

Profiles of Intrinsic and Extrinsic Motivations in Elementary School

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Introduction

• Motivation is often characterized as either *intrinsic* (i.e., inherent to the self) or *extrinsic* (i.e., originating from outside of the self) in nature. Although traditionally conceived as polar opposites, intrinsic and extrinsic motivations are relatively orthogonal constructs (Corpus et al., 2009; Lepper et al. 2005).

• Intrinsic motivation is generally thought to be more adaptive than extrinsic motivation (Deci & Ryan, 2000; Lepper et al., 2005), but it is unclear how different combinations of the two constructs might function, especially at the elementary school level. A *person-centered approach* that examines both types of motivation within individual students is needed to address this issue.

• **Central Research Question:** Does extrinsic motivation detract from intrinsic motivation or compound its benefits? One could imagine two competing hypotheses:

(1) Students at the elementary level may see little conflict between learning as an end in itself (intrinsic motivation) and learning as a means of pleasing others (extrinsic motivation) given that relationships with teachers are close (Midgley et al., 1995) and autonomy is not yet a central developmental task (Wray-Lake et al., 2010). This would suggest that a *high quantity* of motivation – regardless of the type – would be adaptive.

OR

(2) Students with a pattern of high intrinsic but low extrinsic motivation may fare better than others because self-directed, persistent engagement results when students are free from external concerns (Deci & Ryan, 2002; Harter, 1992). The superiority of such *good quality* motivation has recently been shown with older students (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009). We favored this hypothesis given its strong grounding in motivation theory.

• **Current Study:** We used cluster analysis to identify naturally-occurring combinations of intrinsic and extrinsic motivations in elementary school. We then examined the extent to which cluster membership predicted academic achievement both concurrently and over the course of an academic year.

• A longitudinal approach also allowed us to examine sources of motivational change. We tested children's perceptions of their own competence in school (Harter et al., 1992; Ntoumanis et al., 2009) and the goal context of their school environments (Corpus et al., 2009) as predictors of shifts in the quality of their motivation.

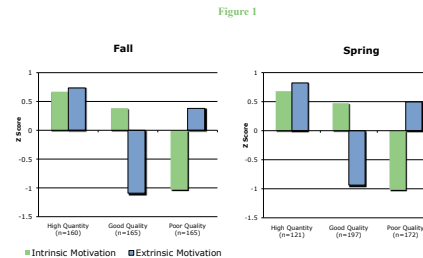
Method

490 3rd-, 4th-, & 5th- grade students from 7 schools twice completed a survey (fall, spring). Items assessed their intrinsic and extrinsic motivational orientations (Lepper et al., 2005), perceived academic competence (Anderman & Midgley, 1997), and perceptions of the school goal context (Roeser et al., 1996). Grades for the 1st and 4th quarters were collected from school records.

Results

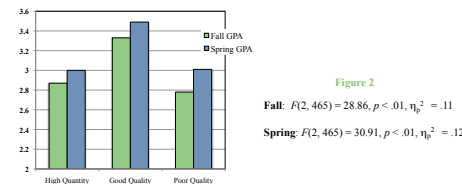
Cluster Analysis

Clusters were formed in an I-States as Objects Analysis using Ward's method followed by k-means clustering. A final solution of three clusters was chosen with groups representing *high quantity*, *good quality*, and *poor quality* motivation. (Fig. 1). This solution explained 59% of the overall variance in motivation and was shown to be stable and replicable through a double-split cross-validation procedure ($\kappa = 0.86$).



Academic Achievement

Students in the good quality cluster outperformed their peers in the other two clusters in both the fall and the spring. (Fig. 2). Moreover, the good quality group experienced the greatest *increase* in achievement over the course of the school year, $F(2, 464) = 3.08, p < .05, \eta_p^2 = .01$.



Sources of Good Quality Motivation

Hierarchical regression analysis showed that an increase in motivation quality over the year was predicted by an increase in perceived competence and a decrease in school performance goals. (Table 1).

	Spring Motivation Quality		
	ΔR^2	B	β
Step 1: $F(1, 420) = 370.54^{**}$.47		
Fall Motivation Quality	.22	.04	.69 ^{**}
Step 2: $F(3, 418) = 191.76^{**}$.11		
Change in Perceived Competence	.48	.05	.32 ^{**}
Change in School Performance Context	-.10	.05	-.07 [*]

Note. $N = 422$. Motivation quality was indexed by subtracting extrinsic from intrinsic motivation. Changes in perceived competence and school performance context were indexed by the unstandardized residual scores after regressing spring levels of each variable on fall levels of that same variable.
* $p < .05$, ** $p < .01$

Conclusions

• Motivation *quality* (i.e., ratio of intrinsic to extrinsic motivation) rather than *quantity* (i.e., amount of intrinsic plus extrinsic motivation) appears to be essential – a message that is lost in traditional variable-centered research. The importance and adaptive value of good quality motivation at the elementary level echoes recent person-centered studies with older students (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009).

