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Motivation and Eudaimonic Well-Being in Athletes: A Self-Determination Theory Perspective

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Abstract

Purpose: Drawing from self-determination theory (SDT; Deci & Ryan, 1985), the present study examined the relationship between motivation and eudaimonic well-being in the sport context. Method: The association between motivation and eudaimonic well-being was assessed using a latent variable model through Structural Equation Modeling (SEM). Three hundred ninety-nine athletes (M_{age} = 25.08, *SD* = 7.35) from 15 different individual and team sports completed a questionnaire package. Results: Results indicated that integrated and identified regulations positively predicted athletes' eudaimonic well-being. External regulation was also a positive predictor of eudaimonic well-being, while introjected regulation and amotivation negatively predicted athletes' eudaimonic well-being. Finally, athletes' intrinsic motivation did not significantly predict their eudaimonic well-being. Conclusions: Results highlight the complex link between different types of sport motivation and athletes' well-being.

Keywords: behavioral regulations, sport, well-being

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Sport participation can play a significant role in individuals' physical and psychosocial health, functioning, and general quality of life (e.g., Adie, Duda, & Ntoumanis, 2012). Athletes engaging in sport for intrinsic reasons, such as enjoyment and inherent satisfaction, experience higher levels of well-being, persistence, and less symptoms of burnout (e.g., Lonsdale, Hodge, & Rose, 2009). Despite the intrinsic motivators, athletes can be otherwise motivated. Various extrinsic factors such as awards, trophies, athletic scholarships, and interpersonal pressures are used to motivate athletes to perform well and win, which can potentially undermine participation, interest, and enjoyment in sport (see Ryan & Deci, 2017).

Deci and Ryan's (1985) self-determination theory (SDT) as a theoretical framework of human motivation and behavior has been applied in sport to provide an understanding of athletes' participation (see Hagger & Chatzisarantis, 2007). The SDT framework posits a continuum in which motivation is progressively internalized. Amotivation lies at one end of the continuum and is characterized by a complete lack of motivational drive, or a lack of intention to engage in a behavior. In sport, an athlete who lacks a sense of intention to take part in sport and questions his/her continued participation is considered to lack self-determination. The other end of the continuum is anchored by intrinsic motivation which refers to motivation derived from the sheer pleasure and satisfaction of engaging in the behavior. An intrinsically motivated athlete experiences interest and enjoyment derived from participating in sport.

Between amotivation and intrinsic motivation lie four types of extrinsic motivation which successively increase in their degree of internalization (Deci & Ryan, 2002). The extrinsic motives are proposed to differentially regulate behavior and result in separable sets of

motivational and behavioral consequences. Two of the extrinsic regulations (i.e., external and introjected) are theorized to be more controlling in nature and represent motivation which is derived from an external locus of causality. External regulation represents the least internalized extrinsic regulation and refers to the desire to obtain external rewards or avoid punishments (Deci & Ryan, 2002). In sport, athletes may be externally motivated if they participate in order to win trophies, money, or gain recognition. Next, introjected regulation represents motives that are slightly more internalized than external regulation and is characterized by the desire to obtain intrapersonal rewards (e.g., pride) or to avoid self-inflicted punishments (e.g., guilt or shame [Deci & Ryan, 2002]). Athletes who persist at their sport because they feel that dropping out would be letting their team down are demonstrating introjection. As the continuum extends toward intrinsic motivation, identified and integrated regulations represent the more autonomous types of extrinsic motivation. Identification and integration are theorized to be derived from an internal locus of causality. Identified regulation refers to being motivated to perform a behavior because it is personally significant and it results in outcomes which are valued by the individual (Deci & Ryan, 2002). In a sport context, athletes may persist because they value the social connections or the physical fitness they derive from participation. The most internalized form of extrinsic motivation, integration, is represented by an individual's belief that a behavior is an important part of his or her identity and is consistent with his or her personal values (Deci & Ryan, 2002). In the case of integrated regulation, athletes may persist in sport because they feel that being "an athlete" is an important part of "who they are."

SDT postulates that self-determined (i.e., autonomous) types of motivation (i.e., identified regulation, integrated regulation, and intrinsic motivation) are more likely to be associated with positive, adaptive, behavioral outcomes (e.g., positive affect, vitality), whereas

less self-determined (i.e., controlled) types of motivation (i.e., introjected regulation, external regulation, and amotivation) should more likely be related with negative outcomes (e.g., burnout, dropout; Ryan & Deci, 2017). Studies in sport has provided support for this theoretical claim. For example, autonomous types of motivation have been found to be associated with better performance (Pope & Wilson, 2014), positive emotions, satisfaction with sport (Blanchard, Amiot, Perreault, Vallerand, & Provencher, 2009), and subjective vitality (Alvarez, Balaguer, Castillo, & Duda, 2012). In contrast, controlled types of motivation have been related to maladaptive outcomes including drop out (Pelletier, Fortier, Vallerand, & Brière, 2001), negative affect (Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008), and burnout (Lonsdale & Hodge, 2011).

