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2   Goal motives and well-being in student athletes: A person-centered approach

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4   Laura C. Healy

5   Nottingham Trent University

6   Nikos Ntoumanis

7   Curtin University

8   Calum A. Arthur

9   UK Sport

10

11   Laura C. Healy, Sport, Health and Performance Enhancement (SHAPE) Research Group,

12   School of Science & Technology, Nottingham Trent University, UK. Nikos Ntoumanis,

13   School of Psychology, Physical Activity and Well-Being Research Group, Curtin University,

14   Western Australia. Calum Arthur, UK Sport, London, U.K.

18   Please address all correspondence to: Laura C. Healy, Department of Sport Science, School

19   of Science and Technology, Nottingham Trent University, Clifton Campus, Clifton Lane,

20   Nottingham, NG11 8NS, UK. email: laura.healy@ntu.ac.uk.

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1   **Goal motives and well-being in student athletes: A person-centered approach**

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1   **Abstract**

2   Using a person-centered approach, the aim of this study was to examine how student-athletes

3   motives for multiple goal pursuit relate to indices of well- and ill-being. Student-athletes ($N =$

4   362) from British Universities identified their most important sporting and academic goals

5   that they were pursuing over the academic year. Participants rated their extrinsic, introjected,

6   identified, and intrinsic goal motives for each goal, and completed measures of well- and ill-

7   being. Latent Profile Analysis revealed six distinct profiles of goal motives, with variations in

8   both the strength of motives and the motivational quality. Follow-up analyses revealed

9   between-profile differences for well- and ill-being; students with more optimal goal motive

10   profiles reported higher and lower well- and ill-being respectively than those with less

11   optimal goal motives. To experience well-being benefits when pursuing multiple goals,

12   student-athletes should strive for their academic and sporting goals with high autonomous

13   and low controlled goal motives.

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15   Keywords: goal pursuit, self-concordance, dual career, multiple goals, latent profile analysis

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1   In daily life, the management of goals pursued simultaneously has been described as a

2   juggling act (Louro, Pieters, & Zeelenberg, 2007) and can present significant challenges for

3   individuals. People regularly strive for multiple goals within a single context, such as a

4   basketball player trying to develop their fitness whilst also improving their free-throw

5   percentage, or a student pursuing a goal to achieve specific grades within several academic

6   modules at one time. Equally, goals can be pursued in multiple contexts at the same time; for

7   example a student-athlete trying to maintain their academic performance whilst trying to

8   achieve their sporting goal of reaching major championships. Multiple goal pursuit is

9   challenging, requiring the careful self-regulation of time, energy, and resources in order to

10   bring about successful outcomes in a range of objectives (Riediger & Freund, 2004). Multiple

11   goals can facilitate each other (Riediger & Freund, 2004), however goal conflict, where the

12   pursuit of one goal hinders progress towards another being pursued simultaneously, can have

13   implications for psychological well-being (Gray, Ozer, & Rosenthal, 2017; Kelly, Mansell, &

14   Wood, 2015). Building on this literature, within the present study we examined how the

15   motives underpinning multiple goal pursuit across domains relate to well- and ill-being in

16   student-athletes.

17   The motives underpinning multiple goal striving - the reasons why individuals are

18   striving for their goals - can explain why some people are more successful in their goal

19   pursuits. In proposing the self-concordance (SC) model, Sheldon and Elliot (1999) suggested

20   that individuals can pursue goals with different goal motives, which may vary in the extent to

21   which they reflect their inherent values and interests. Aligned with the tenets of Self-

22   Determination Theory (SDT; Deci & Ryan, 2000), these motives can be broadly defined as

23   autonomous or controlled. Autonomous goal motives reflect intrinsic or identified motivation

24   regulations, whereby individuals are pursuing goals because of the enjoyment the goal

25   provides, or the personal importance, value or interest in the goal. Conversely, controlled

1	goal motives are a product of striving due to external (e.g., to obtain rewards, avoid

2	punishment or to gain the approval of others) or internal (e.g., the avoidance of unpleasant

3	emotions such as guilt or anxiety; Sheldon & Elliot, 1999) pressures, reflecting introjected

4	and extrinsic motivation regulations. When proposing the SC model, Sheldon and Elliot

5	suggested that goals pursued with more self-concordant motives (i.e. higher autonomous and

6	lower controlled motives) lead to benefits for goal attainment and psychological well-being.

7	Research have supported the main tenets of the SC model, in work (Judge, Erez,

8	Bono, & Locke, 2005), education (Gaudreau, 2012; Sheldon & Houser-Marko, 2001), and

9	sport (Gaudreau & Braaten, 2016; Smith, Ntoumanis, & Duda, 2007) contexts. Autonomous

10	goal motives have been found to be associated with a range of self-regulatory processes,

11	including persistence towards an increasingly difficult goal (Ntoumanis, Healy, Sedikides,

12	Duda, et al., 2014), adaptive coping strategies (Sanjuán & Ávila, 2018), and disengagement

13	from unachievable goals to allow for the reengagement in alternative goal pursuits

14	(Ntoumanis, Healy, Sedikides, Smith, & Duda, 2014). Despite the support for the SC model,

15	studies within the goal motives literature (and the motivation literature in general; Gillet &

16	Vallerand, 2016; Wormington & Linnenbrink-Garcia, 2017) have predominantly used

17	variable-centered approaches. Such approaches are important for some research questions, as

18	they allow for the examination of autonomous and controlled motives as independent

19	variables in association with related mediators (e.g. coping strategies, task appraisals) and

20	outcomes (e.g. goal attainment, well-being). However, it is plausible that individuals may

21	pursue important goals with various combinations of *both* autonomous and controlled goal

22	motives, which is difficult to fully examine within a variable-centered approach. A person-

23	centered approach can allow for the naturally occurring combinations of goal motives to be

24	examined in relation to outcomes related to goal pursuit, such as goal attainment and well-

25	being (Wormington & Linnenbrink-Garcia, 2017). Within the context of the present study, a

1   person-centered approach allows for the examination of how the actual combinations of goal

2   motives with which student-athletes pursue their goals relate to important outcomes in the

3   goal striving process.

