences between students attending the two school types, therefore, could be due to a variety of factors, including the school structure itself. Because of this concern and the small number of interactions involving school type, data were collapsed across school type for all subsequent analyses.

⁴ The scale assessing school mastery context was reasonably internally consistent for the adolescent but not the elementary students. Importantly, items for this scale were drawn from a study of eighth-grade students (Roeser et al., 1996). Although the items resonated with the elementary teachers in our study, they perhaps needed to be fine-tuned for use with elementary students. Indeed, the items elicited near ceiling responses and minimal variability among the elementary students in our sample, which contributed to the low reliability coefficients.

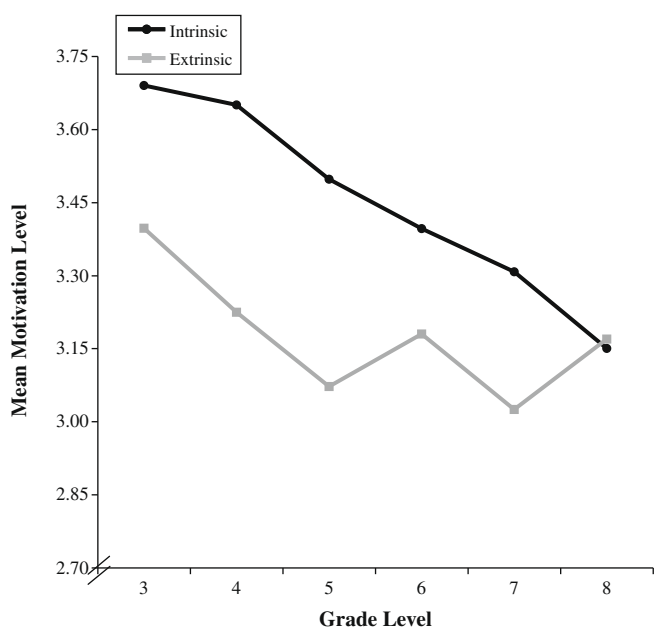


Fig. 1. Mean levels of intrinsic and extrinsic motivations by grade level from the fall survey administration.

among the older students (eighth grade $M = 3.15$, $SD = .63$). Moreover, a weighted polynomial contrast assessing the linear trend across grade levels was also significant, $F(1, 1045) = 67.64$, $p < .001$, $\eta_p^2 = .06$, and accounted for 98% of the between-groups variance. These medium-sized effects nicely replicate both the pattern and magnitude of those documented by Lepper et al.

Findings for extrinsic motivation were similar but not identical to those of Lepper et al. Our omnibus test revealed a similarly small to medium effect of grade level on extrinsic motivation, $F(5, 1045) = 5.85$, $p < .001$, $\eta_p^2 = .03$. However, our weighted polynomial contrast assessing the linear trend across grade levels was also significant, $F(1, 1045) = 11.04$, $p < .01$, $\eta_p^2 = .01$, though it was quite small and accounted for only 38% of the between-groups variance. A visual inspection of Fig. 1 suggests that the linear effect was largely driven by the third- through fifth-grade students with an unsystematic pattern of age differences thereafter. Like Lepper et al., subsequent analyses of the three dimensions of extrinsic motivation revealed slightly inconsistent patterns of data. There were no differences across grade levels for the dimensions of easy work or teacher dependence ($ps > .01$), but there were small significant differences for the dimension of pleasing others, $F(5, 1045) = 15.42$, $p < .001$, $\eta_p^2 = .01$. The weighted polynomial contrast assessing the linear trend across grade levels for the dimension of pleasing others was also significant, $F(1, 1045) = 51.32$, $p < .001$, and accounted for 67% of the between-groups variance. As might be expected, the desire to please authority figures was highest among the younger students (third grade $M = 3.93$, $SD = .91$) and lowest among the older students (eighth grade $M = 3.34$, $SD = .75$).

3.3. Within-year changes in motivational orientations

The congruence between the above pattern of age differences and those reported by Lepper et al. suggests that children's intrinsic – and perhaps extrinsic – motivations may undergo significant developmental change from third through eighth grade. Would these cross-sectional patterns be supported by actual shifts in students' motivation over the course of an academic year? To address this question, we next turned to our longitudinal data. We combined students in the third through fifth grades to form an *elemen-*

