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Social support, academic adversity and academic buoyancy: a person-centred analysis and implications for academic outcomes

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ABSTRACT

The present study employed person-centred analyses that enabled identification of groups of students separated on the basis of their perceptions of social support (home and community), academic support, academic adversity and academic buoyancy. Among a sample of 249 young people, including many from high-needs communities, cluster analysis revealed three distinct groups of students: the thriver, supported struggler and at-risk struggler. We compared the three groups on their academic motivation. Analyses revealed significant differences between groups in adaptive motivation outcomes, but no differences in impeding or maladaptive motivation outcomes. Combined, the results speak to the importance of support and academic buoyancy for positive student outcomes.

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Research has shown that students who thrive at school often have access to strong support networks (e.g. Martin & Dowson, 2009; Wentzel, 2009), experience low amounts of academic adversity (e.g. Martin, 2013, 2014; McLeod, Uemura, & Rohrman, 2012; Wang & Peck, 2013) and remain academically buoyant in the face of typical setbacks and challenges that occur as part of their education (e.g. Martin, Colmar, Davey, & Marsh, 2010; Martin, Ginns, Brackett, Malmberg, & Hall, 2013; Putwain, Connors, Symes, & Douglas-Osborn, 2012; Putwain, Daly, Chamberlain, & Saddredini, 2015). Not all students, however, experience optimal levels of these constructs (e.g. Martin & Marsh, 2006; Putwain & Daly, 2013) – students may have weak or strong support networks, experience varying amounts of academic adversity and may or may not have the capacity to effectively deal with academic challenges. Thus, in the current study we explore the extent to which students' experiences of support (at home, school, and in the community), academic adversity and academic buoyancy (students' ability to successfully navigate 'everyday' academic setbacks and challenges such as a poor grade; Martin & Marsh, 2008) can be combined to identify various student profiles that meaningfully reflect distinct groups of students in high-needs populations. We also seek to examine the extent to which the profiles translate into differences in academic motivation. This type of research is important given that the identification of profiles may help teachers to better recognise groups of students within the classroom thereby enabling differentiated approaches in their teaching.

Resilience among adolescents: the roles of support, adversity and buoyancy

Resilience refers to positive adaptation in the face of challenge (Masten, Cutuli, Herbers, & Reed, 2009) and encompasses both the qualities of the individual and the individual's environment (Ungar & Liebenberg, 2011). Resilience may be characterised in terms of resilience in the face of personal challenges (e.g. mental health, toxic home life, disability) referred to as 'personal resilience' and in terms of resilience in the face of complex and sometimes difficult-to-access systems and structures (e.g. support services, bureaucracies) referred to as 'system resilience' (Ungar, Liebenberg, Dudding, Armstrong, & Vijver, 2013). This article recognises the centrality of personal and contextual/system-related factors in promoting resilience and positive youth development (Larson, 2000; Lerner, 2005) and as such seeks to draw together research traditions that emphasise the individual (e.g. psychological research) and those that emphasise the contextual (e.g. sociological research). Accordingly, the present research aims to harness the strengths of both of those approaches in a bid to more holistically understand the individual in his/her context as well as the role of the context in impacting the individual (Bronfenbrenner, 1979).

The study draws on positive youth development perspectives on resilience that argue against deficit approaches to young people's development (Lerner, 2005). Deficit approaches position positive development as simply an absence of negative constructs (e.g. disengagement; Lerner, 2005). In contrast, the current article positions positive development in terms of the many positive factors and processes relevant to youth development (e.g. self-efficacy, valuing of school, mastery). It is worth noting that the constructs in this study reflect 'mainstream' educational values. Importantly, the constructs examined here are not promoted as the 'correct' or 'only' educational values possible, but given their links with enhanced educational opportunity (e.g. Liem & Martin, 2012) they are included in this research as key student outcomes. Notwithstanding this, we recognise the potential disconnect between educational values held by some students in high-needs communities (such as in our study) and values promoted by the educational system more broadly (Armstrong & Cairnduff, 2012).

An important aspect of resilience is the role of promotive factors that predict positive adaptation (Masten et al., 2009) and facilitate recovery from the influence of risk factors (Wright, Masten, & Narayan, 2013). Two central variables that influence resilience in different ways are adolescents' experiences of support and adversity (Fergus & Zimmerman, 2005; Rutter, 2013; Wright et al., 2013). Whereas support acts as a promotive factor, adversity acts as a risk factor (Wright et al., 2013). Alongside these, academic buoyancy is another factor suggested in the resilience constellation (Martin & Marsh, 2009). As we now describe, these three factors play important roles in students' academic outcomes and constitute a set of factors on which meaningfully distinct student profiles may emerge and which may have relevance for student-targeted educational intervention.

Social support

We define social support as the social resources that individuals perceive are available to them in informal helping relationships (Cohen, Gottlieb, & Underwood, 2000). In our study, two types of social support were examined: home and community support (Ungar, 2008). Home support refers to students' perceptions of the support offered by their parents or caregivers. Community support refers to the young person's perceptions of support offered by the community. Social support makes an important contribution to positive adolescent development including academic motivation (e.g. Collie, Martin, Papworth, & Ginns, 2016; Martin, Marsh, McInerney, & Green, 2009; Oberle, Schonert-Reichl, & Zumbo, 2011).

