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Cognitive and Affective Motivation Profiles of Student-Athletes Compared to Student Non-Athletes in University

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Abstract

Background: Attribution theory posits that individuals' explanations for their achievement outcomes trigger cognitive and affective processes that drive motivated behaviour (Weiner, 2018). **Objective:** This study examines the relational structure of these processes for individuals who experience simultaneous demands arising from disparate achievement settings (sport and academic) and how they are associated with performance. **Study groups:** Postsecondary student-athletes (n = 207) participating in sport competitively (participating 5x or greater per week) and students not involved in sport (n = 534) were examined. **Methods:** Using latent profile analyses, our study identifies attribution-based motivation profiles for student-athletes and students not involved in sport in a two-semester, online introductory university course. **Results:** Student-athletes' cognitions and emotions yielded three motivation profiles: *high control-positive emotion* (56%), *moderate control-emotion* (29%), and *low control-negative emotion* (15%). In contrast, LPA for student non-athletes yielded four profiles: *high control-positive emotion* (27%), *high control-mixed attribution* (25%), *moderate control-emotion* (30%), and *low control-negative emotion* (18%). Of these profiles, theoretically predicted adaptive and maladaptive profiles were associated with better and worse performance, respectively. **Conclusions:** Relative to student non-athletes, student-athletes exhibited more homogenous motivation profiles and were at greater risk of achievement setbacks. The implications of the findings are discussed in light of the demands placed on student-athletes entering postsecondary settings and potential approaches are offered to assist those with at-risk motivation profiles.

Keywords: sport, student-athletes, attributions, achievement motivation

Introduction

Important psychosocial aspects of academic motivation are undoubtedly impacted for students during the shift to postsecondary education. Students involved in competitive college sports represent an ideal population to study from a social psychological perspective because of the diverse cognitive and affective demands they encounter in multiple achievement settings (cf., Wright, 2016). They are expected to be engaged and committed to both sports and academic programs of study. However, this balance poses significant motivational challenges, is highly stressful (Chyi et al., 2018; Papanikolaou et al., 2003), and can result in sacrificing success in one domain (e.g., academic) to prioritize success in another (e.g., sport; Cosh & Tully, 2014).

Students in competitive sport programs are unique because they face disparate demands that other students do not face, such as competition-class attendance overlap, training and competition-related exhaustion, and in some cases, injury. They often deal with academic-sport identity concerns and are expected to adjust to new and unfamiliar training regimens that can interfere with their academic motivation and performance (Bengtsson & Johnson, 2012; Parker et al., 2021). This combination of athletic and academic programs is exacerbated by motivational demands upon entering and adjusting to college. The present study sought to understand the motivation factors occurring for students involved in sport from a person-centered perspective that can impact their achievement. We address this by drawing from Weiner's (1985, 2018) attribution theory of motivation.

Attribution Theory and Challenging Achievement Settings

Weiner’s (1985, 2018) attribution theory of motivation and emotion provides a rich conceptual framework to examine academic development for students who encounter the many challenges inherent in transitioning to postsecondary. First, the theory posits that individuals

have a fundamental need to understand the causes of outcomes they experience. Important, negative, and unexpected outcomes lead individuals to engage in a causal search process to identify explanations for the outcome. For student-athletes who must excel in two very different competitive achievement settings, unexpected failure experiences in either setting are likely to elicit causal search and to impact achievement-related cognitions, emotions, and motivated behaviour.

Second, although there are hypothetically countless perceived causes for outcomes, there are certain ascriptions for success and failure (e.g., strategy, ability) that are more salient than others (Weiner, 2018). These perceived causes (attributions) share dimensional properties (locus of causality, stability, and controllability) and play a key role in determining future motivation and behavior. These kinds of attributions are salient in achievement settings and are posited to co-occur with theoretically connected cognitions and emotions (e.g., see Hamm et al., 2017)

Cognitions and Emotions in Attribution Theory

Causal attributions in achievement settings are posited to prompt a motivational sequence (Weiner, 1985, 2018). Two performance attributions found to predict achievement motivation are *strategy* and *ability* attributions that have been studied in other achievement studies (e.g., Perry et al., 2008; 2010). Simply put, individuals who attribute their poor test performance to a bad strategy (internal, unstable, controllable cause) will perceive the outcome as modifiable because a better strategy may be available. These attributions are tied to greater perceived control in their academic setting since changing their strategy is directly under their control (Perry et al., 2001). This also means they may experience certain attribution-related emotions (i.e., elevated hope), when thinking about future academic performance since a bad strategy can be changed to a better one. Conversely, individuals who attribute their poor performance to low

ability (internal, stable, uncontrollable cause) are likely to have lower perceived control over their learning (Hamm et al., 2017). They may perceive the cause of the negative outcome as unchanging because low ability is stable and uncontrollable. Theoretically, these students may experience greater *helplessness* from making internal, stable, and uncontrollable attributions to poor performance (Weiner, 2014), which can negatively impact future motivation. Similar examples in sport are shown where athletes who were provided attributional feedback that focused on their effort and strategy (i.e., internal, unstable, controllable) following a failure performance indicated higher hope, expectancy for success, and motivated behavior (persistence on a task) post-feedback (Le Foll et al., 2008).

Perceived academic control concerns individuals' subjective beliefs about their capacity to influence and predict achievement outcomes and is an important factor related to attributions (Hamm et al., 2017; Perry et al., 2001). Students who explain poor performance outcomes using controllable attributions should have higher perceived academic control than students ascribing uncontrollable attributions (Perry et al., 2005). Not surprisingly, control-related constructs are linked to GPA and other standardized test scores across several meta-analytic reviews (Richardson et al., 2012), as well as university drop-out (Respondek et al., 2019).

Although not addressed in Weiner's theory, stress is an important emotion to consider since it is a ubiquitous experience for student-athletes (Papanikolaou et al., 2003) and is linked to attribution-related cognitions and emotions (Parker et al., 2018; Ruthig et al., 2009). The addition of multiple commitments (e.g., academic and sport) can lead to elevated stress levels that may have significant implications for motivated behavior. In sum, cognitions, such as common attributions for poor performance (strategy, ability), and perceived academic control, as well as

achievement emotions (hope, stress, helplessness) were selected as key factors to identify student motivation profiles in this study.

