



The effect of basic psychological needs satisfaction on intrinsic regulation is moderated by hedonic and eudaimonic motives: a longitudinal investigation among youth athletes in Japan

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
- E) obtaining funding

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Abstract

The current study was conducted to examine the interactive effects of basic psychological needs satisfaction (BPNS), hedonic and eudaimonic motives on intrinsic regulation. To assess the causal relationship, two-wave time-lagged data collection was employed. A total of 159 youth athletes in Japan participated in online surveys twice (three-month time lag between two data points). The results indicated that the effect of BPNS on intrinsic regulation was moderated by hedonic and eudaimonic motives. Interestingly, BPNS negatively affected intrinsic regulation among youth athletes with low hedonic motives. This negative impact was further augmented when the level of eudaimonic motives was higher. Conversely, BPNS positively influenced intrinsic regulation among youth athletes with high hedonic motives. This positive impact of BPNS was more prominent when eudaimonic motives were lower. Overall, the findings suggest that when intrinsic regulation is the central concern, youth athletes should focus more on seeking enjoyment while putting self-development aside to maximize the positive impact of BPNS.

Key words: Motivation, psychology, sport development, youth sport

Introduction

In the past decade, the Japanese government has strived to promote sport to facilitate a more active lifestyle (Japan Sports Agency, 2015) and to develop elite athletes in an effort to improve the global presence of the nation (Funahashi, De Bosscher, & Mano, 2015). However, it is also reported that the number of sport participants among Japanese adolescents is decreasing. For example, according to the Nippon Junior High School Physical Culture Association (NJPA, 2017), the number of sport participants in the middle school age group has decreased by seven percent over the past decade. This trend is considered problematic because numerous studies have demonstrated that sport participation can provide physical, psychological and social benefits that can lead to the development of healthy behaviors among youth (c.f., Eime, Young, Harvey, Charity, & Payne, 2013; Hebert, Møller, Andersen, & Wedderkopp, 2015). To overcome such a challenging situation, building a more sophisticated sport development program is necessary.

The sport development system should serve two important roles: 1) to increase the number of sport participants and the quality of engagement, and 2) to facilitate a more positive development for the participants (Green,

2005). Accordingly, as motivation is a key component of sport continuation (e.g., Roberts, 2012) and development (Ryan & Deci, 2017), the present study focused on youths' motivation in the context of Japanese sport. Self-Determination Theory (SDT: Ryan & Deci, 2000, 2017) posits that people have the potential for development. According to SDT, intrinsic regulation is the highest quality of behavioral regulatory processes that lead youth to obtaining important outcomes for athlete development such as sport continuation (e.g., Jöesaar, Hein, & Hagger, 2011; Rottensteiner, Tolvanen, Laakso, & Konttinen, 2015). Moreover, Ryan and Deci (2017) argued that the associations of basic psychological need satisfaction with outcome variables are affected by the individual difference such as personality and personal motivational orientation (e.g., Deci, & Ryan, 2012; Ryan, Huta, & Deci, 2008). Thus, the purpose of the present study was to investigate the moderating effect of personal motives (i.e., hedonic and eudaimonic motives) on the relationship between basic psychological need satisfaction and intrinsic regulation.

Basic psychological needs and intrinsic regulation

SDT (Ryan & Deci, 2000, 2017) argues the psychological mechanism of *internalization*, which is the process of improvement in the quality of behavioral regulation. For example, a person starts playing a sport to make a friend (an external reason). After Friendships form with teammates, the persons' behaviors (participating in sport; e.g., basketball) would be regulated by more internal reasons such as having a fun or the enjoyment of playing itself. Thus, in this case, the behavior becomes regulated by internal reasons after fulfilling one of his basic psychological needs (i.e., relatedness). According to the extensive research and the development of the mechanism of the internalization, Ryan and Deci (2002, 2017) found that satisfaction of basic psychological needs (BPNS) enhances the quality of behavioral regulation. As such, the internalization occurs when the person satisfied his/her three basic psychological needs (i.e., autonomy, competence, and relatedness). In the theory, *autonomy* refers to the desire to experience self-determination and psychological freedom (Deci & Ryan, 1985). *Competence* refers to the desire to demonstrate and improve one's capabilities (Deci, 1975). Lastly, *relatedness* refers to the desire to be valued, respected, and desired by significant others (Baumeister & Leary, 1995). Hence, the theory posits that when these three psychological needs are fulfilled, human growth and development would occur (Ryan & Deci, 2002).