Academic support

Academic support refers to students' use of additional support services offered by schools such as those provided by a career guidance counsellor, social worker, school psychologist or an individualised education plan. Thus, academic support is different from home and community support in that it refers to support services that usually come into play when students are already experiencing academic challenges (e.g. Murray et al., 2014).

Academic adversity

Academic adversity refers to experiences of chronic and/or acute academic setback or challenge (Martin, 2013). These include major adversities such as failing a subject, repeating a grade, suspension or expulsion from school, and having a learning disability. Research has shown that academic adversity (e.g. depression, ADHD, substance use, intellectual disability) is negatively associated with academic engagement (Martin, 2012, 2014; Wang & Peck, 2013) and academic achievement (McLeod et al., 2012; Wang & Peck, 2013).

Academic buoyancy

Whereas support and academic adversity are well-established factors on the risk and resilience landscape, academic buoyancy is a relatively new entrant to this research area. As noted above, buoyancy refers to the ability to successfully navigate 'everyday' academic setbacks and challenges (Martin & Marsh, 2008). Although there are some similarities between buoyancy and the motivational construct of self-efficacy, it is important to note that they are different. More precisely, buoyancy refers to an appraisal of reactions to prior adverse experiences, whereas self-efficacy refers to a sense of agency with respect to future experiences (Collie, Martin, Malmberg, Hall, & Ginns, 2015). In the current study, we were interested in examining the role played by academic buoyancy in different profiles of students. Research has demonstrated that academic buoyancy is positively associated with social support (Putwain et al., 2012, 2015) and with important academic outcomes including greater persistence (e.g. Martin et al., 2010), self-efficacy (e.g. Martin & Marsh, 2008; Martin et al., 2010), perceived control (e.g. Collie, Martin, Malmberg et al., 2015; Martin et al., 2013) and lower anxiety (e.g. Martin, 2013; Martin et al., 2010, 2013; Putwain et al., 2012). In order to further develop knowledge of academic buoyancy and its role in healthy development among adolescents, there is a need for research that considers it alongside both risk and protective factors more well established in the resilience literature.

Summary of promotive and risk factors

Taken together, research has highlighted the salience of social and academic support, academic adversity and academic buoyancy for resilience among adolescents (e.g. Martin & Marsh, 2009; Wright et al., 2013). However, the literature has yet to consider these variables together and how they may combine among different groups of students. We suggest this is important given that it would enable examination of promotive and risk factors in several salient spheres of students' lives – home, school and the community. Moreover, given that these variables have been highlighted as central factors in resilience, examining them together is important for developing knowledge about how they combine to influence resilience and academic outcomes.

Student profiles, academic outcomes and person-centred analysis

The literature is replete with examples of the importance of motivation for student development and functioning (e.g. Liem & Martin, 2012; Litalien, Lüdtke, Parker, & Trautwein, 2013; Van Ryzin, Gravely, & Roseth, 2009; Walsh, Harel-Fisch, & Fogel-Grinvald, 2010). Of relevance to the current study, research has also demonstrated that support, adversity and buoyancy are significantly associated with academic motivation (e.g. Martin, 2013, 2014; Martin et al., 2010). What remains unknown, however, is the extent to which and in what ways different combinations of social and academic support, adversity and buoyancy are associated with motivation. Person-centred research provides one approach to examine this and is relevant from an intervention perspective as it helps educators and researchers to identify the students who require support and the areas in which this support is needed. A strength of person-centred research is that it allows for more weight to be placed on the experiences of individual students (rather than focusing on the 'average' student). This is particularly relevant for students whose experiences may be different from the general population.

The importance of a high-needs sample

Our study involved students from high-needs communities that have a higher proportion of at-risk students than the general population. This included schools comprising youth accessing a relatively large number of mandated services (e.g. social worker, on probation, school psychologist, therapist) and from community centres that are targeted to at-risk youth. Previous research has demonstrated that at-risk students can experience lower levels of academic motivation and engagement, less positive interpersonal relationships with peers and teachers (e.g. Martin, 2014) and lower educational attainment and achievement (e.g. McLeod et al., 2012). Returning to the constructs under examination in our study, it is evident that the very factors under focus are likely to be of pertinence to the young people targeted for sampling. In addition, academic buoyancy may be particularly relevant to students in high-needs samples (e.g. Martin, 2012) given that the accumulation of small setbacks (that are relevant to buoyancy) may make more major or chronic challenges typically facing these students even more difficult to manage.

The influence of demographic characteristics

In order to best understand the associations between the clusters and the motivation outcome variables, it is important to consider the influence of demographic factors. In the current study, we considered three characteristics: gender, age and language background. These constructs have been linked with processes relevant to this study. For example, females tend to report greater social support, lower academic support and adversity, and lower buoyancy (e.g. Martin, 2014; Martin et al., 2013; Murray et al., 2014). Younger students tend to report greater social support and buoyancy (e.g. Martin et al., 2013), whereas evidence suggests no difference in adversity between younger and older students (e.g. Martin, 2014). Finally, language background has mixed associations – research has shown that a non-English speaking background can have a negative (e.g. Liem & Martin, 2012) or null association (e.g. Collie, Martin, Papworth et al., 2016; Martin et al., 2013) with social support, adversity and buoyancy. Thus, assessing the influence of these demographic characteristics is important for further developing knowledge of how they are relevant to students' perceptions of support, adversity and buoyancy, and their motivational outcomes.