4   To the best of our knowledge, only one study has used a person-centered approach in

5   relation to the motives for goal pursuit. Specifically, Healy, Ntoumanis, and Duda, (2016)

6   used latent profile analysis to create profiles based on student-athletes motives for their

7   academic and sporting goals that they were pursuing simultaneously. They subsequently

8   examined the between-profile differences in inter-goal facilitation (e.g. the extent to which

9   the pursuit of one goal facilitated progress in the other) and interference (e.g. how the pursuit

10   of one goal interfered with the pursuit of the other). Their analyses found support for three

11   distinct profiles of motives, with varying degrees of autonomous and controlled goal motives

12   for both goals. Importantly, the profiles with higher levels of autonomous goal motives

13   experienced higher levels of inter-goal facilitation between their multiple goal pursuits,

14   regardless of their level of controlled goal motives. There were no differences in inter-goal

15   interference; participants across all profiles reported moderate levels of interference between

16   their sporting and academic goals. The authors suggested that more adaptive forms of

17   motivation might not stop goals in multiple domains interfering with each other, whilst

18   recognizing that further studies were needed to fully explore this finding.

19   **Goal Motives and Well-being**

20   In addition to variations in goal motives explaining goal self-regulatory processes,

21   autonomous and controlled goal motives have been found to have different relations with

22   well- and ill-being, often defined as the cognitive and affective evaluations an individual has

23   about their life (Diener, Oishi, & Lucas, 2009). This is of particular relevance within student-

24   athletes, where the competing demands of academic and sporting commitments can have

25   implications for well-being (Cosh & Tully, 2014; van Rens, Ashley, & Steele, 2019).

1   Autonomous goal motives have been shown to be related to enhanced well-being, both

2   directly (Healy et al., 2014; Miquelon & Vallerand, 2006; Sheldon, Ryan, Deci, & Kasser,

3   2004) and indirectly through goal attainment (Smith et al., 2007), psychological need

4   satisfaction (Bahrami & Cranney, 2018) and coping strategies (Sanjuán & Ávila, 2018). It has

5   also been shown that autonomous motives can protect against ill-being (Healy et al., 2014;

6   Miquelon & Vallerand, 2006), while controlled motives have been generally negatively or

7   unrelated to well-being, and positively related to ill-being (Gaudreau & Braaten, 2016; Healy

8   et al., 2014).

9   To the best of our knowledge, no research has examined how profiles of goal motives

10   are related to other outcomes proposed within the SC model, such as indicators of well- and

11   ill-being. This would represent a significant addition to the literature, as it is difficult to

12   examine the implications for well-being when individuals are pursuing goals with high levels

13   of both autonomous and controlled motives using variable-centered approaches. Adopting a

14   person-centered approach allows for the examination of the combinations of goal motivation

15   regulations that lead to the most adaptive outcomes in relation to well-being. Whilst research

16   in the wider SDT literature has shown associations between different motivation profiles and

17   well-being (Broeck, Lens, Witte, & Coillie, 2013; Gustafsson, Carlin, Podlog, Stenling, &

18   Lindwall, 2018), the implications for well- and ill-being when individuals are pursuing goals

19   with different combinations of motives is as yet unknown.

20   The vast majority of the SC model literature has examined the relations between

21   autonomous and controlled goal motives and well-being in relation to the pursuit of a single

22   goal. However, it is important to examine these relations when individuals are pursuing

23   multiple goals, particularly as a recent meta-analysis showed that goal conflict is associated

24   with poorer psychological well-being (Gray et al., 2017). A notable exception in the literature

25   is the work of Gorges, Esdar, and Wild (2014), who found that junior academics' conflict in

1   multiple goal pursuits was related to positive affect when goal self-concordance was high.

2   The opposite relation was found for negative affect; goal conflict was related to negative

3   affect when self-concordance was low. However, Gorges and colleagues only examined

4   multiple goal pursuit in one context, whereas the reality is individuals are often pursuing

5   goals across several domains (Louro et al., 2007).

6   **Aims and hypotheses**

7   This study expands on the research by adopting a person-centered approach to

8   examine relations between the motives for multiple goals and well-being. Our specific aim

9   was to examine how motives for simultaneously pursued academic and sporting goals relate

10   to student-athletes' well- and ill-being, using a person-centered approach. Based on previous

11   literature, we formulated two hypotheses. First, based on literature exploring goal specific

12   and global motivation (e.g., Healy et al., 2016; Langan et al., 2016), we expected that

13   students would pursue their academic and sporting goals with a diverse range of goal

14   motives. Second, we expected that variations in the goal motives across these profiles would

15   explain differences in indicators of well- and ill-being. Specifically, we anticipated that

16   profiles where participants reported better quality goal motives for their sporting and

17   academic goals (i.e., higher autonomous and lower controlled motives) would have higher

18   well- and lower ill-being than participants in profiles with less optimal motives (i.e., higher

19   controlled, lower autonomous motives).

20   **Materials and Methods**

21   **Participants**

22   We recruited 362 student-athletes (202 male, 160 female, Mage = 20.35 SD = 2.03

23   years) from eight British universities. Students needed to be formally registered as a student

24   at the university, and represent their university in British University and College Sport

25   (BUCS) competitions. The student-athletes came from a range of team (n = 253; e.g. hockey)

1   and individual ($n = 109$; e.g. golf) sports, had been competing in these sports on average for

2   9.55 years ($SD = 4.45$), and competed at university ($n = 112$), county ($n = 41$), regional ($n = $

3   52), national ($n = 72$) and international ($n = 78$) levels of competition (seven athletes did not

4   respond). One hundred and fourteen athletes (32.2% of the sample) received a scholarship for

5   their studies based on their athletic performance.

