CREATING RICH PORTRAITS

A Mixed-Methods Approach to Understanding Profiles of Intrinsic and Extrinsic Motivations

ABSTRACT

A person-centered, mixed-methods approach (self-report surveys, semistructured interviews, school records) was used to characterize and evaluate profiles of intrinsic and extrinsic motivations among 243 third- through eighth-grade students. Cluster analysis suggested four distinct profiles: high quantity (high intrinsic, high extrinsic), primarily intrinsic (high intrinsic, low extrinsic), primarily extrinsic (low intrinsic, high extrinsic), and low quantity (low intrinsic, low extrinsic) motivation. The primarily intrinsic profile showed the most adaptive pattern of responses; the primarily extrinsic and low quantity profiles, conversely, displayed similarly maladaptive patterns. Both quantitative and qualitative analyses suggested that particular combinations of intrinsic and extrinsic motivations may explain students' academic and emotional functioning in school better than levels of each variable in isolation.

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WHY do some students delight in the opportunity to learn while others complete their schoolwork primarily to gain recognition or avoid punishment? The distinction between learning for the sake of learning (i.e., intrinsic motivation) versus learning as a means to some separable end (i.e., extrinsic motivation) has long been central to both motivational science (e.g., Deci, Koestner, & Ryan, 1999; Harter, 1978; Sansone & Harackiewicz, 2000; White, 1959) and pedagogical philosophy (e.g., Greenberg, 1992; Lillard, 2005). Traditionally, this distinction has been studied from a variable-centered perspective, one in

which intrinsic or extrinsic motivation per se is the focal point for statistical analysis. This approach has yielded rich information about the developmental trajectories and predictive power of both intrinsic and extrinsic motives.

But particular combinations of motives may be more meaningful than levels of either type of motivation alone. In order to address this possibility, person-centered approaches that examine how variables interact and combine within individual students must be adopted (Bergman & Trost, 2006). Consider an analogy from Magnusson (2003): Whereas a traditional variable-centered approach might address the correlates of a particular variable, such as body temperature, a person-centered approach might consider how body temperature combines with other variables (e.g., muscle tone, respiratory function) to determine which clusters of symptoms are diagnostic of particular illnesses. Person-centered approaches thus may provide a window for understanding motivation as it operates in the complex world of the classroom.

Motivation researchers from diverse theoretical traditions have recently adopted such approaches to examine the prevalence and adaptive value of particular combinations of motivational variables (e.g., Conley, 2012; Senko, Hulleman, & Harackiewicz, 2011; Trautwein et al., 2012). In the literature on achievement goals, for example, person-centered approaches have been used to address the debate over multiple goals (i.e., whether it is most adaptive to pursue "mastery" goals alone or in concert with "performance" goals; Daniels et al., 2008; Luo, Paris, Hogan, & Luo, 2011).[1] To a limited extent, person-centered approaches have been adopted to address the important distinction between intrinsic and extrinsic motives as well, as we describe in the following sections (Hayenga & Corpus, 2010; Ratelle, Guay, Vallerand, Larose, & Senécal, 2007; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009; Wormington, Corpus, & Anderson, 2012).

This work has relied almost exclusively on survey methods to characterize motivational profiles and their academic correlates. Quantitative survey methods dominate the broader literature on motivation (see Fulmer & Frijters, 2009) and can be used with large samples that contribute to generalizability, but they may fail to capture the nuanced realities of students' social-emotional functioning (DeGroot, 2002). Qualitative work, by contrast, allows for rich descriptions that can form the basis of explanatory theories (Guba, 1990; Tashakkori & Teddlie, 1998). Using the two approaches in concert may yield complementary results (Greene, Caracelli, & Graham, 1989; Johnson & Onwuegbuzie, 2004).

The goal of the present study was to bring a mixed-methods approach to this line of inquiry in order to richly characterize and evaluate profiles of intrinsic and extrinsic motivation among elementary and middle school students. In the first phase of this study, we used survey data to establish motivational profiles and examine their relationship to a broad set of academic and social-emotional indicators of functioning. In the second phase, we used semistructured interviews to gain a deeper understanding of how students from each motivational profile experience school.

Overview of the Research

A Developmental Perspective

Extant person-centered studies of intrinsic and extrinsic motivations have focused on high school and college students (Ratelle et al., 2007; Vansteenkiste et al., 2009; Wormington et al., 2012). As detailed in the next section, this work has gener-

ally shown a more adaptive pattern of responding among profiles with high levels of intrinsic motivation than those with low levels of intrinsic motivation across a range of outcomes (e.g., course grades, engagement, learning strategies). But among those profiles with substantial intrinsic motivation, there is mixed evidence regarding the optimal combination of motivation types. Predominantly intrinsic profiles (i.e., those with minimal extrinsic motivation) appear to be most adaptive for some outcomes, but no more so than profiles characterized by high levels of both motive types for others—a pattern similar to that of research on multiple goal pursuit in the achievement goal literature (e.g., Daniels et al., 2008; Pastor, Barron, Miller, & Davis, 2007; Tuominen-Soini, Salmela-Aro, & Niemivirta, 2012).

Moreover, mirroring the paucity of research on younger samples in the achievement goal literature (Schwinger & Wild, 2012; Veermans & Tapola, 2004), only two studies to date have investigated profiles based on intrinsic and extrinsic motivations among younger populations—one with third- through fifth-grade students (Corpus & Wormington, 2014) and one with sixth- through eighth-grade students (Hayenga & Corpus, 2010). In both cases, profiles of intrinsic and extrinsic motivations were established via cluster analysis of survey responses and then examined in relation to students' classroom grades and standardized test scores. Both studies found that students characterized by a predominantly intrinsic profile performed best, with profile membership accounting for between 6% and 12% of the variance in academic achievement. The present study sought to replicate the link between profile membership and academic achievement and extend upon this work by including multiple indicators of academic and socioemotional functioning assessed using both quantitative and qualitative methodologies.

The two prior studies with younger populations also examined stability and change in profile membership. Interestingly, the third- through fifth-grade sample migrated toward a largely intrinsic profile over the course of an academic year (Corpus & Wormington, 2014), but the sixth- through eighth-grade sample shifted away from it (Hayenga & Corpus, 2010). This is perhaps not surprising in light of a robust variable-centered literature documenting motivational declines across grade levels (Corpus, McClintic-Gilbert, & Hayenga, 2009; Eccles et al., 1993; Gottfried, Marcoulides, Gottfried, & Oliver, 2009; Harter, 1981; Lepper, Corpus, & Iyengar, 2005). Given this literature and the general dearth of research on younger students, the present study focused on those in the broad range from grades 3–8.

Motivational Profiles and Their Correlates

In order to establish motivational profiles, we considered the degree to which intrinsic and extrinsic motivations co-occurred within individual students. We expected to find four distinct motivational profiles: one with high levels of both intrinsic and extrinsic motivations (high quantity), one with high intrinsic but low extrinsic motivation (primarily intrinsic), one with low intrinsic but high extrinsic motivation (primarily extrinsic), and one with low levels of both motive types (low quantity). These profiles have been found in previous research using an intrinsic-extrinsic framework (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009; Wormington et al., 2012) and are similar to those most commonly found in person-centered achievement goal studies (Wormington & Linnenbrink-Garcia, 2013). Our general expectation was that students with primarily intrinsic motivation would

show the most adaptive pattern of responses across a broad array of correlates. The rationale and hypotheses for each potential correlate are described in the following sections.

Learning strategies. The ability to regulate and facilitate one's own learning is a critical component of school success (Pintrich & DeGroot, 1990). We considered the extent to which both deep (e.g., elaboration, organization, critical thinking) and surface (e.g., rehearsal, memorization) learning strategies may be related to motivational profiles. Variable-centered research has shown intrinsic motivation to be positively correlated with the use of deep and, to a lesser extent, surface strategies (Entwistle & Ramsden, 1983; Meece, Blumenfeld, & Hoyle, 1988; Nolen, 1988; Weinstein & Mayer, 1986). There is also evidence of a positive relationship between surface learning strategies and aspects of extrinsic motivation (Román, Cuestas, & Fenollar, 2008). The only relevant person-centered study to date aligns with these findings: high school and college students with primarily intrinsic and high quantity motivation reported greater use of deep cognitive strategies than their peers (Vansteenkiste et al., 2009), with motivational profiles accounting for between 10% and 15% of the variance in strategy use. We predicted a similar pattern among our younger students.

Of course, students may also use a variety of strategies that interfere with—rather than contribute to—learning. Variable-centered research has shown a negative relationship between intrinsic motivation and the use of both superficial strategies (e.g., guessing, copying) and self-handicapping (Meece et al., 1988; Shih, 2005). There is also evidence that extrinsic motivation may relate positively to superficial strategy use (Meece et al., 1988; Stipek & Gralinski, 1996). Again, only one person-centered study has addressed these issues, finding the greatest maladaptive strategy use among students with primarily extrinsic and low quantity motivation, and the least among those with primarily intrinsic motivation, with motivational profiles accounting for between 12% and 15% of the variance in strategy use (Vansteenkiste et al., 2009). Accordingly, we expected the greatest use of maladaptive strategies among students with high quantity and primarily extrinsic motivation because seeing schoolwork as a means to an end may promote a superficial route to task completion.