The present study and its key elements

The first aim of the present study was to identify profiles based on students' experiences of social and academic support, academic adversity, and academic buoyancy. The second aim was to examine the extent to which membership in the different profiles is associated with differences in academic motivation. We conducted two phases of data analysis starting with cluster analysis, where groups of students were formed based upon their responses to the support, adversity and buoyancy constructs (Phase 1). After identifying the different clusters, we examined the extent to which the clusters differed in relation to motivation outcomes (Phase 2). We examined several motivational constructs that have been linked with adaptive outcomes such as student achievement and positive adjustment (e.g. Liem & Martin, 2012; Van Ryzin et al., 2009): self-efficacy, valuing of school, mastery orientation, persistence, planning and task management. We also examined several motivational constructs that have been linked with impeding or maladaptive academic and non-academic outcomes (e.g. Liem & Martin, 2012): anxiety, failure avoidance, uncertain control, self-handicapping and disengagement.

As this combination of clustering variables has not been considered previously and there is also the presence of a relatively new construct (academic buoyancy), we only made tentative hypotheses about how the cluster variables may combine. Given the operationalisation of academic support as services that are generally required when students may be already experiencing academic challenges, we anticipated that academic support would combine with academic adversity at similar levels – such that individual need is matched by academic support. We also hypothesised that levels of home and

community support would match levels of buoyancy given that students who have adequate social support are likely to have access to more resources to help navigate academic setbacks (Martin & Marsh, 2008). Finally, we anticipated that high levels of adversity would correspond with low levels of buoyancy given that major academic adversities may make it harder for students to successfully navigate the minor academic adversities relevant to buoyancy (Martin, 2012). Notwithstanding these hypothesised combinations, the precise number, nature and effect of different clusters are left as open empirical questions. Four research questions guided this study:

- (1) Can profiles be identified based on students' experiences of support, adversity and buoyancy?
- (2) In what ways do the identified profiles differ from one another in terms of support, adversity and buoyancy?
- (3) Are the profiles associated with differences in students' motivation?
- (4) Do associations between profiles and the outcomes vary as a function of particular background characteristics (age, gender, language background)?

Methods

Sample and procedures

Our sample comprised 249 young people aged between 16 and 20 years ($M = 16.5$ years, $SD = 0.84$ years). We drew participants from three schools (one single-sex Catholic girls' school and two single-sex boys' schools) and two community/youth service providers. These sites were in high-needs geographic areas of Sydney, Australia. The schools were identified as having a large number of students who were mandated users of community (e.g. social worker), correctional (e.g. probation), educational (e.g. school counsellor), and mental and other health (e.g. therapist) services by the central education office. The community/youth centres were selected from inner city areas with programming targeted to at-risk youth.

Over half of the participants were male (57%) and 39% were from a non-English speaking background (i.e. they spoke English as an additional language). About half (51%) of the sample were service users – they accessed at least one of the following services in the past 6 months: youth/family and community services (e.g. social worker, youth programmes), correctional services (e.g. community service, on probation), educational support services (e.g. school-based occupational therapist, career guidance counsellor), and/or mental and other health services (e.g. counsellor, drug or alcohol programme). The high-needs nature of the sample becomes further apparent when looking at students' reports of the outcome variables. More precisely, participants reported significantly lower adaptive motivation (e.g. self-efficacy, persistence; t -test range (229–237) = -2.23 to -9.74 , all $p < .03$) and higher impeding or maladaptive motivation (e.g. disengagement, anxiety; t -test range (228–235) = 9.50 – 19.84 , all $p < .001$) than levels reported in a large, representative sample of students from schools with average to slightly above average achievement and socio-economic status (Martin, 2007). Thus, these comparisons provide further evidence of the high-needs nature of our sample.

For data collection in schools, teachers administrated the questionnaire to students during regular class time. Teachers were asked to provide literacy assistance to any students who required it. For data collection at youth/community centres, participants completed the questionnaire in small groups or one-on-one with a research assistant. The research assistant provided help as needed. Drawn from a larger project, the data in the current study are also shared with another study by Martin, Bottrell, et al. (2015) that investigates the role of service use in predicting resilience and educational connectedness.

Measures

All measures were included in one questionnaire. Demographic items were presented first, followed by the substantive variables: home and community support, academic support, academic adversity,

Table 1. Descriptive statistics and reliability.

