

## Page Proof Instructions and Queries

**Journal Title:** International Journal of Sports Science & Coaching (SPO)

**Article Number:** 887300

Thank you for choosing to publish with us. This is your final opportunity to ensure your article will be accurate at publication. Please review your proof carefully and respond to the queries using the circled tools in the image below, which are available by clicking “Comment” from the right-side menu in Adobe Reader DC.\*

Please use *only* the tools circled in the image, as edits via other tools/methods can be lost during file conversion. For comments, questions, or formatting requests, please use . Please do *not* use comment bubbles/sticky notes .



\*If you do not see these tools, please ensure you have opened this file with Adobe Reader DC, available for free at [get.adobe.com/reader](http://get.adobe.com/reader) or by going to Help > Check for Updates within other versions of Reader. For more detailed instructions, please see [us.sagepub.com/ReaderXProofs](http://us.sagepub.com/ReaderXProofs).

No.	Query
	Please note, only ORCID iDs validated prior to acceptance will be authorized for publication; we are unable to add or amend ORCID iDs at this stage.
	Please confirm that all author information, including names, affiliations, sequence, and contact details, is correct.
	Please review the entire document for typographical errors, mathematical errors, and any other necessary corrections; check headings, tables, and figures.
	Please confirm that the Funding and Conflict of Interest statements are accurate.
	Please ensure that you have obtained and enclosed all necessary permissions for the reproduction of artistic works, (e.g. illustrations, photographs, charts, maps, other visual material, etc.) not owned by yourself. Please refer to your publishing agreement for further information.
	Please note that this proof represents your final opportunity to review your article prior to publication, so please do send all of your changes now.
AQ: 1	Please provide the details of the reviewer(s) of this article, per journal style, in the following format: Reviewer Name (University/Institution, Country)

# Comparing Masters athletes with varying degrees of coaching for psychological need satisfaction and frustration

**Matt D Hoffmann<sup>1,2</sup> , Bradley W Young<sup>2</sup>, Scott Rathwell<sup>3</sup>  and Bettina Callary<sup>1</sup>**

International Journal of Sports Science  
& Coaching  
0(0) 1–6  
© The Author(s) 2019  
Article reuse guidelines:  
[sagepub.com/journals-permissions](http://sagepub.com/journals-permissions)  
DOI: [10.1177/1747954119887300](https://doi.org/10.1177/1747954119887300)  
[journals.sagepub.com/home/spo](http://journals.sagepub.com/home/spo)



## Abstract

Exploratory research suggests Masters athletes (MAs; adult athletes  $>35$  years) derive benefits from the coached context. This study sought to compare groups of MAs with varying degrees of coaching for reports of psychological need satisfaction and frustration. A total of 561 individual sport MAs completed surveys assessing psychological need satisfaction and frustration. MAs self-categorized into one of three groups: (1) coached MAs ( $n = 284$ ), (2) moderately coached MAs ( $n = 92$ ), and (3) non-coached MAs ( $n = 185$ ). Analyses comprised ANOVAs followed by Games-Howell post hoc tests. Coached and moderately coached MAs reported greater relatedness satisfaction than non-coached MAs. Coached MAs also reported greater relatedness satisfaction than moderately coached MAs. Coached and moderately coached MAs reported greater autonomy frustration than non-coached MAs, whereas coached MAs reported lower relatedness frustration than moderately coached and non-coached MAs. The findings suggest the coached context assists adult athletes in fulfilling their need for belongingness. Similarly, results imply that receiving frequent exposure to coaching helps MAs experience lower feelings of relatedness frustration. Lastly, findings suggest that the structure provided by coaches can have the inevitable consequence of slightly frustrating MAs' autonomy. Future research should explore how coach-mediated processes explain MAs' psychological need satisfaction and frustration.

## Keywords

Adult athletes, basic needs, coaching, sport, thwarting

Masters athletes (MAs) are one of the fastest growing athletic cohorts in Westernized countries.<sup>1</sup> Adult athletes generally classify as MAs at 35 years of age,<sup>2</sup> with many competing into their 70s and 80s.<sup>3</sup> They are characterized by formal sport registration and a propensity to prepare for competition via regular training.<sup>3</sup> Though MAs remain understudied, the proliferation of Masters sport has prompted recent inquiries into the nature and impact of coaching in this context.<sup>4–8</sup> Exploratory work suggests MAs derive benefits from coaching, such as enhanced self-efficacy, performance, and sport interest.<sup>4</sup> MAs noted that coaches' effective communication resulted in social, health, and performance benefits,<sup>6</sup> and they appreciated how coaches fostered the social aspects of sport, were relatable, and motivated them through enjoyable interactions.<sup>7</sup> Santi et al.<sup>8</sup> found that healthy coach support predicted MAs' voluntary commitment to swimming, which in turn predicted MAs' participation in a

coached context. Finally, MacLellan et al.<sup>9</sup> underscored a coach's efforts to support the mature self-concept and autonomous learnings of adult canoe/kayak athletes. Overall, this body of research suggests a possible link between MAs' participation in the structured coached context and satisfaction of basic psychological needs.