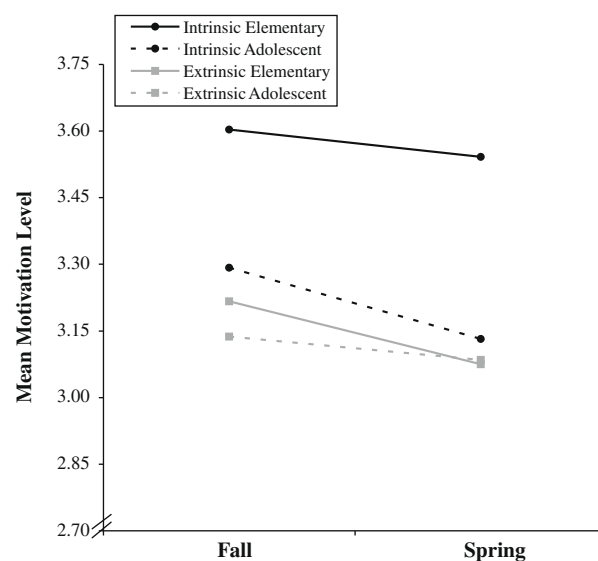


Fig. 2. Within-year changes in intrinsic and extrinsic motivations for elementary students (grades 3–5) and adolescents (grades 6–8).

tary group and students in the sixth through eighth grades to form an *adolescent* group in order to examine whether patterns of change might differ for relatively younger versus relatively older students. We then conducted a series of 2 (time: fall, spring) \times 2 (age group: elementary, adolescent) mixed ANOVAs, with time as the within-subjects factor. Fig. 2 displays levels of both intrinsic and extrinsic motivations by time and age group. Table 1 presents descriptive statistics for all analyses.

3.3.1. Intrinsic motivation

A mixed ANOVA on students' intrinsic motivation revealed a significant main effect of time, $F(1, 1049) = 35.29$, $p < .001$, $\eta_p^2 = .03$, a significant main effect of age group, $F(1, 1049) = 81.51$, $p < .001$, $\eta_p^2 = .07$, and a significant time by age group interaction, $F(1, 1049) = 6.94$, $p < .01$, $\eta_p^2 = .01$. Intrinsic motivation decreased from fall to spring, and the decline was especially pronounced for the adolescents as compared to the elementary students. In addition, overall levels of intrinsic motivation were higher for elementary students than for adolescents.⁶ These findings support and extend the cross-sectional analysis reported above by revealing that small but genuine developmental shifts in intrinsic motivation occur over the course of a single academic year.

3.3.2. Extrinsic motivation

A mixed ANOVA on students' overall extrinsic motivation revealed a significant main effect of time, $F(1, 1049) = 31.49$, $p < .001$, $\eta_p^2 = .03$, and a significant time by age group interaction,

⁶ For the reader interested in a more micro-analysis of developmental change, a 2 (time: fall, spring) \times 6 (grade level) mixed ANOVA was conducted for intrinsic motivation. There was a significant main effect of time, $F(1, 1045) = 33.24$, $p < .001$, $\eta_p^2 = .03$, a significant main effect of grade level, $F(5, 1045) = 21.17$, $p < .001$, $\eta_p^2 = .09$, and a marginally significant time by grade level interaction, $F(5, 1045) = 2.85$, $p < .05$, $\eta_p^2 = .01$. Difference scores by grade level indicated that the decline in intrinsic motivation from fall to spring was generally sharper among the older students (M_{diff} for Grade 3 = .13, Grade 4 = -.04, Grade 5 = .08, Grade 6 = .19, Grade 7 = .15, Grade 8 = .14). A 2 (time: fall, spring) \times 6 (grade level) mixed ANOVA was also conducted for extrinsic motivation. There was a significant main effect of time, $F(1, 1045) = 4.75$, $p < .001$, $\eta_p^2 = .03$, a significant main effect of grade level, $F(5, 1045) = 5.98$, $p < .001$, $\eta_p^2 = .03$, and a marginally significant time by grade level interaction, $F(5, 1045) = 2.34$, $p < .05$, $\eta_p^2 = .01$. Difference scores by grade level indicated that the decline in extrinsic motivation from fall to spring generally lessened from third to eighth grade (M_{diff} for Grade 3 = .18, Grade 4 = .12, Grade 5 = .14, Grade 6 = .10, Grade 7 = .06, Grade 8 = -.02).

