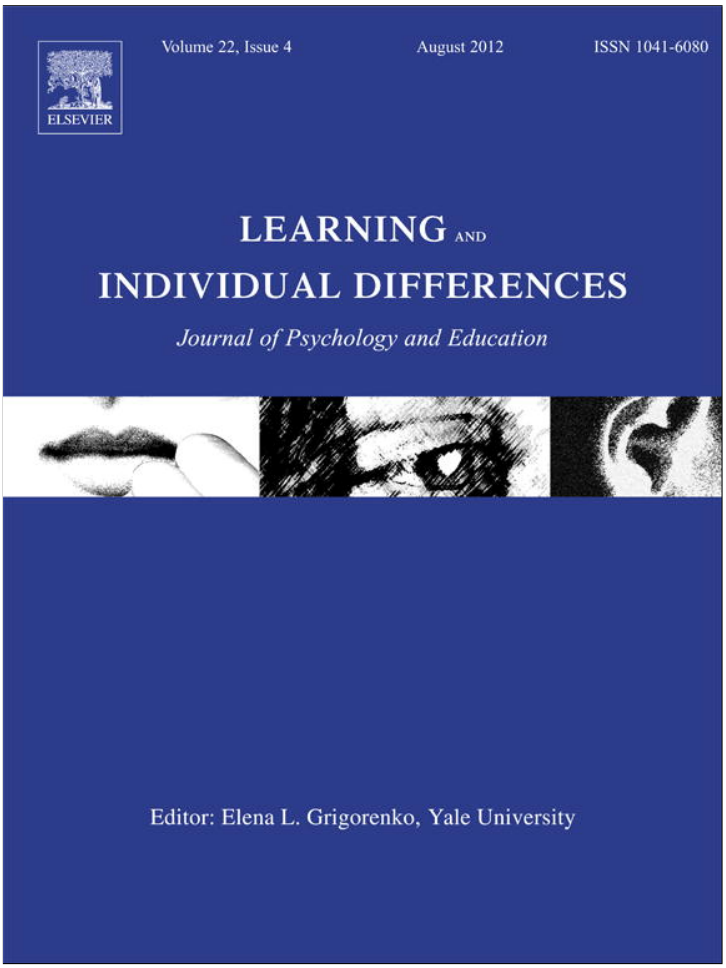

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A person-centered investigation of academic motivation and its correlates in high school ☆

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ABSTRACT

This study used a person-centered approach to identify naturally occurring combinations of intrinsic motivation and controlled forms of extrinsic motivation (i.e., introjected and external regulation) and their correlates in an academic context. 1061 high school students completed measures of academic motivation, performance, and school-related correlates. Cluster analysis revealed four motivational profiles characterized by comparably high levels of all types of motivation (*high quantity*), high intrinsic motivation relative to introjected and external regulation (*good quality*), low intrinsic motivation and introjected regulation relative to external regulation (*poor quality*), and very low intrinsic motivation and introjected regulation relative to external regulation (*low quantity with poor quality*). Students in the high quantity and good quality profiles reported the strongest academic performance and greatest overall extracurricular participation, with students in different motivational profiles likely to participate in different types of activities. Students in the high quantity profile, moreover, perceived the most teacher support and school relatedness. These findings suggest that controlled forms of extrinsic motivation may not be associated with maladaptive outcomes at the high school level when coupled with high levels of intrinsic motivation.

High school is a low point in student motivation, despite being a critical time for developing the skills necessary to thrive in the adult world (Seidman & French, 1997). Both intrinsic (i.e., learning for enjoyment) and extrinsic (i.e., learning as a means to an end) forms of motivation decrease across the high school transition (Otis, Grouzet, & Pelletier, 2005) and are lower than motivation levels of elementary school and college students (Martin, 2009). Adolescents' decreased investment in school is concerning given their newfound freedom; students who are not academically motivated may not pay attention, complete their work, or even attend school (Yonezawa, Jones, & Joselowsky, 2009). It is vital, then, to investigate the nature of high school students' motivation, the contextual forces that may predict it, and the school outcomes that may flow from it.

Self-determination theory (SDT; Deci & Ryan, 1985) may be a useful framework for conceptualizing academic motivation. According to SDT, motives exist on a continuum along which the source of control for an individual's behavior is perceived to be autonomously derived to varying degrees. At one end of the motivational continuum is intrinsic motivation, which is perceived to be fully autonomous and characterized by an internal source of control; it describes behaviors that are inherently interesting or enjoyable. Extrinsic motivation, by contrast, is an overarching term describing behaviors that are perceived as less autonomously derived; it encompasses identified regulation (behaviors that are not enjoyable but further a personally held goal or belief), introjected regulation (behaviors spurred by external forces that have been internalized, e.g., guilt), and – toward the other end of the continuum – external regulation (behaviors initiated by external constraints, e.g., rewards or threats). In general, motivation is thought to be adaptive to the extent that it is closer to the autonomous rather than the controlled end of the continuum (Deci & Ryan, 1985; Vansteenkiste, Lens, & Deci, 2006). Indeed, intrinsic motivation is consistently associated with more positive outcomes than more controlled forms of extrinsic motivation (i.e., introjected and external regulation), including school attendance (Vallerand & Bissonnette, 1992), conceptual learning (Benware & Deci, 1984; Ryan, Connell, & Deci, 1985), preference for challenging tasks (Pintrich & DeGroot, 1990), enjoyment of material (Harter, 1981; Vallerand, 1997), creativity (Hennessey, 2000), cognitive engagement (Miller, Behrens, & Greene, 1993), and academic performance (Boiché, Sarrazin, Grouzet, Pelletier, & Chanal, 2008; Burton, Lydon, D' Alessandro, & Koestner, 2006; Corpus, McClintic-Gilbert, & Hayenga, 2009; Lepper, Corpus, & Iyengar, 2005).

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1. Focusing on the individual: a person-centered approach

What happens, though, when students simultaneously possess motives that represent both the autonomous *and* controlled ends of the motivation continuum? How might such students fare relative to those who possess what SDT would consider to be the ideal combination of high intrinsic motivation with little emphasis on the more controlled forms of extrinsic motivation? To answer these questions, a person-centered approach must be adopted. Unlike variable-centered analyses, person-centered techniques examine relationships among variables at the level of the individual, and then group individuals who show similar patterns of relationships into a profile (Bergman, 2001; Bergman, Magnusson, & El Khouri, 2003). Cluster analysis was used in the current study because it identifies naturally occurring profiles rather than dividing participants into artificial groups that do not necessarily reflect how motivations combine in the real world (Maxwell & Delaney, 1993). Person-centered research within other motivational frameworks (e.g., achievement goal theory) has gained considerable recognition recently, contributing complementary knowledge to a primarily variable-centered corpus of work (e.g., Conley, 2012; Daniels et al., 2008; Meece & Holt, 1993; Pastor, Barron, Miller, & Davis, 2007; Schwinger & Wild, 2012). Because few studies grounded within SDT have used this approach to examine academic motives in concert with one another, it is unclear precisely how academic motives most frequently combine within individual students and to what effect. It is especially important to examine such combinations of academic motives during the high school years when external constraints may be particularly salient (Ratelle, Guay, Vallerand, Larose, & Senecal, 2007).