Well-being and Sport Participation

There has been considerable interest in the relationship between motivation and well-being. Ryan and Deci (2001) suggest that well-being has been derived from two approaches: the hedonic perspective that focuses on subjective well-being (SWB), and the eudaimonic perspective that focuses on eudaimonic well-being (EWB). The hedonic approach assumes the fundamental life goal is achieving the maximum amount of pleasure and happiness and minimizing pain (Ryan & Deci, 2001). Specifically, SWB refers to individuals' beliefs (i.e., cognitive judgments) and feelings (i.e., affective responses) about their own lives and consists of life satisfaction, the presence of positive affect, and the absence of negative affect (Diener, Suh, Lucas, & Smith, 1999).

Contrary, the eudaimonic view focuses on reaching human potential, living a complete human life, and self-realization (Ryan & Deci, 2001; Ryan & Huta, 2009). This approach posits that living well leads to pleasure but not all antecedents of pleasure entail eudaimonic living and

would not promote well-being (Ryan, Huta, & Deci, 2008). Based on this, the core of SDT embraces various elements of the eudaimonic conception (i.e., pursuing intrinsic motivation, behaving autonomously, being mindful, and satisfying basic psychological needs; Ryan et al., 2008). Accordingly, Ryan and Deci defined EWB in terms of optimal psychological functioning and experience and operationalize it as a set of wellness (i.e., the process of living well) aspects (e.g., vitality). SDT proposes that for optimal well-being, the fulfillment of the basic psychological needs of autonomy (i.e., sense of volition and choice), competence (i.e., sense of efficacy), and relatedness (i.e., sense of closeness) is required (Ryan & Deci, 2000). When these needs are met and satisfied, self-determination is enhanced, leading to increased levels of well-being (Ryan & Deci, 2000), whereas when the needs are thwarted, well-being is diminished (Bartholomew, Ntoumanis, Ryan, & Thogersen-Ntoumani, 2011).

Ryff (1989) has also embraced the eudaimonic conceptualization of well-being and presented a multidimensional model (i.e., Scales of Psychological Well-Being) by identifying six components (i.e., self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth) to describe psychological well-being (PWB). The label of PWB is used interchangeably with EWB in Ryff's research (Ryff, 2013).

It is argued that sport participation is linked to physiological and psychological benefits (e.g., Adie et al., 2012), leading to well-being, but may also generate conditions that are detrimental for athletes (Bartholomew et al, 2011). The high dedication to the sport with long hours of training despite illness, pain, or injuries, nutrition restrictions, and limited personal and social life, may lead athletes to experience difficult sport experiences and diminished well-being. Accordingly, research has primarily focused on the pursuit of enhancing athletes' well-being

since it may help athletes to overcome challenges that they face in their sport life and experience optimal functioning (Lundqvist, 2011).

In a review related to well-being in competitive sports, the lack of conceptual clarity and consistency of the definition of well-being was highlighted (Lundqvist, 2011). Moreover, the majority of studies have failed to make distinctions between general well-being and well-being specific to the sport context, leading to lack of measurements for assessing athletes' well-being (Lundqvist, 2011).

Taking into consideration that different life domains (e.g., work, family) may influence individuals' well-being (Page & Vella-Brodrick, 2009), distinct factors may influence well-being in sport compared to well-being in general. Thus, a sport-specific well-being measure may provide more detailed and precise information in understanding athletes' well-being by examining how the competitive environment either enhances or diminishes well-being (Kouali, Hall, & Pope, 2020).

Studies grounded in SDT (e.g., Mack et al., 2011) have utilized various indicators to assess athletes' well-being approaching it from either the hedonic perspective (i.e., life satisfaction, presence of positive affect, and the absence of negative affect), or the eudaimonic perspective (i.e., optimal psychological functioning; Ryan & Deci, 2001). The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), and the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) are the measures that have been used to assess hedonic indices of athletes' well-being, whereas the Subjective Vitality Scale (SVS; Ryan & Frederick, 1997) has been utilized to assess EWB in sport. It is important to note that none of these measures are sport specific.