$F(1, 1049) = 6.55, p = .01, \eta_p^2 = .01$. Extrinsic motivation decreased from fall to spring, and the decline was more pronounced for the elementary students than the adolescents. There was not, however, a main effect of age group ($p > .20$). Subsequent analyses of the three dimensions of extrinsic motivation revealed slightly inconsistent patterns of data, as shown by the means in Table 1. For the dimension of easy work, there was no effect of time ($p > .05$) but a small time by age group interaction, $F(1, 1049) = 23.62, p < .001, \eta_p^2 = .02$. From fall to spring, elementary students decreased but adolescents increased in their preference for easy work. There was also a small main effect of age group such that adolescents preferred easy work more than elementary students, $F(1, 1049) = 11.93, p < .01, \eta_p^2 = .01$. For the dimensions of both pleasing others and teacher dependence, there were no time by age group interactions ($ps > .20$), but there were small main effects of time such that levels of both dimensions decreased from fall to spring, $F_s(1, 1049) > 10.50, ps < .01$. Finally, there were no age differences on the dimension of teacher dependence ($p > .20$), but there was a main effect of age group for the dimension of pleasing others, such that elementary students reported seeking to please authority figures more than did adolescents, $F(1, 1049) = 23.18, p < .001, \eta_p^2 = .02$. In summary, it appears that extrinsic motivation undergoes a small but significant decline from fall to spring, except for the desire for easy work, which slightly increases with time for adolescents. This pattern of change could help explain why the cross-sectional analysis reported above revealed a linear decline in extrinsic motivation from third to fifth grade, but an unsystematic pattern of differences among the middle grade levels.

3.4. Perceptions of the school context

Might these changes in motivation be accompanied by shifts in students' perceptions of the school goal context? We first examined the data for within-year shifts in perceived school mastery and school performance goal contexts and then tested the extent to which these shifts might predict motivational change.

3.4.1. Within-year shifts

A series of 2 (time: fall, spring) \times 2 (age group: elementary, adolescent) mixed ANOVAs, with time as the within-subjects factor, were conducted on students' perceptions of the school goal con-

text. For school mastery context, there was a significant medium-sized main effect of age group such that elementary students perceived their schools as more mastery-oriented than did adolescents, $F(1, 977) = 45.78, p < .001, \eta_p^2 = .05$. The main effect of time and the time by age group interaction, however, were not significant ($ps > .05$). For school performance context, there was a small but significant main effect of time, $F(1, 977) = 20.56, p < .001, \eta_p^2 = .02$, and a significant medium-sized main effect of age group, $F(1, 977) = 67.42, p < .001, \eta_p^2 = .07$. These effects were qualified by a small but significant time by age group interaction, $F(1, 977) = 41.24, p < .001, \eta_p^2 = .04$. From fall to spring, perceptions of a school performance context increased for the adolescents, but not for the elementary students. In addition, adolescents generally perceived their schools as more performance-oriented than did elementary students.

As validation of students' perceptions, we asked the teachers (elementary $n = 27$, adolescent $n = 24$) to complete measures of the school mastery context (seven items, $\alpha = .73$) and the school performance context (six items, $\alpha = .72$) from the *Patterns of Adaptive Learning Survey* (Midgley et al., 2000). A *t*-test for independent samples revealed significant differences between elementary and adolescent teachers for both school mastery context and school performance context, $t_s(49) > 3.5, ps < .01$. Like their students, teachers of adolescents perceived the school context to be less mastery-oriented ($M = 3.97, SD = .56$) and more performance-oriented ($M = 3.32, SD = .57$) than did teachers of elementary students (mastery $M = 4.41, SD = .32$, performance $M = 2.55, SD = .61$). Although we did not survey teachers repeatedly to obtain converging evidence for shifts in the school goal context, the agreement between teacher and student reports suggests that students' perceptions have some basis in reality and, to some extent, offsets the relatively low reliability coefficients for the student measures of school context.

3.4.2. Contextual predictors of motivation

To what extent might shifts in students' perceptions of the school goal context predict motivational changes from fall to spring? Table 2 presents the bivariate correlations among the school context and motivation variables at each time point. Intrinsic motivation was positively correlated with school mastery context (r_s from .19 to .29) and slightly negatively correlated with