Although a small number of person-centered studies on SDT-defined academic motivation have been conducted to date, they have reached somewhat different conclusions about the prevalence and adaptiveness of different combinations of motivation (Hayenga & Corpus, 2010; Ratelle et al., 2007; Vansteenkiste, Soenens, Sierens, Luyckx, & Lens, 2009). Studies with 6th- through 8th-grade students (Hayenga & Corpus, 2010) and 7th-grade through college-aged students (Vansteenkiste et al., 2009) have revealed four profiles: one with high levels of both intrinsic and extrinsic motivations (*high quantity*), one with high intrinsic but low extrinsic motivation (*good quality*), one with low intrinsic but high extrinsic motivation (*poor quality*), and one with low levels of both types of motivation (*low quantity*). In these studies, students with good quality motivation fared better than their peers from other profiles, thus supporting claims of SDT that, when comparing highly motivated students, it is the ratio of intrinsic to extrinsic motivation rather than the overall amount of motivation that is crucial in determining success (Vansteenkiste et al., 2006). On the other hand, students with lower overall levels of motivation – i.e., those characterized by poor or low quality motivation – fared equally well in many respects, though students with poor quality motivation reported higher levels of test anxiety and procrastination, and lower levels of effort regulation (Vansteenkiste et al., 2009). A third study identified the same four motivational groups in a college sample, but the good quality profile was absent from two large samples of high school students (Ratelle et al., 2007). Instead, high school students were characterized by profiles of high quantity, poor quality, and moderate levels of intrinsic and extrinsic forms of motivation. Students with poor quality motivation exhibited the lowest academic performance and were most likely to drop out of school.

To explain the absence of a good quality profile, Ratelle et al. (2007) suggested that the high school environment may be too controlling to effectively foster high intrinsic motivation without also fostering highly controlled forms of extrinsic motivation (cf. Otis et al., 2005). Vansteenkiste et al. (2009) proposed a more statistically driven explanation, suggesting that it is more difficult for profiles with opposing scores on the relevant dimensions (as in the good and poor quality profiles) to emerge when the dimensions of interest are highly correlated with one another. Indeed, intrinsic motivation and external regulation were substantially positively correlated in Ratelle et al.'s (2007) high school samples but not in their college sample or the samples from Vansteenkiste et al. (2009) and Hayenga and Corpus (2010). However, Vansteenkiste et al. (2009) assertion is based in a variable-centered foundation, and thus may not apply to person-centered analyses; even substantially correlated variables can combine in different patterns for different individuals.

There may be several additional explanations for the discrepant findings from past studies. One possibility is that, although both Ratelle et al. (2007) and Vansteenkiste et al. (2009) were situated within the SDT tradition, they used different scales to measure motivation. In particular, the introjected items from the Academic Motivation Scale (e.g., "to prove to myself that I am capable of completing my high school diploma"; Vallerand et al., 1993) used by Ratelle et al. represent arguably more internalized and autonomous motivations than those from the Academic Self-Regulation Scale (e.g., "because I would feel guilty if I didn't study"; Ryan & Connell, 1989) used by Vansteenkiste et al. This may account for the stronger correlations between constructs in Ratelle and colleagues' study and perhaps the different profiles that emerged. Another plausible explanation is that Ratelle and colleagues examined a sample comprised exclusively of high school students; Vansteenkiste et al.'s high school sample, on the other hand, included a large proportion of 7th- and 8th-grade students (56% of the total sample), who were overrepresented in the good quality profile. It is possible, then, that middle school students largely drove the emergence of a good quality profile and that students characterized by good quality motivation may be rare in high school settings.

Given the disagreement in past studies as to whether a group of students possessing good quality motivation might exist in high school, the present study sought to document naturally occurring motivational profiles in a sample comprised exclusively of high school students. Using SDT as the theoretical framework, we anticipated profiles with high quantity, relatively low quantity, and poor quality motivation similar to those found in existing person-centered studies (i.e., Hayenga & Corpus, 2010; Ratelle et al., 2007; Vansteenkiste et al., 2009). The presence or absence of a good quality profile was of particular interest given its absence in Ratelle et al.'s high school samples. A second purpose of the study was to examine the adaptive nature of profiles relative to one another. To do so, we examined an array of school-related correlates, including factors that might theoretically contribute to or arise from specific combinations of motivation. Specifically, we considered teacher support and school relatedness as factors that may foster certain motivational profiles; we also measured students' academic performance and participation in extracurricular activities as factors likely to flow from students' academic motivation.

2. Academic performance

Existing person-centered studies have focused on academic performance (i.e., grade point average) and other learning outcomes (e.g., attitudes about cheating, distraction in class) as correlates of interest. To replicate findings from prior studies, and because grades are critical for students' success in securing employment or college admission, we measured the relationship between profile membership and performance in school. A profile characterized by good quality motivation, if found, was expected to possess the highest academic performance based on theory that learning is optimized when students are minimally focused on external constraints (Deci & Ryan, 1985; Pintrich & DeGroot, 1990). Otherwise, we generally expected the best performance among students in profiles with the most autonomous motivation given its association with optimal performance

(Corpus et al., 2009; Fortier, Vallerand, & Guay, 1995; Lepper et al., 2005).

3. Teacher support and school relatedness

We also considered students' relationship to the school because "school motivation cannot be understood apart from the social fabric in which it is embedded" (Weiner, 1990, p. 621; see also Patrick & Ryan, 2005). According to the self-system model of motivational development (Connell & Wellborn, 1991; Skinner & Belmont, 1993), students' learning and achievement is determined by their engagement or disaffection with school. This engagement arises from factors within the school environment and – more proximally – factors within the self that flow from these environmental supports (Skinner, Furrer, Marchand, & Kindermann, 2008). Contextual factors include teacher support of adolescents' autonomy, competence, and relatedness, three needs that SDT has identified as fundamental in fostering autonomous motivation (Deci & Ryan, 1985). Corresponding to these are more proximal self factors, which include feelings of autonomy, perceived competence, and school relatedness, or students' subjective sense of belonging to the school community. Both contextual and self factors were considered in the present study as likely facilitators of motivation.

In terms of contextual factors, we focused on teacher relatedness support, which does not garner as much attention in the literature as autonomy and competence support (Skinner et al., 2008) yet has been linked both empirically and theoretically to school involvement (Goodenow & Grady, 1993; Lynch & Cicchetti, 1997; Reddy, Rhodes, & Mulhall, 2003; Rhodes, Grossman, & Resch, 2000; Wentzel, 1997). Teacher support appears an important construct to account for in motivation research when considering its bidirectional relationship with engagement—one in which students who feel unsupported by teachers may disengage from school, subsequently spurring further withdrawal of support from the teacher (Skinner & Belmont, 1993). It is also crucial for adolescents to feel a sense of relatedness to the school environment given the increasingly strong influence of peers at this stage of life (Johnson, 2008; Shin, Daly, & Vera, 2007). In terms of self factors, we focused on school relatedness, which has been associated with positive academic outcomes in myriad studies (Furrer & Skinner, 2003; Wentzel, 1997; Eccles & Midgley, 1989). Researchers have posited that the extent to which students feel they belong to the school community is likely to relate to their academic motivation and subsequent achievement (Ryan & Patrick, 2001). In light of claims by Ratelle et al. (2007) that high schools lack the support necessary to foster high intrinsic motivation without also fostering controlled forms of extrinsic motivation, the present study sought to examine whether students' perceptions of teacher support and school relatedness were related systematically to motivational profiles.

One would expect intrinsic motivation to be greatest when contextual (e.g., teacher support) and self (e.g., school relatedness) factors fully satisfy students' basic psychological needs. Thus, students belonging to motivational profiles with high levels of intrinsic motivation – i.e., those in the high quantity and good quality profiles, if present – were expected to report the greatest levels of teacher support and school relatedness because such support would ostensibly encourage students' investment in school (Connell & Wellborn, 1991; Patrick & Ryan, 2006; Vallerand & Bissonnette, 1992; Wentzel, 1997). Of these two profiles, however, it was uncertain which would perceive greater support. On the one hand, students with positive school relationships may feel free to focus primarily on intrinsic motives because their basic needs are being met; if this were the case, students with good quality motivation would be expected to report the greatest levels of teacher support and school relatedness. On the other hand, students who are supported by their school community and teachers may also want to please them by performing well in school; in that case, students with high quantity motivation – who are both interested in school for its own sake and aim to gratify authority figures – would be expected to perceive the greatest teacher support and school relatedness.