6   **Measures**

7   **Personal goal motives.** Student-athletes identified their most important goal for both

8   their sporting and academic pursuits that they were currently working towards, and would

9   continue to work towards over the academic year. Athletes were given no instruction on the

10   types of goals (i.e. performance, process, outcome goals) they should report. Athletes

11   subsequently rated their personal goal motives for each of these goals, using four items from

12   previous goal motives research (Sheldon & Elliot, 1999). Specifically, participants rated on a

13   1 (*Not at all*) to 7 (*Very much so*) scale the extent to which they were pursuing each goal with

14   extrinsic ("Because someone else wants you to"), introjected ("Because you would feel

15   ashamed, guilty, or anxious if you didn't"), identified ("Because you personally believe it's

16   an important goal to have") and intrinsic ("Because of the fun and enjoyment the goal

17   provides you") motives.

18   **Well- and ill-being.** We used a range of measures in order to assess different aspects

19   of well- and ill-being. We measured vitality (a measure of organismic well-being defined as a

20   " positive feeling of aliveness and energy"; Ryan & Frederick, 1997, p.529) using the five-

21   item Subjective Vitality Scale which has been used in previous literature (e.g., Bostic, Doris,

22   & Hood, 2000; Rouse et al., 2015). These items (e.g. "I have energy and spirit") were

23   assessed on a 1 (*Not true at all*) to 7 (*Very True*) Likert scale. As a measure of psychological

24   well- and ill-being, positive (four items; "happy", "joyful", "pleased", "enjoyment/fun") and

25   negative affect (five items; "frustrated", "depressed/blue", "unhappy", "angry/hostile",

1 "worried/anxious") were measured using items developed by Diener and Emmons (1984).

2 Finally, physical ill-being was measured using the Physical Symptoms Checklist (10

3 symptoms e.g. "Headache"; Emmons, 1991). The affect items and Physical Symptoms

4 Checklist were both measured on a 1 (*Not at all*) to 7 (*All the time*) Likert scale. For all of the

5 well- and ill-being measures, participants were asked to respond in relation to their general

6 experience (i.e. not domain specific) over the past week.

7 **Procedure**

8 Following institutional ethical approval from the first author's institution (Non-

9 Invasive Human Ethics Committee application number 17/18-08), participants were recruited

10 through contact with sport administrators, coaches and captains. Arrangements for data

11 collection were made via these individuals, which included participants completing a battery

12 of questionnaires either online (using the Survey Monkey and JISC online platforms) or in

13 person (e.g. before a training session). Data were collected over several academic years from

14 2013 to 2020. Regardless of how the data were collected, all participants were provided with

15 information about what their participation involved, including that their participation was

16 voluntary and of their right to withdraw from the study. All participants provided informed

17 consent prior to completing the questionnaire measures, which took around 15 minutes to

18 complete. Participants received no form of compensation for their involvement in the study.

19 **Data analysis**

20 Descriptive statistics and bivariate correlations were performed using SPSS Version

21 26 (IBM Corp., 2019). We conducted our primary analyses using MPlus software (Version

22 8.0: Muthén & Muthén, 1998-2012). To create goal motives profiles, we used Latent Profile

23 Analysis (LPA) using the maximum likelihood (ML) estimation. This approach allows for the

24 determination of profiles based on a combination of goodness-of-fit indices, theoretical

25 considerations and the nature of the classes (Gerber, Jonsdottir, Lindwall, & Ahlborg, 2014),

1   as well as testing if a more complex model offers a better solution to the data than one which

2   is more parsimonious. This analytic approach is appropriate for sample sizes of at least 100

3   participants (Williams & Kibowski, 2016). We used the four motivation regulations for both

4   the academic and sporting goal, resulting in eight variables in total.

5   We conducted analyses exploring three up to seven class solutions. To determine the

6   optimum number of classes, we primarily used the bootstrapped log-likelihood ratio test

7   (BLRT) as this has been shown to be more effective for smaller sample sizes (Nylund,

8   Asparouhov, & Muthén, 2007). We looked for a statistically significant ($p < .05$) BLRT value

9   to indicate that a model offered a better solution than a model with one less profile specified.

10   Additionally, we examined the Bayesian Information Criteria (BIC) and sample-size adjusted

11   BIC (SSA-BIC); lower values indicate better model fit. We also used the entropy criterion,

12   with values closer to 1 indicating a more accurate solution (Aldridge & Roesch, 2008; Berlin,

13   Williams, & Parra, 2014). Finally, we examined the conceptual plausibility of the profiles

14   generated within each model, in relation to our theoretical underpinnings. We avoided

15   solutions with small profiles, as they can present issues relating to power and precision

16   (Berlin et al., 2014).

17   We utilized the AUXILIARY function within MPlus (Muthén & Muthén, 1998-2012)

18   to examine between-profile differences in well- and ill-being. This approach uses a Wald chi-

19   square test and pairwise comparisons to analyze the between-profile differences in the mean

20   values for our outcome variables. We adjusted for multiple comparisons through false

21   positive rate control using the Benjamini-Hochberg procedure (Benjamini & Hochberg, 1995;

22   Glickman, Rao, & Schultz, 2014), and set the false positive rate to $d = .10$ (McDonald, 2014).

23   **Results**

24   **Preliminary Analyses and Descriptive Statistics**

1   Participants identified a range of sporting (e.g. "To get my highest goal count", "To

2   play for my country", "To increase strength and fitness") and academic (e.g. "Graduate with

3   1st class honours", "Get my first major research project published", "Pass the year") goals.

4   Following data entry, we screened the data for missing values. Two participants were

5   removed as their responses revealed that they did not compete in BUCS competitions (i.e.

6   they identified their main sport as gym exercise, and their sporting goal related to exercise

7   performance). Three participants failed to complete all of the goal motives items. Given the

8   importance of these values to our main analyses, we removed these participants from the

9   sample. Three further participants were removed as they had failed to complete any of the

10   measures of well- and ill--being. We checked for multivariate outliers using Malhalanobis'

11   distance (Tabachnick and Fidell, 2014). Five participants were potential outliers; however the

12   Cook's distance for all of these participants was less than 1. Aligned with established

13   guidelines and previous research (Gustafsson et al., 2018; Tabachnick & Fidell, 2014) we

14   chose not to remove these participants from the sample. This left a total sample of 354

15   participants.