Table 2
Bivariate correlations among scales.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
<i>Motivational orientation</i>																			
1. T1 IM	–	.66	–.16	–.21	–.53	–.46	.16	.02	.06	–.00	.26	.19	–.11	–.15	.13	.17	.19	.15	.15
2. T2 IM		–	–.22	–.25	–.47	–.62	.04	.07	–.03	.03	.20	.29	–.09	–.22	.17	.17	.24	.08	.19
3. T1 EM			–	.67	.73	.50	.76	.52	.70	.45	.10	.03	.24	.13	–.28	–.29	–.24	–.42	–.42
4. T2 EM				–	.52	.74	.50	.80	.42	.68	.01	–.03	.21	.22	–.25	–.29	–.26	–.39	–.37
5. T1 easy					–	.66	.28	.26	.29	.20	–.05	–.12	.25	.20	–.27	–.27	–.27	–.29	–.32
6. T2 easy						–	.22	.34	.19	.26	–.08	–.21	.21	.31	–.24	–.29	–.32	–.27	–.30
7. T1 please							–	.60	.35	.27	.17	.11	.15	.04	–.15	–.18	–.12	–.33	–.26
8. T2 please								–	.25	.38	.05	.04	.17	.11	–.13	–.17	–.10	–.29	–.23
9. T1 depend									–	.56	.11	.08	.10	.05	–.19	–.17	–.14	–.27	–.34
10. T2 depend										–	.06	.13	.07	.05	–.18	–.18	–.15	–.31	–.30
<i>School context</i>																			
11. T1 school mastery											–	.47	–.22	–.21	.08	.07	.12	.08	.11
12. T2 school mastery												–	–.22	–.40	.07	.09	.15	.00	.04
13. T1 School performance													–	.54	–.16	–.17	–.18	–.18	–.21
14. T2 School performance														–	–.19	–.15	–.20	–.05	–.19
<i>Achievement</i>																			
15. Prior year GPA															–	.67	.64	.69	.64
16. T1 GPA																–	.79	.66	.60
17. T2 GPA																	–	.56	.58
18. Prior year test score																		–	.84
19. T2 test score																			–

Note: Correlations $\pm .09$ are significant at $p < .01$.

school performance context (*r*s from $-.09$ to $-.22$). Extrinsic motivation was positively correlated with school performance context (*r*s from $.13$ to $.24$) but largely unrelated to school mastery context. Roughly the same pattern of correlations held for each of the dimensions of extrinsic motivation, with the exception of teacher dependence, which was positively correlated with school mastery context.

We used hierarchical regression analyses to examine the extent to which shifts in students' perceptions of the school goal context would predict changes in their motivational orientations from fall to spring. In order to index change in school context perceptions, we used the unstandardized residual scores computed by regressing spring levels of each context variable on fall levels of that same variable. Using residual scores rather than simple change scores reduces problems associated with regression to the mean (Cohen & Cohen, 1983; Meece & Miller, 2001). In the first step of each regression, two control variables were entered: GPA from the previous academic year and the fall assessment of the motivation criterion variable. In the second step, age group and the school context change variables (unstandardized residual scores) were added to the analysis. Finally, in the third step, interaction terms between age group and each of the school context change variables were entered.

Table 3 presents the results from the regressions predicting changes from fall to spring in students' intrinsic and extrinsic motivational orientations. A positive fall-to-spring change in intrinsic motivation was predicted by an increase in students' perceptions of the school context as mastery-oriented ($\beta = .15, p < .001$), but not significantly related to changes in students' perceptions of the school context as performance-oriented ($\beta = -.05, ns$). A positive fall-to-spring change in extrinsic motivation was predicted by an increase in students' perceptions of the school context as performance-oriented ($\beta = .12, p < .001$), but unrelated to changes in students' perceptions of the school context as mastery-oriented ($\beta = .01, ns$). Separate regressions conducted for each of the three dimensions of extrinsic motivation revealed largely similar patterns except that an increase in perceived school mastery context negatively predicted the preference for easy work ($\beta = -.07, p < .01$) and positively predicted teacher dependence ($\beta = .11, p < .001$). Overall, then, changes in students' perceptions of the school goal context explained a small amount of additional variance in spring levels of motivation that was not explained by fall levels of motivation or previous academic achievement. There were no significant interactions with age group, suggesting that

these predictive relationships held for both elementary students and adolescents.

3.5. Motivation and achievement

We next examined the implications that students' motivational orientations might have for their academic achievement. Bivariate correlations among students' motivational orientations and their GPAs and standardized test scores at each time point are presented in Table 2. As expected, all correlations between intrinsic motivation and both GPA (*r*s from $.13$ to $.24$) and test scores (*r*s from $.08$ to $.19$) were positive, and nine of the ten were significant albeit quite small. Also as predicted all correlations between extrinsic motivation and both GPA (*r*s from $-.24$ to $-.29$) and test scores (*r*s from $-.37$ to $-.42$) were negative, significant, and moderate in magnitude. There were also significant negative correlations between each of the dimensions of extrinsic motivation and each of the achievement indicators at all time points. These findings largely replicate those of Lepper et al. (2005), though the magnitude of correlations in the present study was slightly lower for comparisons involving intrinsic motivation and slightly higher for comparisons involving extrinsic motivation.