• Our longitudinal approach showed that good quality motivation is not a simple byproduct of high achievement but rather uniquely contributes to gains in such achievement over time.

• Good quality motivation may be fostered by non-competitive school contexts that fulfill children's need for competence.

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Abstract

The present study employed a person-centered, longitudinal approach to identify and evaluate naturally occurring combinations of intrinsic and extrinsic motivations among 490 third- through fifth-grade students. Cluster analysis revealed three groups, characterized by high levels of both motivations (*high quantity*), high intrinsic but low extrinsic motivation (*good quality*), and low intrinsic but high extrinsic motivation (*poor quality*). Analyses of stability and change in cluster membership indicated that the good quality cluster was most stable (76% stability) and the high quantity cluster most precarious (45% stability) over the course of an academic year. Most strikingly, students in the good quality cluster outperformed their peers in the other two clusters and showed the greatest increase in achievement over time. These findings suggest that a favorable ratio of intrinsic to extrinsic motivation may be more important than the total amount of motivation present. Moreover, analyses suggested that good quality motivation may be fostered by non-competitive school contexts that fulfill children's need for competence.

Theoretical Framework and Objectives

The question of what motivates children's behavior in achievement contexts is one of both theoretical and practical import. Much of the research in this area has classified motivation as either *intrinsic* (i.e., inherent to the self) or *extrinsic* (i.e., originating from outside of the self). Although traditionally conceived as opposing forces, recent work suggests that intrinsic and extrinsic motivations are relatively orthogonal constructs (Lepper, Corpus, & Iyengar, 2005). Indeed, the two forms of motivation have distinct developmental pathways and are predicted by different aspects of the educational context (Corpus, McClintic-Gilbert, & Hayenga, 2009).

Given their relative independence, an essential next step is to identify naturally occurring *combinations of* intrinsic and extrinsic motivations and their relationship to meaningful achievement behaviors. Intrinsic motivation is generally thought to be more adaptive than extrinsic motivation (Deci & Ryan, 2000; Lepper et al., 2005), but it is unclear how different combinations of the two constructs might function. Holistic person-centered research has begun to address this question among high school and college students with mixed results. In some cases a pattern of high intrinsic coupled with low extrinsic motivation performs the best (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009), but in others a pattern of high intrinsic with high extrinsic motivation appears equally adaptive and far more prevalent in high school (Ratelle, Guay, Vallerand, Larose, & Senecal, 2007). When coupled with intrinsic motivation, then, extrinsic motivation may promote academic achievement in high school, perhaps because of the competitive, outcome-oriented stance common at this level of schooling.

No research to date, however, has identified such motivational profiles and their correlates among elementary populations. A *developmental perspective* is critical for this line of research because the optimal combination of motivation types may differ for older versus younger students. Students at the elementary level may see little conflict between learning as a means toward pleasing others and learning as an end in itself, in which case any profile with sufficient motivation – regardless of the type – would be adaptive. A competing hypothesis is that students with a pattern of high intrinsic but low extrinsic motivation may fare better than others, largely because self-directed, persistent engagement results when students are free from external concerns (Deci & Ryan, 2002; Harter, 1992). Indeed, the superiority of such *good quality* motivation is supported by recent research with middle school students (Hayenga & Corpus, 2010; cf. Vansteenkiste et al., 2009). The present study addressed these possibilities empirically by using cluster analysis to identify naturally-occurring combinations of intrinsic and extrinsic motivations among third- through fifth-grade students. We then examined the extent to which profile membership predicted academic achievement. Based on motivation theory and the aforementioned research with middle school students, we expected that a profile of good quality motivation would emerge as the most adaptive group.

Because previous research has been limited by correlational, slice-in-time methods, we adopted a longitudinal approach in the present study. This allowed us to move beyond simple associations to probe for a causal relationship between profile membership and academic achievement. Including multiple time points also allowed us to examine sources of motivational change. More specifically, we tested children's perceptions of their own competence in school (Harter, Whitesell, & Kowalski, 1992; Ntoumanis, Barkoukis, & Thogersen-Ntoumani, 2009) and the goal context of their school environments (Corpus et al., 2009; Vansteenkiste et al., 2009) as predictors of shifts in the quality of their motivation. Finally – in the most basic sense – a longitudinal approach enabled us to document patterns of movement among motivational profiles over time, thus providing a much-needed descriptive account of individual differences in motivational change at the elementary level.