Examining Student Motivation Profiles

LPA is a person-centered analytic procedure that enables a systematic examination of multifaceted motivation profiles. Motivation variables do not exist in isolation, but are integrated (Ainley, 2006). It is useful to examine how these interrelated variables function simultaneously for students in achievement settings since this should provide a better understanding of common patterns of academic motivation. Thus, person-centered approaches provide insights into understanding the motivation processes that function concurrently (Parker et al., 2021). Although it is unlikely that all student-athletes have the same academic experiences, it seems reasonable that some students exhibit similar motivational tendencies.

Student-athlete motivation has been studied for some time (e.g., Bullard, 2016; Simons et al., 1999), however a critical omission concerns a theory-based research perspective that considers student motivation using person-centered approaches. Latent profile analysis (LPA) has been used to identify motivation profiles of students in educational contexts (e.g., Marsh et al., 2009), but few studies have adopted this approach to assess motivation in student-athletes (see Haerens et al., 2018 for an exception). Haerens and colleagues (2018) examined elite Belgian athletes and physical education students with a cluster analysis procedure. Athletes who perceived their coaches or teachers as having a high autonomy-supportive motivating style, with a low controlling motivating style, were better off in terms of motivation and emotional well-being. Wang and colleagues (2016) examined motivation profiles based on behavioral regulation for physical education students in Singapore and found profiles with higher motivation (autonomous motivation, internalized regulation) were associated with perceived competence

and intentions to exercise. These studies addressed specific motivational components; however, they did not consider the student-athlete experience who encounter multiple achievement settings or an attribution-based framework that considers how student profiles may comprise unique ways of attributing causes for achievement outcomes that are interwoven with cognitions and emotions.

A second omission in the literature concerns the comparison of motivation profiles of students involved in competitive sport to those who are not (student non-athletes; NA). Student-athletes encounter multiple demands in varying environments which may influence motivational processes (cognitions, emotions) differently than for students not involved in sport. To date, findings have been inconsistent in delineating whether students' involvement in sport plays a role in their motivation and achievement striving. As such, our study used a person-centered approach (LPA) to examine the nature of student-athlete motivation based on attribution theory which specifies interrelationships involving achievement-related cognitions, emotions, and performance.

From an attribution perspective, we expect low, moderate, and high motivation profiles will emerge since the cognitive and emotion variables comprising the profiles should coalesce in predictable ways. Highly motivated students should have adaptive cognitions such as controllable attributions for performance (strategy) and higher levels of perceived academic control, as well as adaptive levels of emotions—higher hope, less stress, and helplessness. Moderately motivated students should endorse moderate levels of these motivation-based variables. Finally, students with low motivation should exhibit a maladaptive combination of cognitions such as uncontrollable attributions (ability), lower levels of perceived control, and lower levels of emotions—higher stress, helplessness, and lower hope (Perry et al., 2008).

Course-based test performance was expected to reflect these theory-derived profiles, whereby students with a high motivation profile would have better performance, students moderately motivated would have average performance, and students with low motivation would have the poorest performance. Since this is the first attempt to assess such motivation profiles in SA, no differences in the number of profiles were hypothesized between student-athletes and student non-athletes. However, we did expect that a larger proportion of the student-athletes (vs. non-athletes) would have a low motivation (maladaptive) profile due to the motivational challenges they face in multiple domains.

Objectives

Our main objectives were to: (a) identify latent motivation profiles of student-athletes and student non-athletes based on theory-derived cognitive and emotional processes; (b) examine differences between the student-athlete and student non-athlete motivation profiles (e.g., number and type of latent profiles); and (c) validate profile differences using a course-based achievement test. Person-centered LPA procedures were adopted to specify motivation profiles involving causal attributions for poor performance (strategy, ability), perceived academic control, perceived hope, stress, and helplessness.

Method

Participants and Procedure

Students enrolled in multiple sections of a two-semester, online introductory psychology course at a Canadian university were invited by their instructor to partake in the study in exchange for partial course credit. Ethical approval to conduct this study was provided from the Institution's Research Ethics Board. The study procedure involved students completing an online survey in October, the second month of their academic term, which comprised demographic

(e.g., age), cognitive (e.g., attributions, perceived academic control), and affective (e.g., emotions) measures using a secure survey website. A pre-survey course-based test was administered earlier in October and students' test scores were gathered from the course instructor.

The participants were categorized into two groups: student-athletes (n = 207) who were 53% female, 88% 17-20 years old, and the majority in their first two years of university (93%); and student non-athletes (n = 534) who were 74% female, 78% 17-20 years old, and the majority in their first two years of university (88%). All students were asked if they had participated in a competitive sport (yes, no). Student-athletes were selected if they had (a) self-reported they participated in a "competitive sport" and (b) were currently engaged in a competitive sport *five times or more* per week. Competitive sport was defined as any competition above the intramural (within the same university or organization) or recreational level (a hobby). The participation frequency criterion ensured our student-athlete sample was involved in their respective sport each week and juggling busy sport schedules (Parker et al., 2018). Furthermore, student non-athletes were those who indicated they had not participated in a competitive sport; thus, there was no overlap between groups.[1]

Covariates

Age, sex, and high school grades were gathered as covariates. Students' self-reported age was assessed using a 10-point scale (1 = *17-18*, 2 = *19-20*, 3 = *21-22*, 4 = *23-24*, 5 = *25-26*, 6 = *27-30*, 7 = *31-35*, 8 = *36-40*, 9 = *41-45*, 10 = *older than 45*). Sex was self-reported at Time 1 and treated as a dummy-coded variable (1 = *female*; 2 = *male*). Students' self-reported high school

[1] Student-athletes who were *not* engaged in a competitive sport five times or more per week were not included in our student-athlete sample.

grades were assessed using a 10-point scale (1 = *50% or less*, 10 = *91-100%*). Self-reported high school grades can be considered a proxy for actual high school achievement since they share a strong relationship (r = .84; Perry et al., 2005). Past research reveals self-reported high school grades are strong correlates of post-secondary achievement (e.g., final course grades, r = .40-.54; grade point averages, r = .51-.54; Perry et al., 2001, 2005). In a meta-analysis by Richardson et al. (2012), high school grades were strongly associated with university GPAs (r = .40).