Further, Ryan and Deci (2000, 2017) distinguished the types of behavior regulation using a continuum of the qualities of self-determined motivation (Ryan & Deci, 2000, 2017). Accordingly, human behaviors are regulated by the degree of self-determination (i.e., autonomous vs controlled). The highest quality of self-determined behaviors is regulated by internal experiences such as enjoyment and interest, which is called *intrinsic regulation*. Intrinsic regulation refers to participating in certain behaviors for enjoyment or interests and many studies have demonstrated that the relations of intrinsic regulation with the important outcomes for youth athlete development including sport continuation and well-being (e.g., Balish, McLaren, Rainham, & Blanchard, 2014; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002). Internalization occurs when basic psychological needs are fulfilled (Ryan & Deci, 2002). Intrinsic regulation leads to personal growth and development (e.g., Rottensteiner et al., 2015). Consequently, positive youth athlete development should be predicted by the level of intrinsic regulation and subsequently enhanced by BPNS (Behzadnia, Adachi, Deci, & Mohammadzadeh, 2018; Jöesaar et al., 2011).

Hedonic and eudaimonic motives

Motives demonstrate why you do what you do as motives are more broadly defined than reasons for the behaviors in English dictionary (Cambridge University, 2001). Thus, such a way of living is an essential indicator of human behaviors. Hedonic and eudaimonic motives are the personal orientations towards behaviors in specific activities (Huta & Waterman, 2014). Specifically, *hedonic motives* refer to the orientation that seeks hedonic experience (e.g., pleasure, fun, comfort) while *eudaimonic motives* are the orientation that seeks eudaimonic experience (e.g., development, excellence, meaning). Thus, a hedonic-oriented athlete often seeks more enjoyment, pleasure, and ease in their sport participation while an eudaimonic-oriented athlete frequently seeks personal growth and development in their sport participation (Huta & Ryan, 2010). Therefore, these motives can be important personal factors to predict future youth athlete development (Huta & Ryan, 2010). In fact, previous research demonstrated that the two types of personal orientations, originated from hedonic and eudaimonic perspectives, were uniquely associated with outcome variables including sport continuation, well-being, goal progress/performance (Huta & Ryan, 2010; Kinoshita, MacIntosh, & Sato, 2020; Kryza-Lacombe, Tanzini, & O'Neill, 2019; Saunders, Sweet, & Huta, 2018). Furthermore, the combination of the motives has shown the unique relationships with outcome variables. For, example, Huta and Ryan (2010) presented that the individuals with high eudaimonic and low hedonic motives significantly showed the experience of higher negative affect and lower positive affect and vitality compared to the

individuals with high hedonic and high eudaimonic motives. However, no study to date has investigated the impact of the hedonic and eudaimonic motives on the associations between BPNS and important elements for youth athlete development such as intrinsic regulation.

Moderating roles of hedonic and eudaimonic motives

Although many studies have demonstrated the causal relationship between BPNS and intrinsic regulation, research has also denoted that the relationship is influenced by the personal motivational orientation (Baard, Deci, & Ryan, 2004; Hagger & Chatzisarantis, 2011). This hypothesis came from one of the mini-theories in the SDT, which is called the Causal Orientation Theory (COT). The COT assumes that there are individual differences in how personal motivational orientation affects people's specific motivation (Ryan & Deci, 2017). According to the COT, there are individual differences in a personal tendency to perceive their behaviors as self-determined or non-self-determined: autonomy or controlled orientation (Deci, Ryan, 1985). For example, people with high autonomy orientation predicted greater experiences of BPNS (Baard et al., 2004). Furthermore, the person with high autonomy orientation maintained their intrinsic regulation in the situation where they were offered external rewards. In contrast, the person with high controlled orientation decreased their intrinsic regulation following the external rewards (Hagger & Chatzisarantis, 2011). Thus, these results suggest that the personal motivational orientation might be a moderating factor for the process of improvement in the quality of behavioral regulation that affected by the BPNS.

