

**A Person-Centered Investigation of Academic Motivation, Performance, and Engagement  
in a High School Setting<sup>1</sup>**

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### **Abstract**

This study used a person-centered approach to identify naturally occurring combinations of intrinsic and extrinsic academic motives and their correlates. 1061 high school students completed measures of academic motivation, performance, and school engagement. Cluster analysis revealed four motivational profiles characterized by high levels of both intrinsic and extrinsic motivations (*high quantity*), high intrinsic but low extrinsic motivation (*good quality*), low intrinsic but high extrinsic motivation (*poor quality*), and low levels of both intrinsic and extrinsic motivations (*low quantity*). Students in the high quantity and good quality profiles reported the strongest academic performance and extracurricular participation, implicating intrinsic motivation as the primary correlate of positive school outcomes in the high school environment. Students in the high quantity profile, however, reported the most emotional engagement with school. These findings suggest that extrinsic motivation may not be maladaptive at the high school level when coupled with high levels of intrinsic motivation.

## **A Person-Centered Investigation of Academic Motivation, Performance, and Engagement in a High School Setting**

High school is a low point in student engagement, 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) motivations decrease across the high school transition (Otis, Grouzet, & Pelletier, 2005) and are lower than those of both elementary and college students (Martin, 2009). High school students also report being disconnected from school and teachers (Willms, 2003). This decreased engagement in school is particularly alarming considering adolescents' newfound freedom; students who are not academically motivated may not pay attention, complete their school work, or even attend school (Yonezawa, Jones, & Joselowsky, 2009). It is vital, then, to investigate high school students' academic motives and how they map on to meaningful school outcomes.

Self-determination theory (SDT; Deci & Ryan, 1985) may be a useful framework for conceptualizing academic motivation. In SDT, motives exist along a spectrum ranging from behaviors originating within the self (autonomous, intrinsic) to those spurred by outside forces (controlled, extrinsic). Intrinsic motivation, one end of the motivational continuum, describes behaviors that are inherently interesting or enjoyable. Extrinsic motivation, by contrast, is an overarching term for behaviors governed to varying degrees by external forces; 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, i.e., guilt), and external regulation (behaviors initiated by external constraints, i.e., rewards or threats). These motives have important consequences in the academic realm. Intrinsic motivation and identified regulation are consistently associated with more positive outcomes than more

controlled motives, including a preference for challenging tasks (Pintrich & De Groot, 1990), enjoyment of material (Harter, 1981; Vallerand, 1997), creativity (Hennessey, 2000), attendance (Vallerand & Bissonnette, 1992), cognitive engagement (Miller, Behrens, & Green, 1993), conceptual learning (Benware & Deci, 1984; Ryan, Connell, & Deci, 1985), and academic performance (Boiché, Sarrazin, Grouzet, Pelletier, & Chanal, 2008; Burton, Lydon, D'Alessandro, & Koestner, 2006; Corpus, McClintic-Gilbert, & Hayenga, 2009; Lepper, Corpus, & Iyengar, 2005).

### **Focusing on the Individual: A Person-Centered Approach**

What happens, though, when students simultaneously possess both intrinsic and extrinsic motivation? How might such students fare relative to those who possess what SDT would consider to be the ideal combination of intrinsic *without* extrinsic motivation? Because few studies have used a person-centered approach to examine academic motives in concert with one another, it is unclear precisely how intrinsic and extrinsic 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 are particularly salient (Ratelle, Guay, Vallerand, Larose, & Senécal, 2007).