	α	Scale	M	SD	Skewness		Kurtosis	
					Statistic	Std. error	Statistic	Std. error
Cluster variables								
Home support	.91	1–5	4.03	0.98	–1.06	.16	0.31	.31
Community support	.87	1–5	3.86	0.73	–0.54	.16	–0.24	.31
Academic support	.63	0–3	0.55	0.55	1.24	.16	1.57	.31
Academic adversity	.71	0–10	1.31	1.78	1.81	.15	3.69	.31
Academic buoyancy	.79	1–7	4.47	1.29	–0.19	.16	–0.13	.31
Outcomes								
Adaptive motivation								
Self-efficacy	–	1–7	5.50	1.43	–0.77	.16	0.31	.31
Valuing of school	–	1–7	5.19	1.51	–0.67	.16	0.17	.31
Mastery orientation	–	1–7	4.84	1.58	–0.39	.16	–0.48	.32
Persistence	–	1–7	4.87	1.56	–0.42	.16	–0.45	.32
Planning	–	1–7	4.24	1.69	–0.15	.16	–0.76	.32
Task management	–	1–7	4.17	1.50	–0.21	.16	–0.36	.32
Impeding motivation								
Anxiety	–	1–7	5.10	1.66	–0.64	.16	–0.23	.32
Failure avoidance	–	1–7	4.56	1.81	–0.27	.16	–0.94	.32
Uncertain control	–	1–7	3.38	1.78	0.31	.16	–0.75	.31
Maladaptive motivation								
Self-handicapping	–	1–7	4.77	1.55	–0.37	.16	–0.37	.32
Disengagement	–	1–7	4.28	1.82	–0.16	.16	–0.93	.32

Note: Descriptive statistics were calculated on unstandardised variables. There are no alpha values for the outcome variables as these were single-item indicators.

buoyancy and motivation. Table 1 shows the reliability and descriptive statistics for the different constructs.

Support

Home, community and academic support variables were assessed using items from the Child and Youth Resilience Measure (Liebenberg, Ungar, & Vijver, 2012; Ungar & Liebenberg, 2011). Home support was assessed with seven items relating to parental relations and interactions (e.g. 'My parent(s) or carer(s) watch out for me'). Items for home support were scored on a 1 (*Does not describe me at all*) to 5 (*Describes me a lot*) scale. Community support was assessed with 10 items relating to support, resources and identification with the community (e.g. 'I have people to look up to'). Community support was scored on the same scale as home support. Academic support was assessed with seven items relating to services that students may use or be required to use at school (e.g. 'career guidance counsellor'; 'school-based social worker, therapist, or psychologist'; 'speech pathologist'). Two additional academic support items were also added to capture the experiences of our sample: 'individual or personalised educational programme' and 'alternative education centre'. Items for academic support were scored on a scale ranging from 0 (*Never needed it*) to 3 (*Three time or more*). Prior research has also provided evidence of the sound factor structure (items loaded as expected onto each of the three factors of support), content-related validity involving adolescent samples, reliability and cross-cultural validity of the scale (e.g. Canada, China, India, Russia; Liebenberg et al., 2012; Ungar & Liebenberg, 2011). In the current study, Cronbach's alphas ranged from .63 to .91 for these scales (see Table 1).

Academic adversity

We used the 10 risk items from the Academic Risk and Resilience Scale (Martin, 2013) to assess academic adversity. Participants responded 'no' (coded 0) or 'yes' (coded 1) to a list of major adversity items in the academic domain (e.g. 'failed a subject in your end-of-year report card'; 'expelled from school'). These were summed to create a score out of 10. Prior research has also demonstrated evidence of construct

validity (i.e. confirmatory factor analysis examining academic adversity alongside academic resilience yielded two distinct factors and good fit), approximate normal distributions among a sample of adolescents and reliability for the scale scores (e.g. Martin, 2013). In the current study, Cronbach's alpha was .71.

Academic buoyancy

We used the four-item Academic Buoyancy Scale (Martin & Marsh, 2008) to measure academic buoyancy (e.g. 'I think I'm good at dealing with schoolwork pressures'). Participants rated items from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Evidence of sound factor structure among adolescents, construct validity (buoyancy items loaded as expected on their own factor when examined alongside cognate constructs such as academic resilience), measurement invariance across participant subgroups and reliability for this scale has been demonstrated in prior research (Martin & Marsh, 2008; Martin et al., 2010; Putwain et al., 2012). Our study yielded Cronbach's alpha of .79 for the academic buoyancy scale.

Academic motivation

We used the Motivation and Engagement Scale – Short Version (Martin, 2010) to measure 11 factors of adaptive, impeding or maladaptive motivation. Each factor was assessed by a single item. The adaptive motivation factors are associated with positive processes and outcomes: self-efficacy ('I believe I can do a good job in my schoolwork/studies'), valuing of school ('I believe that what I learn in my schoolwork/studies is important and useful'), mastery orientation ('In my schoolwork/studies, I am focused on learning and improving more than competing and being the best'), persistence ('I persist at my schoolwork/studies even when it is challenging or difficult'), planning ('In my schoolwork/studies I plan how I will do my assignments and study') and task management ('In my schoolwork/studies I use my time well and try to study under conditions that bring out my best'). The impeding motivation factors are associated with impeded or inhibited processes and outcomes: anxiety ('In my school/work studies, I get quite anxious about assignments and tests'), failure avoidance ('I mainly do my schoolwork/studies to avoid failure or disapproval from parents or the teacher/s') and uncertain control ('I don't think I have much control over how well I do in my schoolwork/studies'). Finally, the maladaptive motivation factors are associated with negative processes and outcomes: self-handicapping ('In my schoolwork/studies I sometimes reduce my chances of doing well [e.g. waste time, not study, disrupt others, procrastinate]') and disengagement ('I often feel like giving up in my schoolwork/studies'). Participants rated items from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). This scale has demonstrated sound psychometric properties among high school students in previous research including appropriate factor structure of the 11 factors, measurement invariance across different participant subgroups, reliability, and meaningful correlations among the factors (e.g. adaptive factors negatively associated with maladaptive factors) and with other related constructs such as academic engagement (e.g. Martin, 2007; Martin, Yu, Papworth, Ginns, & Collie, 2015).