Motivation and Well-Being in Sport

Several studies have examined motivation as a predictor of well-being indices and supported that autonomous types of motivation are associated with greater levels of well-being, whereas controlled types of motivation are negatively associated with athletes' well-being. Gagné, Ryan, and Bargmann (2003) conducted a diary study with female adolescent gymnasts and by using multilevel modeling analysis found that athletes' intrinsic motivation and identified regulation for coming to practice predicted pre-practice well-being (i.e., vitality and positive and negative affect). Similar findings were reported by Alvarez et al. (2012) in a sample with young male soccer players. Specifically, the results showed that intrinsic motivation was positively related to athletes' subjective vitality. Some researchers have grouped the motivational regulations into two main variables, namely autonomous motivation and controlled motivation (by aggregating the intrinsic motivation, integrated and identified regulations, and the introjected and external regulations, respectively) to investigate the relationship between motivation and well-being. Using this approach, Healy, Ntoumanis, van Zanten, and Paine (2014) found autonomous motives were related to subjective vitality whereas no association was found between controlled motives and well-being, in regional-level team sport athletes.

While in many studies complex models have been tested, researchers have used a single score of self-determination, labeled the Self-Determination Index (SDI; Vallerand, 2007) or Relative Autonomy Index (RAI; Ryan & Connell, 1989) in which all the motivational subscales are combined into one latent motivation variable. Although researchers have tended to use the SDI, limitations have been noted regarding its use because motivation is a multidimensional construct and it is recommended to examine each type of motivation separately (e.g., Chemolli & Gagné, 2014).

Although previous research has investigated the association between motivation and well-being in sport settings (e.g., Gagné et al., 2003; Stenling et al., 2015) to our knowledge none of the studies has employed a sport specific well-being instrument. Additionally, previous studies have focused mostly on young athletes (e.g., Gagne et al., 2003) or on participants engaged in one single sport (e.g., basketball, Blanchard et al., 2009; skiing, Stenling et al., 2015).

The present study was designed to overcome the aforementioned limitations in the sport literature (e.g., using aggregate scores of motivation and non-sport specific measures of EWB) and extend previous findings to a diverse sample of adult athletes. The purpose of the present study was to examine the relationship between each of the six forms of motivation and EWB in athletes from various sports based on the SDT framework. It was hypothesized that each of the autonomous types of motivation (i.e., intrinsic motivation, integrated regulation, and identified regulation) would positively predict EWB, whereas each of the controlled types of motivation (i.e., introjected regulation, external regulation, and amotivation) would negatively predict athletes' EWB.

Method

Participants

The sample consisted of 399 (n_{males} = 312; $n_{females}$ = 87) athletes (M_{age} = 25.08, SD = 7.35) from 15 different individual and team sports and was reflective of global sports participation. One hundred eighty-six athletes engaged in soccer, 55 track and field, 52 volleyball, 33 running, 28 basketball, 10 futsal, 10 swimming, 9 triathlon, 5 golf, 3 cycling, 3 waterskiing, 2 karate, 1 biathlon, 1 tennis, and 1 kickboxing. The athletes played at club (n = 21), varsity (n = 23), regional (n = 16), provincial (n = 287), national (n = 32), and international (n = 19) levels (1 athlete did not report his competitive level). On average, the athletes practiced

11.46 hours per week (*SD* = 4.10) and had been participating in their sport for 11.92 years (*SD* = 5.87). In terms of the stage of the competitive season of their sport, athletes reported that they were at the pre-season stage (*n* = 276), early season stage (*n* = 48), middle season stage (*n* = 15), late season stage (*n* = 12), and off-season stage (*n* = 48). Participants described themselves as Caucasian (*n* = 364), African American (*n* = 9), Hispanic (*n* = 7), Asian (*n* = 3), and other (*n* = 16) and 96.7% (*n* = 386) indicated currently having a coach.

Measures

Demographics. The demographic questionnaire included information about age, gender, major sport, years of participation in respective sport, hours practiced per week, competitive level, ethnicity, stage of competitive season of sport, and if they currently had a coach or not.

Motivation. Athletes' motivation was assessed using the original English version of the Behavioral Regulation in Sport Questionnaire (BRSQ; Lonsdale, Hodge, & Rose, 2008). The BRSQ asked athletes the reasons they participate in their sport using the stem "I participate in my sport" followed by 24 items and a seven-point Likert scale that ranged from 1 (*not at all true*) to 7 (*very true*). The questionnaire includes the dimensions of intrinsic motivation (e.g., "because it's fun"), integrated regulation (e.g., "because it's part of who I am"), identified regulation (e.g., "because the benefits of sport are important to me"), introjected regulation (e.g., "because I would feel ashamed if I quit"), external regulation (e.g., "because people push me to play"), and amotivation (e.g., "but I wonder what's the point"). Cronbach alpha coefficient scores were reported in the initial development of the BRSQ ranging from .77 to .91 (Lonsdale et al., 2008). Test-retest reliability and factorial validity of the BRSQ have been supported in four studies conducted by Lonsdale and colleagues (2008).