A small number of person-centered studies on intrinsic and extrinsic motivation have been conducted to date, but 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 6<sup>th</sup>-through 8<sup>th</sup>-grade students (Hayenga & Corpus, 2010) and 7<sup>th</sup>-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 constructs (*low quantity*). In these studies, students with good quality motivation fared better than their peers from other profiles, thus supporting SDT (Vansteenkiste, Lens, & Deci, 2006). 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 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) argued that the high school environment may be too controlling to effectively foster pure intrinsic motivation (cf. Otis et al., 2005). Vansteenkiste et al. (2009) proposed a more statistically driven explanation, suggesting that it is more difficult for clusters with opposing scores on the relevant dimensions (e.g., high intrinsic, low extrinsic) to emerge when the dimensions of interest are highly correlated with one another. Indeed, intrinsic and extrinsic motivations were moderately positively correlated in Ratelle et al.'s high school samples but not in their college sample or the samples from Vansteenkiste et al. (2009) and Hayenga and Corpus (2010).

We suggest two additional explanations for the discrepant findings. First, although both Ratelle et al. (2007) and Vansteenkiste et al. (2009) were situated within the SDT tradition, they used slightly different scales to measure motivation. In particular, the extrinsic items from the Academic Motivation Scale (Vallerand, Pelletier, Blais, Brière, Senécal, & Vallieres, 1993) used by Ratelle et al. represent arguably more internalized motivations than those from the Academic Self-Regulation Scale (Ryan & Connell, 1989) used by Vansteenkiste et al. This may account for

the stronger correlations among constructs in Ratelle et al.'s study and perhaps the different clusters that emerged. Second, Ratelle et al. studied a sample comprised exclusively of high school students; Vansteenkiste et al.'s high school sample included mostly 7<sup>th</sup>- and 8<sup>th</sup>-grade students (56%), who were overrepresented in the good quality profile. It is possible, then, that their good quality cluster was driven largely by middle school students and that students characterized by good quality motivation may be rare in high school settings. The present study addressed this ambiguity by focusing on a sample comprised exclusively of high school students.

Using SDT as the theoretical groundwork, we preliminarily expected to find four motivational profiles with varying combinations of intrinsic and extrinsic motivation similar to those found in existing person-centered studies. The presence or absence of a good quality profile was of particular interest, given its absence in Ratelle et al.'s high school sample.

### **Academic Performance and School Engagement**

Existing person-centered studies have focused on academic performance (i.e., GPA) 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, we measured the relationship between profile membership and performance. A profile characterized by good quality motivation, if found, was expected to possess the highest academic performance based on the tenets of SDT. Otherwise, we generally expected the best performance among students who exhibited the most intrinsic motivation (Burton, et al., 2006; Corpus et al., 2009; Lepper et al., 2005).

We also examined school engagement because it is a major factor affecting academic achievement that is more tractable than many other predictive factors (e.g., race, SES) and is particularly low in the United States (Finn, 1993; Lee & Shute, 2010; Martin, 2008; Yazzie-

Mintz, 2006). Early work on school engagement focused primarily on behavioral aspects such as attendance, participation, and help-seeking behavior (Finn, 1989, 1993; Nelson-LeGall & Jones, 1991; Rumberger, 1987; Willms, 2003). Recently, the definition has expanded to encompass cognitive (e.g., self-regulation) and emotional (e.g., teacher support) aspects of involvement (Appleton, Christenson, Kim, & Reschly, 2006; Fredricks, Blumenfeld, & Paris, 2004; Jimerson, Campos, & Greif, 2003). While many studies consider one aspect of engagement, they rarely consider two or all three types of engagement in concert with one another. Researchers have increasingly called for the treatment of engagement as a multidimensional construct, stressing the importance of considering how types of engagement interact (Fredricks, Blumenfeld, Friedel, & Paris, 2005). Accordingly, we considered several types of school engagement in the current study, including two forms of what is commonly referred to as emotional engagement (teacher support and school relatedness) and one form of behavioral, nonacademic engagement (participation in extracurricular activities).

**Emotional Engagement.** Even though it is hypothesized to be one of the strongest factors affecting achievement, emotional engagement is the least frequently studied form of engagement in motivation research (Martin & Dowson, 2009). Teacher support and school relatedness were considered in the present study to represent emotional engagement.