16   While goal motives research has generally examined data from team and individual

17   athletes within the same analyses, based on the suggestion of an anonymous reviewer we

18   explored if there were any differences in goal motive regulations across the different sport

19   types within our sample. Given the range of sports included, we classified athletes into team

20   and individual sports, and conducted a one-way multivariate analysis of variance

21   (MANOVA) on the goal motives regulations. This revealed significant multivariate (Pillai's

22    $V = .07$, $F (8, 345) = 3.22$, $p = .002$, partial $\eta^2 = .07$) and univariate between group differences

23   for the extrinsic ($F (1, 352) = 5.74$, $p = .02$, partial $\eta^2 = .02$) and introjected ($F (1, 352) =$

24   6.65, $p = .01$, partial $\eta^2 = .02$) motives for the sporting goal, and the introjected ($F (1, 352) =$

25   13.10, $p < .001$, partial $\eta^2 = .04$) and intrinsic ($F (1, 352) = 3.86$, $p = .05$, partial $\eta^2 = .01$)

1   motives for the academic goal. Therefore, within our main analyses we included sport type as

2   a categorical variable to examine if there were any differences across the profiles.

3   <INSERT TABLE 1 ABOUT HERE>

4   The descriptive statistics, scale reliabilities and bivariate correlations are displayed in

5   Table 1. All multi-item measures demonstrated reliability (Cronbach α) above .70. Overall,

6   participants were pursuing their sporting goals with low extrinsic and introjected, and high

7   identified and intrinsic motives. There were more diverse motives for the academic goal.

8   Participants reported very high identified motives for their academic goal, along with

9   moderate intrinsic and introjected, and low extrinsic goal motives. Participants overall

10   reported higher well-being and lower ill-being.

11   <INSERT TABLE 2 ABOUT HERE>

12   **Latent Profile Analysis**

13   Based on the BLRT, BIC, SSA-BIC and entropy (Table 2), there was no clear cut-off

14   in terms of the number of potential classes; each new solution with one more profile offered a

15   better fit for the data. The BLRT was statistically significant for all analyses. However, when

16   running the seven profile solution the best likelihood value was not replicated even when

17   increasing the number of random starts, and inspection of this solution showed one class with

18   a small number of participants ($n = 16$; <5% of sample). Based on this, the better BLRT,

19   entropy values and the goal motive regulations in the different profiles, we accepted the

20   solution with six classes as our final model.

21   The motivation regulations for each of the six latent profiles are displayed in Figure 1,

22   expressed as standardized z-scores in relation to the sample mean of 0. There are no clear

23   criteria within the literature for high and low values, therefore we followed an approach

24   adopted by other studies (e.g., Gustafsson et al., 2018) when interpreting the nature of the

25   profiles. Specifically, we classified values of ± 1 SD as very high/low, ± 0.5 to 1 SD as

1   high/low, and -0.5 to 0.5 SD (encompassing 0) as above/below average. The classes are

2   presented in order from least to most adaptive, in line with our theoretical expectations.

3   Within the first class (n = 34; 9.6% of the sample), participants reported very high extrinsic,

4   and high introjected motives for both goals. Identified motives for the sporting goal were

5   above average, whereas the intrinsic motives for the sporting goal, and both the identified and

6   intrinsic motives for the academic goal were below average. Therefore, this class was

7   labelled "High Controlled Strivers". Class 2 (n = 20, 5.6%) was labelled as "Low

8   Autonomous Strivers", as within this class participants had below average intrinsic and low

9   identified motives for the academic goal, as well as very low identified and intrinsic motives

10   for the sporting goal. Participants also reported high extrinsic and very high introjected

11   motives for the sporting goal. The extrinsic and introjected motives for the academic goal

12   were below and above average, respectively. Participants within Class 3 (n = 32; 9%)

13   reported lower than group mean values for all goal motive regulations for both goals; thus

14   this profile was named "Low Motive Strivers". Class 4 contained the largest number of

15   participants (n = 118; 33.3%) and presented a somewhat mixed profile. Extrinsic motives for

16   the sporting goal were low, introjected motives for the academic goal were high, and all of

17   the other goal motive regulations for both goals were above average, with the exception of

18   intrinsic motives which were below average. Therefore, this profile was named "Mixed

19   Motive Strivers". Class 5 (n = 68; 19.2%) was labelled "High Motive Strivers", as for both

20   goals all of the goal motive regulations were above the group mean. Extrinsic motives for

21   both goals were high, whilst all of the other goal motives were above average. Finally, Class

22   6 (n = 82; 23.2%) had below average to low controlled (e.g. extrinsic and introjected) and

23   above average autonomous (e.g. identified and intrinsic) motives for both goals. As such, we

24   named this profile "Self-Concordant Strivers". We deemed the "Self-Concordant Strivers" to

25   be the most optimal motivational profile, given the relative high autonomous and low

1   controlled motives for both goals. Both the "High Controlled Strivers" and the "Low

2   Autonomous Strivers" were deemed to be of the poorest motivational quality; the former

3   because of the high controlled motives and the latter because of the low autonomous motives

4   for both goals.

5   In relation to sport type (i.e., team or individual), the results showed that participants

6   in the "Self-Concordant Strivers" class were more likely to be from an individual sport than

7   those in the "Mixed Motive Strivers" class (OR = 2.46, 95% CI [0.90, 4.67], p = .01), the

8   "High Motive Strivers" class (OR = 1.95, 95% CI [0.70, 3.78], p = .01) and the "High

9   Controlled Strivers" (OR = 2.76, 95% CI [0.72, 6.48], p = .05). The "Mixed Motive Strivers"

10   were less likely to be from an individual sport than the "Low Motive Strivers" (OR = 0.32,

11   95% CI [0.09, 0.74], p = .05) and the "High Motive Strivers" (OR = 0.79, 95% CI [0.29 –

12   1.50], p = .01). Within the latter two classes, the "Low Motive Strivers" were more likely to

13   be from an individual sport than the "High Motive Strivers" (OR = 2.47, 95% CI [0.65 –

14   5.89], p = .05).