Ability-validation goals. Students with different motivational profiles may also differ in their focus on ability-validation goals—a type of performance goal that involves striving to confirm intellectual ability through school performance (Grant & Dweck, 2003). These goals capture the original conception of performance goals in terms of proving one's competence to self and others and may have significant consequences for students' learning and well-being (Brophy, 2005; Dweck & Leggett, 1988). Indeed, endorsing ability-validation goals is associated with losses to intrinsic motivation (Grant & Dweck, 2003; Haimovitz, Wormington, & Corpus, 2011) and poor achievement (Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). Although no studies have yet examined the association between ability-validation goals and extrinsic motivation, the two constructs share a preoccupation with demonstrating performance. Therefore, we expected students with primarily extrinsic motivation to endorse ability-validation goals to a greater extent than their peers, particularly those with primarily intrinsic and low quantity motivation.

Well-being. Perhaps the most commonly studied emotion in relation to motivation is anxiety. Variable-centered work has established that anxiety is negatively related to academic intrinsic motivation (Gilman & Anderman, 2006; Gottfried, 1985) and positively related to extrinsic motivation (Assor, Kaplan, Kanat-Maymon,

& Roth, 2005; Ryan & Connell, 1989). Similarly, person-centered research has shown that high school students with primarily intrinsic motivation demonstrate the least anxiety, while those with primarily extrinsic motivation report the most, with motivational profiles accounting for 1%–11% of the variance in anxiety (Ratelle et al., 2007; Vansteenkiste et al., 2009). Research with high quantity students is mixed in that they appear to have either less or equivalent anxiety compared to their peers with primarily extrinsic motivation (Ratelle et al., 2007; Vansteenkiste et al., 2009).

Beyond anxiety, variable-centered studies have shown a positive relationship between academic intrinsic motivation and general life satisfaction (Gilman & Anderman, 2006; Sheldon, Ryan, Deci, & Kasser, 2004), but it remains to be seen how combinations of intrinsic and extrinsic motivations may relate to psychological well-being in children. This issue is particularly interesting with respect to the high quantity profile given that competing goals may compromise well-being. In the present study, we expected students with primarily intrinsic motivation to show the greatest life satisfaction and least anxiety, while those with primarily extrinsic and potentially high quantity motivation would be at an emotional disadvantage. Students in the low quantity profile were expected to fall somewhere in the middle because they were presumed to be less emotionally engaged with school in either a positive or negative sense.

Academic achievement. Variable-centered research has shown classroom grades and standardized test scores to be positively correlated with intrinsic motivation and negatively correlated with extrinsic motivation (Corpus et al., 2009; Lepper et al., 2005; Miserandino, 1996). Consistent with these findings, person-centered research has documented the strongest classroom grades among students with primarily intrinsic motivation at the elementary and middle school level, with high quantity motivation as a close second among older populations (Corpus & Wormington, 2014; Hayenga & Corpus, 2010; Ratelle et al., 2007; Vansteenkiste et al., 2009; Wormington et al., 2012). Motivational profiles have accounted for between 4% and 12% of the variance in achievement across these studies. We sought to replicate these findings in the present study using both classroom grades and standardized achievement tests in order to address concerns that classroom grades are perhaps unduly influenced by teachers' perceptions of student motivation (Cross & Frary, 1999; McMillan, Myran, & Workman, 2002).

Method

Participants

Participants were recruited from two K–8 schools in order to minimize motivational differences across age groups caused by the transition to a new school during early adolescence (see Harter, Whitesell, & Kowalski, 1992; Simmons & Blyth, 1987). Both schools were affiliated Catholic and located in middle- to upper-middle-class neighborhoods in which most parents had attended at least some college. The schools were structured with one classroom per grade level and a departmentalized junior high program in which students rotated around to specialist teachers for core academic subjects. The student population was stable from year to year, even at the typical point of transition to middle school (>80% stability according to school staff). Both schools had strong communities, heavily involved parents, and student

accountability in the sense that every student was known and adults had high expectations for academic performance and behavioral compliance.

All students in the grades 3–8 were invited to participate in the survey. Parental consent was received from 85% of the student body, resulting in a final sample of 243 students (57% girls), all of whom assented to participate. Participants were fairly evenly distributed across the six grade levels: grade 3 ($n = 46$), grade 4 ($n = 48$), grade 5 ($n = 37$), grade 6 ($n = 38$), grade 7 ($n = 33$), grade 8 ($n = 41$). They largely identified as Caucasian (84%) with smaller groups who identified as Asian (11%), Black or African American (5%), Hispanic (5%), and Native American (3%).

Fifty-four of these students (56% girls) were individually interviewed: grade 3 ($n = 10$), grade 4 ($n = 9$), grade 5 ($n = 10$), grade 6 ($n = 8$), grade 7 ($n = 8$), grade 8 ($n = 9$). Although interviews took place prior to obtaining the final cluster solution, students were selected with the goal of having approximately 12 students per cluster, with equal representation of grade levels and genders in each group. Therefore, from each of the 12 participating classrooms (one per grade level per school), we selected approximately four children to be interviewed based on their survey responses: one with high levels of both motivation types, one with high intrinsic but low extrinsic motivation, one with high extrinsic but low intrinsic motivation, and one with low levels of both motivation types.[2] The third author matched selected cases to participant names, thus allowing the first two authors to conduct all interviews while remaining blind to cluster membership.

Measures

Students were provided with a 5-point response scale (1 = not like me at all, 5 = exactly like me) for use with all 64 of the survey items described in the following sections.

Motivational orientations. Students' intrinsic and extrinsic motivations were measured with reliable and valid scales from Corpus et al. (2009; see also Harter, 1981; Lepper et al., 2005), which were used in prior studies of motivational profiles in elementary school populations (i.e., Corpus & Wormington, 2014; Hayenga & Corpus, 2010). Intrinsic motivation was indexed by averaging the 17 items focusing on the dimensions of challenge-seeking, independent mastery, and curiosity-driven engagement (e.g., "I read things because I am interested in the subject"; $\alpha = .88$). Extrinsic motivation was indexed by averaging the 16 items focusing on a desire for easy work, dependence on the teacher for guidance, and orientation toward pleasing authority figures (e.g., "I do my schoolwork because it makes my parents happy"; $\alpha = .81$).

Learning strategies. Four strategic approaches to schoolwork were assessed for all but the third-grade students, for whom we believed the items too complex for meaningful processing: deep learning strategies, surface learning strategies, superficial strategies, and self-handicapping. Both deep and surface learning strategies were assessed with items drawn from the cognitive strategy use subscale from Pintrich and DeGroot (1990). We classified five original items that described elaboration, critical thinking, and organization as deep learning strategies (e.g., "When I study I put important ideas into my own words"), and five original items that described rehearsal and memorization as surface learning strategies (e.g., "When studying, I copy my notes over to help me remember material"), because previous research has de-

fined deep and surface learning strategies in these ways (Entwistle & Ramsden, 1983; Nolen, 1988; Weinstein & Mayer, 1986). Superficial strategies were assessed with five items from previous research on superficial cognitive engagement (Meece et al., 1988; Stipek & Gralinski, 1996) that described guessing, copying, and minimal effort (e.g., "When I do work, I usually guess a lot so I can finish quickly"). Finally, self-handicapping was assessed with a six-item scale from Urdan, Midgley, and Anderman (1998; e.g., "Some students fool around the night before a test so that if they don't do well they can say that is the reason. How true is this of you?"). This scale was given only to students in grades 5–8 based on validation information in previous studies (i.e., Midgley & Urdan, 2001; Shih, 2005).

Scores on the 21 strategic approaches were subjected to a principal components factor analysis with varimax rotation. The eigenvalues and scree plot indicated that a two-factor solution was most appropriate and interpretable. The first factor represented maladaptive strategy use, indexed by averaging four of the five superficial strategy items and all six of the self-handicapping items ($\alpha = .80$). The second factor represented cognitive strategy use, indexed by averaging the five deep and five surface learning strategy items ($\alpha = .81$).[3]

Ability-validation goals. Students' need to verify their intellectual ability through schoolwork was assessed by averaging two items adapted from Grant and Dweck (2003) by Haimovitz et al. (2011) for use with children (i.e., "I need to do well in school to know that I'm smart"; "I want to do a good job in school so that I can know for sure that I'm smart"; $\alpha = .85$).

Well-being. Students' life satisfaction was assessed with the five-item Satisfaction with Life Scale adapted for children (Gadermann, Schonert-Reichl, & Zumbo, 2010; e.g., "In most ways my life is close to the way I would want it to be; $\alpha = .84$). Students' school-related anxiety was assessed with a three-item scale adapted from the Rochester Assessment of Intellectual and Social Engagement by Miserandino (1996). One item described anxiety (i.e., "When my teacher first explains new material, I feel scared") and two described sadness (i.e., "When I'm in class, I feel sad"; "When I'm in class, I feel unhappy"). Due to weak internal consistency ($\alpha = .55$), we retained the single-item assessment of anxiety about learning new material and averaged the two remaining items to index school-related sadness ($\alpha = .74$).