Demographic variables

Data were also collected on demographic variables (covariates). These included gender, age and language background. Gender was coded as 0 for females and 1 for males. Given that Analysis of Variance (ANOVA) was used for analyses, age was coded as 0 for participants aged 16 years (the bulk of the sample were of this age) and 1 for participants older than 16. In addition, language background was coded as 0 for English and 1 for non-English speaking background.

Statistical analyses

Phase 1 – cluster analysis

The first phase of analysis involved identification of the profiles based on students' reports of support, adversity and buoyancy. We standardised the variables so that they all used a five-point scale (0–4; using a formula that mathematically converts the scores and standard deviations to accurately represent the new scores) and then converted them into z-scores ($M = 0$, $SD = 1$). Given that we did not have a hypothesised number of clusters, we conducted two types of cluster analysis (Clatworthy, Buick,

Table 2. Cluster analysis solution, significant mean differences, and hypothesised cluster names.

Cluster	<i>n</i>	Final cluster means					Hypothesised cluster name
		Home support	Community support	Academic support	Academic adversity	Academic buoyancy	
1	160	0.51 ^a	0.45 ^a	−0.43 ^c	−0.42 ^c	0.34 ^a	Thriver
2	26	0.07 ^b	0.05 ^b	1.33 ^a	1.56 ^a	0.04 ^a	Supported struggler
3	63	−1.31 ^c	−1.17 ^c	0.51 ^b	0.43 ^b	−1.03 ^b	At-risk struggler

Note: The superscript values after each mean indicate significant differences between clusters on that variable (in each column). ^a Represents the highest scores on that variable (i.e. significantly higher than ^b and ^c).

Hankins, Weinman, & Horne, 2005). First, we utilised hierarchical cluster analysis to gain an idea of how many clusters might be helpful for describing the data-set (Clatworthy et al., 2005). This is an exploratory procedure that requires no specification of the number of clusters to be retained. We used the agglomeration coefficient to identify the variance explained by each potential cluster (Hair, Anderson, Tatham, & Black, 1995). With the information gained from hierarchical clustering, we followed this with *k*-means cluster analysis to optimise the results (Clatworthy et al., 2005). This method uses algorithms to create a specific number of clusters that are as distinct from one another as possible (Burns & Burns, 2008).

To further understand how the clusters differed from one another, we used Analysis of Variance (ANOVA) with Student-Newman-Keuls (SNK) post hoc tests (and a Bonferroni correction of $p < .01$ [derived from $p = .05$ divided by 5 cluster variables]) to compare the means of the cluster variables. We also report omega-squared effect size (ω^2).

Phase 2 – differences in motivation

In the second phase of analysis, we compared the clusters on the motivation outcome variables using ANOVA and SNK post hoc tests with a Bonferroni correction of $p < .005$ (derived from $p = .05$ divided by 11 motivation outcomes). We also examined the extent to which associations between clusters and the outcomes were moderated by respondent characteristics of gender, age and language background. Once again, ANOVA and SNK post hoc tests were used. Given that the interaction effects were of interest at a subsidiary level compared with the main analyses, a Bonferroni correction was not applied. For both analyses in Phase 2, omega-squared effect size (ω^2) is reported.

Results

Descriptive statistics and reliability

Prior to conducting the main analyses, we examined the reliability and descriptive statistics of the constructs. Table 1 shows the reliability, mean, standard deviation, skewness and kurtosis for the (unstandardised) variables. The alphas for the cluster variables ranged from .63 to .91 ($M = .78$). The lowest alpha occurred for academic support and is not unexpected given that students utilise different services depending on their unique needs, and it represents actual experiences of adversity rather than a latent construct. Although relatively high for some constructs, the skewness and kurtosis values fall within acceptable bounds for conducting multivariate analysis (Kline, 2011). Combined, these statistics provide support for continuing with the cluster analysis.

Phase 1 – cluster analysis

We began with hierarchical cluster analysis to identify profiles based on students' perceptions of support, adversity and buoyancy. By calculating the percentage change in the agglomeration coefficient for two to ten clusters, this revealed that moving from one to two clusters explained 32% of the variance