Eudaimonic well-being. The original English version of the Eudaimonic Well-Being in Sport Scale (EWBSS; Kouali et al., 2020) was employed to measure athletes' well-being. The item stem was ''Circle the number that best describes your present agreement or disagreement with each statement . . .''. The EWBSS consists of five items (i.e., "As an athlete, I feel that I continue to learn more about myself", "I have a sense of direction in sport", "In general, I feel positive about myself as an athlete", "I like most aspects of myself as an athlete", "My goals in sport have been a source of satisfaction"), which were answered on a six-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Kouali et al. tested the psychometric properties of the instrument, demonstrating evidence of internal consistency reliability ($\alpha = .74$), factorial validity, nomological validity, and convergent validity have been provided.

Procedure

Ethical approval was granted by the institutional research ethics board. Participants were recruited either in person or online. First, one of the investigators of the study contacted and received permission from coaches via email to approach the athletes. The potential participants were contacted before or after their practice with the investigator providing them a letter of information regarding the purpose and confidentiality of the study. The athletes who agreed to participate completed the corresponding paper and pencil questionnaire (with the absence of the coaches). Additionally, communications coordinators of sporting associations were contacted via email and were asked to post the description of the study and the questionnaire link on their website. Thus, athletes that were interested to participate in the study could access the letter of information and survey link. The questionnaire took approximately 10-15 minutes to complete. Completion of the questionnaire indicated participants' consent to participate.

Data Analyses

After screening the data for missing and incomplete data, outliers and normality, descriptive statistics (i.e., mean and standard deviation) and Cronbach alpha coefficients (Cronbach, 1951) were calculated for all the examined variables. Confirmatory factor analysis (CFA) was conducted to assess factorial validity for both instruments (i.e., BRSQ and EWBSS). Bivariate correlations (Pearson correlation) were also computed to test patterns of association between the constructs. Independent *t*-test was performed to examine whether there are any differences between the examined variables for individual and team sports. Next, structural equation modeling was employed using AMOS 24.0 software (Arbuckle, 2016) to examine a full measurement model and structural model. Maximum likelihood estimation was used to test the hypotheses. The goodness-of-fit of the hypothesized models were tested using multiple indices (Hu & Bentler, 1999): the chi-square statistic (χ^2), the comparative fit index (CFI), the Tucker-Lewis index (TLI) the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). While a nonsignificant χ^2 indicates an adequate model fit, it is affected by sample size (Hu & Bentler, 1999). According to Hu and Bentler (1999), for CFI and TLI values greater than .95 and for RMSEA and SRMR values less than .06 indicate an excellent model fit. However, RMSEA and SRMR values less than .08 are considered satisfactory as well (Hu & Bentler, 1999). More recently, Marsh, Hau, and Wen (2004) suggested for CFI and TLI values greater than .90 denote acceptable fit. Given the presence of multivariate nonnormal data, the bootstrapping method was performed using the Bollen–Stine bootstrap.[1]

Results

Preliminary Analyses, Descriptive Statistics, and Scale Reliabilities

Assessment of normality was conducted for all BRSQ and EWBSS variables and variables considered to be non-normal if their skewness values were greater than 3 and kurtosis values greater than 7 (Kline, 2011). The results indicated that the variables were normally distributed with the exception of intrinsic motivation. Kurtosis values for two items (i.e., "because I enjoy it", and "because I like it") substantially departure from normality. Based on this, these items were removed from the subscale and further analyses because kurtosis were reported to severely affect test of variances and covariances, such as structural equation modeling (DeCarlo, 1997). Mahalanobis distances were calculated to check for the presence of multivariate outliers. Accordingly, two cases with extremes scores were deleted.

The descriptive statistics and Cronbach alpha coefficients for all the measures are presented in Table 1. On average, participants scored above the midpoint for the EWB scale, intrinsic motivation, integrated regulation, and identified regulation subscales, and below the midpoint for the controlled types of motivation (i.e., introjected regulation, external regulation) and amotivation subscales. All the examined variables had acceptable levels of internal consistency with alphas ranging from .62 to .82 (Taber, 2018). Additionally, the descriptive statistics and Cronbach alpha coefficients scores of individual (n = 123) and team sports (n = 274) for all variables were presented in Table 2. Athletes from both samples were on average above the midpoint for the autonomous types of motivation subscales and EWB scale and below the midpoint for the non-autonomous types of motivation subscales. All the examined variables had acceptable levels of internal consistency with alphas ranging from .66 to .84 with the exception of the intrinsic motivation subscale for the individual sports which indicated a poor

level of reliability (α = .55). While the results for this variable are reported, the findings that include intrinsic motivation for athletes from individual sports must be interpreted with caution.

CFA

The CFA model representing the BRSQ revealed an adequate fit to the data (χ^2 (191) = 450.26, p = .000; *CFI* = .92; *TLI* = .91; *RMSEA* = .06; *SRMR* = .06). The measurement model representing the EWBSS revealed an excellent fit to the data (χ^2 (5) = 8.30, p = .14; *CFI* = .99; *TLI* = .98; *RMSEA* = .04; *SRMR* = .02).