Method

Participants and Procedure

490 3rd-, 4th-, and 5th-grade students from seven schools (four public, three parochial) twice completed a survey (fall, spring) that included the measures listed below.

Measures

Intrinsic and Extrinsic Motivational Orientations. Motivational orientations were assessed with reliable and valid scales from Corpus et al. (2009), which were based on Lepper et al. (2005). These scales derive from Harter's (1981) classic research on intrinsic versus extrinsic motivational orientations and are built on a tradition that has been prominent in research with child populations (e.g., Guay, Boggiano, & Vallerand, 2001; Hayenga & Corpus, 2010; Lepper et al., 2005; Tzuriel, 1989; Wong, Wiest, & Cusick, 2002). The intrinsic motivation scale included 17 items focusing on the dimensions of challenge-seeking (e.g., "I like to go on to new work that's at a more difficult level"), 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"). Children responded to each item using a five-point scale and scores were averaged together to form a composite variable of intrinsic motivation. The extrinsic motivation

scale included 16 items focusing on an orientation toward pleasing authority figures (e.g., “I answer questions because the teacher will be pleased with me”), a desire for easy work (e.g., “I like school subjects where it’s pretty easy to just learn the answers”), and a dependence on the teacher for guidance (e.g., “I like the teacher to help me plan what to do next”). Again, a five-point response scale was used and scores for each item were averaged together to form a composite variable of extrinsic motivation.

Perceived Academic Competence. Children’s perceived competence was assessed with four items (e.g., “Even if the work in school is hard, I can learn it”) from Anderman and Midgley (1997), each of which focused on children’s beliefs about their basic ability to master academic material. We took care to select a scale that did not frame competence in normative terms but rather indexed children’s sense of whether or not they are capable of learning, given sufficient time and effort. Children responded to each item using a five-point scale. Responses for two items were reverse-coded before averaging all scores together to form a composite variable of perceived competence.

Perceived School Goal Context. We focused on student perceptions rather than objective indicators of the school goal context because students may experience the same learning environment in different ways (see Ames, 1992; Kaplan, Middleton, Urdan, & Midgley, 2002; Ryan & Grolnick, 1986). Indeed, previous research has shown greater variability within classrooms than between classrooms (Urden, 2010). Students’ *perceptions* of the school context, therefore, were assessed with respect to the mastery and performance goal structures using items drawn from Roeser, Midgley, and Urden (1996). The perceived school mastery goal scale included four items indicating that the school culture emphasized personal growth (e.g., “In this school, mistakes are OK as long as we are learning”); the perceived school performance goal scale included four items indicating that the school culture emphasized competitive evaluative structures (e.g., “In this school, only a few kids get praised for their work”). Children used a five-point response scale for each item. Responses to the four items for each goal context scale were then averaged together to form two composite variables: one for school mastery goals and one for school performance goals. Although the limited work to date with third- and fourth-grade students suggests weak internal consistency of the mastery goal measure (Dresel, Fasching, Steuer, & Valerie, 2010; Midgley, Anderman, & Hicks, 1995; cf. Koskey, Karabenick, Woolley, Bonney, & Dever, 2010), we included it for the sake of parity with the performance goal measure. Finally, because of concerns about the length of the survey for the youngest participants, only about half of the third-grade classrooms completed the school context measures ($n = 80, 53\%$); the remaining third-grade students completed measures unrelated to the present investigation.

Academic Achievement. Students’ grades were collected from school records for the first and fourth quarters of the academic year, corresponding to the timing of the fall and spring student surveys. Because grading systems varied across the participating schools, all grades were converted to a standard four-point scale (i.e., A = 4.0, A- = 3.7, B+ = 3.3, etc.). Grade point averages (GPAs) were then computed by averaging scores for the core academic subjects of language arts, math, social studies, and science. GPA data were unavailable for a small number of students whose parents did not grant access to school records ($n = 24, 4.7\%$). These students did not differ in their levels of intrinsic or extrinsic motivations in either the fall or spring from those whose parents did grant such access, $ts(505) < 1.52, ns$.