Achievement. Objective measures of academic achievement included both report card grades and standardized test performance, which we had permission to access from school records for 82% of the sample ($n = 199$). These students did not differ in their levels of intrinsic or extrinsic motivation from those whose parents did not grant such access, $ts(240) < .91$, $ps > .36$. Report cards from the first trimester of the year were collected to correspond with the timing of survey administration in November. All grades were converted to a standard four-point scale and grade point averages (GPAs) were computed by averaging scores from language arts, math, social studies, and science. We also collected composite national percentile ranks from the Iowa Test of Basic Skills (ITBS), which was administered the month prior to the study.

Interview Protocol

The interview protocol was designed with two goals in mind: (1) methodological triangulation to validate the survey data, and (2) complementarity to more richly

characterize and differentiate the four motivational profiles. It began with a series of seven open-ended questions based on DeGroot (2002) that covered three main topics: (1) attitudes toward school ("What is your favorite part of the school day? Least favorite? What is your favorite subject in school and what kinds of things do you do in that subject?"); (2) self-appraisal ("What would you tell somebody else about the kind of student you are? Can you think of a time when you felt nervous in school?"); and (3) classroom context ("In your classroom, do some kids get special privileges that others don't get, and what do you think about that? Do you get to make your own choices in school or do the teachers mostly tell you what to do, and how do you like that?").

The second part of the interview protocol was centered around two hypothetical scenarios developed for the present study that pitted intrinsic and extrinsic concerns against one another:

> *Book selection scenario:* Let's pretend that you have a special assignment this week: You get to pick a new book to read and then tell the class about it. Your teacher tells you about a book she thinks you should choose, but you have a book at home that you're very curious about and would like to read.
>
> *Project selection scenario:* Let's pretend you get to choose the project you will do for social studies. One project looks really interesting, but it also looks hard and you're not sure how well you'll do. Another project isn't as interesting, but it looks easy and you know you'll get a good grade.

For each scenario, students were asked to make a choice and justify that choice, then to imagine making the opposite choice and justify that choice. They were also asked to describe the difficulty of the decision, anticipated emotional responses, and how they might advise a friend.

Procedure

Survey. Surveys containing the items described in the Measures section and demographics (age, grade level, gender, race/ethnicity) were administered in students' regular classrooms by at least two of the authors. After students were reminded that participation was voluntary, they were taught to use the 5-point response scale with items unrelated to school. They were then asked to create a private space on their desks by propping up folders from the researchers. Each survey item was read aloud twice for third-grade students and once for the older students as they responded quietly at their desks. Trained research assistants circled the room and responded to questions. After survey completion, students were thanked and invited to keep the folder. No other compensation was provided. The entire session lasted 20–30 minutes.

Interview. Based on pilot interviews with one child from each of grades 3, 5, and 7, we refined question wording and generated strategies for best eliciting information. Interviews were conducted by one of the first two authors, who were blind to students' survey responses and cluster membership. Interviews took place in a private space on school grounds during school hours a few weeks after survey administration. All students assented to participate at the start of the interview session. Interviews were audio-taped with two exceptions due to lack of parental consent; in these

cases, notes were taken by hand. Students were reminded that their responses would be kept confidential, and interviewers attempted to establish rapport with students in order to maximize their comfort in responding honestly. Interviewers asked questions in the order listed above, probed for more detail when needed, and repeated back utterances that were unclear to ensure accurate interpretations. Although there was occasional difficulty understanding students' responses, even the youngest participants seemed able to comprehend the interview questions and respond appropriately. The entire interview typically lasted 15 minutes, with a range from 8 to 21 minutes.[4]

Coding

Interviews were transcribed and all coding was done from written transcripts, which had no indication of students' survey responses, cluster membership, or identifying demographic information. In order to develop a coding scheme, all three authors read the same 10 randomly selected interview transcripts and each author additionally read a unique set of five transcripts such that 25 transcripts in all were initially consulted. We independently created lists of all conceptual responses that were given in these transcripts for each major question of the interview protocol. We then discussed these lists in order to group children's responses into slightly broader conceptual categories for each of the major interview questions. Once clearly defined, these conceptual categories became our set of interview codes.

Consider for example the self-appraisal portion of the interview protocol, which included the question asking children to describe themselves as students. We identified 13 unique interview codes for students' responses to this question: competent, average, poor performer, well behaved, poorly behaved, intrinsically motivated, extrinsically motivated, work avoidant, socially oriented, teacher oriented, well-rounded, having a particular learning style, and having particular personality attributes. Interview codes for this and all other questions were not mutually exclusive in that a student could be coded for as many of the categories as their response indicated. In all, we specified 199 unique interview codes across the seven open-ended questions and two hypothetical scenarios. A subset of these codes are defined in Table 1.

In order to establish reliability of the coding scheme, two of the authors independently coded a randomly selected set of 10 transcripts. They reached an overall agreement rate of 97%, with a range from 94% to 100% across interview questions. Disagreements were settled through discussion. One of these authors then coded the remaining 44 transcripts.

Using the full set of 54 coded transcripts, we examined the frequency of each of the 199 codes. Of these, 102 were given too infrequently (i.e., by $\leq$10% of the sample) for meaningful interpretation, leaving 97 codes as the basis of subsequent analysis. We next sorted the coded transcripts into the four motivational clusters. We were interested in whether particular codes were given more or less frequently for particular clusters, with the focus of our interpretation on what made each cluster distinct. In order to determine distinctiveness, we calculated the percentage of interviews in each cluster that each of the 97 interview codes was present and then computed the difference between the two most extreme clusters for each code (i.e., we subtracted the percentage of the cluster in which each code appeared least frequently from the

Table 1. Differentiating Interview Codes and Frequency by Cluster

Interview Code	Definition	Sample Quote	No. of Students Reporting (Percentage of Cluster)			
			HQ ($n = 15$)	PI ($n = 13$)	PE ($n = 15$)	LQ ($n = 11$)
School attitudes:						
Work avoidant	Dislike volume of work perceived to be excessive	"[I dislike reading because] you have to do extra homework"	1 (7)	2 (15)	6 (40)	1 (9)
Dislike areas of low competence	Dislike activities perceived to reflect low competence	"I just don't like [math]. I'm not very good at it all."	4 (27)	6 (46)	7 (47)	7 (64)
Dislike specials	Dislike academic specialty classes (e.g., PE, art, music)	"Probably music [is my least favorite time] because I get kind of bored in what we do."	3 (20)	1 (8)	5 (33)	1 (9)
Like hands-on	Like interactive, project-based assignments and exercises	"We have to make a model, like with a whole thing like teepees and stuff. It just really fascinates me."	7 (47)	6 (46)	10 (67)	9 (82)
Like social interaction	Enjoy school activities that allow for social interaction	"[I like] getting to share our stuff in class. I like getting to talk with my friends and see what they did and what I did."	4 (27)	1 (8)	5 (33)	3 (27)
Like nonacademics	Nonacademic times (e.g., recess, lunch) are favorites	"I think lunch [is my favorite time] because it's relaxing."	4 (27)	1 (8)	4 (27)	4 (36)
Self-appraisal:						
Self as competent	Describe self as smart, high achieving	"[I have a] good memory, so I remember things. Smart. I get a lot done quickly and I can learn things quickly."	11 (73)	6 (46)	11 (73)	5 (45)
Self as intrinsically motivated	Describe self as curious, drawn to challenge and mastery	"I like challenging things. I don't like just sitting there and doing really easy problems."	3 (20)	6 (46)	3 (20)	4 (36)
Self as well-rounded	Describe self in context of hobbies or extracurriculars	"I like doing sports like basketball and baseball."	0 (0)	6 (46)	1 (7)	1 (9)
Self as well-behaved	Describe comportment positively (e.g., paying attention, meeting deadlines)	"I pay attention and listen in class, but once we get out to recess I talk a lot."	9 (60)	9 (69)	12 (80)	10 (91)

Table 1. (*Continued*)