Measures

Attributions for Poor Performance. When thinking about a poor performance in their course, students were asked to respond to the following statement: to what extent do the following factors contribute to your performance?", students rated the influence of "strategy" and "ability" on a 10-point scale (1 = *not at all*, 10 = *very much so*). Based on past research, "Strategy" and "ability" were selected because they are common attributions used to explain academic performance in the classroom in controllable or uncontrollable ways (strategy represents an internal, unstable, controllable attribution; ability represents an internal, stable, uncontrollable attribution; Perry et al., 2008; Perry et al., 2010). The perceived controllability of these attributions can vary according to the phenomenology of the individual but are most commonly characterized as described above (Weiner, 1985; Perry et al., 2008).

Perceived Academic Control. Students' rated their perceived control over course performance outcomes using Perry et al.'s (2001) eight-item Perceived Academic Control measure, e.g., "I have a great deal of control over my academic performance in my psychology course" (1 = *strongly disagree*, 5 = *strongly agree*). Four items were negatively worded and reverse coded so that when the ratings were summed, high scores indicated high perceived academic control (Cronbach α = .80). Past research shows that the perceived academic control

measure has respectable psychometric properties: Cronbach αs = .77 to .80 (Perry et al., 2001); Mcdonald's ω > .70 (Respondek et al., 2019); and test-retest reliability: *r*(227) = .59 (Perry et al., 2005); *r*(227) = .66 (Stupnisky et al., 2008).

Achievement-related Emotions. Students rated single-item achievement emotions using a 10-point scale indicating the extent to which they experienced "hope" and "helplessness" with respect to their introductory psychology course (1 = *not at all*, 10 = *very much so*). These single item emotion measures have been used in a variety of achievement-related studies (Hall, Hladkyj, Perry & Ruthig, 2004; Perry et al., 2008, 2010; Daniels et al., 2009). According to Weiner (2018), hope is likely to result when internal, unstable, and controllable attributions for performance are used. It is posited that helplessness is the result of an internal, stable, uncontrollable attribution that reflects a lesser variant of hopelessness (Perry et al., 2010).

Perceived Stress. Seven items from Cohen et al.'s (1983) Perceived Stress Scale were used to assess students' perceived stress, e.g., "During the last month, how often have you found yourself thinking about things that you would have to accomplish" (1 = *never*, 5 = *very often*). Items were summed so higher scores reflected greater perceived stress (Cronbach α = .88). This perceived stress measure has been shown to have satisfactory psychometric properties: Cronbach αs = .83 to .87 (Ruthig et al., 2009). The original 10-item scale was reduced to seven items as part of an effort to reduce the length of the survey for participants, and thus three positively worded items were removed (e.g., "During the last month, how often have you felt that things were going your way?"). Internal reliability of this shortened seven-item measure is similar to the full version (α =.84-.86; Cohen et al., 1983).

Course-based Test. Participants were administered a test based on course content at the beginning of the course roughly two weeks prior to the online survey in October. The test

covered content in the first two units in introductory psychology covering topics on *Psychology's History and Methodology* and *Biological Bases of Psychology*. The test consisted of 40 multiple-choice items and all students had the same instructor.

Rationale for the Analyses

A person-centered analytical approach was used to identify individuals with similar patterns of motivation based on multiple (continuous) indicator variables. Two separate latent profile analyses (LPA) were conducted to identify student-athlete and student non-athlete profiles based on the motivation variables: causal attributions for poor performance (strategy, ability), perceived academic control, and emotions (hope, perceived stress, helplessness) using M*plus* version 7 (Muthén & Muthén, 1998-2016). LPA models were estimated by testing a range from 2-6 motivation profile numbers based on recommendations by Marsh et al. (2009). Models with 500 random starts with 50 optimizations ensured model convergence issues were avoided from local maxima.

The best fitting models were selected based on attribution theory, fit statistics, classification quality, and size of profiles (Infurna & Grimm, 2017; Marsh et al., 2009). As recommended, several fit statistics were considered, including the Aikake information criteria (AIC), the Bayesian information criterion (BIC), the sample-size adjusted BIC (SABIC), the bootstrapped likelihood ratio test (BLRT), and the Lo-Mendell-Rubin test (LMRT) to select the best fitting class solution for student-athletes and student non-athletes. The AIC, BIC, and SABIC tests that yield lower values indicate better fitting models. Significant values generated by the BLRT and LMRT support the tested model over a model with one fewer profiles (*k* profile vs. *k-1* profile; Lo et al., 2001).

Classification quality was determined using Entropy values, where values approaching 1.00 are considered best and convey clear separation of individuals into profiles (recommended values ≥ .80; Infurna & Grimm, 2017). Ideal model solutions are parsimonious in terms of having the fewest latent profiles, while still effectively addressing the complex nature of the data, and have few profiles that comprise less than 5% of the total sample (Jung & Wickrama, 2008). Finally, the LPAs controlled for age and sex since both demographic variables correlate with key academic variables involved in the formation of the profiles.

LPA Profiles and Performance-based Validation. Following the specification of the LPA motivation profiles for student-athletes and student non-athletes, the profile comparisons were assessed based on a performance outcome (course-based test) using M*plus*'s Auxiliary (BCH) function (Asparouhov & Muthén, 2014). The Auxiliary (BCH) function estimates mean differences between the latent profiles and the continuous outcome variable (Marsh et al., 2009; Wang et al., 2016). This function ensures the latent profile variables are only measured by the original latent profile indicator variables without the bias introduced by other (auxiliary) observed variables.

Results

Student Athlete Results

Table 1 presents the zero-order correlations for all of the study variables for student-athletes. As expected, strategy attributions for poor performance were positively related to hope (r = .20). Ability attributions for poor performance were positively related to perceived stress and helplessness (rs = .27, .33, respectively). In keeping with past research, perceived academic control was associated with emotions (hope, r = .42; perceived stress, r = -.31; helplessness, r = -.55) and with test performance (r = .21; Parker et al., 2018; Stupnisky et al., 2008; all ps < .01).

Aside from high school grades, perceived academic control, hope, and helplessness, but not stress, had the highest associations with test performance.