15   <INSERT FIGURE 1 ABOUT HERE>

16   **Between-Class Analyses**

17   Visual inspection of the mean well- and ill-being values (Table 3) across the classes

18   revealed that the "Self-Concordant Strivers" had the highest well- and lowest ill-being scores

19   respectively. Conversely, the "Low Autonomous Strivers" reported the lowest well- and

20   highest ill-being scores across the classes. These descriptive findings were supported by the

21   results of the AUXILIARY analyses, which revealed between-class differences for all of the

22   indicators of well- and ill-being. In relation to well-being, the "High Motive Strivers" (Wald

23   χ^2 = 11.84, p = .001, Hedges' g = .92), the "Self-Concordant Strivers" (Wald χ^2 = 21.09, p <

24   .001, Hedges' g = .96) and the "Mixed Motive Strivers" (Wald χ^2 = 6.70, p = .01, Hedges' g

25   = .57) all reported significantly higher subjective vitality than the "Low Autonomous

1   Strivers" class (Global Wald χ^2 = 25.97, p < .001). For positive affect (Global Wald χ^2 =

2   14.96, p = .01), the "High Motive Strivers" (Wald χ^2 = 7.03, p = .008, Hedges' g = 81), the

3   "Self-Concordant Strivers" (Wald χ^2 = 10.98, p = .001, Hedges' g = .91), and the "Mixed

4   Motive Strivers" (Wald χ^2 = 5.72, p = .02, Hedges' g = .62) reported significantly higher

5   positive affect than the "Low Autonomous Strivers".

6   For the indicators of ill-being, the participants in the "Low Autonomous Strivers"

7   class reported significantly higher negative affect than the "Low Motive Strivers" (Wald χ^2 =

8   6.28, p = .01, Hedges' g = .70) and the "Self-Concordant Strivers" (Wald χ^2 = 12.41, p <

9   .001, Hedges' g = .88). The "Self-Concordant Strivers" also reported lower negative affect

10   than the "Mixed Motive Strivers" (Wald χ^2 = 9.38, p = .002, Hedges' g = .47), the "High

11   Controlled Strivers" (Wald χ^2 = 14.28, p < .001, Hedges' g = .74) and the "High Motive

12   Strivers" (Wald χ^2 = 6.04, p = .01, Hedges' g = .40; Global Wald χ^2 = 24.30, p < .001). For

13   physical symptoms of ill-being, the "Self-Concordant Strivers" reported significantly lower

14   symptoms than the "High Motive Strivers" (Wald χ^2 = 8.28, p = .004, Hedges' g = .47) and

15   the "High Controlled Strivers" (Wald χ^2 = 6.34, p = .01, Hedges' g = .49; Global Wald χ^2 =

16   15.62, p = .008).

17   <INSERT TABLE 3 ABOUT HERE>

18   **Discussion**

19   The aim of the present study was to examine, using a person-centered approach, how

20   profiles of academic and sporting goal motives relate to student-athletes well- and ill-being.

21   We hypothesized that 1) student athletes would pursue their academic and sport goals with a

22   broad range of goal motives and 2) more adaptive motivational profiles (i.e., higher

23   autonomous and lower controlled goal motives) would be associated with higher and lower

24   well- and ill-being respectively, and our findings support these hypotheses. Within our

25   sample, there were six distinct goal motives profiles with student-athletes across these

1   profiles reporting a wide range of goal motives for their sporting and academic goals. The

2   profiles found in the present study are more diverse than those found within the previous

3   literature (Healy et al., 2016), with greater distinction between the quality and quantity of

4   motivation for both the sporting and academic goals. Within the wider SDT literature,

5   person-centered research examining the motivation regulations for engagement in sporting

6   and other contexts has shown variations across samples, both in relation to the number of

7   profiles identified, and the composition of those profiles (Gillet, Berjot, Vallerand, Amoura,

8   & Rosnet, 2012; Gustafsson et al., 2018; Wang, Morin, Ryan, & Liu, 2016). Thus, it is

9   perhaps not surprising that that the goal motives profiles identified within the present

10   research differ from those within the extant literature.

11   The profiles found within the present study do highlight some interesting aspects

12   about how student-athletes pursue their goals. It is surprising to observe that the profile

13   representing the largest number of participants reported mixed goal motives for both of their

14   goals, and less than a quarter of the student-athletes reported optimum motivation for both

15   goals. While not examined within the context of this study, the previous literature has shown

16   that the motives underpinning goal pursuit can have important implications for goal

17   attainment (Bahrami & Cranney, 2018; Gaudreau & Braaten, 2016; Ntoumanis, Healy,

18   Sedikides, Duda, et al., 2014; Smith et al., 2007). As such, it is important to consider

19   whether, within the context of U.K. university sport, student-athletes may need support from

20   coaches, lifestyle advisors and academic staff to pursue both their academic and sporting

21   goals with the most adaptive of motives.