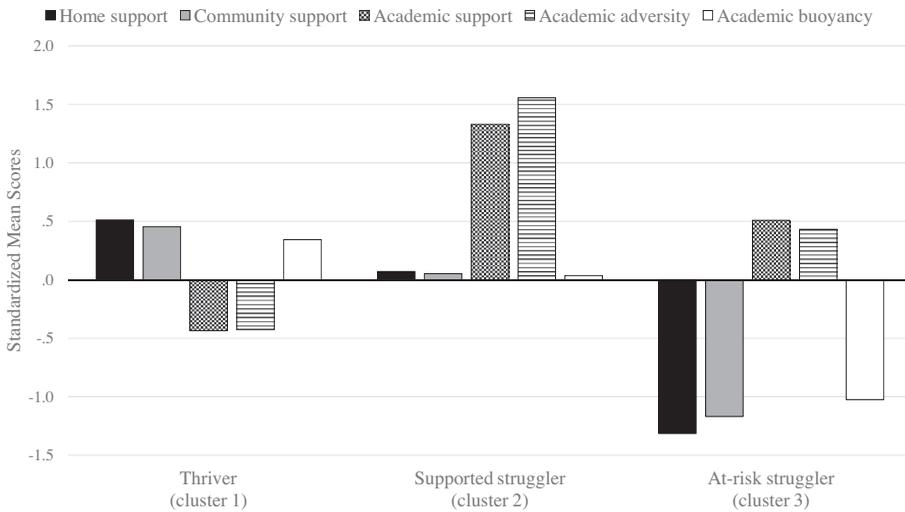


Figure 1. Standardised home, community, and academic support, academic adversity, and academic buoyancy mean scores for the three clusters. Clusters are significantly different on all variables except for the thriver and the supported struggler on academic buoyancy.

in cluster grouping. Moving to three, four and five clusters explained an additional 11, 12 and 12% of the variance, respectively. After this, less than 10% of additional variance was explained by each extra cluster. Thus, this information suggested that we should consider solutions with up to five groups.

We conducted *k*-means clustering with 2 through 5 clusters to identify the number of clusters that provided the most parsimonious solution. We began by interpreting the 5-cluster solution, which was not parsimonious as three groups appeared to be similar. In addition, some cluster sizes were very small (e.g. 2% of sample). A similar issue was evident with 4 clusters – two groups appeared similar and one group represented only 4% of the sample. In contrast, the 3-cluster solution appeared to indicate three different groups with a minimum cluster size of 10% of the sample. For completeness, we also ran a 2-cluster solution. In this solution, one of the groups evident in the 3-cluster solution was no longer represented despite being quite different. Thus, some nuance was lost with the 2-cluster solution. The 3-cluster solution was selected as the most parsimonious and representative solution.

Table 2 shows the cluster sizes, final cluster means and hypothesised grouping for the final 3-cluster solution. Cluster 1 represented 64% of the sample ($n = 160$) with cluster centres that were above average on home support ($M = 0.51$), community support ($M = 0.45$), and academic buoyancy ($M = 0.34$), and low on academic support ($M = -0.43$) and academic adversity ($M = -0.42$). This pattern reflects students who are supported, buoyant, and thriving at school. This group is named the ‘thriver’ because they are faring well in all respects. Cluster 2 represented 10% of the sample ($n = 26$) with cluster centres that were average on home support ($M = 0.07$), community support ($M = 0.05$) and academic buoyancy ($M = 0.04$), and above average on academic support ($M = 1.33$) and academic adversity ($M = 1.56$). We have called this group the ‘supported struggler’ because they report above average social and academic support and buoyancy despite experiencing a very high number of academic challenges. Cluster 3 represented 25% of the sample ($n = 63$) with cluster centres that were below average on home support ($M = -1.31$), community support ($M = -1.17$) and academic buoyancy ($M = -1.03$), but above average on academic support ($M = 0.51$) and academic adversity ($M = 0.43$). This group is named the ‘at-risk struggler’ because despite experiencing adequate academic support in the face of their academic challenges, they lack home and community support and report very low buoyancy. Figure 1 shows a graph of the mean scores for the three clusters.

In order to better understand how the clusters are different from one another, we compared them on the five cluster variables used to create them. As expected, ANOVA revealed significant differences across

Table 3. Mean differences across cluster groups on the motivation outcome variables.

	Mean (Standard deviation)			Significant difference between groups
	Thriver (cluster 1)	Supported struggler (cluster 2)	At-risk struggler (cluster 3)	
<i>Adaptive motivation</i>				
Self-efficacy	5.92 (1.14) ^a	4.88 (1.51) ^b	4.56 (1.60) ^b	$F(2, 235) = 25.40$, $p < .001$, $\omega^2 = .17$
Valuing of school	5.61 (1.33) ^a	4.58 (1.63) ^b	4.26 (1.48) ^b	$F(2, 234) = 21.13$, $p < .001$, $\omega^2 = .15$
Mastery orientation	5.32 (1.36) ^a	4.12 (1.61) ^b	3.73 (1.52) ^b	$F(2, 233) = 28.29$, $p < .001$, $\omega^2 = .19$
Persistence	5.38 (1.37) ^a	4.12 (1.59) ^b	3.72 (1.35) ^b	$F(2, 232) = 32.66$, $p < .001$, $\omega^2 = .21$
Planning	4.54 (1.63)	3.64 (1.73)	3.62 (1.62)	$F(2, 233) = 8.19$, $p < .001$, $\omega^2 = .06$
Task management	4.49 (1.36) ^a	3.64 (1.81) ^{a,b}	3.43 (1.45) ^b	$F(2, 227) = 12.48$, $p < .001$, $\omega^2 = .09$
<i>Impeding motivation</i>				
Anxiety	5.23 (1.54)	5.00 (1.98)	4.73 (1.81)	$F(2, 233) = 1.86$, <i>ns</i> , $\omega^2 = .01$
Failure avoidance	4.69 (1.86)	4.08 (1.78)	4.42 (1.66)	$F(2, 232) = 1.44$, <i>ns</i> , $\omega^2 = .01$
Uncertain control	3.14 (1.78)	4.08 (1.81)	3.74 (1.65)	$F(2, 234) = 4.61$, <i>ns</i> , $\omega^2 = .03$
<i>Maladaptive motivation</i>				
Self-handicapping	4.85 (1.55)	5.00 (1.57)	4.45 (1.51)	$F(2, 227) = 1.58$, <i>ns</i> , $\omega^2 = .01$
Disengagement	4.05 (1.82)	4.55 (1.47)	4.81 (1.85)	$F(2, 226) = 3.80$, <i>ns</i> , $\omega^2 = .02$