Latent Profile Analysis (LPA). The LPA revealed AIC, BIC, and SABIC values were lowest for the 3-profile and 4-profile solutions (see Table 2). The BLRT tests for all solutions were statistically significant and the LMRT test showed the 3-profile solution was a better suited model (p = .007) compared to other models (e.g., 4-profile solution, p = .164; 5-profile solution, p = .691). The 2-profile, 3-profile, and 4-profile solutions included no profiles that were less than 5% of the total sample. This means for the 5-profile and 6-profile solutions, at least one of these profiles had fewer than 10 participants out of the 207 student-athletes. Additionally, the entropy value for the 3-profile (.89) was highest. Based on all of these criteria, the 3-profile solution was chosen because it had a lower value according to the AIC, BIC, and SABIC indices, significant BLRT and LMRT tests, no profiles less than 5% of the sample, and the highest entropy.

Mean scores for the cognitive and emotion variables were standardized to facilitate interpreting the motivation profiles (see Table 3). Three profiles involving cognitions and emotions were identified based on standardized scores as follows: *high control-positive emotion* (n = 115; 56%), *moderate control-emotion* (n = 61; 29%), and *low control-negative emotion* (n = 31; 15%). Profile variable levels were interpreted as moderate if they were in the range of -0.5 to +0.5 *SD*; and as pronounced (e.g., high) if they were outside this moderate range (see Figure 1).

Figure 1 depicts three latent profiles for student-athletes separated into motivation-related cognitions and emotions to ease interpretation. High control-positive emotion student-athletes believed strategy and ability contributed moderately to poor performance and had relatively high perceived academic control. They also felt somewhat hopeful, unstressed, and very little helplessness. In contrast, low control-negative emotion student-athletes had very low perceived

academic control; but they also believed strategy and ability contributed modestly to their poor performance. They exhibited very low levels of hope coupled with very high levels of stress and helplessness. Finally, moderate control-emotion student-athletes believed strategy and ability contributed moderately to their poor performance and had relatively average perceived academic control. They also experienced average levels of hope, but nevertheless felt somewhat stressed and helpless.

LPA Profile Test Performance. Profile differences on test performance show that high control-positive emotion student-athletes had higher test scores than the moderate control-emotion, χ^2 (1, n = 176) = 19.11, p < .001, or low control-negative emotion SA, χ^2 (1, n = 146) = 8.39, p = .004 (Table 4). The moderate control-emotion and the low control-negative emotion student-athletes had equivalent test scores [χ^2 (1, n = 92) = .003, p = .953]. All test performance results remained significant after controlling for high school grades. Levene's test of equality variances was non-significant (p = .195) indicating the error variance for performance was equal across the profiles.

Student Non-Athlete Results

Table 5 provides the zero-order correlations for the student non-athletes psychosocial variables. Similar to the SA, attributing poor performance to ability was positively related to perceived stress and helplessness (rs = .17, .19, respectively). Perceived academic control was linked to emotions in expected directions (hope, r = .44; perceived stress, r = -.31; helplessness, r = -.58) and test performance (r = .37; all ps < .01). Furthermore, high school grades, perceived academic control, hope and helplessness, but not stress, had the highest associations with test performance.

Latent Profile Analysis (LPA). For the NA, the LPA indicated the AIC, BIC, and SABIC values decreased as number of profiles increased, and the BLRT and LMRT tests were significant with the exception of the 6-profile solution (LMRT: $p = .079$; see Table 6). These findings were anticipated since the student non-athlete sample was relatively large and the selected fit statistics are influenced by sample size (see Marsh et al., 2009). Entropy values were higher for the 3-profile and 4-profile solutions (.855 and .806, respectively). Profile solutions ranging from 2 to 5 did not comprise less than 5% of the total sample. In considering all of these criteria, the 4-profile solution was selected since it was a more parsimonious option than the 5-profile solution and had higher entropy. It also had lower AIC, BIC, and SABIC values than the simpler tested models, significant LMRT and BLRT tests, and no profiles less than 5%.

Figure 1 depicts four latent profiles for student non-athletes separated into motivation-related cognitions and emotions to facilitate interpretation. These motivation profiles were labelled: *high control-positive emotion* ($n = 144$; 27%), *high control-mixed attribution* ($n = 136$; 25%), *moderate control-emotion* ($n = 160$; 30%), and *low control-negative emotion* ($n = 94$; 18%). High control-positive emotion student non-athletes believed strategy contributed moderately to their poor performance, but ability did not. They also had high perceived academic control, and felt modestly hopeful, unstressed, and not helpless. Alternately, low control-negative emotion student non-athletes believed both strategy and ability moderately contributed to their poor performance and had very low perceived academic control. They reported little hope, and felt very stressed and helpless. Moderate control-emotion student non-athletes also believed strategy and ability contributed to their poor performance moderately, as did their perceived academic control, and felt reasonably hopeful, though equally stressed and helpless. Finally, high control-mixed attribution student non-athletes also considered strategy contributed, and ability

strongly contributed, to their poor performance and had high perceived academic control. They felt reasonably hopeful, unstressed, and notably not helpless.

LPA Profile Test Performance. As expected, high control-positive emotion student non-athletes had the highest test performance and low control-negative emotion student non-athletes had the lowest of the four non-athlete motivation profiles (see Table 5). Specifically, high control-positive emotion student non-athletes had higher test scores than their low control-negative emotion [χ^2 (1, n = 238) = 78.28, p < .001] and moderate control-emotion peers [χ^2 (1, n = 304) = 21.96, p < .001], but not their high control-mixed attribution peers [χ^2 (1, n = 280) = 3.22, p = .073].

High control-mixed attribution student non-athletes also had higher test scores than both the moderate control-emotion [χ^2 (1, n = 296) = 8.58, p = .003] and low control-negative emotion student non-athletes [χ^2 (1, n = 230) = 49.99, p < .001]. Although moderate control-emotion non-athletes had lower test scores than high control-positive emotion and high control-mixed attribution non-athletes, they had higher test scores than the low control-negative emotion non-athletes [χ^2 (1, n = 254) = 13.12, p < .001; see Figure 2]. For these students, all performance results remained significant after controlling for high school grades. Levene's test of equality variances was non-significant (p = .219) meaning error variance of the dependent variable was equal across the profiles.

Discussion

The present study examined motivation profiles of student-athletes, as well as student non-athletes as a comparison group, based on Weiner's (1985, 2018) attribution theory of motivation and emotion. The majority of these students were in their first or second year of entering university and enrolled in an online introductory-level course. Several notable

correlations between the main study variables differed between student-athletes and student non-athletes. In addition, the LPA revealed several expected motivation profiles for both groups based on theory-related cognitions and emotions. Furthermore, student-athlete and non-athlete motivation profiles revealed expected mean differences in test performance, with the exception of moderate control-emotion student-athletes. Similarities and differences in motivation profiles emerged between the student-athletes and student non-athletes that help inform our understanding of psychosocial predispositions with students having disparate motivational demands.