22   In relation to our second hypothesis, we found variations across the goal motives

23   profiles for all of the indicators of well-and ill-being in line with our expectations. The profile

24   with the most optimal motives for goal pursuit (i.e., the "Self-Concordant Strivers") reported

25   higher well-being than the profiles with low autonomous (i.e., the "Low Autonomous

1   Strivers") or high controlled motives (i.e., the "High Controlled Strivers"). It is interesting to

2   note that profiles with above average autonomous motives for at least one of their goals (i.e.,

3   the "Mixed Motive Strivers" and "High Motive Strivers") also largely reported higher well-

4   being than profiles with lower autonomous motives, despite also having above average

5   controlled motives for at least one goal. However, it does appear that there is a limit to these

6   benefits, as while the "Mixed Motive Strivers" and "High Motive Strivers" reported better

7   well-being than the least optimal profiles, their levels were significantly lower than the "Self-

8   Concordant Strivers". Our findings relate to previous multiple goals research which

9   suggested that having higher autonomous motives for a least one goal can have benefits for

10   well-being (Gorges et al., 2014), and provide further support for adopting person-centered

11   approaches to examine motivation for goal pursuit (Gillet & Vallerand, 2016). The findings

12   also broadly align with the wider motivation literature (e.g., Langan et al., 2016) that has

13   suggested controlled motivation is not necessarily detrimental to well-being, as long as it is

14   accompanied by high levels of autonomous motivation. However, our results do suggest that

15   these benefits only exist when making comparisons with profiles with poorer quality of

16   motivation. Thus, in order to experience the greatest benefits for well-being, it is important

17   that student-athletes are supported to pursue their academic and sporting goals with the

18   highest quality of motives (i.e., high autonomous and low controlled).

19   In relation to ill-being, we found that the most optimal profile reported the lowest

20   levels of negative affect and physical symptoms, which were significantly lower than the

21   least optimal profiles. This supports previous research which has shown that autonomous

22   goal motives can provide a buffering effect on ill-being (Healy et al., 2014; Sanjuán & Ávila,

23   2018). However, our results extend the literature in this area, as our person-centered approach

24   has identified that this buffering effect only occurs when levels of controlled motives are low

25   in relation to autonomous motives. The "Mixed Motive Strivers" and the "High Motive

1   Strivers" both reported above average autonomous motives, but also above average to high

2   controlled motives for at least one of their goals, and reported significantly higher levels of

3   ill-being than the "Self-Concordant Strivers" who had above average autonomous motives

4   and below average to low controlled motives for both goals. This finding might be explained

5   by goal ambivalence, defined as mixed feelings or thoughts about pursuing a goal, which has

6   been shown to mediate the relationship between goal self-concordance and well-being

7   (Koletzko, Herrmann, & Brandstätter, 2015). As such, it is plausible that when student-

8   athletes have mixed feelings about the reasons why they are pursuing their goals there are

9   consequences for their ill-being.

10   A further interesting finding in relation to ill-being is that "Low Motive Strivers"

11   reported lower levels of negative affect than the "Low Autonomous Strivers", despite

12   reporting low levels of all goal motive regulations for both goals. This could be explained in

13   two ways. On one hand, it could be that the relatively low levels of controlled goal motives

14   reported by participants in this profile results in fewer negative thoughts associated with goal

15   pursuit. Alternatively, the low levels of all goal motivation regulations could be reflective of

16   low commitment to both their academic and sporting goals (Klein, Wesson, Hollenbeck, &

17   Alge, 1999). Thus, they may be less likely to experience challenges in the management of

18   these goals, in comparison to other profiles who may have higher levels of (suboptimal) goal

19   motives. However, given our research is the first to examine how different combinations of

20   goal motives for multiple goals are associated with well- and ill-being, it is important that

21   further research is conducted to replicate our findings within different populations.

22   A surprising finding from our research, which was not originally part of our research

23   question, relates to the differences in goal motives reported in student-athletes from team and

24   individual sports. To the best of our knowledge, research has generally found that motivation

25   regulations are not a function of sport type (Gillet, Berjot, & Rosnet, 2009), however our

1   study has shown that athletes from individual sports were more likely to belong to specific

2   profiles, including the one deemed most optimal for goal pursuit and well-being. While

3   unexpected, this finding may be explained by the contextual differences experienced in goal

4   pursuit, as it is suggested both theoretically (Deci & Ryan, 2000; Duda, 2013; Mageau &

5   Vallerand, 2001) and empirically (Adie, Duda, & Ntoumanis, 2008; Amorose & Anderson-

6   Butcher, 2015; Healy et al., 2014; Smith, Ntoumanis, Duda, & Vansteenkiste, 2011) that

7   motivation can be influenced by aspects of the social environment. It is possible that the

8   differences in the social environment between team and individual sports influenced the

9   motives with which student-athletes were pursing their goal. Equally, it has been shown that

10   both goals and their underpinning motives can be influenced by others (Aarts, Gollwitzer, &

11   Hassin, 2004; Ntoumanis, Healy, Sedikides, Duda, et al., 2014). Therefore, it may be that for

12   at least their sporting goals, team sport athletes were either pursing goals that they were less

13   personally invested in (i.e., team goals that were not important to the individual), or their goal

14   motives were influenced by team mates with suboptimal motives. These findings warrant

15   further investigation in future studies.

16   **Limitations and Future Directions**

17   This research is an important addition to the literature, given the lack of person-

18   centered studies in goal motives research. We have extended the knowledge in this area by

19   examining how profiles of motives for multiple goals are associated with indicators of well-

20   and ill-being when pursuing goals in different domains, using a sample of student-athletes

21   competing at a very high standard of competition. Despite this and other strengths of our

22   research, including the use of validated measures and our sophisticated analytical strategy,

23   some limitations should be acknowledged. First, the cross-sectional nature of our data means

24   that it is hard to draw conclusions about the longer-term implications of pursuing multiple

25   goals with the various profiles of motives discovered in the present study. Extending the

1   present research over the course of a competitive season or academic year would give a

2   greater insight into the experiences of student-athletes simultaneously pursuing their

3   academic and sporting goals. Research has not examined the replicability or stability of goal

4   motives profiles, nor which combination of motives lead to the attainment of multiple goals.

5   As such, there would be significant merit in future studies attempting to replicate profiles

6   within the same student athletes from one year to the next. This is particularly important

7   given the theoretical assumptions that goal motives are dynamic and influenced by the social

8   environment; for instances it is plausible that the change in motive may be different across

9   different athletes or different sports. Latent Profile Transition Analysis (LPTA), an analytical

10   technique which allows for the examination of profiles across time and has recently been

11   applied within sporting contexts (Martinent & Decret, 2015), may be a useful way to address

12   the limitations within our work.