Note: Different superscript values indicate significant differences between the clusters (in each row).

groups for home support ($F[2, 241] = 187.94$, $p < .001$, $\omega^2 = .61$), community support ($F[2, 242] = 111.34$, $p < .001$, $\omega^2 = .47$), academic support ($F[2, 235] = 72.34$, $p < .001$, $\omega^2 = .37$), adversity ($F[2, 246] = 87.90$, $p < .001$, $\omega^2 = .41$) and buoyancy ($F[2, 235] = 54.95$, $p < .001$, $\omega^2 = .31$). Post hoc follow-up tests revealed that the cluster variables discriminated the cluster groups in different ways. Table 2 summarises these findings as shown with the superscript values. Findings of note were that the thriver reported the highest levels of home and community support, the supported struggler reported the highest levels of academic support and adversity, and both the thriver and supported struggler reported similar levels of academic buoyancy. The at-risk struggler reported the lowest levels of home and community support and academic buoyancy, along with medium levels of academic support and adversity.

Phase 2 – cluster differences in motivation

In order to determine the educational implications of the clustering, we compared clusters on the motivation outcomes. Table 3 shows the means and standard deviations for each cluster on the outcome variables along with the results of the ANOVAs and post hoc tests. These results show that there were significant differences between clusters on the adaptive motivation outcomes (with F values ranging from 8.19 to 32.66 ($M = 21.36$), all $p < .001$, and effect sizes ranging from $\omega^2 = .06$ to $\omega^2 = .21$), but none on the impeding or maladaptive outcomes. Moreover, although a significant difference in planning between clusters was found in the ANOVA, this was not reflected in the subsequent post hoc tests when comparing the individual clusters (likely because of the Bonferroni correction applied to the post hoc tests).

Post hoc tests revealed two patterns of findings. First, the thriver reported significantly higher self-efficacy, valuing of school, mastery, and persistence than the other two clusters who reported similar levels of these constructs. Second, the thriver reported significantly higher levels of task management

than the at-risk struggler, whereas the supported struggler reported medium levels that were not significantly different from the thriver or at-risk struggler. Thus, the two types of strugglers reported similar motivation despite having very different profiles. Moreover, these findings suggest that differing mixes of support, adversity and buoyancy are associated with substantial differences in the adaptive motivation outcomes, but no differences in the impeding or maladaptive outcomes.

In our final analysis, we examined the extent to which associations between the clusters and the motivation outcomes varied due to certain demographic characteristics. We ran several four-way ANOVAs where we entered gender, age and language background as interaction effects with the cluster grouping variable. For each of the 11 motivation outcomes, three interaction terms were included: gender by cluster, age by cluster and language background by cluster. There was a significant interaction effect for valuing of school ($F [2, 209] = 11.49, p = .002, \omega^2 = .04$) and anxiety ($F [2, 208] = 11.49, p = .017, \omega^2 = .03$) with respect to language background. These indicated no difference in valuing or anxiety by language background for the thriver, but differences for the supported struggler and the at-risk struggler. More precisely, the English-speaking background supported struggler reported significantly greater valuing and anxiety than the non-English-speaking background supported struggler, whereas the English-speaking background at-risk struggler reported significantly lower valuing and anxiety than the non-English-speaking background at-risk struggler. There were no other significant interaction effects. Thus, we can conclude that the influence of the clusters on the outcome variables is largely a main effect and that language background was the only demographic variable that influenced the clusters.

Discussion

In the present study, we examined the extent to which different profiles of students could be identified based on their reports of support, adversity and buoyancy. Through the use of cluster analysis, we identified three groups: the thriver, supported struggler and at-risk struggler. After this, we compared the clusters on the motivation outcomes. Results showed significant differences between the clusters on the adaptive motivation outcomes, and no differences on the impeding or maladaptive outcomes. Finally, we conducted interaction analyses that revealed only minor moderation by language background in the associations between clusters and the outcomes. Key findings are discussed below.

Cluster identification

The thriver was characterised by the most positive combination of the five cluster variables and reported the most adaptive motivation outcomes. An encouraging finding was that the thriver comprised 64% of the sample. This underscores the important role of protective factors for resilience among students from high-needs communities. A less positive finding was that one-third of students were classified as a (supported or at-risk) struggler, which represents a substantial proportion of students. The impact of this less adaptive confluence of protective factors was evident in the low levels of motivation indicated by the two struggler groups. An important point, however, is that although the two types of strugglers reported similar levels of motivation, they are defined by different profiles. Despite very high experiences of adversity, the supported struggler reported above average support and buoyancy. In contrast, the at-risk struggler reported medium adversity and academic support, but low social support and buoyancy. In looking at the differences in the profiles, it may be that the above average levels of support and buoyancy of the supported struggler helped to offset their elevated experiences of adversity such that they reported similar motivation to the at-risk struggler who experienced much less adversity. Another way of viewing this is that adversity and social support play a qualitatively different, but quantitatively similar role in students' motivation. Moving forward, an interesting avenue of future research would involve examining the outcomes of these two groups over time. Despite the presence of a significant risk factor (i.e. adversity), the supported struggler appeared to have access to several protective factors. In contrast, academic support was the only protective factor apparent for the at-risk struggler. Thus, it may be that the at-risk struggler experiences less adaptive outcomes in the longer term.