Student-Athlete Motivation Profiles

Latent profile analyses of student-athletes' cognitive (attributions, perceived academic control) and affective (hope, perceived stress, helplessness) variables revealed three motivation profiles. *High control-positive emotion* student-athletes appeared to have the most adaptive motivation profile in terms of attribution theory and test performance. Their moderate endorsement of strategy and slight disavowal of ability as possible causes of poor performance was coupled with high perceived academic control and feeling emotionally positive in their learning environment. They also had the highest average (70%) on a course-based test relative to the low control-negative emotion (58%) and moderate control-emotion (59%) profiles. This is significant since the timing of the test took place at the beginning of students' academic term. In sum, these high control-positive emotion student-athletes take an adaptive, mastery-oriented approach in response to the motivational challenges they face as they adjust to university. This approach reflects research where first-year college students exhibiting positive emotions had better academic performance for those with high perceived control (Ruthig et al., 2008).

Moderate control-emotion student-athletes reflected a relatively moderate motivation profile in terms of the cognitive (attributions, perceived academic control) and affective (hope, stress, helplessness) measures, suggesting they were somewhat disengaged from their learning environment. Of note, they did not perform any better on the performance test (59%) than their low control-negative emotion peers (58%). This finding provides some empirical clarity into the motivational disadvantages of their profile. It suggests that although their motivation profile was relatively average in terms of cognitions and emotions, it was not associated with better performance outcomes for these student-athletes who may require strong motivation to cope with the demands they face in their academic and athletic pursuits.

In contrast, *low control-negative emotion* student-athletes appeared to have a more maladaptive motivation profile. These students indicated little academic control over their learning and had a surfeit of negative emotions as reflected in their low hope, and high levels of stress and helplessness. Such an emotional profile suggests that they may be prone to burnout characterized by helpless-like symptoms of amotivation and fatigue (Dubuc-Charbonneau et al., 2014). Moreover, these students' test performance was 11% lower than their high control-positive emotion student-athlete counterparts (69% vs. 58%). In sum, low control-negative emotion student-athletes had the most maladaptive motivation profile for dealing with their learning environments.

Student Non-Athletes' Motivation Profiles

Four motivation profiles were manifest for students not involved in sport based on the same cognitive and affective variables. The *high control-positive emotion, moderate control-emotion,* and *low control-negative emotion* student non-athlete motivation profiles closely resembled the three student-athlete profiles, which is why they were given the same profile

names. As expected, high control-positive emotion student non-athletes achieved the highest average test performance (74%) relative to the other non-athlete profiles (moderate control-emotion, 64%; low control-negative emotion, 55%) suggesting they have better mastery of their learning environment. Moderate control-emotion and low control-negative emotion student non-athlete profiles reflected similar features across the motivation variables akin to their moderate control-emotion and low control-negative emotion student-athlete counterparts.

High control-mixed attribution student non-athletes exhibited a fourth motivation profile that was unlike any of the student-athlete profiles. They endorsed strategy and highly endorsed ability—both controllable and uncontrollable causes—for poor performance but believed they had perceived control over their academic environment. They also had a more positive emotion mix (hope, moderate stress, and low helplessness) which suggests some motivation in their learning environment. Moreover, similar to the high control-positive emotion students, these students achieved high test scores (71%) relative to the other LPA profiles. Student non-athletes in the high control-mixed attribution profile appear to be an interesting group since their emotion profiles are comparable to the high control-positive emotion student non-athletes (see Figure 1, student non-athletes Panel B), yet their causal attributions are discordant from this profile (see Figure 1, student non-athletes Panel A). Unlike the other student non-athletes profiles, high control-mixed attribution non-athletes endorsed both controllable *and* uncontrollable attributions, conveying ambivalence toward the causes ascribed to their poor performance outcomes.

Overall, findings for both the student-athlete and student non-athlete profiles can be considered in line with attribution theory. Accordingly, attributions for negative outcomes that are stable and uncontrollable are tied to a lowered expectancy of success—since they are viewed as unmodifiable—and to reduced hope and greater helplessness regarding achievement (Weiner,

1985, 2018; Le Foll et al., 2008). This mix of cognition and emotion results in a demotivated individual who may struggle to achieve success. As implied by the profiles, students endorsing moderate levels of uncontrollable attributions, who had lower levels of perceived academic control, and dysfunctional emotions (i.e., moderate control-emotion, low control-negative emotion) had the lowest performance (<60%) relative to high control-positive emotion students.

Comparing LPA Motivation Profiles

Both student-athletes and student non-athletes have three motivation profiles in common. Each sample had a motivation profile that was adaptive (high control-positive emotion), relatively average (moderate control-emotion), and maladaptive (low control-negative emotion) across the motivation variables. This is notable considering past research has been shown mixed findings concerning academic motivation differences between student-athletes and student non-athletes (Pascarella et al., 1999; Shulman & Bowen, 2001). The present study reveals the motivational predispositions of student-athletes and student non-athletes are quite comparable. Another similarity between the two samples is reflected in their ratings of helplessness and test performance. Moderate control-emotion and low control-negative emotion student-athletes had scores on helplessness that were greater than +0.5 *SD* above the mean. Low control-negative emotion student non-athletes also indicated helplessness ratings greater than +1.5 *SD*. All three of these profiles with high helplessness ratings also obtained the lowest test scores (55-59%). These findings coincide with evidence showing the deleterious effects of helplessness on a number of outcomes in achievement settings (Krejtz & Nezlek, 2016).

Despite these motivation profile similarities, several differences were also identified between the two samples. For instance, the number of LPA profiles identified differed; four unique latent profiles emerged for the student non-athletes compared to only three that emerged

for the student-athletes. One explanation may be that academic program selection factors contribute to student-athletes being a more homogenous group than non-athletes (Goss et al., 2006; Schneider et al., 2010). Although there is limited research investigating differences in motivation profiles for student-athletes and student non-athletes, it is possible that athletes experience similar selection processes which foster the development of shared motivational experiences (e.g., being selected for competitive sport teams, meeting required GPA guidelines for athletic scholarships, etc.) and interests (e.g., pursuing sport-related academic programs).