Understanding students' relationship to the school community is crucial to understanding school success, as "school motivation cannot be understood apart from the social fabric in which it is embedded" (Weiner, 1990, p. 621; see also Patrick & Ryan, 2005). Teachers are particularly strong influences during the tumultuous transition to high school, serving to enhance academic motivation and model positive adult values (Goodenow & Grady, 1993; Lynch & Cicchetti, 1997; Reddy, Rhodes, & Mulhall, 2003; Rhodes, Grossman, & Resch, 2000; Wentzel, 1997).

Feeling connected to the school community is also crucial for adolescents due to the increasingly strong influence of peers at this stage of life (Johnson, 2008; Shin, Daly, & Vera, 2007). As such, the extent to which students perceive teacher support and school relatedness is very likely to relate to their academic motivation and subsequent achievement (Ryan & Patrick, 2001). We focused on student perceptions of engagement—rather than objective indicators—because these and other school-related perceptions (e.g., academic identification) are key predictors of motivation and achievement (Roeser, Midgley, & Urdan, 1996; Ryan & Grolnick, 1986; Walker, Greene, & Mansell, 2006) and because emotional engagement is most often measured subjectively (Fredricks et al., 2003).

Emotional engagement was expected to be associated with high levels of intrinsic motivation because teacher and peer support encourage students' investment in school and influence students' perceptions of autonomy and competence (Connell & Wellborn, 1991; Patrick & Ryan, 2006; Vallerand and Bissonnette, 1992; Wentzel, 1997). Predictions were less clear regarding accompanying levels of extrinsic motivation. On the one hand, students with high extrinsic motivation may view school solely as a means of attaining future success, which would detract from emotional engagement. On the other hand, students with high extrinsic motivation may view interacting with teachers as a means of meeting their goals without having to necessarily engage with the academic material and accordingly might experience high levels of emotional engagement. It seemed most plausible, then, that students with either high quantity or good quality motivation would report the most emotional engagement.

**Extracurricular Activities.** A more exploratory goal of this study was to investigate the relationship between motivation and participation in extracurricular activities; this was done in an attempt to understand how students might engage with school outside of the academic realm.

Participating in school-sponsored activities is arguably one of the highest levels of behavioral engagement (Finn, 1989, 1993; Fredricks & Eccles, 2006) and may be a useful indicator of school engagement in certain highly engaged academic settings where classic measures of engagement are not useful.

While not explicitly linked to academic functioning, extracurricular participation might benefit students academically because it fosters skills (e.g., goal-setting, concentration, problem solving) that may transfer to the academic realm and help prepare students for adult life (Irvin, Farmer, Leung, Thompson, & Hutchins, 2010; Larson, 2010). In addition, involvement in extracurricular activities becomes increasingly important across the school years as the socializing effect of peer groups becomes stronger (Irvin et al., 2010). According to the participation-identification model, students who are involved in school-relevant activities, including extracurricular activities, are most likely to succeed in school (Finn, 1989).

One might expect a positive association between extracurricular participation and intrinsic motivation because students generally choose their own activities or clubs and can relate to other students with similar interests in those contexts; this fulfills two of the fundamental psychological needs that, according to SDT, foster intrinsic motivation—i.e., autonomy and relatedness (Deci & Ryan, 2000; Jordan & Nettles, 2000; Larson, 2000; Mahoney, Larson, Eccles, & Lord, 2005). Such activities may also provide some students an opportunity to foster competence that they might not otherwise experience at school, thus addressing the third fundamental need underlying intrinsic motivation. There are also more extrinsically motivated reasons to participate in extracurricular activities, such as strengthening college applications and accruing social prestige. It is possible, then, that high extrinsic motivation may also be associated with extracurricular participation. Accordingly, we expected that students in the high quantity

and good quality motivation groups would pursue extracurricular activities more than their peers characterized by other patterns of motivation. We also considered how different activities might be associated with motivational profiles in light of research suggesting that particular activities are associated with distinct academic outcomes (Broh, 2002; Camp, 1990; Fredricks & Eccles, 2005, 2006, 2008; Hanks & Eckland, 1976).