The key role of support

Social and academic support played crucial roles in determining the clusters and how they were associated with the outcomes. High levels of home and community support were central for positive outcomes. As expected, academic support appeared most pertinent when students experienced academic adversity. Indeed, a finding that speaks positively to the support offered by schools was that academic adversity tended to be matched by academic support – with students experiencing higher adversity also reporting greater support. Another positive finding was that despite high levels of academic adversity, the supported struggler still reported average levels of buoyancy. Perhaps this is because they also had access to adequate academic support.

Among the implications of this finding is the significance of efforts that aim to promote healthy homes and communities as a way to boost academic outcomes among students. To improve students' perception of home support, it is helpful when parents are available to talk with their child, are warm and responsive, have some involvement in their child's schooling, and set fair boundaries for their child's activities (Byrnes & Miller, 2012; Walsh et al., 2010). Benson, Leffert, Scales, and Blyth (2012) have suggested that community support can be strengthened by building intentional mechanisms and organisations within the community that acknowledge, value, and involve adolescents and provide opportunities for healthy relationships between adults and adolescents. Ensuring students have access to the academic support they need is also important. Given that many of these academic support services rely on government funding (e.g. speech pathologists), the study's findings have implications at the policy level. Combined, these types of practical suggestions may help to improve adolescents' experiences of social and academic support.

The differentiating role of buoyancy

Buoyancy tended to be associated with a more positive confluence of cluster variables and outcomes. Perhaps this is because students who are able to effectively deal with academic setbacks remain positively aligned and affiliated with their classroom and school environment, which is likely associated with positive motivational experiences. A focus on improving academic buoyancy through interventions at school may be one avenue to enhance the outcomes of the at-risk struggler without requiring significant resources (as may be the case with attempts to build home and community support).

Interventions designed to promote academic buoyancy among students may focus on teaching students to recognise challenges, identify and seek out protective factors (e.g. a supportive peer, teacher, or relative; a book or website that is informative for their schoolwork; making plans to study more effectively for an upcoming test), implement and then refine their use of protective factors in a continuing cycle (Morales, 2000). Through this process, students may be able to increase their capacity to navigate future academic challenges.

Similarities in motivation

Although clusters differed on the adaptive outcomes, no differences were found between groups in terms of impeding or maladaptive motivation. This may have occurred because of the relatively high-needs nature of our sample – the participants were already experiencing levels of impeding and maladaptive motivation that were much higher than national representative samples (Martin, 2007; Martin et al., 2013) resulting in relative ceiling effects. This potentially left no substantial variance to be explained by buoyancy and support. Notably, this finding may provide further confirmation for the notion that positive development is more than the absence of negative affect (Lerner, 2005). After all, it was in relation to the adaptive outcomes that students differed. This speaks to the importance of intervention that focuses on adaptive factors and processes in students' lives. Such interventions might include developing student skills in goal setting and task management, and making learning relevant to students (see Martin, 2007 for further details). A key area for future research is to examine the extent

to which this pattern of outcomes is repeated among students from different socio-economic areas. This will help to provide further endorsement of the value of a positive youth development approach to understanding adolescents' experiences.

Limitations and future directions

Several limitations should be considered when interpreting the findings reported here. First, cluster analysis is a descriptive technique that can have several different solutions. To provide corroboration for our interpretation, we conducted several analyses. Nonetheless, research with different and, ideally, larger samples would help to provide support for our findings. Second, the data are self-reported. This means that the constructs we measured were not 'objective' assessments; rather, they were students' perceptions of the constructs. In addition, given that some teachers may have provided assistance to a small number of students while they completed the survey, it is possible that this may have influenced these students' results. Third, single-item measures were used to assess the motivation outcome variables. Although prior research has successfully employed these single-item scales, there is a need for similar research involving multiple-item scales. Fourth, the unique nature of our sample is a strength of the research in that participants from high-needs communities were involved. At the same time, however, it means that generalisations from our findings are limited to samples of similar youth. Research involving different samples will help to advance understanding of how support, adversity and buoyancy are combined among other students. More broadly, there is also a need for research that – alongside the factors we have identified – also looks at how these constructs are juxtaposed by the values held by the students themselves to better understand any resolution across potential class-based differences.

Conclusions

The present study conducted cluster analysis to identify three profiles of students based on their experiences of support, adversity and buoyancy. Our results indicated that the combination of high home support, community support and buoyancy was associated with the most adaptive student outcomes. It was also positive to see that students' experiences of adversity coincided with matched levels of academic support. The identification of the student profiles is important as it can help teachers to recognise the different types of students in their classroom and, thus, offer instruction that is better differentiated to meet the needs of diverse students. Moreover, the study's findings are relevant for advancing understanding of the role of various protective and risk factors for resilience among students from high-needs communities.

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