Researchers regarding other personal motivational orientation (i.e., hedonic and eudaimonic motives) have argued that high levels of both hedonic and eudaimonic motives were related to greater experience of well-being (Huta & Ryan, 2010; Seligman, 2002). However, in terms of the performance, other researchers presented that the group with high hedonic and eudaimonic motives and the group with high eudaimonic and low hedonic motives equivalently predicted the GPA in the university student samples (Kryza-Lacombe, Tanzini, & O'Neill, 2019). The study also showed that there were no significant differences in the scores regarding well-being between the group with high in both hedonic and eudaimonic motives and the group with high eudaimonic and low hedonic motives (Kryza-Lacombe et al., 2019). However, as a previous study showed that hedonic motives itself did not predict BPNS (Saunders et al., 2018), these results suggest not only the unique relationships of hedonic and eudaimonic motives with the outcome variables, but also the combination of the motives (e.g., high in hedonic and low in eudaimonic motives) would uniquely predict outcome variables. Yet, the previous studies used a median split method to create artificial categorical variables for grouping the participants depending on the degree of each motive (Huta & Ryan, 2010; Kryza-Lacombe et al., 2019), which might lack the important conceptual and statistical considerations of the unique effects of hedonic and eudaimonic motives.

Although the median split method has been widely used to categorize the participants in the past studies, there are some significant limitations (DeCoster, Gallucci, & Iselin, 2011). For example, scholars have criticized that the analysis of variance (ANOVA) should not be used for the artificially categorized personality-related variables (Humphreys, 1978; Humphreys, & Fleishman, 1974). These researchers argued that the use of ANOVA for the median split variable would represent non-realistic results and thus, not allow researchers to interpret the results in real word circumstances. Further, the median split method significantly decreases the correlation between the normally distributed continuous variables (Peters, & Van Voorhis, 1940). A methodological scholar also concluded that the categorized method significantly reduces the statistical power and the accuracy of the estimation (Cohen, 1983). Therefore, the median split method should not be used especially for the personality-related continuous variables such as hedonic and eudaimonic motives. Therefore, we conducted the currently study by simultaneously including both hedonic and eudaimonic motives in the model, which allows us to keep the unique effects of both motives on the associations of interest and the statistical power the moderators on the relationship between BPNS and intrinsic regulation as represented in Figure 1.

The concept of hedonic motives should be more related to the causal relationship between BPNS and intrinsic regulation than eudaimonic motives because the hedonic motives seek the inner psychological experience in terms of pleasure or fun, which is similar to the concept of intrinsic regulation. Previous studies indeed showed that the combination of low hedonic motives and high eudaimonic motives was related to lower positive affect and vitality (e.g., Huta & Ryan, 2010). Therefore, more specifically, we hypothesized that the BPNS would be more positively related to intrinsic regulation for the youths with higher hedonic motives regardless of the level of eudaimonic motives. In contrast, the combination of low hedonic and high eudaimonic motives should be negatively related to the process of improvement of internalization (BPNS → intrinsic regulation).