Interview Code	Definition	Sample Quote	No. of Students Reporting (Percentage of Cluster)			
			HQ ($n = 15$)	PI ($n = 13$)	PE ($n = 15$)	LQ ($n = 11$)
Self as poorly behaved	Describe comportment negatively (e.g., getting in trouble, being late)	"Sometimes I get pretty bored and I doze off, but then you know, I get back up again."	3 (20)	3 (23)	6 (40)	1 (9)
Nervous about public perception	Worry or embarrassment when performing in public, often accompanied by concerns about making mistakes	"You get called on and you don't know the questions, you feel like if you answer it wrong you're going to get embarrassed."	4 (27)	1 (8)	5 (33)	0 (0)
Nervous about performance	Nervous about academic performance, particularly in testing contexts	"Sometimes I feel nervous before a test because I want to make sure I'm all prepared but I don't know."	9 (60)	7 (54)	9 (60)	10 (91)
Nervous about uncertainty	Nervous in new or ambiguous situations	"[Last year, X] was a new teacher and I didn't really know what to expect. So that was when I felt nervous."	3 (20)	4 (31)	0 (0)	1 (9)
Nervous about not having materials	Worry about not having required materials or work completed	"If I forgot my planner or homework at home or if I didn't do something, I feel kind of nervous."	2 (13)	3 (23)	4 (27)	0 (0)
Classroom context:						
Perceive choice	Able to generate at least one choice opportunity in school	"Sometimes we get to make choices like if she has two sheets, you can either pick this one or that one."	14 (93)	13 (100)	13 (87)	8 (73)
Choice as enjoyable[a]	Opportunities for choice provide enjoyment or satisfy personal interests	"It's nice when we get to choose [a partner]. We get to have a little bit of fun and not just be upset because we got put with someone we really just don't enjoy."	1 (7)	2 (15)	6 (46)	0 (0)
Choice as undesirable[a]	Opportunities for choice are not desired or stressful	"I just like to be told what to do because I don't really like picking things."	1 (7)	2 (15)	3 (23)	3 (38)
Desire more choice[b]	Dissatisfaction with choices currently offered or desire for more choices expressed	"I do feel like there should be a little more freedom . . . I wish that we could choose what we read. I mean, as long as it's not completely inappropriate for school."	1 (14)	1 (14)	5 (56)	1 (11)
Perceive privileges	Able to generate at least one special privilege that is given to some children selectively	". . . people get chosen and then they get to move around into the classroom to read in a different area"	8 (53)	6 (46)	11 (73)	5 (45)

Table 1. (*Continued*)

Interview Code	Definition	Sample Quote	No. of Students Reporting (Percentage of Cluster)			
			HQ ($n = 15$)	PI ($n = 13$)	PE ($n = 15$)	LQ ($n = 11$)
Agnostic about privileges[c]	Express neutral emotional reaction about the practice of special privileges	"I don't really care"	1 (13)	0 (0)	4 (36)	1 (20)
Book selection scenario—personal interest vs. teacher recommendation:						
Emotional reaction—interest satisfaction	Indicate that their feelings about the choice would depend on the extent to which their personal interests were satisfied	"Not so happy, because I might have liked the other book better than that one."	2 (13)	5 (38)	1 (7)	2 (18)
Desire for appropriate choice	Express desire to make an appropriate choice in terms of difficulty level, topic, or match to personal characteristics	". . . because it might be better for like the level of reading that I'm at or that's what the class is going to be focused on."	2 (13)	0 (0)	8 (53)	3 (27)
Other-oriented rationale for personal interest	Justify the "personal interest" book in terms of how it would please others or respect the opinion of others	"Maybe your friends encouraged you to read it."	3 (20)	0 (0)	4 (27)	0 (0)
Performance rationale for teacher recommendation	Justify the teacher-recommended book as a way of maximizing performance	"It would be easier to choose the one the teacher suggests because you might get better, more points . . ."	1 (7)	1 (8)	3 (20)	4 (36)
Project selection scenario—difficult/interesting vs. easy/good grade						
Project choice is hard	Indicate that it would be difficult to choose between the projects	"I would have a tough decision on that. I would probably take all day to choose."	5 (33)	2 (15)	8 (53)	5 (45)

Table 1. (*Continued*)

Interview Code	Definition	Sample Quote	No. of Students Reporting (Percentage of Cluster)			
			HQ ($n = 15$)	PI ($n = 13$)	PE ($n = 15$)	LQ ($n = 11$)
Emotional reaction—negative (nonspecific) [d]	Indicate nonspecific but negative feelings about making the choice	"I think I would feel, kind of, not that happy."	5 (63)	4 (57)	4 (40)	2 (25)
Desire to please others	Explain choice in terms of how it would please or impress others	"I'd want my teacher and my mom and my dad to think I tried hard. . . . I want them to be proud of me."	4 (27)	0 (0)	5 (33)	2 (18)
Good grades rationale for easy project	Justify the easy project as a way to guarantee a good grade	"[I would want] to get a better grade, have a better chance of getting a good grade."	2 (13)	10 (77)	5 (33)	6 (55)
Desire for easy work	Justify the easy project as a way of minimizing effort, finishing quickly	"Because it wouldn't take a lot of effort and it'd be easy and it'd be really fast.."	9 (60)	7 (54)	12 (80)	7 (64)
Recommend easy project to friend	Indicate that they would recommend the easy (vs. hard) project to a friend	"I'd probably give him the easier one."	0 (0)	4 (31)	2 (13)	2 (18)
Friend's ability matters	Recommendation would depend on friend's ability or prior performance	"It depends if he's good or bad in social studies. If he was kind of bad, I'd tell him he should pick the easier one."	2 (13)	3 (23)	5 (33)	0 (0)
Discomfort deciding for friend	Believe they should not be the one deciding for their friend	"I would say, 'I wouldn't choose for you because my opinion is probably off from yours, different.'."	4 (27)	4 (31)	1 (7)	4 (36)

Note.—HQ = high quantity, PI = primarily intrinsic, PE = primarily extrinsic, LQ = low quantity.

[a] Coding for "choice as enjoyable" and "choice as undesirable" occurred only when also coded as "perceive choice." Percentages represent this smaller total number possible.

[b] Due to interviewer error, only 32 students were asked about their satisfaction with choice opportunities. Percentages represent this smaller total number possible.

[c] Coding for "agnostic about privileges" occurred only when also coded as "perceive privileges." Percentages represent this smaller total number possible.

[d] Due to interviewer error, only 33 students were asked about their emotional reaction. Percentages represent this smaller total number possible.

percentage of the cluster in which each code appeared most frequently). Codes with a between-cluster frequency range less than 25% were excluded from further analysis, leaving 33 total codes, which are presented in Table 1, along with their definitions and sample quotes. We then examined patterns of responses across these codes in order to generate broader conclusions about each cluster.

During the coding process, we additionally noticed a tendency for apathetic responses (e.g., "I don't know/care") that was not captured by our coding scheme, particularly among transcripts from students who reported low levels of motivation. Therefore, a coder who was naive to both cluster membership and the broader goals of the study made a holistic assessment of (1) whether or not each transcript was marked by apathy, and (2) if so, the degree of apathy expressed using a 3-point scale. She was trained using eight transcripts and coded the remaining 46 transcripts independently. Reliability was established by comparing her ratings on a set of 10 randomly selected transcripts to those of the third author ($r = .86$).

Verification procedures. We used a number of procedures to verify our qualitative approach (see Creswell, 1998). First, we used methodological triangulation by comparing characteristics of the four clusters revealed via the interview with those revealed via the survey responses. As noted previously, we hoped to both achieve verification across these multiple sources and gain new information that enriched our understanding of each motivational profile.

Second, we engaged in member checking informally during the interviews by repeating back unclear utterances and frequently restating or summarizing what children said to ensure accurate interpretations. Because our participants were children, we did not engage in member checking regarding our analytic categories, interpretations, and broader conclusions.

Third, we attempted to acknowledge researcher bias throughout the research process. Our knowledge of the literature on intrinsic and extrinsic motivations undoubtedly influenced the design of our interview protocol, the development of our coding scheme (e.g., expecting themes such as competence and curiosity to emerge), and our focus on differences rather than similarities across clusters. We have acknowledged these aims and biases in our introduction and our description of the coding procedure, and took steps to prevent them from invalidating our interpretations. For example, the coding scheme was developed without knowledge of cluster membership, and transcripts were fully coded before examining cluster differences. In addition, the use of multiple investigators provided a context for reflexive dialogue.

Finally, with an awareness of these biases in mind, we aimed to be open to patterns of data that contradicted either previous research or findings from our quantitative phase, with the notion that such contradictions could be sources of enrichment and complexity.

Results

Quantitative Findings

Preliminary analyses. Table 2 presents descriptive statistics and correlations among all variables, which were generally consistent with previous research (e.g.,

Table 2. Descriptive Statistics and Correlations

Variable	1	2	3	4	5	6	7	8	9	10
Motivation:										
1. Intrinsic motivation	(.88)									
2. Extrinsic motivation	−.36**	(.81)								
Learning strategies:										
3. Cognitive strategy use	.39**	.02	(.81)							
4. Maladaptive strategy use	−.33**	.31**	−.07	(.80)						
Goals:										
5. Ability validation	.18**	.25**	.14	.10	(.85)					
Well-being:										
6. Life satisfaction	.24**	.01	.19**	.21**	−.12	(.84)				
7. Anxiety—sad	−.34**	.13*	.02	−.21	.22**	−.30**	(.74)			
8. Anxiety—scared	−.25**	.37**	.18**	.06	.23**	.01	.12	–		
Achievement:										
9. GPA	.28**	−.16*	.04	.09	−.12	.18*	−.20**	−.15*	–	
10. ITBS composite[a]	.28**	−.18**	−.04	−.08	−.12	.05	−.08	−.14	.55**	–
Mean	3.37	3.13	3.37	3.32	1.62	3.76	1.63	1.96	3.22	76.83
SD	.66	.62	1.23	.69	.53	.83	.85	1.04	.58	20.79

Note.—Values in parentheses are alpha coefficients.
[a] ITBS = Iowa Test of Basic Skills.
*$p < .05$.
**$p < .01$.