### **The Current Study**

The current study investigated how intrinsic and extrinsic motives may or may not complement one another among high school students. We identified naturally occurring motivational profiles using cluster analysis and examined each profile's level of academic performance and school engagement. 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 engage with school.

## **Method**

### **Participants and Procedure**

Participants were 1066 students (49% female; 83.9% white) enrolled in a Catholic high school in the Pacific Northwest. The school is known for its academic rigor, high attendance rate, and community service requirement. According to school statistics, 76% of the student body identifies as Catholic and 25% receive 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 that focused largely on alcohol and drug use; 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 from 90.9%

of the students. Fifteen participants were dropped from analyses due to inconsistent responding on questions unrelated to the present study, leaving the sample described above. One of three proctors provided standardized instructions to groups of 20 to 60 students seated in the school's computer laboratories during school hours. Students had 45 minutes to complete the survey, which included the measures described below along with questions unrelated to this study.

### **Measures**

**Academic Motivation.** A subset of questions from the reliable and valid Academic Motivation Scale (AMS; Vallerand et al., 1993) was used to measure academic motivation. 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). Three items each were used to measure intrinsic motivation ( $\alpha = .88$ ; e.g., "I go to school for the pleasure I experience when I discover new things never seen before"), introjected regulation ( $\alpha = .84$ ; e.g., "I go to school because of the fact that when I succeed in school I feel important"), and external regulation ( $\alpha = .87$ ; e.g., "I go to school in order to obtain a more prestigious job later on"). The full AMS used by Ratelle et al. (2007) included one additional item for each dimension of motivation, which we did not include due to school-imposed constraints limiting the number of questions we could ask.

**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; Nofhle & Robins, 2007). School personnel also indicated that students were keenly aware of their precise grade point averages.

**School Engagement.** School relatedness and teacher support were used to measure emotional engagement. 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 public California high schools and research (Davis, Kreutzer, Lipsett, King, & Shaikh, 2006; Rhee, Furlong, Turner, & Harari, 2001) and has been found to be reliable (Hanson & Austin, 2003). 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). 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).

**Extracurricular Activities.** Participation in extracurricular activities was also used to indicate 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 among 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).

### **Statistical Analysis Strategy**

Cluster analysis was used to generate motivational profiles based on students’ responses to the items assessing intrinsic, introjected, and extrinsic 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 (Vansteenkiste et al., 2009; Hayenga & Corpus, 2010).

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. The most favorable cluster solution is determined by considering percent of variance explained, a priori theorizing, and distinctiveness of groups. 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 are 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 stable and replicable (Breckenridge, 2000). In this procedure, the data set is split into two random halves and subjected to hierarchical and nonhierarchical clustering techniques. 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. A kappa greater than .60 is considered acceptable.

As a final step, we ensured that clusters were distinct in terms of input and outcome variables. A multivariate analysis of variance (MANOVA) and follow-up analysis of variance (ANOVA) tests determined if motivational profiles differed in motivation levels. Subsequent ANOVAs and chi-square analyses assessed whether profiles were associated with the outcome variables—academic performance and school engagement—in distinct ways.

## **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**

Correlations among all variables are presented in Table 1. Patterns of relationships were largely consistent with prior research. One exception was that correlations among the different types of motivation did not follow the simplex pattern described by SDT (Ryan & Connell, 1989). Introjected regulation correlated more strongly with intrinsic motivation than with external regulation. Additionally, intrinsic motivation and external regulation were significantly positively correlated. Other person-centered motivation studies have found similar correlations between intrinsic motivation and introjected regulation (Boiché et al., 2008; Ratelle et al., 2007).