In order to determine whether motivational orientations are best characterized as predictors or outcomes of achievement, a series of hierarchical regressions was conducted. The motivation variables from the fall were examined as predictors of achievement levels in the spring, with prior achievement entered in the first step. Likewise, the achievement variables from the fall were examined as predictors of motivational orientations in the spring, with fall levels of motivation entered in the first step. This analytic approach was chosen in order to probe for directional effects. Although the present study was primarily aimed at understanding motivational change, this particular set of analyses was based in the assumption that motivation has both dynamic and static properties. In other words, as documented in the preceding analyses, students' motivational orientations change across time in predictable ways; at the same time, however, these orientations also have enduring elements, particularly when considering students' levels of motivation relative to those of their classmates. Assuming some stability across time in motivation allows for the meaningful use of fall variables to predict spring variables – an analytic approach that provides a window for understanding the direction of effects between motivation and achievement. Analyses below involving GPA are based on only the 965 participants for whom both fall

Table 3
Hierarchical regression analyses predicting intrinsic and extrinsic motivations.

	Intrinsic motivation ^a			Extrinsic motivation ^b		
	B	SE B	β	B	SE B	β
<i>Step 1</i>						
Previous year GPA	.08	.03	.08*	-.06	.03	-.06
T1 motivation	.65	.03	.66**	.67	.03	.65**
<i>Step 2</i>						
Age group ^c	-.18	.04	-.12**	.02	.04	.02
Change in school mastery context	.18	.03	.15**	.01	.03	.01
Change in school performance context	-.04	.02	-.05	.10	.02	.12**
<i>Step 3</i>						
Age group x change in school mastery	-.08	.06	-.05	-.09	.06	-.06
Age group x change in school performance	.01	.05	.01	-.06	.05	-.06

Note: $N = 833$.

^a Step 1 $\Delta R^2 = .46, F(2, 830) = 355.91, p < .001$; Step 2 $\Delta R^2 = .05, F(3, 827) = 27.78, p < .001$; Step 3 $\Delta R^2 = .00, F(2, 825) = .95, ns$.

^b Step 1 $\Delta R^2 = .45, F(2, 830) = 335.91, p < .001$; Step 2 $\Delta R^2 = .02, F(3, 827) = 7.98, p < .001$; Step 3 $\Delta R^2 = .00, F(2, 825) = 1.59, ns$.

^c Age group coded as 0 (elementary) and 1 (adolescent).

* $p < .01$.

** $p < .001$.

and spring data were available; analyses involving test scores are based on only the 478 participants for whom both previous and current year data were available.

3.5.1. Intrinsic motivation

Fall intrinsic motivation significantly and positively predicted spring GPA, controlling for fall GPA ($\beta = .06, p < .01, \Delta R^2 = .003$). The reverse was also true: Fall GPA significantly and positively predicted spring intrinsic motivation, controlling for fall intrinsic motivation ($\beta = .06, p = .01, \Delta R^2 = .004$). These small but significant effects, coupled with their roughly equivalent beta weights and percentages of variance explained, suggest that intrinsic motivation and GPA may influence one another in a reciprocal fashion. For test scores, however, neither intrinsic motivation nor test scores were significant predictors of one another ($|β|s < .03, ps > .49, \Delta R^2s = .00$).

3.5.2. Extrinsic motivation

Fall extrinsic motivation was not a significant predictor of spring GPA, controlling for fall GPA ($\beta = -.02, ns$). Fall GPA was, however, a significant and negative predictor of spring extrinsic motivation, controlling for fall extrinsic motivation ($\beta = -.11, p < .001, \Delta R^2 = .01$). These analyses suggest that poor achievement on regular classroom assessments may minimally contribute to extrinsic motivation, but that extrinsic motivation is not a source of low classroom grades. For test scores, fall extrinsic motivation was a significant and negative predictor of spring test scores, controlling for previous year test scores ($\beta = -.08, p < .01, \Delta R^2 = .005$). The reverse was also true: Previous year test scores significantly and negatively predicted spring extrinsic motivation, controlling for fall extrinsic motivation ($\beta = -.15, p < .001, \Delta R^2 = .02$). Although this suggests a potentially reciprocal relationship between extrinsic motivation and performance on standardized tests, the effect from test scores to motivation was clearly stronger than the reverse. Separate regressions testing the predictive relationships between each of the three dimensions of extrinsic motivation and the two achievement indicators revealed nearly identical patterns to those with the extrinsic motivation composite.

4. Discussion

The present study revealed within-year declines in levels of intrinsic motivation among both elementary and middle school students. This developmental trend affirms the troubling conclusion that the more time children spend in our schools, the less they seem to be learning for learning's sake – a conclusion that theorists and educators have bemoaned for decades (see Dewey, 1900; Holt, 1964; Lepper et al., 2005). Importantly, though, the present study addresses several ambiguities from the extant literature about the nature and timing of developmental change in children's intrinsic motivation.