Bivariate Correlations and Independent *t*-test

The bivariate correlations between all the variables are also presented in Table 1. Athletes' autonomous forms of motivation were positively associated with EWB, with identified regulation emerging as the strongest correlate (r = .56, p < 0.01). Also, amotivation was more strongly negatively correlated with EWB (r = -.27, p < 0.01) than introjected and external regulations. Additionally, the bivariate correlations between all the examined variables for individual and team sports were presented in Table 2 providing similar results for the two groups. The results from an independent *t*-test indicated that there was a statistically significant difference in identified regulation scores for individual and team sports (t (395) = 3.91, p < .001). Athletes participating in individual sports (M = 6.16, SD = .88, N = 123) scored higher for the identified regulation compared to athletes participating in team sports the college students (M = 5.76, SD = .99, N = 274). No other significant differences were detected.

Measurement and Structural Model

First, the measurement model was tested with a CFA examining the fit of the items of the BRSQ subscales and EWB scale to their hypothesized factor. The latent variables were allowed to correlate with each other, with their variances fixed to 1.00. The measurement model

demonstrated an acceptable model fit (χ^2 (300) = 654.97, p = .000; *CFI* = .91; *TLI* = .90; *RMSEA* = .055; *SRMR* = .06). While a statistically significance result ($p < .05$) regarding χ^2 indicates problematic overall model fit, this model test is sensitive to sample size (Jöreskog & Sörbom, 1993); larger sample sizes are more likely to be significant, thus rejecting the model (Type 1 error). Additionally, moderate-to-strong standardized factor loadings were reported that ranged from .50 to .85. The data of the measurement model did not display multivariate normality (Mardia's multivariate kyrtosis = 231.50). Therefore, the Bollen-Stine boostrap was performed with 1000 iterations. No differences in model fit were obtained (p = .001).

The structural model (see Figure 1) also showed acceptable fit to the data (χ^2 (300) = 654.97, p = .000; *CFI* = .91; *TLI*= .90; *RMSEA* = .055; *SRMR* = .06) as it had the same fit characteristics with the measurement model. Path coefficients were significant at .05, .01, and .001 levels with the exception of the path between intrinsic motivation and EWB ($p > .05$). Integrated and identified regulations positively predicted athletes' EWB (β = .25 and β = .56, respectively) while athletes' intrinsic motivation did not significantly predict EWB (β = -.001). External regulation was also a strong positive predictor of the EWB (β = .54). Finally, introjected regulation and amotivation negatively predicted athletes' EWB (β = -.40 and β = -.39, respectively).[2]

Discussion

The purpose of the present study was to examine the relationship between the different forms of motivation as proposed in SDT and EWB in sport. Two hypotheses were tested. First, it was hypothesized that autonomous types of motivation would be positively associated with athletes' well-being. The analysis partially supported the hypothesis. Integrated regulation and identified regulation moderately and strongly predicted well-being in sport, respectively.

According to SDT, both regulations are the most autonomous forms of extrinsic motivation, as the individuals have internalized the reasons for their actions and their behavior is initiated out of choice (Deci & Ryan, 2000). Specifically, athletes who report engaging in their sport for integrated reasons have fully assimilated the identified regulation to the self and are accompanied by a sense of volition (Deci & Ryan, 2008) leading to well-being. Moreover, with identified regulation athletes indicate participating in their sport because it is beneficial and important to them and helps them to achieve their personal valued goals (Vallerand & Losier, 1999). Therefore, it seems that athletes experienced a sense of purpose and direction in their sport life which indicates high levels of well-being. This finding is also supported by Gagné et al. (2003) who found identified regulation was a positive predictor of gymnasts' subjective vitality.

Contrary to our hypothesis, intrinsic motivation was not significantly linked to athletes' well-being. Previous research has also shown that intrinsic motivation does not significantly predict other positive outcomes in sport. For example, Calvo, Cervelló, Jiménez, Iglesias, and Murcia (2010) have found that intrinsic motivation was not significantly linked to continued participation in a sample with adolescent soccer athletes. According to SDT, athletes' well-being is a positive outcome related to intrinsic reasons for sport participation (Deci & Ryan, 2002). In the present study, and similar to what has been reported in other studies (Pelletier et al., 2001), the athletes displayed high intrinsic motivation (M = 6.36, SD = .77) and athletes that do not have high intrinsic motivation tend to drop out of sport (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002). Thus, given intrinsic motivation is generally high with small variability across all competition levels (i.e., recreational to international), it does not seem to distinguish between athletes with differing levels of sport specific EWB. This is an important finding and

worthy of further empirical investigation to determine if this finding is unique to this study, specific to certain populations or contexts, or if offers an opportunity to refine or alter propositions put forth within the SDT.