13   A second limitation of our work relates to the goal motives measures used in the

14   study. These single-item measures have been used extensively in the goal striving literature

15   (Gillet, Lafrenière, Huyghebaert, & Fouquereau, 2015; Judge et al., 2005; Sheldon & Elliot,

16   1999). However, using single-item measures may be problematic, as we are not able to assess

17   the internal reliability of the measures and these items may be vulnerable to measurement

18   error. Nevertheless, the correlations between the different goal motives in the present study

19   were consistent with the existing theoretical and empirical research. In light of this potential

20   issue for our own work and the literature in general, future research may wish to develop a

21   multiple-item questionnaire that allows for the in-depth exploration of each goal motivation

22   regulation.

23   The final limitation relates to our study and the literature as a whole. To the best of

24   our knowledge, no studies have been conducted to develop, apply and evaluate interventions

25   that support athletes to pursue their goals with the most optimal motivation. Research has

1   shown that goal motives can be influenced by others within the social environment, such as

2   coaches and teammates (Healy et al., 2014; Ntoumanis, Healy, Sedikides, Duda, et al., 2014;

3   Smith, Ntoumanis, & Duda, 2010). However, no research demonstrates the mechanisms

4   through which individuals can become more autonomous in their goal motives. Furthermore,

5   research could investigate if intervening to promote more adaptive goal striving in one

6   domain (e.g. sport) could have beneficial effects for goal pursuits in another domain (e.g.

7   education). Such studies would be important for the literature and would have widespread

8   practical implications.

9   In addition to the avenues already outlined, future research can further develop the

10   understanding of effective goal pursuit in several ways. For example, it would be worthwhile

11   to explore motives for single goals using a person-centered approach, given that the present

12   study and previous research (Healy et al., 2016) shows that individuals can pursue multiple

13   goals with a range of goal motives profiles. Additionally, there are other aspects of goal self-

14   regulation, such as goal adjustment, the disengagement from unattainable goals and

15   reengagement in alternative goals (Lebeau et al., 2018; Ntoumanis, Healy, Sedikides, Smith,

16   et al., 2014; Smith & Ntoumanis, 2014), which have been linked to differences in individual

17   goal motives. As such, it would be worthwhile for research to examine how person-centered

18   examinations of goal motives can explain differences in a range of self-regulatory processes,

19   including the self-regulation of multiple goals. For instance, it would of interest to understand

20   if the motives underpinning goal pursuit can predict whether individuals can disengage from

21   one goal in order to increase the likelihood of attaining another goal being simultaneously

22   pursued (c.f. Ntoumanis & Sedikides, 2018). Finally, given that goal motives have been

23   shown to be influenced by important others, including coaches (Healy et al., 2014; Smith,

24   2016) and other individuals engaged in goal pursuit (Ntoumanis, Healy, Sedikides, Duda, et

25   al., 2014), it would also be worthwhile to examine these variables as predictors of profile

1   membership. Of particular relevance to the present study would be exploring if student-

2   athletes are more likely to have adaptive motives for both their sporting and academic goals if

3   their coach uses an interpersonal style which is high in needs-supportive (Mageau &

4   Vallerand, 2001) and low in need thwarting (Bartholomew, Ntoumanis, & Thøgersen-

5   Ntoumani, 2010) behaviors.

6   **Conclusion**

7   To conclude the present study has extended the goal motives and multiple goal

8   literature by demonstrating how different profiles of student-athletes academic and sporting

9   goal motives relate to indices of well- and ill-being. Specifically, in order to promote benefits

10   for well-being, it is important that student-athletes are pursuing both goals with higher

11   autonomous, and lower controlled goal motives. Furthermore, high autonomous goal motives

12   cannot protect well-being for student-athletes when controlled goal motives are also high.

13

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7

1   Table 1.

2   *Descriptive Statistics, Internal Reliabilities, and Bivariate Correlations among Study Variables*

		M	SD	α	1	2	3	4	5	6	7	8	9	10	11
1.	Sport Extrinsic Goal Motives	2.25	1.52	-	-										
2.	Sport Introjected Goal Motives	2.97	1.74	-	.43***	-									
3.	Sport Identified Goal Motives	5.61	1.30	-	.01	-.004	-								
4.	Sport Intrinsic Goal Motives	5.90	1.18	-	-.15**	-.16**	.38***	-							
5.	Academic Extrinsic Goal Motives	2.77	1.74	-	.49***	.30***	.07	.05	-						
6.	Academic Introjected Goal Motives	4.14	1.86	-	.27***	.54***	.03	-.08	.49***	-					
7.	Academic Identified Goal Motives	5.95	1.17	-	-.08	.02	.28***	.11*	-.09	.06	-				
8.	Academic Intrinsic Goal Motives	4.22	1.72	-	-.03	.01	.12*	.22***	-16**	-.11*	.38***	-			
9.	Physical Symptoms	2.59	1.00	.79	.18***	.17**	.03	-.08	.12*	.14**	-.02	-.06	-		
10.	Subjective Vitality	4.33	1.23	.91	-.12*	-.13**	.08	.22***	-.09	-.24***	.04	.23***	-.30**	-	
11.	Positive Affect	5.02	1.04	.88	-.09	-.13*	.16**	.32***	.03	-.16**	.12*	.16**	-.08	.64***	-
12.	Negative Affect	3.16	1.29	.84	.16**	.19***	-.02	-.19**	.19**	.24***	-.08	-.07	.47***	-.44***	-.35***

3   *Note*: * *p* < .05, ** *p* < .01, ** *p* < .001

1   Table 2.

2   *Fit Indices, Entropy, and Model Comparisons for Estimated Latent Profile Analysis Models*

Model	BLRT	BIC	SSA-BIC	Entropy	LMR
Three classes	<.001	10563.39	10446.01	.79	.007
Four classes	<.001	10510.74	10361.64	.82	.09
Five classes	<.001	10491.38	10310.55	.84	.39
Six classes	<.001	10465.18	10252.63	.87	.25
Seven classes	<.001	10450.136	10205.86	.89	.41

3   *Note.* BLRT = Boostrapped loglikelihood ratio test significance value; BIC = Bayesian
4   Information Criterion; SSA-BIC = Sample Size Adjusted Bayesian Information Criterion;
5   LMR = Lo-Mendell-Rubin likelihood ratio test significance value.