### **Cluster Analysis**

Five multivariate outliers were excluded from analyses, leaving a final sample of 1061 students. Ward's linkage followed by k-means clustering identified a four-cluster solution as best fitting the data. The four-cluster solution explained a substantial percent of variance in intrinsic

(80.2%), introjected (70.7%), and extrinsic (76.4%) motivations, well above the 50% threshold used in related studies (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 with similarly high levels of motivation. A double-split cross-validation confirmed that the cluster solution was replicable and stable ( $\kappa = 0.92$ ).

*Z* scores for the resulting clusters are presented in Figure 1. There are a number of advantages to using *z* scores as opposed to raw scores for cluster analysis. *Z* scores are standardized values, and thus allow for direct comparison of the groups in terms of their levels of motivation. They also provide information on the distinctiveness of clusters; the extent to which scores deviate from the mean is analogous to effect size (Vansteenkiste et al., 2009). Finally, *z* scores allow for an easier comparison between the groups found in the present study with those found in other studies using *z* scores (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009).

Borrowing terminology from Vansteenkiste et al. (2009), motivational profiles were labeled in terms of either motivation quality (ratio of intrinsic to extrinsic motivation) or quantity (sum of intrinsic and extrinsic motivations). 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* ( $n = 116$ ; 11.16%) motivation relative to the sample. A MANOVA confirmed that the clusters differed in motivation levels,  $F(9, 2568) = 426.93, p < .0001$ . Univariate ANOVAs revealed differences between clusters in terms of intrinsic motivation,  $F(3, 1057) = 837.92, p < .0001, \eta_p^2 = .70$ ; introjected regulation,  $F(3, 1057) = 796.62, p < .0001, \eta_p^2 = .69$ ; and external regulation,  $F(3, 1057) = 260.44, p < .0001, \eta_p^2 = .43$ . The high quantity and poor quality profiles, however, possessed similar levels of external regulation.

Recall that Vansteenkiste and colleagues (2009) proposed that the absence of a good quality profile in Ratelle et al.'s (2007) sample was due to a moderately strong correlation between types of motivation. Results from the current study work against this hypothesis; even though intrinsic and extrinsic motives were more positively correlated in the current sample ( $r = .21$ ) than in that of Ratelle et al. ( $r = .19$ ), a good quality profile emerged. Fisher's  $r$ -to- $z$  transformation confirmed that types of motivation were more strongly positively correlated in the present study than in Ratelle et al.'s (2007) sample,  $p < .0001$ .

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

### **School-Related Outcomes**

**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 profile ( $M = 3.38, SD = .45$ ). Findings are displayed in Figure 2.

**Emotional Engagement.** Teacher support and school relatedness were standardized and averaged to form a single measure of emotional engagement in order to simplify results. The two constructs were fairly highly correlated ( $r = .40$ ) and displayed similar patterns. A one-way ANOVA indicated that motivational profiles differed significantly in emotional engagement,

$F(3, 1053) = 39.74, p < .0001, \eta_p^2 = .15$ . Students in the high quantity profile ( $Z = .29$ ) reported higher levels of emotional engagement than students in the good quality ( $Z = -.04$ ) and poor quality ( $Z = -.14$ ) profiles, who in turn indicated higher engagement than students in the low quantity profile ( $Z = -.72$ ).

**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 ( $M = 2.08, SD = 1.07$ ) motivation. The results of chi-square tests for participation in individual extracurricular activities are displayed in Table 2. 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 motivation were underrepresented in nearly all extracurricular activities, and those with poor quality motivation were underrepresented in music/voice and community/Christian service.

## Discussion

In the present study, a person-centered approach was used to examine combinations of intrinsic and extrinsic motives in a U.S. high school sample, which were then considered in relation to different school outcomes. In addition, several explanations for discrepant findings in past research were examined. The findings contribute to understanding how motivation manifests in high school students and suggest paths for future research.