Students in both the poor quality and low quantity profiles were expected to report lower levels of support than students with high quantity or good quality motivation, as support from teachers and the school community should theoretically foster some amount of intrinsic motivation. Students with poor quality motivation were hypothesized to report greater levels of school-related support than their counterparts with low quantity motivation, however, because feeling supported by teachers and peers would arguably lead to an investment in pleasing authority figures, indicated by moderate or high levels of controlled forms of extrinsic motivation. Students characterized by low quantity motivation, on the other hand, may receive less attention from teachers, resulting in low levels of motivation overall and disengagement from school.

4. Extracurricular activities

Academic motivation is important largely because it predicts school engagement, which can be characterized by involvement in and positive emotions toward a learning activity (Skinner & Belmont, 1993). Engagement is most often studied in the classroom and includes such indicators as school attendance, classroom participation, and help-seeking behavior (Finn, 1989, 1993; Nelson-LeGall & Jones, 1991; Rumberger, 1987; Willms, 2003). In some rigorous academic settings, however, classic measures of engagement such as attendance are not useful indicators of student involvement due to ceiling effects. Even in schools where students rarely drop out, consistently attend classes, and frequently participate in class discussions, differences might still exist in how invested students are in their education. In these cases, measuring more active forms of participation can capture variability among students.

Enrollment in extracurricular activities, for which students choose to spend time at school outside of mandatory classes, may be indicative of high levels of school engagement and a useful indicator of involvement (Finn, 1989, 1993; Fredricks & Eccles, 2006). While not directly linked to academic functioning, extracurricular participation might benefit students academically because it fosters skills (e.g., goal-setting, concentration, problem solving) that can transfer to the academic realm and help adolescents prepare for the challenges of adult life (Irvin, Farmer, Leung, Thompson, & Hutchins, 2010; Larson, 2000). Indeed, Finn's (1989) participation-identification model suggests that students who enroll in school-relevant activities are most likely to succeed in school, a finding that has been largely supported by recent studies (for a review, see Farb & Matjasko, 2012). In addition, intrinsic motivation towards afterschool activities promotes subjective well-being, a crucial component of positive school functioning (Beiswenger & Grolnick, 2010). Extracurricular activities may be increasingly important to study in adolescence as the socializing effect of peer groups becomes stronger (Irvin et al., 2010) and participation becomes fairly normative, with more than 70% of high school students spending a significant amount of time taking part in extracurricular activities (Dunn, Kinney, & Hofferth, 2003; Hofferth & Sandberg, 2001; Stearns & Glennie, 2010; Yazzie-Mintz, 2006).

A more exploratory goal of this study was to investigate the relationship between motivational profiles and participation in extracurricular school-sponsored activities. One might expect a substantial amount of extracurricular participation among students from the high quantity and good quality profiles given that intrinsic motivation is associated in both research and theory with school engagement (Deci & Ryan, 1985; Vansteenkiste et al., 2009). It is also possible, however, that students with poor quality motivation may participate in extracurricular activities – in which students generally freely

choose to take part and can relate to other students with similar interests – to fulfill their needs for autonomy and relatedness (Deci & Ryan, 2000; Jordan & Nettles, 2000; Larson, 2000; Mahoney, Larson, Eccles, & Lord, 2005) that are not satisfied in the academic realm. It was expected, then, that students in the high quantity, good quality, and poor quality profiles might all participate in extracurricular activities at reasonably high levels. Those with low quantity academic motivation were expected to participate least in school-sponsored activities because they would not be driven by any of these incentives to put forth additional effort and engage with school.

Perhaps more interesting than the number of activities students pursue is the type of activities they select. Past research suggests that particular activities are associated with distinct academic outcomes (Broh, 2002; Camp, 1990; Fredricks & Eccles, 2005, 2006, 2008; Hanks & Eckland, 1976), which could suggest that students with certain academic motives might be drawn to different activities. For example, students in profiles with more controlled forms of extrinsic motivation – i.e., high quantity and poor quality profiles – may choose to engage in activities that serve to strengthen their college applications. More generally, in a time when extracurricular activities are being cut from many schools due to budget constraints, information on which activities foster or attract students with different patterns of motivation could help administrators and policy makers decide which activities to sponsor. On the one hand, activities that appeal to students with less optimal motivational patterns may be a mechanism through which to hook unengaged students. On the other hand, administrators may be focused on activities that entice students with more optimal motivation because there is likely, to some extent, a bidirectional relationship between extracurricular participation and academic motivation.

5. The current study

The current study investigated the characteristics and correlates of various combinations of intrinsic and controlled forms of extrinsic motivation among high school students. We identified naturally occurring motivational profiles using cluster analysis and examined each profile's level of academic performance, perceived teacher support and school relatedness, and participation in extracurricular activities. We hoped to shed light on the disparate findings of prior person-centered studies of motivation, as well as provide a richer understanding of how students with different motivational profiles perform within and perceive the school environment.

6. Method

6.1. Participants and procedure

Participants were 1066 students (49% female; 83.9% white) enrolled in an academically rigorous Catholic high school in the Pacific Northwest. According to school statistics at the time of the study, 76% of the student body identified as Catholic and 25% received financial aid annually. There were fairly equal numbers of freshmen ($n = 310$, 29%), sophomores ($n = 269$, 25%), juniors ($n = 249$, 23%), and seniors ($n = 236$, 22%); two students did not specify their grade level.

The entire student body was invited to complete an online survey focused largely on alcohol and drug use for an unrelated study (see Anderson, Grunwald, Bekman, Brown, & Grant, 2011); because of the sensitive nature of this material, responses were anonymous and objective data (e.g., GPA) could not be collected. Parental consent was received for 90.9% of the students, and 96.9% of students with parental consent assented to participate. One of three trained research assistants provided standardized instructions to groups of 20 to 60 students seated in the school's computer laboratories during school hours. Students had 45 min to complete the survey, which included the measures described below along with questions unrelated to this study. Fifteen participants were subsequently dropped from analyses due to inconsistent responding on questions unrelated to the present study (i.e., indicating dishonest responding), leaving the sample described above.

6.2. Measures

6.2.1. Academic motivation

Questions were drawn from the Academic Motivation Scale, a reliable and valid measure of academic motivation (AMS; Vallerand et al., 1993). Three questions each were used to measure intrinsic motivation ($\alpha = .88$; i.e., "I go to school for the pleasure I experience when I discover new things never seen before"; "…because I experience pleasure and satisfaction while learning new things"; "…because my studies allow me to continue to learn about many things that interest me"), introjected regulation ($\alpha = .84$; i.e., "I go to school because I want to show myself that I can succeed in my studies"; "…to show myself that I am an intelligent person"; "…because of the fact that when I succeed in school I feel important"), and external regulation ($\alpha = .87$; i.e., "I go to school in order to obtain a more prestigious job later on"; "…in order to have a better salary later on"; "…because I want to have the 'good life' later on"). Participants indicated their reasons for going to school using a 7-point scale (1 = not at all true of me, 7 = exactly true of me). We chose to include these particular types of motivation as they represent the most extreme ends of the motivation continuum; while intrinsic motivation represents the most autonomous form of motivation, introjected and external regulation represent more controlled forms of motivation.

6.2.2. Academic performance

Academic performance was measured using participants' self-reported grade point average, as in Vansteenkiste et al. (2009). Self-report measures of grades have been found to correlate highly with actual grades (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987; Gray & Watson, 2002; Kuncel, Credé, & Thomas, 2005; Noftle & Robins, 2007). School personnel also indicated that students were keenly aware of their precise grade point averages.

6.2.3. Teacher support and school relatedness

Items for both constructs were drawn from the Resilience and Youth Development Module (RYDM) of the California Healthy Kids Survey (CHKS) 2002–2009 high school version. Supported by the California Department of Education, it has been used extensively in research (Davis, Kreutzer, Libsett, King, & Shaikh, 2006; Rhee, Furlong, Turner, & Harari, 2001; Wormington, Anderson, Tomlinson, & Brown, under review) and has been found to be reliable (Hanson & Austin, 2003). Teacher support was measured by three questions from the Caring Relationships section ($\alpha = .90$; e.g., "There is a teacher or other adult at school who really cares about me") on a 4-point scale (1 = not at all true; 4 = very true). For school relatedness, participants responded to four questions from the RYDM School Connectedness section ($\alpha = .86$; e.g., "I feel close to people at this school") on a 5-point scale (1 = strongly disagree; 5 = strongly agree).