First, we used an unconfounded measure of motivation so that the developmental trends observed for intrinsic motivation were independent of those observed for extrinsic motivation. Lepper et al.'s (2005) recent work validating independent measures of motivational orientations was a significant advance along these lines, but their cross-sectional approach did not permit analyses of true developmental change. Thus, we responded to a second ambiguity in the literature by using a longitudinal design, which revealed actual decreases over time in students' reported levels of intrinsic motivation. Moreover, we observed small but significant decreases over the course of a single academic year and for both elementary and middle school students. That the absolute magnitude of these changes was quite small is not surprising given the relatively short period of time between assessments. Indeed, small downward shifts in intrinsic motivation may accumulate to

meaningful drops, as suggested by the larger cross-sectional age differences. This clear pattern of cross-sectional age differences also speaks against the possibility that the lower levels of motivation observed during the second survey administration simply represent a temporary "spring fever" effect. The present documentation of within-year motivational change, then, addresses a final ambiguity in the literature because the vast majority of longitudinal research to date has assessed motivation *across* years – typically those years surrounding the transition to middle school.

Assessing intrinsic motivation multiple times during a single academic year reflects a conceptualization of motivation as dynamic and situated in the everyday experiences of students. Of course, assessing motivational change over major school transitions also reflects a situated view of motivation (e.g., Middleton, Kaplan, & Midgley, 2004), but the present study suggests that contextual changes may not need to be of such a large scale to impact motivation (Bong, 2005; Urdan & Midgley, 2003). Future longitudinal research should compare the magnitude of between- versus within-year changes in motivational orientations, much as some work has done in the area of goal theory (Meece & Miller, 2001). Including even more time points within the year would perhaps even better address the dynamic nature of ontogenetic change (cf. Bong, 2005). It will also be important that such research include elementary populations because much of the literature focuses on negative motivational shifts during the adolescent years (Anderman & Midgley, 1997; Eccles et al., 1998; Pintrich, 2003); unfortunately, the present study suggests that at least some negative motivational patterns are beginning to take hold in elementary school.

A significant advance of the present study lies in the developmental data gathered on extrinsic motivation, which has received far less attention in the literature to date. Although previous cross-sectional research has suggested relative stability in levels of extrinsic motivation from third to eighth grade (e.g., Harter et al., 1992; Lepper et al., 2005), our longitudinal analyses revealed a small but significant pattern of within-year decline. It appears that elementary and middle-school students become less inclined to please authority figures and less dependent on their teachers over time. At first glance, this loss of extrinsic motivation may be puzzling given that attempts to externally control behavior typically increase as children progress through school (Eccles et al., 1993; Harter, 1996). From a developmental perspective, however, it is entirely consistent with early adolescents' increasing need for autonomy and tendency to reject adult influence, especially when it is overt and heavy-handed (Berndt, 1979; Eccles et al., 1993; Steinberg & Silverberg, 1986). Extrinsic contingencies with adult-oriented ends such as good grades or teacher-sanctioned rewards, then, may lose their weight over time. Future research might address the possibility that extrinsic motivation for peer-oriented ends may show a different developmental trajectory. Because adolescents shape one another's motivation (Ryan, 2001) and are concerned with peer social perception (Juvonen, 1996), an extrinsic desire to please peers may stay constant or even increase through the elementary and middle school years.

The pattern of slight decreases in extrinsic motivation held for each of the three dimensions of extrinsic motivation and for both age groups with one exception: the desire for easy work actually increased from fall to spring among the adolescents. It appears that, over the course of the school year, adolescents increasingly seek the most expeditious and effortless path to task completion. It may be that they desire quick and easy solutions precisely because they have learned the "rules of the game called school" (Harter, 1992, p. 86), which, at the middle school level, typically involve highly structured systems of extrinsic contingencies. More theoretically, the increase in adolescents' desire for easy work is also consistent with the decline in levels of intrinsic motivation

among this same age group. Because the desire for easy work is the dimension of extrinsic motivation most diametrically opposed to intrinsic motivation (see Lepper & Henderlong, 2000), one might expect it to shift in an inverse fashion.

Stepping back, then, how might one evaluate the small but significant declines in levels of extrinsic motivation? On the one hand, extrinsic motivation has been associated with negative emotions, maladaptive coping strategies, and poor academic achievement (Boggiano, 1998; Dowson & McInerney, 2001; Lepper et al., 2005), thus a reduction in this form of motivation might be viewed as a positive development. On the other hand, declining levels of extrinsic motivation among high school students are predictive of intentions to drop out of school (Otis et al., 2005). A loss of extrinsic motivation may therefore signify disengagement from school altogether. In evaluating declining levels of extrinsic motivation, it also may be important to consider what motives – if any – displace students' focus on extrinsic contingencies. There are arguably both more desirable (e.g., motivation to master) and less desirable (e.g., motivation to outperform peers) alternatives (see Brophy, 2005). At present, we lack the empirical data necessary to evaluate the consequences of this developmental shift because most research has focused on static levels of extrinsic motivation rather than changes over time as predictors of meaningful outcomes (for an exception, see Otis et al., 2005). The present study marks a significant advance by documenting within-year change in levels of extrinsic motivation. Future research must now examine the consequences of this change.