In addition, high control-mixed attribution student non-athletes had a profile unlike any of the other profiles. Their emotions were relatively adaptive and fairly similar to the high control-positive emotion non-athletes. However, they had incongruent causal thinking that involved endorsing both uncontrollable *and* controllable attributions (ability, strategy). This finding is novel since these students are endorsing a maladaptive attribution for poor performance (ability) but are still attaining high test scores. One possible interpretation is that the positive impact of using a controllable attribution (strategy) and having perceived academic control outweighs the potential negative impact of endorsing an uncontrollable attribution. Another possibility is that for these particular students there is another variable (e.g., contextual factor) contributing to the link between stable attributions for poor performance and higher test performance. For example, Houston (2016) found that context plays a role whereby stable attributions for negative events were related to higher levels of academic achievement in higher vs. lower achievement contexts.

The similarities and differences observed help to clarify the nature of student-athlete and student non-athlete motivation profiles in keeping with attribution theory (Weiner, 1985, 2018). Expected associations between the most adaptive and maladaptive motivation profiles and test

performance are apparent. These findings extend the literature by suggesting that student-athlete and student non-athlete motivational pre-dispositions are not as different as has been suggested in research that highlights differences in academic motivation (Paule & Gilson, 2011; Shulman & Bowen, 2001).

However, variation was apparent in the number of profiles for student-athletes versus student non-athletes corresponding to test performance differences. Student-athletes appear to be a more homogenous group (e.g., fewer profiles emerged) and prone to more academic setbacks as reflected in their lower test performances. This finding highlights the need to conduct more research in this area. For example, are these profiles replicable, and do they extend to a sport performance setting? Research conducted by Van Yperen et al. (2019) found students in a sport domain had a higher willingness to exert effort, for example, than in a school domain. In other words, students' motivational tendencies may differ depending on the context (e.g., sport vs. school).

Strengths, Limitations, and Future Directions

This study has several strengths and limitations. One strength involves using a person-centered analytic approach to assess theory-based profiles and their relationship with performance. In addition, this study identified motivation profiles for student-athletes to provide a better snapshot of their cognitive and emotional experiences as they enter university. Our study makes a notable contribution by assessing student-athletes more broadly (e.g., those who identify playing a competitive sport five times or more per week) and not restricting to only those in high-profile athletic programs (e.g., NCAA or Canadian USports). However, it is worth considering our samples were from a Canadian university and some features of sport programs, such as access, quality, and funding, may differ in other contexts (e.g., U.S.; Geiger, 2013). In

addition, our study did not measure certain sport-related factors such as type of sport, year of eligibility, playing time, etc. which would strengthen the understanding of the sport context for these findings.

Our study suggests 44% of student-athletes may be facing some academic challenges at the start of their first-year course, which is evidenced by lower initial test scores that are only just above a passing grade. This fits with research that shows student-athletes often enter with lower high school grades, attain lower GPAs, report lower academic motivation to perform well, and have lower graduation rates relative to student non-athletes (Cosh & Tully, 2014; Lucas & Lovaglia, 2002). However, caution is needed in interpreting this finding since it is based on a single performance test early in the semester. Future research could consider examining whether targeted motivation treatments would benefit these student-athletes who appear susceptible to poor academic performance.

Attribution-based treatments (Perry & Hamm, 2017) are designed to encourage the use of controllable attributions (e.g., bad strategy) as opposed to uncontrollable attributions (e.g., low ability) for negative performance outcomes. These treatments have been found to boost achievement striving and performance at-risk students (e.g., highly bored, first-generation, Dryden et al., 2020; Parker et al., 2018). Future research could explore whether attribution-based treatments would benefit student-athletes characterized by at-risk profiles using person-centered analytic approaches. Other psychological treatments are effective in enhancing achievement motivation for individuals with certain academic risk factors (e.g., Hulleman & Harackiewicz, 2009; Walton & Cohen, 2011). In light of this, research using attribution-based or other psychological treatments could be strengthened by implementing person-centered approaches

first to help identify what psychological processes need to be targeted. This step would assist researchers in focusing on the appropriate motivational resources and context.

This study helps provide a clearer picture of the motivation profiles of student-athletes and student non-athletes entering university. Our findings extend attribution theory by showing how theoretically cognitive and affective variables combine in adaptive and maladaptive ways and how they can be associated with performance in an achievement setting. Our study also adds to the sport literature suggesting that the student-athletes shared many motivational tendencies with students not involved in sport. However, the athletes were characterized by fewer motivation profiles and were potentially more at-risk when validated with a performance test since a combined 44% of the student-athletes achieved test scores below 60%. Moreover, resources that support their learning environments, and targeted motivation interventions may help to foster motivation in student-athletes who face competing demands for their time in competitive learning environments.

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Ethical Compliance

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Informed consent was obtained from each individual participant involved in this study.

This study was conducted in accordance with the 1964 Declaration of Helsinki and its subsequent amendments.

Table 1

Zero-Order Correlation Matrix for Student-Athletes

	1	2	3	4	5	6	7	8	9	10
1. Age	–									
2. HSG	-.20*	–								
3. Sex	.02	-.16	–							
4. Strategy	-.10	.02	-.06	–						
5. Ability	-.05	-.07	-.11	.13	–					
6. Perceived academic control	.07	.04	.27*	.17	-.20*	–				
7. Hope	-.05	.02	.07	.20*	.01	.42*	–			
8. Perceived stress	-.16	<.01	-.40*	.11	.27*	-.31*	-.19*	–		
9. Helplessness	-.09	-.08	-.27*	.06	.33*	-.55*	-.42*	37*	–	
10. Course-based test	-.06	.35*	.11	-.16	-.13	.21*	.28*	-.12	-.36*	–
M/%	1.61	7.76	53%	7.31	5.51	32.10	7.36	22.51	3.61	64.94
SD	.96	1.63	–	2.17	2.62	5.31	2.00	5.96	2.60	15.63

Note. HSG = high school grade. Sex was dummy-coded where 1 = *female* and 2 = *male*.

* $p \leq .01$ (two-tailed tests).