6.2.4. Extracurricular activities

Participation in extracurricular activities was used to indicate non-academic school engagement and was measured by an item created in conjunction with school administrators. Participants indicated whether they participated in any of six categories of activities – school athletics, community athletics, theater/dance, music/voice, arts/crafts, and community/Christian service – with a yes/no response. Such a dichotomous frequency count is common in research on extracurricular activities (e.g., Fredricks & Eccles, 2005, 2008; Guest & McRee, 2009; Mahoney, 2000; Mahoney & Stattin, 2000). A

dichotomous measure was also considered appropriate because school policy restricted students from simultaneously participating in multiple activities within particular categories (e.g., school athletics).

6.3. Statistical analysis strategy

Cluster analysis was used to generate motivational profiles based on students' responses to the items assessing motivation. Cluster analysis aims to maximize both between-cluster heterogeneity and within-cluster homogeneity. In line with recommendations by Hair, Anderson, Tatham, and Black (1998), an agglomerative hierarchical clustering method (Ward's linkage) followed by an iterative, nonhierarchical (k-means) clustering technique was used (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009). Raw scores were used as input for the cluster analysis (Bergman et al., 2003).

An agglomerative cluster analysis starts with each observation in a data set as its own cluster. Similar data points are combined in subsequent steps until all observations are assigned to one large cluster. Specifically, Ward's linkage is based on squared Euclidian distances and ensures that the within-cluster sum of squares is minimized over variables. In order to choose the most appropriate cluster solution we began by examining a dendrogram, which provides a visual representation of dissimilarity between clusters as they are collapsed, and fusion coefficients. Researchers can examine the change in coefficient values as clusters are collapsed (e.g., moving from 4 to 3 clusters) and try to identify a clear demarcation point—in other words, a sizable jump in the fusion coefficient value. Large changes in fusion coefficients indicate greater dissimilarity in clusters being collapsed, thus arguing against collapsing those clusters (Aldenderfer & Blashfield, 1984). After examining the dendrogram and fusion coefficients, we considered the percent of variance explained by the different cluster solutions, a priori theorizing based on past related work, distinctiveness of groups in terms of the patterns they exhibited and their association with outcomes, and finally whether the solution was stable and replicable. Because hierarchical clustering methods are particularly sensitive to outliers, all multivariate outliers (>3 SDs from the mean), identified using criteria outlined by Hadi (1992; 1994), were excluded from further analyses. K-means clustering, which allows for reassignment of observations, was then used to fine-tune clusters. In k-means clustering, the number of clusters is selected prior to performing analyses and several observations can be chosen as nonrandom starting points. In the present study, centroids from the Ward's clusters served as these starting points. Any observation within a certain distance of the value of each starting point then becomes assigned to that cluster and the process continues until all scores are assigned.

A double-split cross-validation procedure was performed to ensure the resulting cluster solution was both stable and replicable (Breckenridge, 2000). In this procedure, the data set is split into two random halves and subjected to the same hierarchical and nonhierarchical clustering techniques as used for the overall solution. Each half then undergoes nearest neighbor analysis, during which each observation in one half is reassigned to the cluster to which its nearest neighbor in the other half belongs. The resulting solution for each half is then compared to the other half's original cluster solution using Cohen's kappa. In general, a kappa greater than .60 is considered acceptable.

As a final step in the study, we ensured that clusters were distinct in terms of outcome variables. ANOVAs and chi-square analyses assessed whether profiles were associated with correlates in distinct ways.

7. Results

Due to the sample size, we used a significance criterion of $p<.01$ to avoid Type 1 errors. In the very few cases (<.01%) where data from one item of a measure was missing, composite variables were calculated by averaging the values of the completed items for that measure. Correlations among all variables are presented in Table 1. Patterns of relationships were largely consistent with prior research. However, correlations among the different types of motivation were somewhat unexpected. Specifically, introjected regulation correlated more strongly with intrinsic motivation than with external regulation. Additionally, intrinsic motivation and external regulation were significantly positively correlated with one another. While SDT describes these motivations as being correlated in a simplex pattern (Ryan & Connell, 1989), several person-centered studies of motivation have found introjected motivation to correlate more strongly with intrinsic motivation than with external regulation (Boiché et al., 2008; Ratelle et al., 2007). In light of these other findings, the resulting correlations in this study may be more than an anomaly; it

Table 1
Correlations and descriptive statistics for all variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Sex	–	−.02	−.09	−.18**	.04	−.20**	−.01	.06	−.17**	.13**	.04	−.20**	−.06	−.20**	−.20**
2. Grade		–	−.02	−.05	−.04	−.04	.16**	−.04	.07	.08*	.02	−.05	−.04	.07	.22**
3. Intrinsic mot.			–	.66**	.21**	.28**	.36**	.34**	.18**	.03**	−.01	.10**	.15**	.05	.13**
4. Introjected reg.				–	.40**	.21**	.30**	.26**	.09*	.06	−.04	.05	.03	.03	.10**
5. extrinsic reg.					–	.05	.16**	.18**	.01	.08*	.06	−.05	−.08	−.09*	.04
6. GPA						–	.13**	.14**	.19**	−.01	.02	.12**	.16**	.07	.12**
7. Teacher support							–	.40**	.13**	.08*	−.01	.04	.01	.05	.15**
8. School relatedness								–	.09*	.13**	.00	.02	−.02	−.04	.12**
9. Total extracurriculars									–	.25**	.46**	.36**	.46**	.36**	.63**
10. School athletics										–	.06	−.24**	−.16**	−.15**	.05
11. Community athletics											–	−.17**	−.07	.02	.14**
12. Theater/dance												–	.32**	.09*	.09*
13. Music/voice													–	.10*	.06
14. Arts/crafts														–	.13**
15. Community service															–
Mean		10.39	4.96	4.84	5.97	3.59	3.26	4.18	2.33	75%	51%	17%	25%	11%	54%
Standard deviation		1.12	1.43	1.43	1.16	0.34	0.78	0.80	1.10						

Note: types of motivation and regulation measured on a 7-point scale; teacher support measured on a 4-point scale; school relatedness measured on a 5-point scale. Mean for total extracurriculars is the average number of types of activities students participate in. Means for individual extracurricular activities indicates the percentage of sample who participated in each activity. For Sex: 0 = girls, 1 = boys. Mot. = motivation; Reg. = regulation; GPA = grade point average.

* $p<.01$.

** $p<.0001$.

Table 2
Fusion coefficients from hierarchical cluster analysis.

Cluster number	Fusion coefficient
1	5650.42
2	3584.15
3	2853.31
4	2320.44
5	1992.94
6	1769.81
7	1558.96

is possible that the scale's measure of introjected regulation may be tapping into a type of motivation closer to intrinsic motivation. Future research is needed to determine whether this pattern of results is consistently replicated.

7.1. Cluster analysis

Five multivariate outliers were excluded from analyses, leaving a final sample of 1061 students. Using results from Ward's linkage, it was determined that a four-cluster solution best fit the data (for fusion coefficients, see Table 2). K-means clustering was then used to refine the clusters and produce the final cluster solution described below. The four-cluster solution explained a substantial percent of overall variance (76%), well above the 50% threshold used in related studies (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009). A three-cluster solution explained an adequate percent of variance but combined the theoretically distinct good and poor quality profiles. A five-cluster solution explained additional variance, but split the high quantity profile into two groups, one with slightly higher levels of intrinsic motivation relative to introjected and external regulation and the other with slightly higher levels of external regulation relative to intrinsic motivation and introjected regulation. Because these two groups were not theoretically distinct and did not differ in terms of outcome variables, a four-cluster solution was selected. A double-split cross-validation procedure confirmed that the four-cluster solution was replicable and stable ($\kappa = 0.92$).