Assor et al., 2005; Gilman & Anderman, 2006; Gottfried, 1985; Lepper et al., 2005; Meece et al., 1988).

Forming motivational profiles. We used cluster analysis to capture naturally occurring combinations of intrinsic and extrinsic motivations. Because this technique is sensitive to outliers, we removed one case (>3 *SD*s from the mean) prior to analysis, leaving a final sample of 242 students. We then followed the two-step clustering procedure recommended by Hair, Anderson, Tatham, and Black (1998; see also Aldenderfer & Blashfield, 1984; Bergman, 1998).

In the first step, we used Ward's agglomerative hierarchical clustering method with average squared Euclidian distance as the measure of similarity. After examining the agglomeration schedule and dendrogram, a solution of four clusters was chosen. The four-cluster solution explained sufficient variance in intrinsic (62%) and extrinsic (63%) motivations, generated distinct clusters (i.e., those with moderate to strong deviation from the mean for both motivation types), and was consistent with previous theory and research (i.e., Hayenga & Corpus, 2010; Vansteenkiste et al., 2009). A three-group solution was not selected because it failed to explain a sufficient amount of variance. A five-group solution explained more total variance but was less parsimonious and theoretically interpretable in that it split a group with primarily intrinsic motivation into two subgroups—one with a more pronounced disparity between levels of intrinsic and extrinsic motivations than the other. Because these two groups did not differ from one another across outcome variables, moving to a five-group solution did not add substantial information in terms of profile adaptiveness. Moreover, one of these groups was quite small, containing less than 5% of the total sample.

In the second step, we used an iterative nonhierarchical *k*-means clustering procedure to fine-tune the cluster solution. Following the *k*-means procedure, the four-group solution explained 63% of the variance in intrinsic motivation and 71% of the variance in extrinsic motivation. A double-split cross-validation procedure confirmed that the solution was stable and replicable ($\kappa = .60$; Breckenridge, 2000).

The final cluster solution included a high quantity group ($n = 81$) with high levels of both motivation types, a primarily intrinsic group ($n = 49$) with high intrinsic but low extrinsic motivation, a primarily extrinsic group ($n = 56$) with low intrinsic but high extrinsic motivation, and a low quantity group ($n = 56$) with low levels of both. There was no difference in gender distribution across the four clusters, $\chi^2(3, N = 242) = 1.66$, $p = .65$. In order to test for grade-level differences with sufficient power given the relatively small sample size at each grade, we created groups of younger (grades 3–5) versus older (grades 6–8) students, who did in fact differ in their distribution across clusters, $\chi^2(3, N = 242) = 12.40$, $p < .01$. Adjusted standardized residuals indicated that the high quantity group had more younger and fewer older students.

Motivational profiles and outcome variables. Each of the outcome variables was first examined for possible interactions between cluster membership and younger- versus older-student status, none of which were significant. Data were therefore collapsed across grade level, and one-way analyses of variance (ANOVAs) were used to test for differences across clusters. Descriptive statistics, *F* values, effect sizes, and Tukey-Kramer comparisons by cluster are reported in Table 3. As expected, there were significant differences by cluster for all eight variables, with the primarily intrinsic cluster showing the most optimal pattern of outcomes. Motivational profiles explained between 4% and 12% of the variance in outcomes, which—for all but life satisfaction and GPA—surpass Cohen's (1988) criterion for medium-sized effects such that they should be "visible to the naked eye of a careful observer" (Cohen, 1992, p. 156). Pairwise comparisons indicated that the high quantity group fared just as well as the primarily intrinsic group on half of the outcome variables: both reported cognitive strategy use, high life satisfaction, minimal sadness, and both did well on their report cards. But high quantity motivation was also associated with maladaptive strategy use, ability-validation goals, feelings of anxiety surrounding the introduction of new material, and worse standardized test performance—all at a magnitude well above Cohen's (1988) threshold for medium-sized effects (see Table 3). Arguably the least optimal pattern of outcomes was seen for students in the primarily extrinsic group, who reported the greatest use of maladaptive strategies, experienced the most anxiety, and earned the lowest GPA. The low quantity group also fared relatively poorly but endorsed ability-validation goals to a lesser extent than their peers.

Qualitative Findings

Findings are presented in terms of the key distinguishing characteristics of each cluster. The complete distribution of responses across the four clusters is reported in Table 1.

High quantity cluster. Students with high quantity motivation primarily distinguished themselves in the self-appraisal portion of the interview, which suggested concern about presenting themselves positively to others. As shown in Table 1, they

Table 3. Mean Values of Motivation Dimensions and Outcome Variables by Profile

Variable	High Quantity ($n = 81$)	Primarily Intrinsic ($n = 49$)	Primarily Extrinsic ($n = 56$)	Low Quantity ($n = 56$)	F	η^2
Motivation dimensions:						
Intrinsic motivation	$3.74\ (.38)_a$	$4.01\ (.45)_b$	$2.78\ (.41)_c$	$2.86\ (.39)_c$	135.05^{**}	.63
Extrinsic motivation	$3.36\ (.30)_a$	$2.35\ (.36)_b$	$3.81\ (.36)_c$	$2.80\ (.33)_d$	196.97^{**}	.71
Total amount of motivation[a]	$7.10\ (.48)_a$	$6.36\ (.49)_b$	$6.59\ (.57)_b$	$5.66\ (.49)_c$	90.49^{**}	.53
Quality of motivation[b]	$.38\ (.48)_a$	$1.66\ (.65)_b$	$-1.03\ (.52)_c$	$.05\ (.53)_d$	223.13^{**}	.74
Learning strategies:						
Cognitive strategy use	$3.62\ (.67)_a$	$3.41\ (.67)_{ab}$	$3.20\ (.65)_{bc}$	$3.04\ (.63)_c$	7.69^{**}	.11
Maladaptive strategy use	$1.64\ (.57)_a$	$1.33\ (.29)_b$	$1.82\ (.55)_a$	$1.63\ (.53)_a$	6.73^{**}	.10
Goals:						
Ability-validation goal	$3.72\ (1.10)_a$	$3.14\ (1.37)_{bc}$	$3.59\ (1.17)_{ab}$	$2.84\ (1.14)_c$	7.33^{**}	.09
Well-being:						
Life satisfaction	$3.96\ (.84)_a$	$3.77\ (.80)_{ab}$	$3.58\ (.77)_b$	$3.66\ (.87)_{ab}$	2.79^{*}	.04
Anxiety—sad	$1.43\ (.71)_a$	$1.39\ (.79)_a$	$1.95\ (.89)_b$	$1.79\ (.92)_{ab}$	6.34^{**}	.08
Anxiety—scared[c]	$1.99\ (1.04)_a$	$1.33\ (.66)_b$	$2.43\ (1.19)_c$	$1.98\ (.88)_{ac}$	10.81^{**}	.12
Achievement:						
GPA	$3.30\ (.49)_{ab}$	$3.39\ (.49)_a$	$3.04\ (.61)_b$	$3.09\ (.74)_{ab}$	3.69^{**}	.05
ITBS composite[d]	$77.11\ (18.81)_a$	$89.45\ (11.10)_b$	$71.84\ (21.94)_a$	$70.73\ (24.40)_a$	7.50^{**}	.10

Note.—Cell values are means with standard deviations in parentheses. Mean values are significantly different across motivational profiles according to Tukey-Kramer comparisons if they have different subscripts.

[a] Sum of intrinsic and extrinsic motivation.

[b] Intrinsic motivation minus extrinsic motivation.

[c] This was based on a single item and therefore may be unreliable as a measure of anxiety about the introduction of new material.

[d] ITBS = Iowa Test of Basic Skills.

$^{*}p < .05$.

$^{**}p < .01$.

characterized themselves as competent when asked to provide a self-description and indicated nervousness about their public perception. As one sixth grader said, "I just feel really nervous when I, like, go in front of the class and talk. Well, like if I mess up, then I don't want to look like I don't know anything." These characteristics were similarly mentioned by those in the primarily extrinsic group, but not generally by those in the primarily intrinsic or low quantity groups.

The hypothetical scenarios also revealed a distinct pattern of responding among students in the high quantity cluster—one that could be characterized as a desire to please others. When explaining why they might select the book at home, high quantity students and their peers alike typically justified this choice in terms of satisfying curiosity, expressing autonomy, or acting on previous knowledge. Additionally, however, three of the 15 high quantity students offered an other-oriented rationale (e.g., pleasing or valuing the opinions of family members), which suggests a reliance on extrinsic factors for an ostensibly intrinsic choice. A similar pattern was seen in their explanations for the difficult project: Students from all clusters typically justified this choice in terms of interest, challenge, or learning opportunities—all markers of intrinsic motivation. However, four students in the high quantity group additionally cited a desire to please others. One fifth-grade boy from this cluster said, "I'd do

the hard one because it's a challenge and my mom will probably be happy with me for doing a hard one, not an easy one."