1   Table 3.

2   *Wald chi-square test vales, means and standard deviation of indices of well- and ill- being for each of latent profiles.*

	Global χ^2	Class 1 High Controlled Strivers n = 34 M(SEM)	Class 2 Low Autonomous Strivers n = 20 M(SEM)	Class 3 Low Motive Strivers n = 32 M(SEM)	Class 4 Mixed Motive Strivers n = 118 M(SEM)	Class 5 High Motive Strivers n = 68 M(SEM)	Class 6 Self-Concordant Strivers n = 82 M(SEM)	Summary
Subjective Vitality	25.97**	3.95(.22)	3.43(.26)	4.28(.25)	4.17(.1)	4.45(.13)	4.84(.17)	2<4,5,6; 1,4<6
Positive Affect	14.96*	4.81(.19)	4.27(.29)	4.79(.20)	5.02(.11)	5.11(.12)	5.32(.12)	2<4,5,6
Physical Symptoms	15.16**	2.85(.17)	2.98(.27)	2.36(.20)	2.56(.11)	2.81(.12)	2.32(.12)	1,5<6
Negative Affect	24.30**	3.66(.22)	3.89(.32)	2.85(.27)	3.33(.14)	3.17(.15)	2.64(.16)	2>3,6; 1,4,5>6

3

4   *Note*. Summary indicates significantly different means when applying the Benjamini Hochberg procedure d = .10. * = $p < .05$, ** = $p < .01$.

5   Profiles are presented from left to right from the least to most adaptive goal motivation regulations.

6
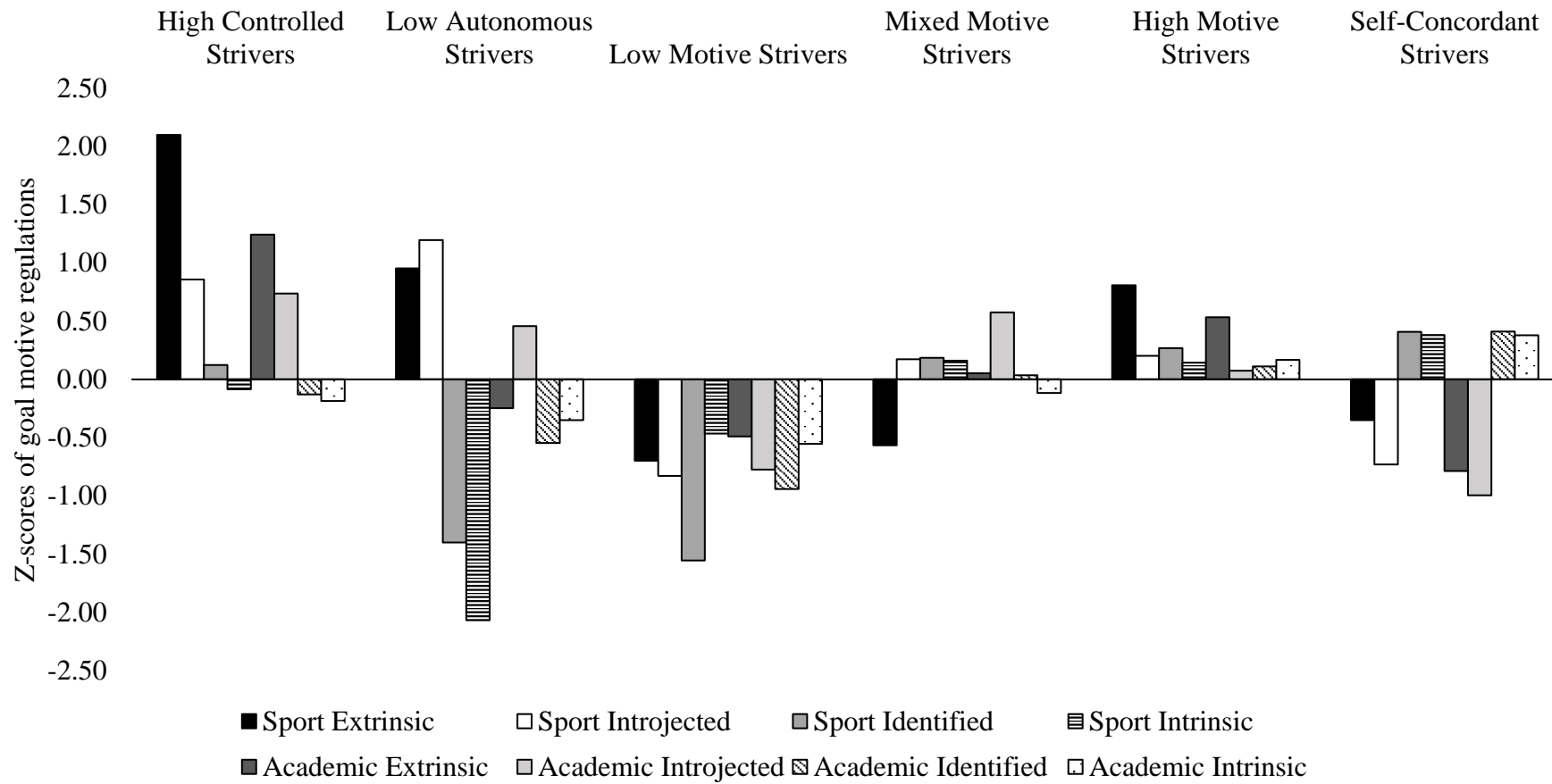
1

2 *Figure 1.* Graphical representation of the sporting and academic goal motivation regulations for the six identified profiles. Values for each goal

3 motives are expressed as z scores in relation to the sample mean. Profiles are presented from left to right from the least to most adaptive goal

4 motivation regulations.

5