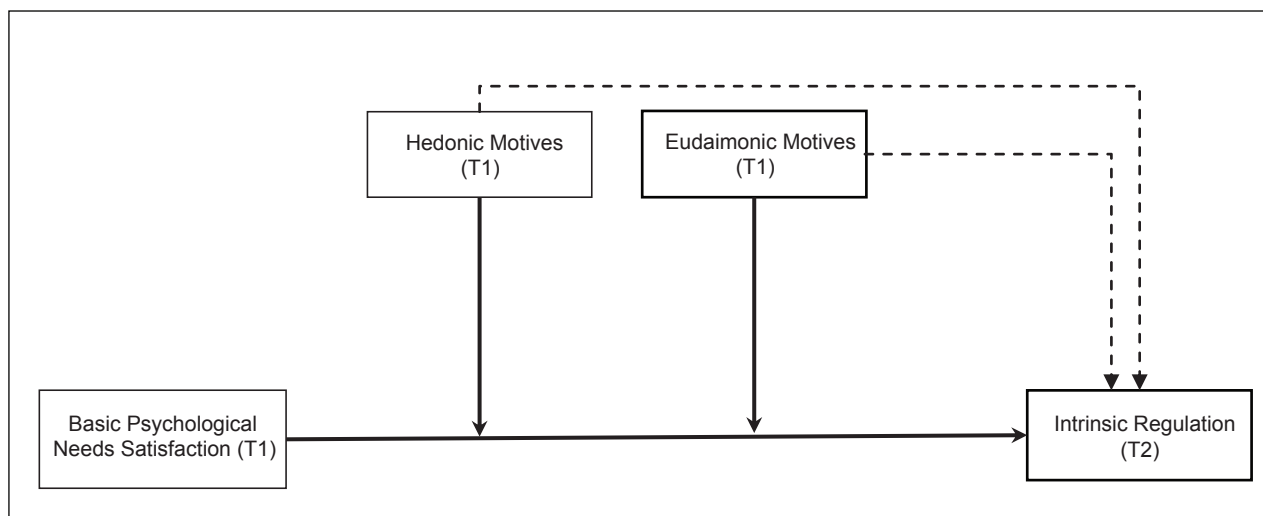


Figure 1 . A conceptual diagram of moderating effects

Methods

Participants and procedures

Youth sport participants (aged 13–18) in Japan were recruited by the assistance of several youth sport clubs. The authors directly contacted the organizations or coaches by an email and phone to obtain the confirmation to conduct the project for the recruitment of the participants. We did not require any specific criteria for the recruitment of the participants except their age and sport participation. Three hundred and sixty four youth sport participants answered an online survey at time 1, while 159 participants ($M_{age} = 15.67$; $SD = 1.85$; 58 female, 96 male, 5 prefer not to answer) completed an online survey at time 1 and 2 (The response rate of the second time was 43.7%). The second data collection was conducted for the same participants three months after the first data collection. Participants answered the questionnaires regarding personal motives (i.e., hedonic and eudaimonic motives), and basic psychological need satisfaction in Time 1, and intrinsic regulation was measured in Time 2. Hence, we only used the 159 participants who completed the survey for two times for the data analysis. Participants were from a wide range of sports (e.g., basketball, baseball, soccer, rugby). Participants listed themselves as either recreational (25.1%), regional (37.7%), provincial (13.2%), national (18.9%), or international (5.0%) level athletes, who weekly practice 18.33 ($SD = 9.50$) hours on average. All participants completed an online survey operated by Qualtrics. The survey was translated into Japanese using the back-translation method by the first author and the third author who are both familiar with the concept and the questionnaires. The participants were provided a consent form outlining the voluntary nature of participation and their rights to withdraw from the study. The study protocol had been approved by the ethics board at the first author's university.

Measurements

The Hedonic and Eudaimonic Motives for Activities (HEMA; Huta & Ryan, 2010) was used to measure the degree of both hedonic and eudaimonic motives in sport domain. The example of the hedonic motive item was "Seeking pleasure in your sport?" and the eudaimonic motives item was "Seeking to develop a skill, learn, or gain insight into something in your sport?" The scale is a 10-item scale using a 7-point Likert scale from 1 (not at all) to 7 (very much). The questionnaire assesses both hedonic and eudaimonic motives (five items for each). However, we removed two items of the hedonic motives subscales (i.e., "seeking relaxation", "seeking to take it easy?") because the results of a Confirmatory Factor Analysis (CFA) demonstrated poor loadings on those items (less than .30, Hoyle, 2000). The reliabilities for hedonic and eudaimonic motives were .80 and .83, respectively.

To assess the Basic Psychological Need Satisfaction (BPNS), we used a 12-item version of Basic Need Satisfaction Scale (Deci & Ryan, 2000). The questionnaire measures three subscales: autonomy, competence, and relatedness. An example item is "I feel free to decide what is best for me. The participants were asked to respond by a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The three subscales can be combined to

create a general index of BPNS. This procedure is also line with past studies that the measurement has been applied to youth sport contexts with adequate reliabilities (Verner-Filion & Vallerand, 2018). The internal consistency for the present study was .88.

Intrinsic regulation was assessed using the Behavioral Regulation in Sport Questionnaire (BRSQ; Lonsdale, Hodge, & Rose, 2008). Participants rated how well the statements fit with their reasons for their sport participations. Following the stem “I participate in my main sport...” participants answered four items of intrinsic regulation (e.g., because it is fun). Participants were asked to rate their agreement with four questionnaire items on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The internal consistency of the scale was .97.