Primarily intrinsic cluster. Students with primarily intrinsic motivation distinguished themselves through their responses to several portions of the interview. In the section on school attitudes, they were similar to their peers in that they liked aspects of school that were interesting, challenging, and interactive, but they differed in their infrequent references to social interactions or nonacademic times as favorite parts of the school day.

In the self-appraisal portion of the interview, the primarily intrinsic cluster distinguished themselves as being intrinsically motivated, well-rounded, and relatively relaxed in school. Indeed, the ratio of students describing themselves as intrinsically motivated to those describing themselves as extrinsically motivated was quite distinct across clusters: 6:0 in the primarily intrinsic group, 2:1 in the low quantity group, and 3:2 in the high quantity and primarily extrinsic groups. As one eighth-grade boy from the primarily intrinsic cluster said, "I guess I'm really curious, I guess that would count. Um, some people say I'm smart but they say that, like, I don't put enough effort into stuff and I guess I would agree with that. It's just that like, some stuff I put a lot of effort into but if it, like, doesn't really catch my interest and stuff I guess I just do the minimum."

The primarily intrinsic group also had a unique set of responses regarding the types of situations that made them nervous in school. Compared to their peers, they were more likely to report being nervous about uncertainty and less likely to report being nervous about their public perception.

The relaxed stance of students from the primarily intrinsic cluster was echoed in their responses to the hypothetical scenarios. First, they rarely indicated that making the choice would be hard, especially compared to their peers in the other clusters. Second, they showed a complete absence of other-oriented justifications across both scenarios, suggesting that they were using a fairly internal compass as the basis of their reasoning. But they were not immune to characteristically extrinsic concerns: four of the 13 students reported that they would advise a friend to choose an easy project, and 10 cited good grades as the reason for making such a choice themselves. Of those who used a good-grades rationale, however, half also indicated that they would feel dissatisfied in such a situation. As one seventh-grade boy explained, "I could get an easy grade. It's just an easy grade. . . . I don't think I'd feel I did my best or I tried my hardest and I don't think I would feel very good about that project."

Primarily extrinsic cluster. Responses of students from the primarily extrinsic group were similar to their peers in the high quantity group but also distinct in several respects. For example, in the first section of the interview on school attitudes, six of the 15 students with primarily extrinsic motivation but very few of their peers were coded as work avoidant in that they disliked school subjects that required a heavy volume of work.

In the self-appraisal section of the interview, students with primarily extrinsic motivation exhibited a concern with how they were perceived by others. Similar to their peers in the high quantity cluster, they characterized themselves as competent and indicated nervousness about their public perception. One fifth grader recalled her experience in a recent musical performance: "It was weird because everybody is standing there staring at you and waiting for you to do something, and you know

when everybody's staring at you you're going to probably mess up during a song or something. Then, if you do, people probably start laughing at you."

More pronounced differences between the primarily extrinsic and high quantity clusters were revealed in the section on classroom context. Although students in all clusters reported positive reactions to choice opportunities, a greater proportion of the primarily extrinsic cluster described the choice as enjoyable. They also reported less room for making their own decisions compared to their peers, as in the case of the following fifth-grade student: "I think we don't get to choose, which I feel really upset about. Like sometimes I'm like—in my head—I'm like, *I don't want to be here. I don't want to be bossed around by somebody*. Sometimes, like if my teacher tells me to do something I'll be like, 'Yes, [teacher's name],' but in my mind I'm like, *No, [teacher's name], I get to do what I want to do*. . . . I still do what the teacher says but in my mind I'm like, *I don't want to do this*."

Responses to the hypothetical scenarios again revealed similarities between the primarily extrinsic group and high quantity group in their desire to please others: four offered an other-oriented rationale for selecting the book at home, and five cited a desire to please others as justification for their project selection. As one eighth grader projected, "I'd definitely look to [the teacher's] face to see when I held up the book. . . . I'd want to see what her reaction was. And if it was negative, that would . . . sink me a little bit." Like their peers in the high quantity cluster, then, students in the primarily extrinsic cluster appeared to have an external frame of reference.

But students in the primarily extrinsic cluster also had some unique responses. For the book-selection scenario, eight such students expressed a desire to make an appropriate choice, compared to only a handful of peers from the other clusters. One eighth-grade girl, for example, said that she might choose the teacher's recommended book because, "maybe if they've read it before they might know it's a good book for me." The primarily extrinsic group also expressed a desire for easy work that was reminiscent of their work-avoidant response to the school attitudes section of the interview. Finally, they were less likely than their peers to express discomfort making recommendations to a friend about how to navigate the hypothetical scenario.

Low quantity cluster. Interviews with students from the low quantity cluster were arguably the least revealing because this group was somewhat disengaged from the interview process. Indeed, holistic coding across the entire interview protocol indicated that 8 of the 11 transcripts (73%) from the low quantity cluster were marked by apathy—far more than from any of the other clusters: 6 of 15 (40%) in high quantity, 6 of 13 (46%) in primarily intrinsic, and 5 of 15 (33%) in primarily extrinsic. There was no meaningful difference, however, among clusters using the 3-point scale designed to capture the degree of apathy.

Although students in the low quantity cluster rarely exhibited enthusiasm for learning, they were particularly likely to report that hands-on activities were a favorite part of the school day. One seventh grader from the low quantity cluster explained her liking for science in these terms: "We get to do labs and . . . [my teacher] has a bunch of cool—we call them toys—but they're all like scientific, science equipment and we do experiments with those. And [my teacher] does jokes that are relevant to the science and we just learn faster and we have a great time."

In the self-appraisal section of the interview, students with low quantity motivation distinguished themselves by reporting a complete absence of nervousness about

their public perception and about not having materials required for class. But they did appear invested in their performance outcomes: all but one student from this group reported being nervous about performance, compared to substantial but smaller numbers of their peers from other groups.

The classroom-context portion of the interview also suggested a unique perspective among students in the low quantity profile in that they were less likely to perceive or desire choice opportunities in the classroom. One sixth grader explained that "I just like to be told what to do because I don't really like picking things." A fifth grader cast this in more emotional terms: "Sometimes it can be very overwhelming making your own choices, and stressful." Overall, then, the responses from the low quantity cluster suggested a mixture of apathy and anxiety.

Discussion

The current study adopted a nuanced approach to examining the experiences of students who varied in their endorsement of intrinsic and extrinsic motives to learn. Consistent with previous research (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009), four profiles of students with distinct patterns of academic motivation were identified. These profiles displayed similarities but also differences across a range of cognitive, emotional, and academic correlates, with effect sizes of similar magnitude to previous related studies.

A comparison of findings for the high quantity and primarily intrinsic profiles in particular informs our understanding of multiple motive pursuit. Although these two profiles were indistinguishable on half of the quantitatively measured correlates, students pursuing multiple motives (i.e., the high quantity group) reported greater levels of maladaptive strategy use, ability-validation goals, and anxiety than their peers focusing solely on intrinsic motivation. Such self-defeating approaches to schoolwork may undercut learning over time, which could explain why the high quantity group scored 12 percentile points lower on the ITBS than their primarily intrinsic peers. This is consistent with the achievement advantage for primarily intrinsic students documented in previous person-centered studies, with an effect size similar in magnitude (e.g., Corpus & Wormington, 2014; Hayenga & Corpus, 2010: Vansteenkiste et al., 2009). Although only accounting for 5%–10% of the variance in academic achievement, the impact of motivational profiles over time may interact with other forces in the school environment to accumulate larger effects of greater practical significance, as studies manipulating similar motivational factors have shown (e.g., Garcia & Cohen, 2012).

The high quantity group also evidenced concerns about pleasing others and preserving their public image—concerns that were absent from the primarily intrinsic profile. Taken together, these findings indicate that the simultaneous pursuit of multiple motives is associated with some costs among elementary and middle school students. This echoes findings with older populations (Ratelle et al., 2007; Vansteenkiste et al., 2009) and related research in achievement goal theory showing exhaustion and feelings of inadequacy among adolescents pursuing multiple goals (Tuominen-Soini et al., 2012). It is also consistent with theoretical accounts of intrinsic motivation stipulating that well-being is maximized when students are less focused on exogenous concerns (Lepper & Henderlong, 2000; Ryan & Deci, 2000).

Although one could imagine extrinsic motivation to be helpful in the absence of intrinsic motivation, a comparison of the primarily extrinsic and low quantity groups suggests that this was not the case. If anything, the primarily extrinsic group showed a less adaptive pattern of responding in that they were more likely to endorse ability-validation goals and showed tendencies toward work avoidance, concerns about others' approval, and a lack of personal autonomy. These two groups with relatively low levels of intrinsic motivation also shared some maladaptive patterns compared to the other profiles (e.g., relatively poor performance, compromised well-being), but their distinct responses underscore the need to consider levels of intrinsic and extrinsic motivation in concert. This echoes related work with older populations (Vansteenkiste et al., 2009) in which the primarily extrinsic and low quantity groups shared some maladaptive patterns (e.g., cheating, poor metacognition, poor performance) but not others (e.g., anxiety, procrastination). Thus, a distinction between these two groups appears to emerge in elementary school and maintain through the high school and college years.