Reviewer: ■ **[AQ1]**

<sup>1</sup>Department of Experiential Studies in Community and Sport, Cape Breton University, Sydney, Canada

<sup>2</sup>School of Human Kinetics, University of Ottawa, Ottawa, Canada

<sup>3</sup>Department of Kinesiology and Physical Education, University of Lethbridge, Lethbridge, Canada

## Corresponding author:

Matt D Hoffmann, Department of Experiential Studies in Community and Sport, Cape Breton University, Sydney, Nova Scotia, Canada.  
Email: matthieu.hoffmann@gmail.com

According to basic psychological needs theory,<sup>10</sup> humans have universal psychological needs for autonomy (sense of volition), competence (sense of mastery), and relatedness (sense of belongingness with others). Psychological needs satisfaction in sport has been associated with desirable outcomes such as subjective vitality, positive affect, and well-being.<sup>11</sup> Psychological need frustration—"the perception that need satisfactions are being obstructed or actively frustrated within a given context"<sup>12</sup> (p.78)—has emerged as a distinct, opposing construct to need satisfaction. Need frustration has been associated with harmful outcomes such as emotional and physical exhaustion,<sup>12</sup> depression, burnout, and negative affect.<sup>13</sup> Felton and Jowett<sup>14</sup> found younger adult athletes' perceptions of need frustration from coaches were related to lower performance and life satisfaction and greater depression and negative affect.

Although many studies have investigated motivation among MAs, few have related motivation to the coached context, and none have examined need satisfaction and frustration with respect to variability in exposure to a coached context. Medic et al.<sup>15</sup> sampled 71 track and field MAs and found that those exposed to coaching had higher self-determined motives (intrinsic motivation) than those who were not coached. They inferred that coaches support the organismic integration of extrinsic motives (i.e. help facilitate internalization of self-determined regulations). They suggested coaches indirectly foster athletes' effort, persistence, and psychological well-being, and recommended future researchers examine the basic psychological needs that may underpin MAs' intrinsic motivation within the coached context. Indeed, coaches' structure and involvement within the coached context is a salient contributor to athletes' progression in sport (competence) and sense of connectedness (relatedness).<sup>16</sup>

We sought to further explore the coached Masters sport context and extend Medic et al.'s<sup>15</sup> work by comparing coached, moderately coached, and non-coached MAs' reports of psychological need satisfaction and frustration. Based on the apparent benefits of participating in a coached context, we posited that coached and moderately coached MAs would report greater (H1) competence satisfaction and (H2) relatedness satisfaction, than non-coached MAs. The Masters sport literature provides little evidence that coached MAs experience more or less autonomy satisfaction as a result of training in a coached context; thus, we deduced (H3) there would be no group differences for autonomy. Given the total absence of research linking the coached Masters sport context with need frustration, we forwarded no hypotheses in this regard (i.e. exploratory approach).

## Method

### Participants

Participants were 561 individual sport MAs ( $M_{age} = 58.01$  years;  $SD = 11.33$ ; 279 males, 281 females, one undisclosed) whose primary sports were swimming (45.3%), cross-country running (17.3%) and track and field (13.9%), and various other summer and winter individual sports (23.5%). They were primarily from Canada (68.1%) and the USA (22.3%), with several countries representing the remaining 9.6%. The sample was predominantly Caucasian (93.5%). Although MAs reported competing across several competitive levels, their highest competitive participation was at international (32.4%), national (25.8%), provincial (12.2%), regional (11.8%), and recreational (17.9%) levels. MAs self-categorized into one of three groups: (1) MAs who were coached ( $n = 284$ ), (2) MAs who were moderately coached ( $n = 92$ ), and (3) MAs who did not have a dedicated coach ( $n = 185$ ). On average, coached MAs trained 4.29 times per week ( $SD = 1.55$ ) and were coached 2.87 times per week ( $SD = 1.56$ ), moderately coached MAs trained 4.71 times per week ( $SD = 1.92$ ) and were coached 1.53 times per week ( $SD = 1.52$ ), and non-coached MAs trained 4.77 times per week ( $SD = 1.77$ ) and were coached 0.14 times per week ( $SD = 0.59$ ).<sup>a</sup> Thus, coached MAs were coached approximately 67% of the time they trained, moderately coached MAs 32% of the time, and non-coached MAs only 3% of the time.