### **Emerging Motivational Profiles**

A four-cluster solution was selected as best fitting the data, largely replicating Vansteenkiste et al.'s (2009) cluster solutions and resembling Ratelle et al.'s (2007) findings with the addition of a good quality profile. These results speak against Ratelle et al.'s claim that the high school environment is too controlling to foster high intrinsic motivation without correspondingly high extrinsic motivation. Interestingly, if data in the present study had been considered in terms of raw scores—as in Ratelle et al.'s study —three rather than four clusters might have been retained. Instead, we adopted the approach used by Vansteenkiste et al. (2009) and converted motivational ratings into standardized  $z$  scores; as a result, a relatively good quality group of students as compared to the other motivational profiles was clearly present (see Figure 1). It is uncertain whether Ratelle et al. would have retained three clusters if they had analyzed their data in this manner. Because  $z$  scores facilitated the detection of a good quality profile in the present study, and generally allow for direct comparison between studies, their use in interpreting results of cluster analysis may be more favorable than using raw scores.

Vansteenkiste et al. (2009) offered a more statistically driven explanation for the discrepancies between studies, claiming that stronger correlations between motivation types limit the possible combinations of said motivations. Results from the current study work against this hypothesis. Despite motives being more positively correlated in the present study than in Ratelle et al.'s sample, four clusters emerged in our sample. We proposed two additional hypotheses for why Vansteenkiste et al. and Ratelle et al. arrived at different cluster solutions: (1) the studies used different motivation scales and (2) Vansteenkiste et al.'s good quality profile may have been driven by middle school students. Even though we used the same motivation scale as Ratelle et al. with a sample of strictly high school students, we still identified a good quality

profile. Our findings suggest that it is possible to possess good quality motivation in high school, at least an academically rigorous Catholic high school in the United States.

### **Performance: The Compensatory Relationship Between Quality and Quantity**

Once a cluster solution was chosen, we examined how academic performance and school engagement were associated with each motivational profile. For performance, students with high quantity and good quality motivation were equally successful. 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 findings from previous variable-centered studies (e.g., Boiché et al., 2008; Lepper et al., 2005; Soenens & Vansteenkiste, 2005).

Simply noting a relationship between intrinsic motivation and good performance, however, would be an incomplete account of the findings. In reality, the results may implicate a compensatory relationship between the ratio of intrinsic to 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 extrinsic motivation (see Figure 1). The poor quality profile also consistently outperformed the low quantity profile—though the two had comparable ratios of intrinsic to extrinsic motivation—arguably because it possessed more motivation in total.

The hypothesis that a high ratio of intrinsic to extrinsic motivation can compensate for a relatively low total amount of motivation aligns with SDT's claims about the benefits of autonomous motivation (Deci & Ryan, 1985). The claim that a large total amount of motivation

can mitigate unfavorable ratios of intrinsic to extrinsic motivation, however, suggests that 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 nature of the high school environment makes extrinsic motivation more adaptive than it is in other educational settings.

### **School Engagement**

Students in the high quantity profile 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 profile. That profiles with high quantity and poor quality motivation both reported relatively high levels of emotional engagement implicates the significance of extrinsic motivation for perceived teacher support and school relatedness. Extrinsic motivation may imply a desire to please authority figures – those who are the gatekeepers to rewards in most high school settings. Teachers, in response, may reach out most to students who are receptive to such support. Students who also possess high levels of intrinsic motivation have the additional incentive of being genuinely interested in class material and thus appear to be the most emotionally engaged with the school community. Although students characterized by good quality motivation are similarly interested in learning, they may feel stifled by the controlling aspects of the high school environment that do not support their learning goals (e.g., tedious assignments; Otis et al., 2005). This could precipitate feeling unsupported by the school community and, consequently, result in less emotional engagement.

In summary, it appears that having high intrinsic or extrinsic motivation alone may be insufficient to foster the highest emotional engagement with teachers and the school community at the high school level. Instead, it may be only when students possess high amounts of *both* types of motivation that they will feel most supported by teachers and most affiliated with school. This is a conclusion that would not have been drawn without the use of a person-centered approach.

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 with low quantity motivation were underrepresented in each type of activity, suggesting that 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.