Data analyses

Data analyses were executed by using IBM SPSS 26.0. A moderation analyses was conducted to examine whether hedonic and eudaimonic motives would moderate the relationship between BPNS and intrinsic regulation. To conduct the moderation analyses, the PROCESS macro model 2 was employed based on 5000 bootstrap samples (Hayes, 2017; Preacher & Hayes, 2004). First, the unique impacts of each moderating factor should be remained although both motives should be simultaneously analyzed, being consistent with the past studies (Huta & Ryan, 2010; Kryza-Lacombe; Seligman, 2002). Second, although the analyses of previous studies (Huta & Ryan, 2010; Kryza-Lacombe, 2019) tried to retain the unique effects of hedonic and eudaimonic on the variables of interest by using the median split method, the categorized method was strongly criticized (e.g., Cohen, 1983). The Process macro model 2 allows us to retain the unique characteristics of each motive while simultaneously analyzing the data and achieving statistical power thus providing more accurate estimations of path coefficients (Hayes, 2017).

Table 1. Descriptive statistics and correlations

		Mean	SD	1	2	3
1	BPNS	4.88	0.95			
2	Hedonic motives	5.94	1.08	.19*		
3	Eudaimonic motives	5.80	1.01	.36**	.73**	
4	Intrinsic Regulation	6.15	1.16	.38**	.14	.29**

Note. BPNS = Basic Psychological Need Satisfaction, * $p < .05$. ** $p < .01$.

Results

A missing data analysis found only 0.3% of the data missing and thus, expectation-maximization was performed (Tabachnick & Fidell, 2013). Descriptive statistics and correlations are presented in Table 1.

We tested the moderating effects of hedonic and eudaimonic motives on the relationship between BPNS and intrinsic regulation using process macro model 2 (Hayes, 2017). We first tested the model with BPNS, hedonic motives, and eudaimonic motives to predict intrinsic regulation ($R^2 = .29$; $F(5, 153) = 12.57$; $p < .001$). The results showed that the main effect of BPNS was significant ($B = .32$, $t = 3.58$, $p < .001$), whereas that of hedonic ($B = -.002$, $t = -.02$, $p = .99$) and eudaimonic motives were not significant ($B = .16$, $t = 1.20$, $p = .23$). More importantly, these main effects were qualified by a set of two-way interactions between BPNS and motives (BPNS $\times$ hedonic: $B = .59$, $t = 4.98$, $p < .001$; BPNS $\times$ eudaimonic: $B = -.41$, $t = -3.69$, $p < .001$), which resulted in significant increase of 11.5% and 6.3% in explained variance, respectively (hedonic $\times$ BPNS: $\Delta R^2 = .115$, $\Delta F(1, 153) = 12.18$ $p < .001$; eudaimonic $\times$ BPNS: $\Delta R^2 = .063$, $\Delta F(1, 153) = 1.05$ $p < .001$). Hence, the slope of the association between BPNS and intrinsic motivation significantly differed depending on the degree of hedonic and eudaimonic motives.

Although the three-way interaction (hedonic $\times$ eudaimonic $\times$ BPNS) was non-significant ($B = -.04$, $t = -.64$, $p = .52$), we conducted each moderating effect. First, we expected the significance level of the three-way interaction should be balanced because the moderating effects of both motives on the relationships were almost opposite. Second, while the detection of moderating effects requires a higher statistical power (Shieh, 2009), our sample size was relatively small. Although the examination of the three-way interaction was not found to be significant, we then conducted simple slope analyses to further understand the interactions between BPNS and hedonic/eudaimonic motives. Specifically, we examined the effect of BPNS on intrinsic regulation for the individuals with low ($-1SD$),