### Measures

**Psychological need satisfaction.** The 20-item Basic Needs Satisfaction in Sport Scale (BNSSS)<sup>17</sup> was used to assess needs satisfaction through five subscales: autonomy-choice (e.g. "In my sport, I get opportunities to make choices"), autonomy-internal perceived locus of causality (e.g. "I feel I am pursuing goals that are my own"), autonomy-volition (e.g. "I feel I participate in my sport willingly"), competence (e.g. "I feel I am good at my sport"), and relatedness (e.g. "I have close relationships with people in my sport"). We used a global autonomy satisfaction score in our analysis.<sup>18</sup> All MAs' responses were on a Likert scale anchored at 1 (*not true at all*) and 7 (*very true*). See Ng et al.<sup>17</sup> for support for the reliability and factorial validity of the BNSSS.

**Psychological need frustration.** The 12-item Psychological Need Thwarting Scale (PNTS)<sup>12</sup> measured the extent to which athletes felt their needs were actively frustrated in sport. It comprises three subscales: autonomy frustration (e.g. "I feel prevented from making choices with regard to the way I train"), competence frustration (e.g. "Situations occur in which I am made to feel

incapable”), and relatedness frustration (e.g. “I feel I am rejected by those around me”). All items were on a Likert scale anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). See Bartholomew et al.<sup>12</sup> for support for the reliability and factorial validity of the PNTS.

### Procedure

Following institutional ethics clearance, MAs were contacted via recruitment emails that were forwarded by directors of Masters sport organizations and through social media platforms controlled by Masters sport organizations. Recruitment messages contained a link to our SurveyMonkey online survey. In total, 744 MAs electronically consented to participate, provided demographic information, completed the BNSSS and PNTS, and responded to the self-categorization question (“Do you have a coach/instructor that regularly supports you in your primary sport?” Response options: Yes; Sometimes; No). Following removal of 117 participants whose data were unusable (i.e. participants exited the survey shortly after consenting), an additional 17 participants did not qualify based on age (<35 years)<sup>b</sup> and 14 were removed for not intentionally preparing to compete (i.e. trained zero times per week).<sup>2</sup> MAs responded to all items in relation to their current/recent involvement in their primary sport.

### Main analyses

Since we were interested in whether groups differed on individual outcome variables rather than a composite effect of the outcome variables, we conducted a series of one-way ANOVAs without first performing a MANOVA.<sup>19</sup> A Bonferroni correction was used to

adjust for multiple ANOVAs (.05/6 =  $p < .008$ ) and post hoc tests employed the Games-Howell procedure, which is robust to type 1 error and accounts for unequal sample sizes.<sup>20</sup> The following effect sizes for partial  $\eta^2$  guided interpretation of results: .01 (small), .06 (medium), and .14 (large).<sup>21</sup>

## Results

### Preliminary analyses

Missing data were negligible (< 1%); thus, missing values were not replaced. Univariate outliers (>three times the interquartile range) were identified through boxplots, resulting in the removal of 35 MAs. Consequently, the final sample comprised 561 MAs. Skewness and kurtosis values indicated no issues with normality (skewness < 3, kurtosis < 10).<sup>22</sup> Descriptive statistics, internal consistencies (omega total), and bivariate correlations are in Table 1. We explored potential covariates (number of times MAs trained per week, age) via a correlation matrix.<sup>23</sup> Correlations with outcome variables were low ( $r$ 's < .16), indicating that adjustments in the main analyses were unwarranted. Chi-square tests revealed no association between MAs' highest competition level and coaching status (coached, moderately coached, non-coached),  $\chi^2(8) = 10.68$ ,  $p = .221$ , but did indicate a gender imbalance across groups,  $\chi^2(2) = 35.52$ ,  $p < .001$ , percentages of females: 61.1% (coached); 51.1% (moderately coached); 33.0% (non-coached).<sup>c</sup>

### Psychological need satisfaction

Results revealed group differences for *relatedness* satisfaction,  $F(2, 552) = 25.39$ ,  $p < .001$ ,  $\eta_p^2 = .10$ .