Table 2

Criteria Values for Latent Profile Analysis in Student-Athletes

No. of profiles	LL	Free par.	AIC	BIC	SABIC	LMRT	BLRT	Entropy
2	-3038	21	6119	6189	6122	0.0001	0.000	0.831
3	**-3002**	**30**	**6065**	**6165**	**6070**	**0.007**	**0.000**	**0.894**
4	-2977	39	6032	6162	6039	0.164	0.000	0.886
5	-2960	48	6016	6176	6023	0.691	0.000	0.885
6	-2943	57	6000	6190	6009	0.447	0.000	0.857
Interpretation	*Lower* values better	*Lower* values better	*Lower* values better	*Lower* values better	*Lower* values better	Values significant at $p < .05$	Values significant at $p < .05$	*Higher* values better

Note. Criteria values of the latent profile analysis when random starts = 500 50. LL = Log likelihood. Free par. = number of free parameters. AIC = Aikake information criterion; BIC = Bayesian information criterion; SABIC = sample-size adjusted BIC; LMRT = Lo-Mendell-Rubin Test and BLRT = bootstrapped likelihood ratio test (values significant at $p < .05$). Analyses controlled for age and sex. Values for 5- and 6-profiles indicated the model was not trustworthy due to local maxima. For 5-profiles, the sample variance of sex in class 5 was 0 and for 6-profiles, the sample variance of sex in class 6 was 0.

Table 3

Standardized Motivation Variable Scores of Student Athlete and Student Non-Athlete Profiles

Student-Athlete Profiles	Strategy	Ability	Perceived control	Hope	Perceived stress	Helpless
High control-positive emotion	-0.01	-0.31	0.46	0.32	-0.31	-0.76
Moderate control-emotion	-0.10	0.35	-0.32	-0.13	0.18	0.52
Low control-negative emotion	0.20	0.40	-1.05	-0.94	0.80	1.77

Student Non-Athlete Profiles	Strategy	Ability	Perceived control	Hope	Perceived stress	Helpless
High control-positive emotion	-0.37	-1.09	0.55	0.48	-0.44	-0.78
High control-mixed attribution	0.42	0.79	0.51	0.34	-0.31	-0.78
Moderate control-emotion	-0.02	0.09	-0.31	-0.21	0.25	0.41
Low control-negative emotion	-0.06	0.33	-1.06	-0.88	0.69	1.64

Note. Standardized scores for the motivation-based variables are presented for each profile (separately for student-athletes and student non-athletes).

Table 4

Mean-Level Differences Across Motivation Profiles on Test Performance

Student-Athlete Profiles	*M*	*SE*
Profile 1: High control-positive emotion	69.68	1.57
Profile 2: Moderate control-emotion	58.50	1.91
Profile 3: Low control-negative emotion	58.25	3.63
Differences Between Profiles	1>2=3	

Student Non-Athlete Profiles	*M*	*SD*
Profile 1: High control-positive emotion	74.45	1.42
Profile 2: High control-mixed attribution	70.56	1.42
Profile 3: Moderate control-emotion	64.03	1.61
Profile 4: Low control-negative emotion	55.06	1.68
Differences Between Profiles	1=2>3>1	

Note. Means and standard deviations for test performance are reported for each profile (separately for student-athletes and student non-athletes).

Table 5

Zero-Order Correlation Matrix for Student Non-Athletes

	1	2	3	4	5	6	7	8	9	10
1. Age	–									
2. HSG	-.20*	–								
3. Sex	.06	-.14*	–							
4. Strategy	.09	.03	.04	–						
5. Ability	.05	-.11	-.11	.32*	–					
6. Perceived academic control	.09	.16*	.09	.11*	-.17*	–				
7. Hope	.01	.20*	.08	.09	-.12*	.44*	–			
8. Perceived stress	-.09	-.01	-.20*	.15*	.17*	-.31*	-.18*	–		
9. Helplessness	-.03	-.18*	-.15*	-.01	.19*	-.58*	-.45*	.41*	–	
10. Course-based test	.02	.39*	.07	.08	-.14*	.37*	.32*	-.08	-.40*	–
M/%	2.04	7.70	74%	7.16	5.58	32.11	7.14	24.21	3.77	67.30
SD	1.51	1.72	–	2.27	2.76	5.17	2.25	5.62	2.62	15.55

Note. HSG = high school grade. Sex was dummy-coded where 1 = *female* and 2 = *male*.

* $p \leq .01$ (two-tailed tests).

Table 6

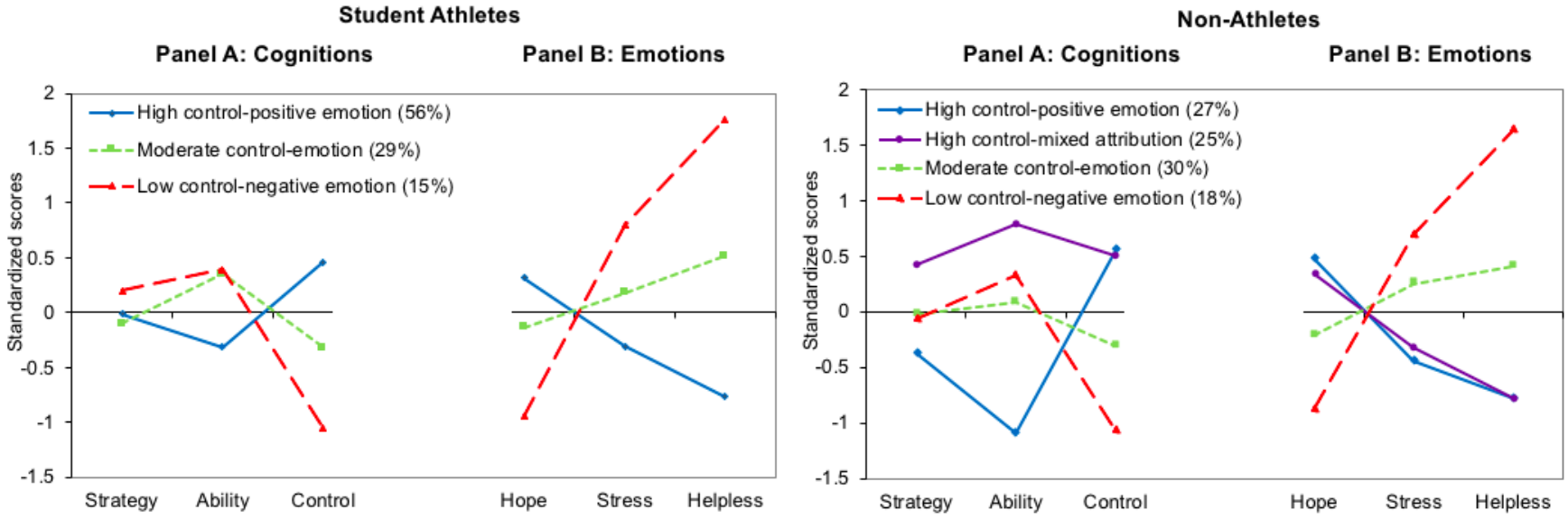
Criteria Values for Latent Profile Analysis in Student Non-Athletes