Cluster centroids for the final solution are presented in Table 3. Borrowing terminology from Vansteenkiste et al. (2009), motivational profiles were labeled in terms of either motivation quality (ratio of intrinsic to controlled forms of extrinsic motivation) or quantity (sum of all types of motivation). Students were characterized by *high quantity* ($n = 445$; 42.83%), *good quality* ($n = 203$; 19.54%), *poor quality* ($n = 275$; 26.47%), or *low quantity with poor quality* ($n = 116$; 11.16%) motivation. It is important to note that, while the high quantity group did possess significantly greater levels of intrinsic motivation than the good quality group, the good quality profile maintained a favorable ratio of intrinsic to controlled forms of extrinsic motivation. Thus, it was still considered to be good quality and was labeled as such.

Grade and gender differences among profiles were also examined. Chi-square tests indicated no grade differences, $\chi^2(9, N = 1061) = 19.84$[2], *ns*, but did detect a significant difference in gender makeup, $\chi^2(3, N = 1061) = 21.79$, $p < .0001$. Girls were overrepresented in the high quantity and good quality profiles, consistent with previous person-centered studies (Ratelle et al., 2007; Vansteenkiste et al., 2009).

[2] We also clustered separately by grade level to examine potential age differences. Clusters were similar in terms of make-up across grade levels with two exceptions. First, a group of students with truly low quantity motivation was present in 9th and 10th grades; in contrast, a low quantity with poor quality group similar to the overall cluster solution was present for 11th and 12th grade students. Second, the ratio of intrinsic to controlled forms of extrinsic motivation was more pronounced for the good quality clusters in 11th and 12th grades than in 9th and 10th grades.

7.2. School-related correlates

7.2.1. Academic performance

A one-way ANOVA revealed a significant difference among the profiles in grade point average, $F(3, 1050) = 24.68$, $p < .0001$, $\eta_p^2 = .06$. Follow up Tukey HSD tests indicated that students in the high quantity ($M = 3.65$, $SD = .31$) and good quality ($M = 3.65$, $SD = .30$) profiles reported higher grades than students in the poor quality profile ($M = 3.53$, $SD = .32$), who in turn reported higher grades than students in the low quantity with poor quality profile ($M = 3.38$, $SD = .45$). Findings are displayed in Table 2.

7.2.2. Teacher support and school relatedness

A one-way ANOVA indicated that motivational profiles differed significantly in their perceptions of teacher support, $F(3, 1053) = 42.51$, $p < .0001$, $\eta_p^2 = .11$. Follow-up Tukey HSD tests revealed that students in the high quantity profile ($M = 3.51$, $SD = .64$) reported higher levels of teacher support than students in the good quality ($M = 3.24$, $SD = .74$) and poor quality ($M = 3.12$, $SD = .82$) profiles, who in turn reported higher levels of teacher support than students in the low quantity with poor quality profile ($M = 2.72$, $SD = .85$). The same pattern of results was found for school relatedness, $F(3, 1056) = 37.38$, $p < .0001$, $\eta_p^2 = .10$. Students in the high quantity profile ($M = 4.39$, $SD = .72$) reported the highest levels of school relatedness, while students in the good quality ($M = 4.14$, $SD = .75$) and poor quality ($M = 4.12$, $SD = .76$) profiles reported lower levels of school relatedness. The low quantity with poor quality profile ($M = 3.59$, $SD = .88$) reported the lowest levels of school relatedness.

7.2.3. Extracurricular activities

There was a significant difference among the profiles in total number of extracurricular activities, $F(3, 1057) = 5.72$, $p < .0001$, $\eta_p^2 = .02$. Students with high quantity ($M = 2.46$, $SD = 1.11$) and good quality ($M = 2.42$, $SD = 1.20$) motivation participated in more types of extracurricular activities than students with poor quality ($M = 2.21$, $SD = .97$) and low quantity with poor quality ($M = 2.08$, $SD = 1.07$) motivation. The results of chi-square tests for participation in individual extracurricular activities are displayed in Table 4. Adjusted standardized residuals indicated that students in the good quality cluster were overrepresented in theater/dance and music/voice, while students in the high quantity profile were overrepresented in community/Christian service. Students with low quantity with poor quality motivation were underrepresented in nearly all extracurricular activities, and those with poor quality motivation were underrepresented in music/voice and community/Christian service.

8. Discussion

The purpose of this study was to document motivational profiles and their school-related correlates among high school students. Ultimately, we hoped to add to the literature by examining largely neglected school-related correlates and attempting to shed light on discrepancies in previous related research, particularly whether good quality motivation might exist in a high school setting.

8.1. The presence of good quality motivation

A four-cluster solution was selected as best fitting the data, with groups characterized by high quantity, good quality, poor quality, and low quantity with poor quality motivation. These results largely replicated the cluster solution found by Vansteenkiste et al. (2009), though the low quantity profile clearly also possessed poor quality motivation. Notably, the cluster solution differed from findings of Ratelle et al. (2007) in that a good quality profile was present. Important to note, however, is that the good quality cluster contained fewer

Table 3
Cluster differences on input and outcome variables.

	High quantity	Good quality	Poor quality	Low quantity with poor quality	η^2
Intrinsic motivation	6.03 (.70)$_a$	5.32 (.89)$_b$	4.05 (.78)$_c$	2.61 (1.14)$_d$	.70
Introjected regulation	6.04 (.66)$_a$	4.14 (.92)$_b$	4.52 (.83)$_c$	2.46 (.95)$_d$	.69
External regulation	6.48 (.60)$_a$	4.81 (1.02)$_b$	6.44 (.59)$_a$	5.03 (1.65)$_d$	.43
Academic performance	3.65 (.31)$_a$	3.65 (.30)$_a$	3.53 (.32)$_b$	3.38 (.45)$_c$	.06
School relatedness	3.51 (.64)$_a$	3.24 (.74)$_b$	3.12 (.82)$_b$	2.72 (.85)$_c$	.11
Teacher support	4.39 (.72)$_a$	4.14 (.75)$_b$	4.12 (.76)$_b$	3.59 (.88)$_c$	.10
Total extracurriculars	2.46 (1.11)$_a$	2.42 (1.20)$_a$	2.21 (.97)$_b$	2.08 (1.07)$_b$	.02

Note: all differences significant at $p<.0001$. Different subscripts within each row indicate significant differences.

students than either the high quantity or poor quality clusters. Thus, while it is possible for students to maintain good quality motivation during high school, it may still be relatively uncommon.

Even though the good quality profile in the present study had less overall intrinsic motivation than the high quantity profile, it possessed a clearly favorable ratio of intrinsic to controlled forms of extrinsic motivation indicative of good quality motivation. These results speak against Ratelle et al.'s (2007) claim that the high school environment is too controlling to foster high intrinsic motivation without correspondingly high controlled forms of extrinsic motivation. Results from the current study also challenge Vansteenkiste et al.'s (2009) statistical explanation for discrepancies between studies. Indeed, intrinsic motivation and external regulation were more positively correlated in the current sample ($r=.21$) than in that of Ratelle and colleagues' ($r=.19$); nevertheless, a good quality profile emerged. That highly correlated variables combined in different patterns is not surprising when one recalls that correlations represent a variable-centered technique; as has been discussed previously, person-centered analyses reveal different relationships between variables for different individuals.

We proposed two additional explanations for why past studies arrived at different cluster solutions: (1) the studies used different motivation scales, which may have tapped slightly different types of motivation, and (2) Vansteenkiste and colleagues' good quality profile may have been driven by middle school students. Even though we used the same motivation scale as Ratelle and colleagues, we were still able to detect a group of students with good quality motivation. Similarly, our sample was composed of strictly high school students yet a good quality profile emerged. These findings suggest that it is indeed possible to possess relatively good quality motivation at the high school level. The advantages of such a profile over other motivational profiles, however, may not be as clear as previous research would suggest.