Furthermore, it has been suggested that there are situations where the activities are less or not interesting and enjoyable (e.g., practicing in bad weather), and therefore, integrated and identified regulations can be the best predictors of positive consequences, instead of intrinsic motivation (e.g., Koestner, Losier, Vallerand, & Carducci, 1996). The results of the present study generally supported this proposition, as the most autonomous forms of extrinsic motivation (i.e., integrated regulation and identified regulation) were significant predictors of athletes' well-being, whereas intrinsic motivation was not.

In terms of the controlled forms of motivation, introjected regulation negatively predicted EWB as was expected. Athletes engaging in their sport to avoid negative feelings like shame, guilt, or failure experienced low levels of well-being. In other words, athletes with introjected reasons for sport participation were controlled by internal pressure; thus, this control could lead to a lack of a sense of direction in their sport life, or may not allow them to feel very positive about themselves as athletes. Although the present finding aligns with SDT, this relationship has not been always supported. The majority of research has examined introjected regulation combined with external regulation as a composite score (e.g., Healy et al., 2014) or the subscale has been included in the SDI (e.g., Blanchard et al., 2009) and mixed findings were reported. For example, controlling motives (i.e., introjected and external regulations) of regional athletes participating in team sports were not linked with subjective vitality and were only related to burnout and physical ill-being symptoms (Healy et al., 2014). On the other hand, Smith,

Ntoumanis, and Duda (2007) found that controlling motives negatively predicted subjective well-being in British athletes from a variety of individual and team sports.

An interesting finding was that external regulation proved to be a positive predictor of well-being. The positive relationship between external regulation and athletes' well-being is contrary to SDT postulations that external regulation undermines well-being and is associated with less adaptive consequences (e.g., Gagné & Blanchard, 2007). Ryan and Deci (2017) mentioned that each individual can have autonomous and controlled types of motivations simultaneously. Accordingly, Karageorghis and Terry (2011) stated that elite-level athletes who have both intrinsic and extrinsic motives, tend to have the best motivational outcomes. For example, Vlachopoulos et al. (2000) examined motivational profiles in sport participants and found that the participants with high scores on all forms of motivation reported greater enjoyment, positive affect, satisfaction, and intention to continue sport participation compared to the participants characterized by an autonomous profile.

Furthermore, Vansteenkiste, Sierens, Soenens, Luyckx, and Lens (2009) highlighted that combining autonomous types of motivation and controlled types of motivation may associate with adaptive and maladaptive outcomes in a different ways compared to the examination of each type of motivation separately in relation to positive and negative outcomes. For example, Chu, Zhang, and Hung (2018) explored the characteristics of motivational profiles in table tennis players from multiple countries. The results revealed that the self-determined profile (high autonomous motivation, moderate controlled motivation, and low amotivation) had greater subjective vitality than the low profile (low autonomous and controlled extrinsic motivations, and moderate intrinsic motivation and amotivation) and the controlled profile (low intrinsic motivation, moderate extrinsic motivation, and high controlled motivation and amotivation).

Moreover, Markland and Ingledew (2007) suggest that when intrinsic motivation is dominant, extrinsic motivation does not lead to detrimental effects on well-being. It seems that the extrinsic motives of the athletes can act in synergy with other forms of motivation in leading to well-being. External regulation may not be perceived as negatively for adult populations, as adults have more control over their engagement in sport. Based on this, the perception that others are pressuring or pushing one to play may be perceived in a positive light as a source of accountability. If an individual feels like a significant other is pressuring/ pushing them to play in a positive way, they may perceive this as external regulation, albeit it is unlikely to have the same detrimental effects on their well-being. Based on this, it would be interesting to investigate how the combination of motivational regulations (e.g., motivation profiles) may relate to EWB.

As was hypothesized, amotivation negatively predicted EWB. Athletes who participated in their sport without intention, sense of purpose, and expectations experienced low well-being levels, suggesting that amotivated sport behavior resulted in athletes' feeling of dissatisfaction with themselves, and lack of improvement, direction, and goals in their sport life (Healy et al., 2014). Similar findings were reported by Standage et al. (2005), as amotivation was a negative predictor of subjective well-being in young students participating in physical education classes. Other studies have focused on examining the association between amotivated behaviors and ill-being (e.g., Lonsdale et al., 2009). Mouratidis et al. (2008) showed that lack of motivation was a positive predictor of negative affect and depression in top young athletes from sport schools in Belgium.