4.1. Contextual predictors of motivational change

In addition to documenting developmental changes in student motivation, we sought to examine the potential role of the educational context in explaining these changes. As expected, within-year changes in students' levels of intrinsic motivation were predicted by shifts in their perceptions of the school context as mastery-oriented, and within-year changes in their levels of extrinsic motivation were predicted by shifts in their perceptions of the school context as performance-oriented. Although these predictive relationships were small in magnitude, they held for both elementary students and adolescents.

One interesting exception to the pattern outlined above was the positive relationship observed between school mastery context and the extrinsic dimension of teacher dependence, which was revealed in both correlational and regression analyses. We had initially conceptualized teacher dependence as a marker of extrinsic motivation in that we expected students to frequently consult their teachers about their work when they wanted to ensure that their efforts would produce a desired extrinsic end (see Lepper et al., 2005). The findings of the present study suggest that dependence on one's teacher may mean something quite different when exhibited in a mastery-oriented context – i.e., students who believe their schools value effort and personal improvement rather than high test scores may turn to their teachers in order to increase their conceptual understanding of the material. Future research using the Lepper et al. measures of motivational orientations should carefully consider the extent to which dependence on one's teacher necessarily represents an extrinsic orientation toward learning.

More predictably, there were small but systematic associations between intrinsic motivation and *both* dimensions of perceived school context: a positive association with mastery context and a negative association with performance context. Although the latter set of relationships was quite small and was not supported in the regression analysis, it is reminiscent of the rich tradition of research demonstrating that superfluous extrinsic constraints undermine intrinsic motivation (see Deci, Koestner, & Ryan, 1999; Lepper & Henderlong, 2000). Perhaps the relationship between

intrinsic motivation and a school performance orientation holds only when considering static levels as was done in the correlational analyses, or perhaps it is such a small association that it is overshadowed by the relationship between intrinsic motivation and a school mastery orientation. That changes in intrinsic motivation were better predicted by the school emphasis on mastery than performance goals is, in fact, consistent with several studies in the achievement goal literature (e.g., Bong, 2005; Urdan & Midgley, 2003). For example, Ames and Archer (1988) found that students' perceptions of the classroom mastery context had a much greater impact on their challenge-seeking, effort-valuation, and use of effective learning strategies than their perceptions of the classroom performance context. The findings regarding school mastery context should be interpreted with caution, however, because of the weak reliability of the measure, especially among elementary students.

A key contribution of the present study is that we moved beyond static levels of motivational constructs to examine how changes in the perceived school context mapped onto changes in personal motivation. Repeated assessments allow for inferences about the effects of students' experiences over time, which may be more telling than the effects of their perceptions on a single day. Indeed, a number of recent studies have found that changing levels of constructs are more predictive of meaningful motivational outcomes than are static levels at a single point in time (e.g., Bong, 2005; Nurmi & Aunola, 2005; Otis et al., 2005). Including multiple assessments within a single academic year, moreover, allows for a fine-grained understanding of motivational processes (cf. Bong, 2005). The present study suggests that small-scale contextual shifts that occur within a single academic year may be a source of motivational change. It is not simply moving from the intimate and comfortable elementary school to the anonymous, competitive middle school that matters, but also the goal structure embedded in day-to-day classroom practices.

Considering these practices naturally brings us to the issue of school reform. Our findings are consistent with the proposal that a school-wide focus on mastery goals promotes intrinsic motivation, or at least prevents its loss. Indeed, intervention research has shown that increasing the salience of mastery goals at the classroom level produces positive shifts in intrinsic motivation and effective strategy use (see Anderman & Maehr, 1994). Although we assessed students' perceptions rather than measuring the objective school environment, actual changes in the school goal structure do tend to affect students' perceptions and motivation (Midgley, Middleton, Gheen, & Kumar, 2002). Primary schools and classrooms may do well, then, to emphasize conceptual understanding over test scores and reward effort and personal improvement (cf. Schweinle et al., 2006). Unfortunately, an emphasis on high-stakes testing may work against such efforts (see Amrein & Berliner, 2003). Future educational policies will ideally broaden beyond a focus on accountability to include student motivation. Of course, we do not advocate making policy decisions on the basis of a single study with relatively small effect sizes but rather suggest that the present findings be considered in concert with the broader literature demonstrating the motivational benefits of contexts rooted in mastery goals.