8.2. Performance: the compensatory relationship between quality and quantity

Once a cluster solution was chosen, we examined the academic correlates of each motivational profile and found that students with high quantity and good quality motivation were equally successful in terms of academic performance. Because these two profiles reported relatively high, though significantly different, levels of intrinsic motivation, the most basic explanation is that intrinsic motivation is the primary correlate of school performance. This is much in line with variable-centered studies of motivation and performance (e.g., Boiché et al., 2008; Lepper et al., 2005; Soenens & Vansteenkiste, 2005).

Simply noting a relationship between intrinsic motivation and good performance, however, fails to capture nuances of the present study's findings. If performance was driven solely by intrinsic motivation, students with high quantity motivation would have reported the highest grade point average. Instead, the data suggest a compensatory relationship between the ratio of intrinsic to more controlled forms of extrinsic motivation and the total amount of motivation present. As evidence, the good quality profile was just as adaptive in terms of performance as the high quantity profile despite possessing less intrinsic motivation; conversely, the high quantity profile performed just as well academically as the good quality profile, despite having a less favorable ratio of intrinsic to controlled forms of extrinsic motivation. The poor quality profile also consistently outperformed the low quantity with poor quality profile arguably because it possessed more motivation in total.

That a high ratio of intrinsic to controlled forms of extrinsic motivation can compensate for a relatively low total amount of motivation aligns with SDT's claims about the benefits of intrinsic compared to controlled forms of extrinsic motivation (Deci & Ryan, 1985). The finding that a large total amount of motivation can mitigate unfavorable ratios of intrinsic to extrinsic motivation, however, suggests that controlled forms of extrinsic motivation may not be as maladaptive as SDT would posit. Of course, related research with middle school and college populations has shown that a profile of high intrinsic motivation coupled with low extrinsic motivation is far more adaptive than one with high levels of both motivation types (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009). Perhaps the controlling, unengaging nature of the high school environment makes controlled types of extrinsic motivation more adaptive than they are in other educational settings where students can thrive by focusing more exclusively on intrinsic motivation.

Table 4
Participation in extracurricular activities for motivational groups.

Extracurricular activity	High quantity ($n=445$)	Good quality ($n=203$)	Poor quality ($n=275$)	Low quantity with poor quality ($n=116$)	Sig. (χ^2)
School athletics	78.2%	69.0%	79.3%	67.2%	11.42**
Community athletics	51.0%	49.8%	52.4%%	55.2%	2.28
Theater/dance	18.0%	23.2%	14.2%	10.3%	11.31*
Music/voice	27.0%	36.5%	18.2%	17.2%	22.04***
Arts/crafts	11.9%	13.3%	9.5%	9.5%	2.97
Community/Christian service	60.7%	52.7%	48.4%	44.8%	15.38**

Note: extracurricular activities reported as percentage of students who indicated participating in the activity.
* $p<.01$.
** $p<.001$.
*** $p<.0001$.

8.3. Teacher support and school relatedness

In an attempt to speak to Ratelle et al.'s (2007) hypothesis that the high school environment is too controlling to foster good quality motivation, we examined how contextual and self variables that might foster engagement mapped on to motivational profiles. Students with high quantity motivation reported the greatest perceived teacher support and school relatedness, followed by those in good and poor quality profiles, and finally, students in the low quantity with poor quality profile. It appears that accounting for contextual and self factors is most useful in determining the overall amount of motivation a student will possess: students who felt most supported by teachers and most affiliated with school possessed high amounts of *all* types of motivation and those who felt least supported and affiliated possessed low amounts of all (though particularly intrinsic) types of motivation. Participants from the high quantity profile could arguably afford to approach schoolwork with interest and curiosity because they were adequately supported; in addition, they may have adopted goals that would be looked upon favorably by the school community (e.g., doing well in school in order to attend a prestigious college) in order to reciprocate this support.

Perceived teacher support and school relatedness, however, were not more strongly associated with one type of motivation than another. Adolescents who perceived relatively moderate levels of support (i.e., good and poor quality profiles) adopted high levels of one type of motivation toward school, but not high levels of all types. Perhaps students with good quality motivation felt supported by teachers but also stifled by controlling aspects of the high school environment that failed to support their learning goals (e.g., tedious assignments; Otis et al., 2005); this could also speak to why students in the good quality profile possessed somewhat less intrinsic motivation than those with high quantity motivation. Students with poor quality motivation, on the other hand, could have endorsed controlled forms of extrinsic motivation because they felt like part of a school community that places importance on extrinsic goals (e.g., attending a well-known university) but not intrinsic motives (e.g., learning for the sake of learning). Future studies might attempt to identify other variables that, given a certain level of school-related support, determine which academic motives students endorse.

8.4. Extracurricular activities

An additional, more exploratory goal of this study was to examine students' involvement in school-sponsored activities. Overall, students in the good quality and high quantity motivation profiles were the most frequently involved in extracurricular activities. Not surprisingly, students in the low quantity with poor quality profile were underrepresented in each type of activity, suggesting that relatively unmotivated students are unlikely to expend extra effort to engage with the school community outside of the hours they are required to be at school. Of course, students undoubtedly have a host of non-academic motives governing their involvement in clubs or sports (e.g., work, family obligations, social prestige); it is notable that systematic links were found between motivational profiles and extracurricular participation despite such complexities.

Interesting differences emerged when considering the types of activities to which different motivational profiles were attracted. For example, students in the high quantity profile participated in community/Christian service to a greater extent than their peers. Recall that students with high quantity motivation also reported the greatest levels of school-related support; this may have encouraged volunteering given that the school from which students were drawn in the current study valued community service and even mandated such service at some point during each student's high school career. By contrast, students in the good quality profile participated the most in creative activities like theater/dance and music/voice. Several studies have documented an association between intrinsic motivation and the creative arts (Shernoff & Vandell, 2007; Winner & Hetland, 2000), although little research has examined the effects of participating in artistic programs (Shernoff & Vandell, 2007). Most pertinent to the present study, Amabile's (1996) body of work suggests that creativity – a key component of the activities mentioned above – flourishes in the presence of intrinsic motivation and the absence of controlled forms of extrinsic motivation; good quality students, then, may have been well-suited for participating in creative arts because of their particular combination of motivation. Such a conclusion could not have been drawn from the use of a variable-centered approach relating levels of intrinsic and extrinsic motivation to participation in creative arts activities.

Of course, findings from the present study were intended to be a preliminary step in understanding the relationship between motivation and extracurricular participation. Any speculations as to why these patterns emerged must be tentative as our measure of participation was a simple frequency count. Although this approach is often used in research on extracurricular activities (e.g., Barber, Eccles, & Stone, 2001; Eccles & Barber, 1999; Johnson, Beebe, Mortimer, & Snyder, 1998; Mahoney, 2000; Mahoney, Schweder, & Stattin, 2002; Mahoney & Stattin, 2000), it did not capture the depth of students' engagement in the activities, which could yield important information (see Bohnert, Fredricks, & Randall, 2010). Attending an improvisation club once a week, for example, involves less engagement than spending weeks in rehearsals for a dance performance, though both activities would have counted equally as participation in theater/dance in this study; work building on the present study could incorporate more sensitive measures of involvement that might assess depth of engagement (Rose-Krasnor, Busseri, Willoughby, & Chalmers, 2006). Future research could also consider how eligibility requirements for extracurricular participation (e.g., minimum GPA) might influence students' controlled forms of extrinsic academic motivation. This was unlikely a driving force in the present study as this school required only passing grades to participate in clubs and sports—a goal that students at a high achieving institution would presumably already endorse.