**Table 1.** Bivariate correlations between dependent variables, and descriptive statistics according to coaching group status.<sup>a</sup>

Variables	1	2	3	4	5	6
1. Autonomy need satisfaction	(.78)	.50**	.48**	-.36**	-.37**	-.23**
2. Competence need satisfaction		(.88)	.37**	-.18**	-.25**	-.10*
3. Relatedness need satisfaction			(.87)	-.12**	-.24**	-.27**
4. Autonomy need frustration				(.71)	.56**	.39**
5. Competence need frustration					(.70)	.61**
6. Relatedness need frustration						(.76)
Skewness	-1.03	-1.11	-1.49	1.66	1.74	1.71
Kurtosis	.69	1.58	2.45	2.93	2.59	3.70
<i>M</i> (coached group)	6.41	6.05	6.44	1.69	1.41	1.42
SD	0.55	0.94	0.70	0.90	0.68	0.61
<i>M</i> (moderately coached group)	6.43	6.00	6.22	1.75	1.58	1.73
SD	0.48	0.99	0.78	0.94	0.72	0.90
<i>M</i> (non-coached group)	6.38	6.02	5.79	1.37	1.42	1.66
SD	0.61	0.86	1.13	0.60	0.61	0.77

<sup>a</sup>Internal consistencies (omega total) are on the diagonal. Subscale ranges are 1 and 7.

<sup>b</sup>\* $p < .05$ .

<sup>c</sup>\*\* $p < .01$ .

Coached MAs reported greater relatedness than non-coached ( $p < .001$ ) and moderately coached ( $p = .046$ ) MAs. Moderately coached MAs reported greater relatedness than non-coached MAs ( $p = .001$ ). There were no differences between groups on *autonomy* ( $p = .737$ ;  $\eta_p^2 = .00$ ) or *competence* satisfaction ( $p = .853$ ;  $\eta_p^2 = .00$ ).

### Psychological need frustration

Results revealed group differences on *autonomy* frustration,  $F(2, 554) = 13.76$ ,  $p < .001$ ,  $\eta_p^2 = .04$ . Coached MAs reported greater autonomy frustration than non-coached MAs ( $p < .001$ ); similarly, moderately coached MAs reported greater autonomy frustration than non-coached MAs ( $p = .002$ ). Coached and moderately coached MAs did not differ on autonomy frustration ( $p = .883$ ). There were also group differences on *relatedness* frustration,  $F(2, 555) = 8.75$ ,  $p < .001$ ,  $\eta_p^2 = .03$ . Coached MAs reported lower relatedness frustration than moderately coached ( $p = .008$ ) and non-coached ( $p = .002$ ) MAs. Moderately coached and non-coached MAs did not differ on relatedness frustration ( $p = .771$ ). There were no group differences on *competence* frustration ( $p = .085$ ;  $\eta_p^2 = .01$ ).

## Discussion

In this study, we compared groups of MAs with varying degrees of coaching on their perceptions of psychological need satisfaction and frustration. Results partially supported our hypotheses. Coached and moderately coached MAs did not report greater competence satisfaction than non-coached MAs; thus, H1 was not supported. Consistent with H2, coached and moderately coached MAs reported greater relatedness satisfaction than non-coached MAs. Coached MAs also reported greater relatedness satisfaction than moderately coached MAs. In support of H3, groups did not differ on reports of autonomy satisfaction. Results also revealed coached MAs had lower relatedness frustration scores than moderately coached and non-coached MAs, whereas coached and moderately coached MAs had greater autonomy frustration scores than non-coached MAs.

Our findings suggest the coaching environment is fruitful grounds for helping adult athletes fulfill their need for relatedness, with MAs feeling enhanced belongingness from exposure to coaching on a frequent (coached 67% of the time) and moderate (coached 32% of the time) basis. This finding supports research indicating coaches often make efforts to be relatable and establish friendships with MAs,<sup>4</sup> provide validation support to MAs,<sup>9</sup> and facilitate social connectedness among MAs.<sup>6</sup> Indeed, MAs often have strong

relationships with coaches that affect their well-being.<sup>7</sup> A complementary pattern of results emerged concerning MAs' relatedness frustration, with MAs receiving no coaching or moderate coaching reporting greater relatedness frustration than coached MAs. A coach enhances relatedness because of the direct relational interactions they have with athletes, but also because of how they indirectly shape an environment favoring belonging, and partly because many athletes are drawn to a coach for training in group contexts (e.g. swimmers).