A number of strengths of this study are worth noting. While many researchers have used the SDI to calculate an individual's relative autonomy as a single score (e.g., Stenling et al., 2015), in the present study each motivational regulation was examined individually (i.e.,

multidimensional assessment). Investigating how the different forms of motivation were related independently with EWB, important information was provided to understand the complexity of this association. Athletes, as with all individuals, have multiple motivations for their behaviors (Ryan & Deci, 2017). Given the competitive environment (e.g., difficult, repetitive training) athletes may not always have autonomous types of motivation, and there are situations where extrinsic motivational regulations may impact effectively on athletes' behavior (Taylor, 2015).

Another strength of the current study was the use of a sport specific measure of EWB. Researchers have been assessing EWB in sport by using a global measure of well-being (SPWB; Ryff, 1989) or by using multiple measures targeting different aspects of EWB (e.g., SVS; Ryan & Frederick, 1997). Well-being in sport is influenced by different factors (e.g., overtraining, anxiety, injuries, performance failure compared to overall well-being (Bauman, 2016). Accordingly, the EWBSS can yield more detailed and valuable information regarding athletes' sport life and can benefit SDT research by allowing researchers to further investigate and understand the relationship between constructs of SDT and well-being specifically within the sport context. Additionally, the EWBSS helps to provide researchers with a short, simple instrument that encompasses the main components of EWB and can be easily administered to athletes multiple times, without adding burden to them.

Despite the strengths of the present study, there are some limitations to note. One limitation of the study is its cross-sectional design. As the majority of the participants were at the pre-season stage of the competitive season, it would be interesting to investigate the link between motivation and well-being at athletes' different competitive stages. Athletes' motivation may vary depending on the stage of the competitive season of their sport and influence their well-being. Additionally, only self-report measures were used. Future research

can be improved by including other types of measurement (e.g., observational data on athletes' behavior). A qualitative approach (e.g., focus groups) could also provide more in-depth information regarding the link between athletes' motives and their EWB, and identify potential factors that influence this relationship (e.g., social environment, basic psychological needs).

While a sample with diverse age range was selected in order to provide a more comprehensive representation of adult athletes, it is worthy to consider the role age plays in the relationship between different forms of motivation and EWB. For instance, it would be interesting to examine if the participants were considered as masters athletes or not. Researchers in future studies should examine these relationships across different age cohorts (e.g., children, youth, adults and masters adults) to determine if differences exist.

Furthermore, different measures have been used to examine motivation and EWB across studies in the sport domain (e.g., BRSQ; Lonsdale et al., 2008). Thus, caution must be used when comparing the findings from different studies. BRSQ was criticized in terms of the nomological validity. More specifically, lack of discrimination between the external regulation and introjected regulation subscales regarding their relationships with amotivation was noted (Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013). In the present study, strong correlations were found between external regulation and introjected regulation as well as external regulation and amotivation. That said, these strong correlations may influence the relationship between external regulation and EWB. It would be interesting to check if the administration of a different sport motivation scale (e.g., Sport Motivation Scale II; Pelletier et al., 2013) would yield similar results to the same group of participants (especially examining the relationship between external regulation and EWB).

Assor, Vansteenkiste, and Kaplan (2009) proposed that there are two different types of introjected motivation (i.e., approach and avoidance introjection). Based on this distinction, Ntoumanis (2012) suggested that external regulation also includes different components (e.g., avoid punishment, gain rewards) that may have unique consequences. The introjected regulation subscale from BRSQ (Lonsdale et al., 2008) focuses on the avoidance component while the external regulation subscale focuses on the feeling of pressure. Future studies should further examine the different components of introjected and external regulations, and perhaps develop a subscale incorporating items for both types.

What does this study add?

The findings from this study highlight the complex link between different types of sport motivation and athletes' well-being. The assessment of motivation as a multidimensional construct and the use of the EWBSS further extends previous SDT research examining this association specifically within the sport context. These findings have implications for coaches and practitioners working with athletes in any type of sport, especially at elite levels.

Athletes can be encouraged to use various psychological techniques in order to enhance their motives and consequently increase their well-being levels. For example, goal setting, imagery, and self-talk interventions can be designed based on the individual needs of each athlete to improve their well-being and motivational constructs (e.g., autonomous types of motivation) should be considered as potential mechanisms in linking psychological techniques and well-being. Achieving high well-being will have a positive influence on both how athletes practice and perform in competition, as well as cope with diverse challenges and stressful situations in their sport life.

The EWBSS embraces aspects based on the eudaimonic approach and represents EWB in sport. Given that SWB usually accompanies or follows from eudaimonic living as individuals tend to report they are happier when they are fully functioning (Ryan & Deci, 2017) a sport-specific well-being measurement tool focusing on athletes' SBW (i.e., presence of positive affect and absence of negative affect combined with satisfaction in sport life) should also be developed. The assessment of both subjective and eudaimonic well-being may provide a better understanding of what constitutes optimal psychological functioning in the sport context.