New Insights from a Person-Centered Approach

In addition to confirming primarily intrinsic motivation as the most adaptive profile for elementary and middle school students, this study revealed new understandings about the benefits and drawbacks associated with particular combinations of motivation types. By identifying a set of relatively unexpected characteristics for each profile, the present study adds a richer and more complex understanding of how each experiences school.

First, the high quantity group reported relatively high levels of both life satisfaction and ability-validation goals. This is surprising because ability-validation goals predict maladaptive responding in the face of failure and losses to intrinsic motivation over time (Grant & Dweck, 2003; Haimovitz et al., 2011). Perhaps the relatively high classroom grades among students in this profile prevented such a maladaptive response. It will be important for future research to determine whether levels of life satisfaction remain high for students in this profile over time, particularly following situations of challenge.

Second, students in the low quantity group appeared invested in their schoolwork to a greater degree than anticipated. Although they did show more signs of apathy than their peers, they also reported anxiety about their performance. This underscores the possibility that poor performance and its negative emotional sequelae may be a cause rather than a consequence of low quantity motivation. Longitudinal and experimental research could provide a window for understanding the causal mechanisms at play (e.g., anxiety levels manipulated via cognitive reappraisals could test for an accompanying effect on motivation; see Jamieson, Mendes, Blackstock, & Schmader, 2010). Another sign of engagement among the low quantity cluster was their enthusiasm for learning via hands-on methods, an approach to learning that the literature has shown to be supportive of increasing motivation and engagement more generally (e.g., Linn & Muilenburg, 1996). Of course, the schools in the present study had a strong sense of community and personal accountability, perhaps making it difficult for students to fully disengage. Tracking these students as they make the transition to the potentially more anonymous context of high school would be illuminating.

Third, students in the primarily intrinsic group presented themselves as more well-rounded than their peers by referring often to hobbies or extracurricular activities while keeping a healthy perspective on academic stressors. Perhaps intrinsic without extrinsic motivation in the academic realm grows from or contributes to a zest for life more generally, which is consistent with the broaden-and-build theory of positive emotions (Fredrickson, 2001). Exploring this cross-domain enthusiasm may elucidate the motivational processes that drive and maintain learning both in the classroom and beyond (e.g., see Anderman, 2004).

A final new understanding comes from the profile of students with primarily extrinsic motivation, who felt they had little room for making their own decisions. Their responses suggest that they were aware of extrinsic constraints and perhaps begrudgingly operating within that system. That they also had the highest scores on sadness and the single-item measure of anxiety is consistent with the view from self-determination theory that well-being is threatened in environments perceived to be controlling (Deci et al., 1999; Ryan & Deci, 2000). Addressing both the perception and the reality of such environments may be a useful starting point for targeted intervention efforts. This may be particularly important for students with primarily extrinsic motivation whose problems could be overlooked because of their compliance with adult directives. As one fourth grader from this profile said, "My teacher said she wishes she had a whole class of me." Of course, additional studies replicating and extending the present findings are necessary before making specific recommendations for educational practice.

Limitations and Future Directions

Perhaps the most critical limitation of the present study is the correlational, cross-sectional nature of the data, which prevents conclusions about direction of effects. Experimental studies that encourage the adoption of particular motivational profiles could illuminate the causal directions and mechanisms at play. There are also limits to external validity in that participants came from two religiously affiliated K–8 schools and were limited in their demographic diversity. It is possible that students of different cultural and sociodemographic backgrounds may be characterized by somewhat unique profiles and outcomes. The sample size at each grade level was also relatively small, which may have limited our ability to detect developmental differences. The present study does raise the intriguing possibility that particular motivational profiles are experienced similarly across the range of ages tested here, particularly within school systems that adopt the K–8 model (see Corpus & Wormington, 2014). Pending further research, however, we must regard with caution the relative uniformity of students' responses across grade levels. A final direction for future research is to broaden the theoretical framework and include additional measures, perhaps from achievement goal theory or expectancy value theory. This could validate the particular profiles found in the present study and perhaps expand their predictive power beyond the effects documented here (see Conley, 2012). Bridging across distinct yet related motivational frameworks could also guide future research efforts in a way that would be maximally useful to both researchers and practitioners (Murphy & Alexander, 2000).

In conclusion, particular combinations of intrinsic and extrinsic motivation appear to explain students' academic and emotional functioning in school better than

levels of each variable in isolation. More generally, the present findings suggest that person-centered approaches provide an important complement to the variable-centered methods that dominate the field, and that quantitative and qualitative methodologies can be employed together fruitfully in this area of research. A rich and situated understanding of how students in different motivational profiles interpret and respond to school experiences may be a first step in developing maximally effective motivational interventions.

Notes

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1. Intrinsic-extrinsic motivation and achievement goals are related yet distinct constructs. Intrinsic motivation and the mastery goal construct both include competence strivings, but the former is specific to cases when the desire originates from within the self. Intrinsic motivation also more broadly encompasses curiosity-driven engagement and the autonomous pursuit of challenge. Extrinsic motivation differs from the performance goal construct in that the latter is primarily operationalized in terms of interpersonal demonstrations of competence; extrinsic motivation refers more broadly to the engagement in behaviors for their instrumental value, such as pleasing others or gaining material rewards.

2. A check for representativeness revealed that interviewed and noninterviewed students did not differ by age, gender, grade level, ethnicity, or any of the surveyed measures (all $ps > .1$), except for an overrepresentation of African-Americans interviewed, $\chi^2(1, 236) = 4.11$, $p < .05$.

3. The first factor accounted for 21% of the variance. The second factor accounted for an additional 16% of the variance. With the exception of one superficial strategy item that was ultimately dropped, all loadings were above .40 with no cross-loadings greater than .28. Retaining the four strategic approaches to schoolwork as separate factors produced a similar set of findings to that reported in the Results section.

4. Analysis of the written interview transcripts indicated an average word count (child utterances only) of 1,079.52 ($SD = 662.06$), with a range from 210 to 3,789. This word count did not differ across the four clusters, $F(3, 48) = 1.10$, *ns*, nor did it differ for younger ($M = 1{,}025.67$, $SD = 602.31$) versus older ($M = 1{,}137.68$, $SD = 729.13$) students, $t(50) = -.61$, *ns*. Thus, the variability in length of interviews seems unlikely to have affected the results in a systematic way.

References

Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis*. Newbury Park, CA: Sage.

Anderman, L. H. (2004). Student motivation across subject-area domains. *Journal of Educational Research*, **97**, 283–285.

Assor, A., Kaplan, H., Kanat-Maymon, Y., & Roth, G. (2005). Directly controlling teacher behaviors as predictors of poor motivation and engagement in girls and boys: The role of anger and anxiety. *Learning and Instruction*, **15**, 397–413.

Bergman, L. R. (1998). A pattern-oriented approach to studying individual development: Snapshots and processes. In R. B. Cairns, L. R. Bergman, & J. Kagan (Eds.), *Methods and models for studying the individual* (pp. 83–122). Thousand Oaks, CA: Sage.

Bergman, L. R., & Trost, K. (2006). The person-oriented versus the variable-oriented approach: Are they complementary, opposites, or exploring different worlds? *Merrill-Palmer Quarterly*, **52**, 601–632.

Breckenridge, J. N. (2000). Validating cluster analysis: Consistent replication and symmetry. *Multivariate Behavioral Research*, **35**, 261–285.

Brophy, J. (2005). Goal theorists should move on from performance goals. *Educational Psychologist*, **40**, 167–176.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, **112**, 155–159.

Conley, A. M. (2012). Patterns of motivation beliefs: Combining achievement goal and expectancy-value perspectives. *Journal of Educational Psychology*, **104**, 32–47.

Corpus, J. H., McClintic-Gilbert, M. S., & Hayenga, A. (2009). Within-year changes in children's intrinsic and extrinsic motivational orientations: Contextual predictors and academic outcomes. *Contemporary Educational Psychology*, **34**, 154–166.

Corpus, J. H., & Wormington, S. V. (2014). Profiles of intrinsic and extrinsic motivations in elementary school: A longitudinal analysis. *Journal of Experimental Education*, doi:10.1080/00220973.2013.876225

Creswell, J. W. (1998). *Qualitative inquiry and research design*. Thousand Oaks, CA: Sage.

Cross, L. H., & Frary, R. B. (1999). Hodgepodge grading: Endorsed by students and teachers alike. *Applied Measurement in Education*, **12**, 53–72.