Given qualitative work has described how MAs feel more confident and technically skilled as a result of coach support,<sup>4</sup> the lack of group differences for competence satisfaction was unexpected. It may be that non-coached MAs often feel quite competent and thus tend not to seek/require as much coach interaction, thereby negating expected group differences. Alternatively, it may be that attributing needs to global leadership characteristics, or mere immersion in a coached context (rather than assessing needs satisfaction/frustration related to more specific coach behaviors), is not suited to demonstrating associations with competency in one's skills. For example, previous research indicated that coaches' global leadership did not predict MAs' self-confidence.<sup>24</sup>

Low levels of need frustration were reported across all groups, which is a positive finding concerning MAs' sporting experiences. Still, coached and moderately coached MAs reported higher levels of autonomy frustration than their non-coached peers, which is interesting considering MAs with and without coaches did not differ in autonomy satisfaction. This finding provides support for the contention that greater need frustration does not equate with lower need satisfaction.<sup>12</sup> It is interesting to juxtapose our quantitative results concerning autonomy frustration with prior qualitative findings. MAs commonly describe how they prefer and appreciate coaches who plan workouts with structure, and who interact with them in a manner that holds them accountable to structured workouts.<sup>4</sup> While a preference for structure could be motivating, it may inevitably slightly constrain one's sense of volition.

A limitation of our study is that we did not explore how specific coach-mediated processes explained MAs' psychological needs. Future researchers might assess coaches' use of adult-oriented coaching practices<sup>5</sup> and autonomy-supportive or controlling behaviors<sup>16</sup> and their associations with MAs' need satisfaction/frustration. The overall frequency of immersion in a coached context may not be as important as frequent exposure to supportive coaching behaviors. For example, coaches who frequently exhibit adult-oriented coaching practices effectively explain/justify their coaching decisions,<sup>4,5</sup> which may help coached MAs experience

greater autonomy satisfaction and lower autonomy frustration.

In sum, this is the first study to explore MAs' psychological need satisfaction and frustration within the coached sport context. Our results suggest that coaches should be aware of the important role they serve in fostering a healthy climate that supports MAs' feelings of relatedness. Socially mediated sources of motivation are important for MAs' sport participation,<sup>1</sup> and given our results indicate coached MAs experience greater relatedness satisfaction (and lower relatedness frustration), this has important practical implications for recruiting and retaining adult sport participants through coached contexts. At the same time, in participating in a coached context, MAs are exercising their choice to have certain decisions about training structure made for them. This may necessarily increase MAs' perceptions of autonomy frustration but does not appear to diminish very high levels of autonomy satisfaction. In the end, Masters coaches and their sporting organizations should remain cognizant of the fact that, unlike in many youth or elite young adult sport contexts where training and competing in the presence of a coach is all but guaranteed, many MAs may have more flexibility in choosing whether or not to train in a coached context. Additionally, other MAs may not have the flexibility of choosing by whom they are coached, especially in communities with few Masters clubs, which often rely on limited (and sometimes make-shift) coaching staffs. The implication, therefore, is there is an onus on coaches of adults sportspersons to optimize their craft in part by shaping the environment in relation to basic needs to retain their athletic participants and/or enhance their athletes' sport experience. Our results highlight particular ways MAs may benefit from coached contexts, particularly those that promote social connections and fulfillment, and those where coaches navigate roles in providing structured training without constraining MAs' perceptions of autonomy.

## Acknowledgments

The authors would like to thank Chelsea Currie for her help with the recruitment of organizations and participants.

## Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iDs

Matt D Hoffmann  <https://orcid.org/0000-0002-8507-2358>  
Scott Rathwell  <https://orcid.org/0000-0001-8775-1664>

## Notes

- a. Error bars showing the 95% confidence intervals for MAs' training per week did not overlap across the three groups (i.e. coached, moderately coached, non-coached).
- b. Although participation in some Masters sports, such as swimming, can begin before age 35, we elected to remain consistent with Young's<sup>2</sup> definition of a MA and restrict our sample to those aged 35 or above.
- c. We conducted a series of two-way (coaching status by gender) ANOVAs for each dependent variable. None of the interaction effects were significant (all  $p$ 's  $> .152$ ), providing support that gender did not warrant inclusion in our main analyses.