Statistical Analysis Strategy

In order to capture naturally-occurring combinations of intrinsic and extrinsic motivations for both the fall and spring time points, we used I-States as Objects Analysis (ISOA) (Bergman & El-Khoury, 1999). Following dynamic systems models, this technique treats each participant's data from a single time point as a discrete unit – an i-state. Thus, fall and spring responses from the 490 participants were separated into 980 i-states. These i-states were then subjected to an agglomerative hierarchical clustering method (Ward's linkage) followed by a nonhierarchical, iterative clustering technique (k-means clustering) (see Bergman, 1998; Hair, Anderson, Tatham, & Black, 1998). The final cluster solution was chosen by considering motivational theory, percent of variance explained, distinctness of the groups, and parsimony. The Breckenridge (2000) double-split cross-validation procedure was then used to ensure that the solution was stable and replicable.

Results and Discussion

Correlations and Preliminary Analysis

Descriptive statistics, reliability coefficients, and correlations among all variables of interest are displayed in Table 1.

Cluster Solution

Description of Profiles. A final solution of three distinct profiles was chosen, which accounted for 56% of the variance in intrinsic motivation and 62% of the variance in extrinsic motivation. The cross-validation procedure confirmed that the solution was stable and replicable ($\kappa = 0.86$). A four-cluster solution was considered but the groups did not differ sufficiently from one another and the additional profile did not map meaningfully onto motivation theory.

The final solution included a *high quantity* group that reported high levels of both intrinsic and extrinsic motivations (281 i-states), a *good quality* group that reported high intrinsic but low extrinsic motivation (362 i-states), and a *poor quality* group that reported low intrinsic but high extrinsic motivation (337 i-states). Although previous research with older populations has identified a *low quantity* group (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009), this pattern representing the lack of motivation altogether was not found in the present elementary school sample. Figure 1 presents *z* scores of intrinsic and extrinsic motivations for each cluster in the fall and spring.

Stability of Profiles. Clusters were moderately stable with 62% of the sample remaining in the same profile from fall to spring. Students in the high quantity group were most likely to change profile membership, suggesting that this profile may be difficult to sustain. Overall, the pattern of profile movement over time was far more encouraging than that of older samples (cf. Hayenga & Corpus, 2010) in that the good quality group was the most stable and had the highest ratio of new member gains to old member losses. See Table 2.

Academic Achievement

Students in the good quality cluster outperformed their peers in the other two clusters in both the fall and the spring, $F_s(2, 465) > 28.85$, $ps < .001$, $\eta_p^2s > .11$. See Table 3. The adaptive value of good quality motivation was further demonstrated by an ANCOVA examining the effect of fall cluster membership on spring GPA while controlling for fall GPA. As expected, the good quality group experienced the greatest increase in achievement over the course of the school

year, $F(2, 464) = 3.08, p < .05, \eta_p^2 = .01$. This analysis provides a window for understanding the causal role of motivational profiles in academic achievement, which is a significant step beyond previous research. More generally, these data suggest that motivation *quality* (i.e., the ratio of intrinsic to extrinsic motivation) is more important than the sheer amount of motivation present – a message similar to that of research with middle school populations (Hayenga & Corpus, 2010).

Sources of Change in Motivation Quality

Given the significance of motivation quality, we next sought to understand how it might change over time as a function of shifts in perceived competence and perceived school goal context.

First, we examined the data for potential differences among the clusters in these variables. As previous theory and research would suggest, students in the three clusters differed at both the fall and spring time points in their levels of perceived competence [$F_s(2, 487) > 80.16, p_s < .001, \eta_p^2_s > .24$], school mastery goals [$F_s(2, 419) > 4.17, p_s < .05, \eta_p^2_s > .02$], and school performance goals [$F_s(2, 419) > 5.40, p_s < .01, \eta_p^2_s > .02$]. Students in the good quality group reported the highest perceived competence and the lowest school performance goals, as shown in Table 3. They did not, however, report higher school mastery goals than students in the high quantity group. Because school mastery goal perceptions were not measured reliably, we did not consider them further as a source of change in motivation quality.

We next conducted hierarchical regression analyses to examine the extent to which shifts in perceived competence and school performance goals would predict changes in motivation quality from fall to spring. In order to index shifts in perceived competence and school performance goals, we used the unstandardized residual scores after regressing spring levels of each variable on fall levels of that same variable (see Corpus et al., 2009). We indexed motivation quality by subtracting extrinsic motivation from intrinsic motivation (see Vansteenkiste et al., 2009). For each regression, fall motivation quality was entered in the first step and the unstandardized residual for the potential source of change was entered in the second step. As expected, an increase in motivation quality over the year was predicted by an increase in perceived competence ($\beta = .32, p < .001$) and a decrease in school performance goals ($\beta = -.07, p < .05$). It appears, therefore, that shifts in students' perceptions of their own competence in school and their experience of school as a competitive, evaluative context may explain, in part, changes in the quality of their motivation.