8.5. Limitations and future directions

As with all correlational data, no conclusions can be drawn about causality. In all likelihood, the relationships are bidirectional; for example, variable-centered research indicates that motivation and performance predict one another over time (Becker, McElvany, & Kortenbruck, 2010; Corpus et al., 2009). Additionally, any number of third variables – such as demographic factors, personality traits, or parenting style in the home – might have influenced both motivation and academic correlates. Future person-centered studies should employ cross-lagged longitudinal designs to address the directionality of these relationships. A second limitation was the lack of objective measures of school-related correlates. Due to the sensitive nature of this survey, which concerned substance use, all items were self-reported. Although participants were guaranteed full anonymity, they still may not have responded truthfully or accurately. Future studies should attempt to obtain objective reports of behaviors (e.g., academic transcripts, club rosters) when possible. Such studies might also include identified motivation, another subtype of extrinsic motivation identified by self determination theory that is often collapsed with intrinsic motivation to represent autonomous motivation; this would more fully represent the range of motives underlying students' performance and engagement. Finally, our findings with a Catholic high school sample may not be widely generalizable. Although the central purpose of this study was to compare profiles of students to one another, there is still a concern that similar motivation profiles would not be found in other school environments.

This concern may be partially offset by the very high participation rate and percent of the student body on scholarship at this institution.

Nevertheless, the present study raises several points future research could fruitfully address. Most importantly, our results suggest that motivational profiles may be differentially adaptive for different age groups. Perhaps, as Ratelle et al. (2007) argued, the high school environment is one in which some degree of controlled types of motivation is not entirely maladaptive. Studies with different age groups would help determine whether a compensatory relationship between motivation quantity and quality is specific to the high school environment or applies more broadly. Such person-centered investigations may get to the root of how motivation types collectively operate within individual students at different levels of schooling. Similarly, future studies would benefit from documenting the characteristics of motivational profiles more fully. Person-centered approaches are a valuable tool for understanding motivation as it exists in the classroom, bringing researchers one step closer to identifying and ultimately fostering the ideal combination of academic motives.

References

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

Amabile, T. E. (1996). *Creativity in context.* Boulder: Westview Press.

Anderson, K. G., Grunwald, I., Bekman, N. M., Brown, S. A., & Grant, A. (2011). To drink or not to drink: Motives and expectancies for use and nonuse in adolescence. *Addictive Behaviors*, *10*, 972–979.

Barber, B. L., Eccles, J. S., & Stone, M. R. (2001). Whatever happened to the jock, the brain, and the princess? Young adult pathways linked to adolescent activity involvement and social identity. *Journal of Adolescent Research*, *16*, 429–455.

Becker, M., McElvany, N., & Kortenbruck, M. (2010). Intrinsic and extrinsic reading motivation as predictors of reading literacy: A longitudinal study. *Journal of Educational Psychology*, *102*, 773–785.

Beiswenger, K. L., & Grolnick, W. S. (2010). Interpersonal and intrapersonal factors associated with autonomous motivation in adolescents' after school activities. *Journal of Early Adolescence*, *30*, 369–394.

Benware, C. A., & Deci, E. L. (1984). Quality of learning with an active versus passive motivational set. *American Educational Research Journal*, *21*, 755–765.

Bergman, L. R. (2001). A person approach in research on adolescence: Some methodological challenges. *Journal of Adolescent Research*, *16*, 28–53.

Bergman, L. R., Magnusson, D., & El Khouri, B. (2003). *Studying individual development in an interindividual context: A person-oriented approach.* Mahwah, NJ: Lawrence Erlbaum Associates.

Bohnert, A., Fredricks, J., & Randall, E. (2010). Capturing unique dimensions of youth organized activity involvement: Theoretical and methodological considerations. *Review of Educational Research*, *80*, 576–610.

Boiché, J. C. S., Sarrazin, P. G., Grouzet, F. M. E., Pelletier, L. G., & Chanal, J. P. (2008). Students' motivational profiles and achievement outcomes in physical education: A self-determination perspective. *Journal of Educational Psychology*, *100*, 688–701.

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

Broh, B. A. (2002). Linking extracurricular programming to academic achievement: Who benefits and why? *Sociology of Education*, *75*, 69–91.

Burton, K. D., Lydon, J. E., D' Alessandro, D. U., & Koestner, R. (2006). The differential effects of intrinsic and identified motivation on well-being and performance: Prospective, experimental, and implicit approaches to self-determination theory. *Journal of Personality and Social Psychology*, *91*, 750–762.

Camp, W. G. (1990). Participation in student activities and achievement: A covariance structural analysis. *The Journal of Educational Research*, *83*, 272–278.

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

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar, & L. A. Sroufe (Eds.), *Minnesota Symposium on Child Psychology. Self-processes in development*, *Vol. 23*. (pp. 43–77) Hillsdale, NJ: Erlbaum.

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.

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.

Davis, A. M., Kreutzer, R., Libsett, M., King, G., & Shaikh, N. (2006). Asthma prevalence in Hispanic and Asian ethnic subgroups: Results from the California Healthy Kids Survey. *Pediatrics*, *118*, 363–370.

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, *19*, 109–134.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268.

Dornbusch, S. M., Ritter, P. L., Leiderman, H., Roberts, D. F., & Fraleigh, M. J. (1987). The relation of parenting style of adolescent school performance. *Child Development*, *58*, 1244–1257.

Dunn, J. S., Kinney, D. A., & Hofferth, S. L. (2003). Parental ideologies and children's after-school activities. *American Behavioral Scientist*, *46*, 1359–1386.

Eccles, J. S., & Midgley, C. (1989). Stage/environment fit: Developmentally appropriate classrooms for early adolescents. In R. E. Ames, & C. Ames (Eds.), *Research on motivation in education.* (Vol. 3, pp. 139–186). San Diego, CA: Academic Press.

Eccles, J. S., & Barber, B. L. (1999). Student council, volunteering, basketball, or marching band: What kinds of extracurricular involvement matters? *Journal of Adolescent Research*, *14*, 10–43.

Farb, A. F., & Matjasko, J. L. (2012). Recent advances in research on school-based extracurricular activities and adolescent development. *Developmental Review*, *32*, 1–48.

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research*, *59*, 117–142.

Finn, J. D. (1993). *School engagement and students at risk.* Washington, DC: National Center for Education Statistics.

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

Fredricks, J. A., & Eccles, J. S. (2005). Developmental benefits of extracurricular involvement: Do peer characteristics mediate the link between activities and youth outcomes? *Journal of Youth and Adolescence*, *34*, 507–520.

Fredricks, J. A., & Eccles, J. S. (2006). Is extracurricular participation associated with beneficial outcomes? Concurrent and longitudinal relations. *Developmental Psychology*, *42*, 698–713.

Fredricks, J. A., & Eccles, J. S. (2008). Participation in extracurricular activities in the middle school years: Are there developmental benefits for African American and European American youth? *Journal of Youth and Adolescence*, *37*, 1029–1043.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, *95*, 148–162.

Goodenow, C., & Grady, K. E. (1993). The relationship of school belonging and friends' values to academic motivation among urban adolescent students. *The Journal of Experimental Education*, *62*, 60–71.

Gray, E. K., & Watson, D. (2002). General and specific traits of personality and their relation to sleep and academic performance. *Journal of Personality*, *70*, 177–206.

Guest, A. M., & McRee, N. (2009). School-level analysis of adolescent extracurricular activity, delinquency, and depression: The importance of situational context. *Journal of Youth and Adolescence*, *38*, 51–62.

Hadi, A. S. (1992). Identifying multiple outliers in multivariate data. *Journal of the Royal Statistical Society, Series B (Methodological)*, *54*, 761–771.

Hadi, A. S. (1994). A modification of a method for the detection of outliers in multivariate samples. *Journal of the Royal Statistical Society, Series B (Methodological)*, *56*, 393–396.

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

Hanks, M. P., & Eckland, B. K. (1976). Athletics and social participation in the educational attainment process. *Sociology of Education*, *49*, 271–294.

Hanson, T. L., & Austin, G. (2003). *Student health risks, resilience, and academic performance in California: Year 2 report, longitudinal analyses.* Los Alamitos, CA: WestEd.

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

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.

Hennessey, B. A. (2000). Self-determination theory and the social psychology of creativity. *Psychological Inquiry*, *11*, 293–298.