Daniels, L. M., Haynes, T. L., Stupinski, R. H., Perry, R. P., Newall, N. E., & Pekrun, R. (2008). Individual differences in achievement goals: A longitudinal study of cognitive, emotional, and achievement outcomes. *Contemporary Educational Psychology*, **33**, 584–608.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, **125**, 627–668.

DeGroot, E. V. (2002). Learning through interviewing: Students and teachers talk about learning and schooling. *Educational Psychologist*, **37**, 41–52.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, **95**, 256–273.

Eccles, J. S., Wigfield, A., Midgley, C., Reuman, D., MacIver, D., & Feldlaufer, H. (1993). Negative effects of traditional middle schools on students' motivation. *Elementary School Journal*, **93**, 553–574.

Entwistle, N. J., & Ramsden, P. (1983). *Understanding student learning*. New York: Nichols.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, **56**, 218–226.

Fulmer, S. M., & Frijters, J. C. (2009). A review of self-report and alternative approaches in the measurement of student motivation. *Educational Psychology Review*, **21**, 219–246.

Gadermann, A. M., Schonert-Reichl, K. A., & Zumbo, B. D. (2010). Investigating validity evidence of the Satisfaction with Life Scale adapted for children. *Social Indices Research*, **96**, 229–247.

Garcia, J., & Cohen, G. L. (2012). A social-psychological approach to educational intervention. In E. Shafir (Ed.), *Behavioral foundations of policy* (pp. 329–350). Princeton, NJ: Princeton University Press.

Gilman, R., & Anderman, E. M. (2006). The relationships between relative levels of motivation and intrapersonal, interpersonal, and academic functioning among older adolescents. *Journal of School Psychology*, **44**, 375–391.

Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of Educational Psychology*, **77**, 631–645.

Gottfried, A. E., Marcoulides, G. A., Gottfried, A. W., & Oliver, P. H. (2009). A latent curve model of parental motivational practices and developmental decline in math and science academic intrinsic motivation. *Journal of Educational Psychology*, **101**, 729–739.

Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology*, **85**, 541–553.

Greenberg. D. (1992). *Education in America: A view from Sudbury Valley*. Framingham, MA: Sudbury Valley School Press.

Greene, H. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, **11**, 255–274.

Guba, E. G. (1990). The alternative paradigm dialog. In E. G. Guba (Ed.), *The paradigm dialog* (pp. 17–27). Newbury Park, CA: Sage.

Haimovitz, K., Wormington, S. V., & Corpus, J. H. (2011). Dangerous mindsets: How beliefs about intelligence predict motivational change. *Learning and Individual Differences*, **21**, 747–752.

Hair, J. R., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis*. New York: Macmillan.

Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental model. *Human Development*, **21**, 34–64.

Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom. *Developmental Psychology*, **17**, 300–312.

Harter, S., Whitesell, N. R., & Kowalski, P. (1992). Individual differences in the effects of educational transitions on young adolescents' perceptions of competence and motivational orientation. *American Educational Research Journal*, **29**, 777–807.

Hayenga, A. O., & Corpus, J. H. (2010). Profiles of intrinsic and extrinsic motivation: A person-centered approach to motivation and achievement in middle school. *Motivation and Emotion*, **34**, 371–383.

Hulleman, C. S., Schrager, S. M., Bodmann, S. M., & Harackiewicz, J. M. (2010). A meta-analytic review of achievement goal measures: Different labels for the same constructs or different constructs with similar labels? *Psychological Bulletin*, **136**, 422–449.

Jamieson, J. P., Mendes, W. B., Blackstock, E., & Schmader, T. (2010). Turning the knots in your stomach into bows: Reappraising arousal improves performance on the GRE. *Journal of Experimental Social Psychology*, **46**, 208–212.

Johnson, R. B., & Onwuegbuzie, A. J., (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, **33**(7), 14–26.

Lepper, M. R., Corpus, J. H., & Iyengar. S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology*, **97**, 184–196.

Lepper, M. R., & Henderlong, J. (2000). Turning "play" into "work" and "work" into "play": 25 years of research on intrinsic versus extrinsic motivation. In C. Sansone & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 257–307). San Diego: Academic Press.

Lillard, A. S. (2005). *Montessori: The science behind the genius*. New York: Oxford University Press.

Linn, M. C., & Muilenburg, L. (1996). Creating lifelong science learners: What models form a firm foundation? *Educational Researcher*, **25**, 18–24.

Luo, W., Paris, S. G., Hogan, D., & Luo, Z. (2011). Do performance goals promote learning? A pattern analysis of Singapore students' achievement goals. *Contemporary Educational Psychology*, **36**, 165–176.

Magnusson, D. (2003). The person approach: Concepts, measurement models, and research strategy. *New Directions for Child and Adolescent Development*, **101**, 3–23.

McMillan, J. H., Myran, S., & Workman, D. (2002). Elementary teachers' classroom assessment and grading practices. *Journal of Educational Research*, **95**, 203–213.

Meece, J. L., Blumenfeld, P. C., & Hoyle, R. H. (1988). Students' goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology*, **80**, 514–523.

Midgley, C., & Urdan, T. (2001). Academic self-handicapping and achievement goals: A further examination. *Journal of Educational Psychology*, **26**, 61–75.

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

Murphy, P. K., & Alexander, P. A. (2000). A motivated exploration of motivation terminology. *Contemporary Educational Psychology*, **25**, 3–53.

Nolen, S. B. (1988). Reasons for studying: Motivational orientations and study strategies. *Cognition and Instruction*, **5**, 269–287.

Pastor, D. A., Barron, K. E., Miller, B. J., & Davis, S. L. (2007). A latent profile analysis of college students' achievement goal orientation. *Contemporary Educational Psychology*, **32**, 8–47.

Pintrich, P. R., & DeGroot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, **82**, 33–40.

Ratelle, C. F., Guay, F., Vallerand, R. J., Larose, S., & Senecal, C. (2007). Autonomous, controlled, and amotivated types of academic motivation: A person-oriented analysis. *Journal of Educational Psychology*, **99**, 734–746.

Román, S., Cuestas, P. J., & Fenollar, P. (2008). An examination of the interrelationships between self-esteem, others' expectations, family support, learning approaches, and achievement. *Studies in Higher Education*, **33**, 127–138.

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

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

Sansone, C., & Harackiewicz, J. M. (Eds.). (2000). *Intrinsic and extrinsic motivation: The search for optimal motivation and performance*. San Diego: Academic Press.

Schwinger, M., & Wild, E. (2012). Prevalence, stability, and functionality of achievement goal profiles in mathematics from third to seventh grade. *Contemporary Educational Psychology*, **37**, 1–13.

Senko, C., Hulleman, C. S., & Harackiewicz, J. M. (2011). Achievement goal theory at the crossroads: Old controversies, current challenges, and new directions. *Educational Psychologist*, **46**, 26–47.

Sheldon, K. M., Ryan, R. M., Deci, E. L., & Kasser, T. (2004). The independent effects of goal contents and motives on well-being: It's both what you pursue and why you pursue it. *Personality and Social Psychology Bulletin*, **30**, 475–486.

Shih, S. S. (2005). Taiwanese sixth graders' achievement goals and their motivation, strategy use, and grades: An examination of the multiple goal perspective. *Elementary School Journal*, **106**, 39–58.

Simmons, R. G., & Blyth, D. A. (1987). *Moving into adolescence: The impact of pubertal change and school context*. New York: de Gruyter.

Stipek, D., & Gralinski, J. H. (1996). Children's beliefs about intelligence and school performance. *Journal of Educational Psychology*, **88**, 397–407.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches*. Applied social research method series (Vol. **46**). Thousand Oaks, CA: Sage.

Trautwein, U., Marsh, H. W., Nagengast, B., Lüdtke, O., Nagy, G., & Jonkmann, K. (2012). Probing for the multiplicative term in modern expectancy–value theory: A latent interaction modeling study. *Journal of Educational Psychology*, **104**, 763–777.

Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2012). Achievement goal orientations and academic well-being across the transition to upper secondary education. *Learning and Individual Differences*, **22**, 290–305.

Urdan, T., Midgley, C., & Anderman, E. M. (1998). The role of classroom goal structure in students' use of self-handicapping strategies. *American Educational Research Journal*, **35**, 101–122.

Vansteenkiste, M., Sierens, E., Soenens, B., Luyckx, K., & Lens, W. (2009). Motivational profiles from a self-determination perspective: The quality of motivation matters. *Journal of Educational Psychology*, **101**, 671–688.

Veermans, M., & Tapola, A. (2004). Primary school students' motivational profiles in longitudinal settings. *Scandinavian Journal of Educational Research*, **48**, 373–395.

Weinstein, C. E., & Mayer, R. E. (1986). The teaching of learning strategies. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 315–329). New York: Macmillan.

White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, **66**, 297–333

Wormington, S. V., Corpus, J. H., & Anderson, K. A. (2012). A person-centered investigation of academic motivation and its correlates in high school. *Learning and Individual Differences*, **22**, 429–438.

Wormington, S. V., & Linnenbrink-Garcia, L. (2013, April). *A new look at multiple goal pursuit: The promise of a person-centered approach*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.