Students in the good quality profile participated the most in creative activities like theater/dance and music/voice. Although little research has examined the effects of participating in artistic programs (Shernoff & Vandell, 2007), Amabile's (1996) body of work suggests that creativity flourishes in the presence of intrinsic motivation and the absence of extrinsic motivation – precisely the combination found in our good quality profile. Other studies have also found an association between intrinsic motivation and the creative arts (Shernoff & Vandell, 2007; Winner & Hetland, 2000). Somewhat surprisingly, 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 emotional engagement with school; this may have encouraged volunteering given that the school values community service and even mandates such service at some point during each student's high school career.

Of course, any speculations as to why these patterns emerged must be tentative, as our measure of extracurricular participation was a simple frequency count and did not capture the depth of students' engagement in the activities. 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 & Stattin, 2000; Mahoney, Schweder, & Stattin, 2002), studies should strive to include more sensitive measures of involvement that could better assess depth of engagement in relation to these hypotheses (Rose-Krasnor, Busseri, Willoughby, & Chalmers, 2006). Future research should also consider how eligibility requirements for extracurricular participation (e.g., minimum GPA) might influence students' extrinsic motivation. This was unlikely a driving force in the present study as this school requires only passing grades to participate in clubs and sports – a goal that students at a high achieving institution would presumably already possess.

### **Limitations and Future Directions**

This study had a number of limitations that merit discussion. Because the data were correlational in nature, no conclusions can be drawn about causality. In all likelihood, the relationships are bidirectional. Concerning academic performance, variable-centered research indicates that intrinsic motivation and grades predict one another over time, but that the relationship between extrinsic motivation and grades appears unidirectional such that poor performance predicts rises in extrinsic motivation but not vice versa (Corpus et al., 2009). In terms of engagement, forms of school engagement have been studied as both precursors to (e.g.,

Goodenow & Grady, 1993; Grouzet, Vallerand, Thill, & Provencher, 2004; Murdock & Miller, 2003; Wentzel, Battle, Russell, & Looney, 2010) and consequences of (e.g., Fredricks et al., 2004) academic motivation. Additionally, any number of third variables—such as demographic factors, personality traits, or parenting style in the home—might have influenced both motivation and outcome variables. Future person-centered studies should employ cross-lagged longitudinal designs to address the directionality of these relationships.

Another vital limitation is the use of self-reported measures. The sensitive nature of this survey, which concerned substance use, precluded obtaining objective measures of performance. Although participants were guaranteed anonymity, they 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. Similarly, as mentioned previously, our measure of extracurricular participation was superficial in that it only captured categories of activities that students participated in, rather than the number of activities or level of involvement.

Finally, our findings with an academically-rigorous 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.

Despite these weaknesses, 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 extrinsic motivation can be helpful. 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.

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Footnotes

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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 Mot.				---	.40**	.21**	.30**	.26**	.09*	.06	-.04	.05	.03	.03	.10**
5. Extrinsic Mot.					---	.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	0.75	0.51	0.17	0.25	0.11	0.54
Standard Deviation		1.12	1.43	1.43	1.16	0.34	0.78	0.80	1.10						

*Note:* Means for extracurricular activities indicate proportion of students who participated. Mean for total extracurriculars is the average of times of activities students participate in. For Sex: 0=Girls, 1=Boys. Mot.=Motivation; GPA=Grade Point Average.

\*  $p < .01$ , \*\*  $p < .0001$ .

Table 2

*Participation in Extracurricular Activities for Motivational Groups*

Extracurricular Activity	High Quantity ( <i>n</i> = 445)	Good Quality ( <i>n</i> = 203)	Poor Quality ( <i>n</i> = 275)	Low Quantity ( <i>n</i> = 116)	Sig. ( $\chi^2$ )
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. \*  $p < .01$ . \*\*  $p < .001$ . \*\*\*  $p < .0001$ .

Figure Captions

*Figure 1.* Z scores for motivational profiles.

*Figure 2.* Academic performance for motivational profiles. Error bars represent standard error.