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Footnotes

[1] Multi-group SEM analyses were also conducted to examine if the structural model was equivalent for: a) male (n = 310) and female (n = 87), and b) athletes of two different age groups (22 years old and under, n = 188, M = 19.72, SD = 1.41; 23 years old and above, n = 209, M = 29.91, SD = 7.22). A median approach for splitting the data was used because we could not identify a meaningful way (e.g., younger athletes to masters athletes) to split the data according to age post-hoc as this was not a primary research objective.

[2] In terms of multi-group SEM analyses, a model across male and female groups was tested with no equality constraints (i.e., unconstrained model) reporting the fit indices that follow; χ^2 (600) = 1176.84, p = .000; *CFI* = .89; *TLI*= .87; *RMSEA* = .049; *SRMR* = .065. A second model that constrained the structural weights for both groups yielded fit indices (χ^2 (620) = 1259.90, p = .000; *CFI* = .85; *TLI* = .83; *RMSEA* = .051; *SRMR* = .068) that when compared to the unconstrained model indicated a significant difference ($\Delta\chi^2$ (26) = 83.07, p = . 000; ΔCFI > .01; Cheung & Rensvold, 2002).

In regard to age invariance, the unconstrained model reported the following fit indices: χ^2 (600) = 1076.42, p = .000; *CFI* = .89; *TLI*= .87; *RMSEA* = .044; *SRMR* = .075. The comparison to the constrained model (χ^2 (626) = 1106.90, p = .000; *CFI* = .89; *TLI*= .87; *RMSEA* = .051; *SRMR* = .077) indicated that the change in χ^2 between the constrained model and the unconstrained model was not significant ($\Delta\chi^2$ (26) = 30.49, p = .25) and the difference between the CFI values between the two models did not exceed .01, indicating that the difference in fit across groups was negligible.

Table 1.

Descriptive Statistics, Reliability Coefficients, and Bivariate Correlations between Study Variables

Variables	M	SD	Scale Range	α	1	2	3	4	5	6	7
1. Intrinsic Motivation	6.13	1.01	1-7	.62	-						
2. Integrated Regulation	6.00	0.91	1-7	.72	.41**	-					
3. Identified Regulation	5.88	0.97	1-7	.71	.45**	.50**	-				
4. Introjected Regulation	3.36	1.76	1-7	.81	-.17**	.13*	.06	-			
5. External Regulation	2.30	1.39	1-7	.80	-.21**	-.03	-.07	.62**	-		
6. Amotivation	2.56	1.47	1-7	.83	-.32**	-.15**	-.20**	.49**	.65**	-	
7. Eudaimonic Well-Being	5.02	0.69	1-6	.75	.44**	.49**	.56**	-.10	-.12*	-.27**	-

Note. M = Mean; SD = Standard Deviation; α = Cronbach alpha coefficient; ** $p < .01$. * $p < .05$

Table 2.

Descriptive Statistics, Reliability Coefficients, and Bivariate Correlations between Study Variables for Individual and Team Sports

	Variables	M	SD	Scale Range	α	1	2	3	4	5	6	7
Individual Sports	1. Intrinsic Motivation	6.10	0.94	1-7	.55	-						
	2. Integrated Regulation	6.16	0.81	1-7	.73	.33**	-					
	3. Identified Regulation	6.16	0.88	1-7	.73	.31**	.50**	-				
	4. Introjected Regulation	3.36	1.67	1-7	.79	-.27**	.16	.19*	-			
	5. External Regulation	2.19	1.37	1-7	.81	-.25**	-.05	-.01	.59**	-		
	6. Amotivation	2.48	1.48	1-7	.84	-.29**	-.24**	-.26**	.36**	.72**	-	
	7. Eudaimonic Well-Being	5.18	0.64	1-6	.71	.48**	.45**	.49**	-.12	-.13	-.28**	-
Team Sports	1. Intrinsic Motivation	6.15	1.05	1-7	.66	-						
	2. Integrated Regulation	5.83	0.95	1-7	.72	.45*	-					
	3. Identified Regulation	5.76	0.99	1-7	.68	.52**	.48**	-				
	4. Introjected Regulation	3.36	1.80	1-7	.82	-.13*	.11	.01	-			
	5. External Regulation	2.34	1.40	1-7	.80	-.21**	-.01	-.08	.63**	-		
	6. Amotivation	2.60	1.47	1-7	.83	-.33**	-.11	-.17**	.54**	.62**	-	
	7. Eudaimonic Well-Being	4.34	0.70	1-6	.75	.43**	.49**	.57*	-.09	-.10	-.26**	-

Note. M = Mean; SD = Standard Deviation; α = Cronbach alpha coefficient; ** $p < .01$. * $p < .05$