## References

1. Weir PL, Baker J and Horton S. The emergence of Masters sport: participatory trends and historical developments. In: Baker J, Horton S and P Weir (eds) *The masters athlete: Understanding the role of sport and exercise in optimizing aging*. London: Routledge, 2010, pp.7–14.
2. Young BW. Psycho-social perspectives on the motivation and commitment of Masters athletes. In: Holt N and Talbot M (eds) *Lifelong engagement in sport and physical activity*. London: Routledge and International Council of Sport Science and Physical Education, 2011, pp.125–138.
3. Young BW, Callary B and Rathwell S. Psychological considerations for the older athlete. In: Braddock O, Cheung F, M Hogg, et al. (eds) *Oxford research encyclopedia of psychology*. New York, NY: Oxford University Press, 2018, pp.1–26.
4. Callary B, Rathwell S and Young B. Masters swimmers' experiences with coaches: what they want, what they need, what they get. *SAGE Open* 2015; 5: 1–14.
5. Callary B, Rathwell S and Young BW. Alignment of masters swim coaches' approaches with the andragogy in practice model. *Int Sport Coach J* 2017; 4: 177–190.
6. Ferrari G, Bloom GA, Gilbert WD, et al. Experiences of competitive masters swimmers: desired coaching characteristics and perceived benefits. *Int J Sport Exerc Psychol* 2017; 15: 409–422.
7. Rathwell S, Callary B and Young BW. Exploring the context of coached masters swim programs: a narrative approach. *Int J Aquat Res Educ* 2015; 9: 70–88.
8. Santi G, Bruton A, Pietrantoni L, et al. Sport commitment and participation in masters swimmers: the influence of coach and teammates. *Eur J Sport Sci* 2014; 14: 852–860.
9. MacLellan J, Callary B and Young BW. Same coach, different approach? How Masters and youth athletes perceive learning opportunities in training. *Int J Sports Sci Coach* 2018; 13: 167–178.

10. Deci EL and Ryan RM. The “what” and “why” of goal pursuits: human needs and the self-determination of behavior. *Psychol Inq* 2000; 11: 227–268.
11. Taylor I. The five self-determination mini-theories applied to sport. In: Mellalieu SD and Hanton S (eds) *Contemporary advances in sport psychology: a review*. New York, NY: Routledge, 2015, pp.68–90.
12. Bartholomew KJ, Ntoumanis N, Ryan RM, et al. Psychological need thwarting in the sport context: assessing the darker side of athletic experience. *J Sport Exerc Psychol* 2011; 33: 75–102.
13. Bartholomew KJ, Ntoumanis N, Ryan RM, et al. Self-determination theory and diminished functioning: the role of interpersonal control and psychological need thwarting. *Pers Soc Psychol Bull* 2011; 37: 1459–1473.
14. Felton L and Jowett S. On understanding the role of need thwarting in the association between athlete attachment and well/ill-being. *Scand J Med Sci Sports* 2015; 25: 289–298.
15. Medic N, Young BW, Starkes JL, et al. Relationship between having a coach and masters athletes’ motivational regulations for sport and achievement goal orientations. *Int J Coach Sci* 2012; 6: 65–79.
16. Mageau GA and Vallerand RJ. The coach–athlete relationship: a motivational model. *J Sports Sci* 2003; 21: 883–904.
17. Ng JYY, Lonsdale C and Hodge K. The Basic Needs Satisfaction in Sport Scale (BNSSS): instrument development and initial validity evidence. *Psychol Sport Exerc* 2011; 12: 257–264.
18. Hodge K and Gucciardi DF. Antisocial and prosocial behavior in sport: the role of motivational climate, basic psychological needs, and moral disengagement. *J Sport Exerc Psychol* 2015; 37: 257–273.
19. Huberty CJ and Morris JD. Multivariate analysis versus multiple univariate analyses. *Psychol Bull* 1989; 105: 302–308.
20. Sauder DC and DeMars CE. An updated recommendation for multiple comparisons. *Adv Methods Pract Psychol Sci* 2019; 2: 26–44.
21. Cohen J. *Statistical power analysis for the behavioral sciences*. New York, NY: Academic Press, 1969.
22. Kline RB. *Principles and practice of structural equation modeling*. 4th ed. New York, NY: The Guilford Press, 2016.
23. Tabachnick BG and Fidell LS. *Using multivariate statistics*. 6th ed. Boston, MA: Pearson, 2013.
24. Wilson RC, Sullivan PJ, Myers ND, et al. Sources of sport confidence of Master athletes. *J Sport Exerc Psychol* 2004; 26: 369–384.