Conclusions and Significance

A long tradition of variable-centered research has shown the benefits of intrinsic motivation. The present findings suggest that – at least at the elementary level – intrinsic motivation must be paired with low levels of extrinsic motivation to produce strong academic achievement. Motivation *quality* rather than *quantity* appears to be essential – a message that is lost in traditional variable-centered research. Moreover, the longitudinal approach of the present study allowed us to move beyond simple associations to examine the predictive value of profile membership over time. Quality motivation is not a simple byproduct of high achievement but rather uniquely contributes to gains in such achievement over time.

Our exploration of individual differences in motivational change also yielded important insights. That there was no trend toward poor quality motivation is encouraging; if anything, children were more likely to shift toward an adaptive profile of good quality motivation – a

pattern that unfortunately stands in stark contrast to that found in person-centered research with middle school students (Hayenga & Corpus, 2010). Moreover, the present data suggest that this good quality motivation may be sustained over time in non-competitive contexts that fulfill children's need for competence. This is a powerful finding not only for motivation theorists but also practitioners, who focus on the entire constellation of motives as they cohere in real students, rather than variables in isolation.

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Table 1
Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Motivation												
1. F Intrinsic Motivation	(.91)	.59**	-.16**	-.18**	.11*	.11*	.57**	.31**	.26**	.13*	-.10*	-.11*
2. S Intrinsic Motivation		(.90)	-.26**	-.25**	.13**	.17**	.47**	.62**	.12*	.23**	-.04	-.14*
3. F Extrinsic Motivation			(.85)	.64**	-.35**	-.36**	-.37**	-.36**	.13**	.02	.27**	.10*
4. S Extrinsic Motivation				(.87)	-.34**	-.35**	-.31**	-.39**	.03	-.01	.22**	.20**
Achievement												
5. F GPA					---	.82**	.25**	.26**	.09	.08	-.26**	-.19**
6. S GPA						---	.27**	.31**	.12*	.06	-.21**	-.09
Sources of Change												
7. F Perceived Competence							(.61)	.54**	.13**	.07	-.16**	-.07
8. S Perceived Competence								(.69)	.09	.16**	-.05	-.14**
9. F School Mastery Goal									(.48)	.31**	-.10*	-.03
10. S School Mastery Goal										(.49)	-.06	-.28**
11. F School Performance Goal											(.68)	.49**
12. S School Performance Goal												(.74)
<i>Mean</i>	3.60	3.54	3.22	3.07	2.99	3.19	3.57	3.65	4.15	4.16	1.90	1.85
<i>Standard Deviation</i>	.74	.70	.72	.74	.73	.70	.85	.88	.58	.60	.86	.87

Note: F = Fall; S = Spring. Values in parentheses are alpha coefficients.

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

Table 2
Longitudinal Shifts in Cluster Membership

Fall Cluster	1	2	3	Total
1. High Quantity	72 (45.0%)	43 (26.9%)	45 (28.1%)	160 (100%)
2. Good Quality	20 (12.1%)	125 (75.8%)	20 (12.1%)	165 (100%)
3. Poor Quality	29 (17.6%)	29 (17.6%)	107 (64.8%)	165 (100%)
Total	121	197	172	490

Note: Values in parentheses are the percentages of each fall cluster that appear in the various spring clusters.

Table 3
Correlates of Motivational Profiles in the Fall and Spring

Variable	Cluster		
	High Quantity	Good Quality	Poor Quality
Fall			
GPA	2.87 (.74) _a	3.33 (.53) _b	2.78 (.77) _a
Perceived Competence	3.80 (.68) _a	4.02 (.64) _b	3.01 (.75) _c
School Mastery Goals	4.34 (.50) _a	4.13 (.55) _b	4.04 (.62) _b
School Performance Goals	1.97 (.88) _a	1.63 (.68) _b	2.10 (.93) _a
Spring			
GPA	3.00 (.78) _a	3.49 (.51) _b	3.01 (.70) _a
Perceived Competence	3.81 (.80) _a	4.08 (.59) _b	3.14 (.80) _c
School Mastery Goals	4.26 (.56) _a	4.21 (.54) _{ab}	4.07 (.62) _b
School Performance Goals	1.93 (.90) _a	1.67 (.72) _b	1.94 (.91) _a

Note: Cell values are means with standard deviations in parentheses. Mean values are significantly different across motivational profiles if they have different subscripts.

Figure 1
Standardized Motivation Scores by Cluster in the Fall and Spring