No. of profiles	LL	Free par.	AIC	BIC	SABIC	LMRT	BLRT	Entropy
2	-7940	21	15923	16013	15946	0.000	0.000	0.802
3	-7868	30	15795	15923	15828	0.000	0.000	0.855
4	**-7814**	**39**	**15706**	**15873**	**15749**	**0.001**	**0.000**	**0.806**
5	-7778	48	15651	15857	15704	0.044	0.000	0.782
6	-7746	57	15608	15852	15671	0.079	0.000	0.796
Interpretation	*Lower* values better	*Lower* values better	*Lower* values better	*Lower* values better	*Lower* values better	Values significant at $p < .05$	Values significant at $p < .05$	*Higher* values better

Note. Criteria values of the latent profile analysis when random starts = 500 50. LL = Log likelihood. Free par. = number of free parameters. AIC = Aikake information criterion; BIC = Bayesian information criterion; SABIC = sample-size adjusted BIC; LMRT = Lo-Mendell-Rubin Test and BLRT = bootstrapped likelihood ratio test (values significant at $p < .05$) Analyses controlled for age and sex.

Fig. 1

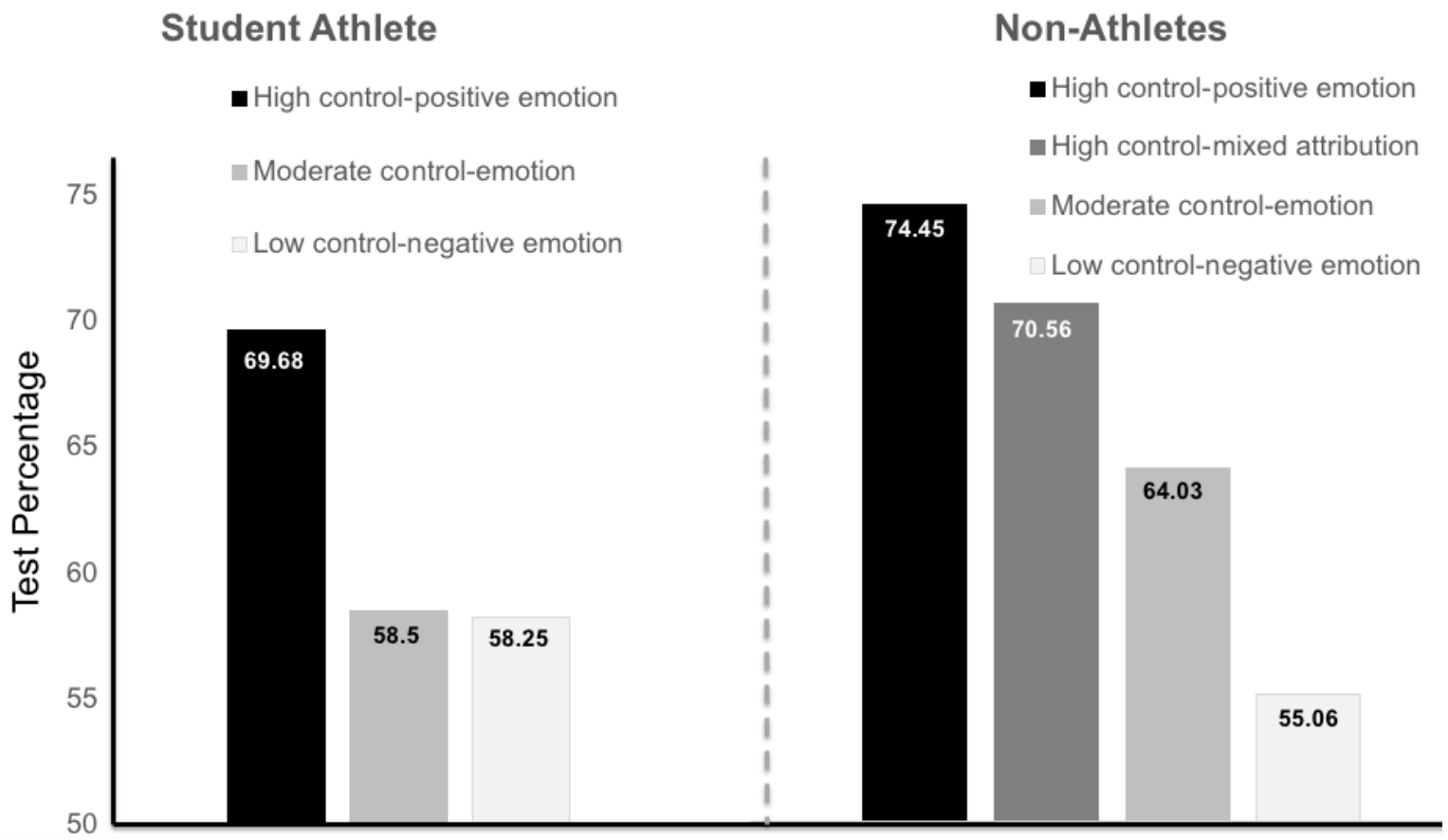
Standardized Scores of Cognitions and Emotions for Student-Athlete and Student Non-Athlete Profiles



Note. Latent motivation profiles are displayed based on standardized scores of student-athletes' and student non-athletes' attributions for poor performance (strategy and ability), perceived academic control (labelled control), hope, perceived stress, and helplessness. A latent profile analysis is conducted for student-athletes and student non-athletes separately using motivation-related measures which are separated into cognitions (Panel A) and emotions (Panel B) for explication.

Fig. 2

Test Performance for Student-Athlete and Student Non-Athlete Profiles



Note. Test performance means are displayed for each attribution-based profile (separately for student-athletes and student non-athletes).