Hofferth, S. L., & Sandberg, J. F. (2001). How American children spend their time. *Journal of Marriage and Family*, *63*, 295–308.

Irvin, M. J., Farmer, T. W., Leung, M., Thompson, J. H., & Hutchins, B. C. (2010). School, community, and church activities: Relationship to academic achievement of low-income African American early adolescents in the rural deep south. *Journal of Research in Rural Education*, *25*, 1–21.

Johnson, L. (2008). Relationship of instructional methods to student engagement in two public high schools. *American Secondary Education*, *36*, 69–87.

Johnson, M. K., Beebe, T., Mortimer, J. T., & Snyder, M. (1998). Volunteerism in adolescence: A process perspective. *Journal of Research on Adolescence*, *8*, 309–332.

Jordan, W., & Nettles, M. (2000). How students invest their time outside of school: Effects on school-related outcomes. *Sociological Psychological Education*, *3*, 217–243.

Kuncel, N. R., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research*, *75*, 63–82.

Larson, R. W. (2000). Toward a psychology of positive youth development. *American Psychologist*, *55*, 170–183.

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*, *87*, 184–196.

Lynch, M., & Cicchetti, D. (1997). Children's relationships with adults and peers: An examination of elementary and junior high school students. *Journal of School Psychology*, *35*, 81–99.

Mahoney, J. L. (2000). School extracurricular activity participation as a moderator in the development of antisocial patterns. *Child Development*, *71*, 502–516.

Mahoney, J. L., Larson, R. W., Eccles, J. S., & Lord, H. (2005). Organized activities as developmental contexts for children and adolescents. In J. L. Mahoney, R. W. Larson, & J. S. Eccles (Eds.), *Organized activities as contexts of development: Extracurricular activities, after-school and community programs* (pp. 3–22). Mahwah, N.J: Lawrence Erlbaum Associates.

Mahoney, J. L., Schweder, A. E., & Stattin, H. (2002). Structured after-school activities as a moderator of depressed mood for adolescents with detached relations to their parents. *Journal of Community Psychology*, *30*, 69–86.

Mahoney, J. L., & Stattin, H. (2000). Leisure activities and adolescent antisocial behavior: The role of structure and social context. *Journal of Adolescence*, *23*, 113–127.

Martin, A. J. (2009). Motivation and engagement across the academic life span: A developmental construct validity study of elementary school, high school, and university/college students. *Educational and Psychological Measurement*, *69*, 794–825.

Maxwell, S. E., & Delaney, H. D. (1993). Bivariate median splits and spurious statistical significance. *Psychological Bulletin*, *113*, 181–190.

Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology*, *85*, 582–590.

Miller, R. B., Behrens, J. T., & Greene, B. A. (1993). Goals and perceived ability: Impact on student valuing, self-regulation, and persistence. *Contemporary Educational Psychology*, *18*, 2–14.

Nelson-LeGall, S., & Jones, E. (1991). Classroom help-seeking behaviors of African-American children. *Education and Urban Society*, *24*, 27–40.

Noftle, E. E., & Robins, R. W. (2007). Personality predictors of academic outcomes: Big five correlates and GPA and SAT scores. *Journal of Personality and Social Psychology*, *93*, 116–130.

Otis, N., Grouzet, F. M. E., & Pelletier, L. G. (2005). Latent motivational change in an academic setting: A 3-year longitudinal study. *Journal of Educational Psychology*, *97*, 170–183.

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.

Patrick, H., & Ryan, A. M. (2005). Identifying adaptive classrooms: Dimensions of the classroom social environment. In K. A. Moore, & L. Lippman (Eds.), *What do children need to flourish?: Conceptualizing and measuring indicators of positive development*. New York, NY: Springer Science and Business Media.

Patrick, H., & Ryan, A. M. (submitted for publication). Teacher practices that communicate mastery goal structure: Students' views. Manuscript.

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.

Reddy, R., Rhodes, J. A., & Mulhall, P. (2003). The influence of teacher support on student adjustment in the middle school years: A latent growth curve study. *Development and Psychopathology*, *15*, 119–138.

Rhee, S., Furlong, M. J., Turner, J. A., & Harari, I. (2001). Integrating strength-based perspectives in psychoeducational evaluations. *The California School Psychologist*, *6*, 5–17.

Rhodes, J. E., Grossman, J. B., & Resch, N. R. (2000). Agents of change: Pathways through which mentoring relationships influence adolescents' academic adjustment. *Child Development*, *71*, 1662–1671.

Rose-Krasnor, L., Busseri, M. A., Willoughby, T., & Chalmers, H. (2006). Breadth and intensity of youth activity involvement contexts for positive development. *Journal of Youth and Adolescence*, *35*, 385–399.

Rumberger, R. W. (1987). High school dropouts: A review of issues and evidence. *Review of Educational Research*, *57*, 101–121.

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., Connell, J. P., & Deci, E. L. (1985). A motivational analysis of self-determination and self-regulation in education. In C. Ames, & R. E. Ames (Eds.), *Research on motivation in education: The classroom milieu* (pp. 13–51). New York: Academic.

Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal*, *38*, 437–460.

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.

Seidman, E., & French, S. E. (1997). Normative school transitions among urban adolescents: When, where, and how to intervene. In H. J. Wahlberg, & O. Reyes (Eds.), *Children and youth: Interdisciplinary perspectives* (pp. 166–189). Thousand Oaks: Ca: Sage Publications.

Shernoff, D. J., & Vandell, D. L. (2007). Engagement in after-school program activities: Quality of experience from the perspective of participants. *Journal of Youth and Adolescence*, *36*, 891–903.

Shin, R., Daly, B., & Vera, E. (2007). The relationships of peer norms, ethnic identity, and peer support to school engagement in urban youth. *Professional School Counseling*, *10*, 379–388.

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

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology*, *100*, 765–781.

Soenens, B., & Vansteenkiste, M. (2005). Antecedents and outcomes of self-determination in 3 life domains: The role of parents' and teachers' autonomy support. *Journal of Youth and Adolescence*, *34*, 589–604.

Stearns, E., & Glennie, E. J. (2010). Opportunities to participate: Extracurricular activities' distribution across and academic correlates in high schools. *Social Science Research*, *39*, 296–309.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. *Advances in Experimental Social Psychology*, *29*, 271–360.

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

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briére, N. M., Senécal, C., & Vallieres, E. F. (1993). On the assessment of intrinsic, extrinsic, and amotivation in education: Evidence on the concurrent and construct validity of the Academic Motivation Scale. *Educational and Psychological Measurement*, *53*, 159–172.

Vansteenkiste, M., Lens, W., & Deci, E. L. (2006). Intrinsic vs. extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist*, *41*, 19–31.

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

Weiner, B. (1990). The history of motivation research in education. *Journal of Educational Psychology*, *82*, 616–622.

Wentzel, K. R. (1997). Student motivation in middle school: The role of perceived pedagogical caring. *Journal of Educational Psychology*, *89*, 411–419.

Willms, J. D. (2003). *Student engagement at school: A sense of belonging and participation: Results from PISA 2000.* Paris: OECD, Organization for economic co-operation and development.

Winner, E., & Hetland, L. (2000). The arts in education: Evaluating the evidence for a causal link. *Journal of Aesthetic Education*, *34*, 3–10.

Wormington, S. V., Anderson, K. G., Tomlinson, K. L., & Brown, S. A. (under review). Illicit substance use in middle school: The interplay between gender, aggression victimization, and supportive social relationships. Manuscript under review.

Yazzie-Mintz, E. (2006). *Voices of student engagement: A report on the 2006 high school survey of student engagement.* Retrieved October 10, 2009, http://ceep.indiana.edu/hssse/pdf/HSSSE2006Report.pdf

Yonezawa, S., Jones, M., & Joselowsky, F. (2009). Youth engagement in high schools: Developing a multidimensional, critical approach to improving engagement for all students. *Journal of Educational Change*, *10*, 191–209.