4.2. Motivation and Achievement

A final aim of the present study was to examine the time-lagged predictive links between motivation and achievement. Consistent with previous research, intrinsic motivation was positively associated both with students' grades and their standardized test scores, although the relationship was quite small. Regression analyses probing the direction of these relationships supported a reciprocal connection between intrinsic motivation and GPA, but not be-

tween intrinsic motivation and test scores. The sample size for the test scores analyses was roughly half that of the GPA analyses, which may explain the disparity. However, this same disparity did not emerge for analyses of achievement and extrinsic motivation, so there may be a more substantive explanation than a simple lack of power. Perhaps the relationship between intrinsic motivation and GPA is inflated because teachers tend to give high marks to students who show a passion for learning but have not necessarily mastered the material. Certainly this must happen to some extent but it seems unlikely to explain fully the present pattern of findings in light of previous research showing that intrinsic motivation leads to adaptive learning strategies (e.g., Meece et al., 1988) and that good grades boost perceived competence, which is a key component of intrinsic motivation (Harter & Connell, 1984). The disparity between grades and test scores notwithstanding, then, the present data support the model of a synergistic and reciprocal relationship between intrinsic motivation and school achievement. Of course, this conclusion must be drawn with caution given the small magnitude of effects. Perhaps future research spanning multiple academic years would detect a stronger pattern of reciprocal influence between intrinsic motivation and achievement.

Extrinsic motivation, on the other hand, was negatively associated with students' grades and their standardized test scores. Regression analyses probing the direction of these relationships indicated that low achievement predicted subsequent rises in extrinsic motivation more so than the reverse. Students may become more extrinsically motivated after receiving poor marks because authority figures react by introducing incentives, punishments, or other extrinsic contingencies in order to encourage better performance. Although the very small effect sizes observed in the present study limit the conclusions that can be drawn, this explanation is supported by previous research, which has shown that poor performance elicits intrusive parental practices (Pomerantz & Eaton, 2001) and that such practices predict increasing levels of extrinsic motivation (Ginsburg & Bronstein, 1993). In short, extrinsic motivation appears to be less a cause than a consequence of poor achievement. Future research should address this possibility using experimental approaches, especially given the small magnitude of effects. Indeed, these minimal effects dictate that any conclusions about directional effects between motivation and achievement must be regarded as tentative and limited in terms of practical significance until further research is conducted.

4.3. Limitations and future directions

The present study represents a significant advance in our understanding of intrinsic and extrinsic motivations as they develop in context. There are, however, some important limitations that must be considered. First, although our longitudinal approach was an improvement over previous cross-sectional work, the present study spanned only a single academic year. Indeed, the relatively short time frame of the present study may account for the small magnitude of effects: Absolute changes in motivation over the 6-month study period were not drastic, and the predictive relationships among motivation, school context, and achievement were quite modest. To be sure, the effect sizes for some analyses (e.g., regarding motivation and achievement) were truly minimal. However, the cumulative impact of small effects over years of schooling could arguably be of practical educational significance. It may be beneficial, therefore, to track changes in motivational orientations and their correlates over a longer period of time.

A second limitation of the present study deals with the correlational nature of the data. Although repeated assessments of the key variables allowed for analyses probing the likely direction of effects, causality cannot be inferred. Future work along these lines

might take advantage of natural experiments that occur in the context of school reform efforts.

Finally, it is also important to consider that the present study adopted a domain-general framework of motivation. We chose this approach in order to be consistent with prior research on intrinsic and extrinsic motivations (e.g., Lepper et al., 2005; Murphy & Alexander, 2000) and adopted it for all other constructs to ensure that they were tested at the same level of generality (see Meece et al., 1988). It is certainly possible, however, that different developmental pathways exist for motivation in different academic domains, and that this could vary from individual to individual. Future domain-specific and person-centered approaches will be important complements to the domain-general and variable-centered approach used in the present study (cf. Eccles, 2005).

In conclusion, the present study moved beyond static and confounded assessments of motivation to track true developmental change in students' motivational orientations over the elementary and middle school years. It appears that both intrinsic and extrinsic motivations undergo small but significant declines within a relatively short period of time. The loss of intrinsic motivation is especially troubling, made even more so by the positive and reciprocal relationship between intrinsic motivation and success in school. However, our findings suggest that efforts to encourage persistence, emphasize the importance of conceptual understanding, and foster an acceptance of mistakes as a necessary part of learning could help attenuate declines and assist students in becoming motivated, life-long learners.

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