moderate (mean), and high (+1SD) levels of hedonic and eudaimonic motives. The results demonstrated that for the youths with a low level of hedonic motives, BPNS was significantly but negatively related to intrinsic regulation when eudaimonic motives were at a high level ($B = -.79, t = -3.07, p < .01$) or a moderate level ($B = -.59, t = -2.75, p < .01$) or, but not significant at a low level of eudaimonic motives ($B = .06, t = .40, p = .69$). For the young athletes with a medium level of hedonic motives, BPNS was not significantly related to intrinsic motivation at a high ($B = .20, t = 1.68, p = .09$), but significant at a moderate level ($B = .39, t = .4.13, p < .001$) and at a low level of eudaimonic motives ($B = 1.05, t = .5.72, p < .001$). Lastly, for the youth athletes with a high level of hedonic motives, the relationships between BPNS and intrinsic motives were significant at a high ($B = .59, t = 4.81, p < .001$), a medium ($B = .79, t = .6.20, p < .001$), and a low level of eudaimonic motives ($B = 1.44, t = 5.89, p < .001$). The slopes of the associations for each value of hedonic and eudaimonic motives were represented in Figure 2.

Discussion

The purpose of the present study was to investigate the moderating effect of personal motives (i.e., hedonic and eudaimonic motives) on the relationship between BPNS and intrinsic regulation. The present results found that the relation between BPNS and intrinsic regulation was moderated by both hedonic and eudaimonic motives as is consistent with the study hypotheses. More specifically, the results demonstrated that the lower participants eudaimonic motives were, the more positive relationships between BPNS and intrinsic regulation particularly when hedonic motives were at moderate or high level. In other words, higher hedonic motives were associated with more positive internalization process (BPNS $\rightarrow$ intrinsic regulation), regardless of the level of eudaimonic motives. Moreover, the findings showed that the combination of low hedonic motives and higher eudaimonic motives was negatively influential on the process of internalization (BPNS $\rightarrow$ intrinsic regulation). These results enrich the body of literature regarding youth athletes' motivation.

BPNS was positively related to intrinsic regulation three months later, being consistent with past studies as we hypothesized (Behzadnia et al., 2018; Jöesaar et al., 2011; Ryan & Deci, 2002). Although both hedonic and eudaimonic motives did not significantly predict intrinsic regulation, the analyses of moderating effects showed that hedonic motives were positively, but eudaimonic motives were negatively associated with the process of internalization generated from BPNS. More specifically, for the youths with low hedonic motives, BPNS was negatively associated with intrinsic regulation when their eudaimonic motives were at high and moderate. The results were consistent with a previous study showed that the group with high eudaimonic and low hedonic motives significantly experienced more negative affect and less positive affect and vitality (Huta & Ryan, 2010). Thus, although higher eudaimonic motives itself may assist people to experience higher performance or achievement, which is not a psychological experience, the combination of high eudaimonic and low hedonic motives would not lead youths to more positive psychological experience (Kinoshita et al., 2020; Kryza-Lacombe et al., 2019). Consequently, high eudaimonic motives without a high level of hedonic motives is not appropriate to facilitate the quality of behavioral regulation. It may be because the individuals with high eudaimonic motives and low hedonic motives would be more achievement orientation, which results in higher achievements (Kryza-Lacombe et al., 2019), but low positive psychological experience (Huta & Ryan, 2010). Furthermore, for the young athletes with moderate or high levels of hedonic motives, lower eudaimonic motives were shown, the more positive relationships between BPNS and intrinsic regulation were found. The results were not consistent with the previous assumption, which asserts that high in both hedonic and eudaimonic motives should be associated with more desirable outcomes including well-being (Huta & Ryan, 2010; Seligman, 2002). This results also suggest that higher eudaimonic motive might be not appropriate for the process of internalization.

However, interestingly, the results of simple slopes (Figure. 2) suggest that high eudaimonic motives were more important for the acquisition of higher intrinsic regulation when the youths felt a low level of BPNS. The results were found because it may be imperative for the youth athletes with less feeling of BPNS to first pursue growth or meaning in their sport participation rather than pursuing enjoyment or pleasure. Since the condition where the athletes lack the feeling of BPNS is a difficult situation, the athletes in the condition may believe that they first want to improve their abilities or obtain meanings in their sport participation (i.e., eudaimonic motives) rather than purely pursuing enjoyment (i.e., hedonic motives). The mechanism is similar to the process of internalization as many of the behaviors are first regulated by external reasons (e.g., making a friend for sport participation), in turn, the behaviors would be internalized by satisfying their psychological needs (Ryan & Deci, 2000, 2017). Thus, eudaimonic motives would be more important for the youths with a low level of BPNS.

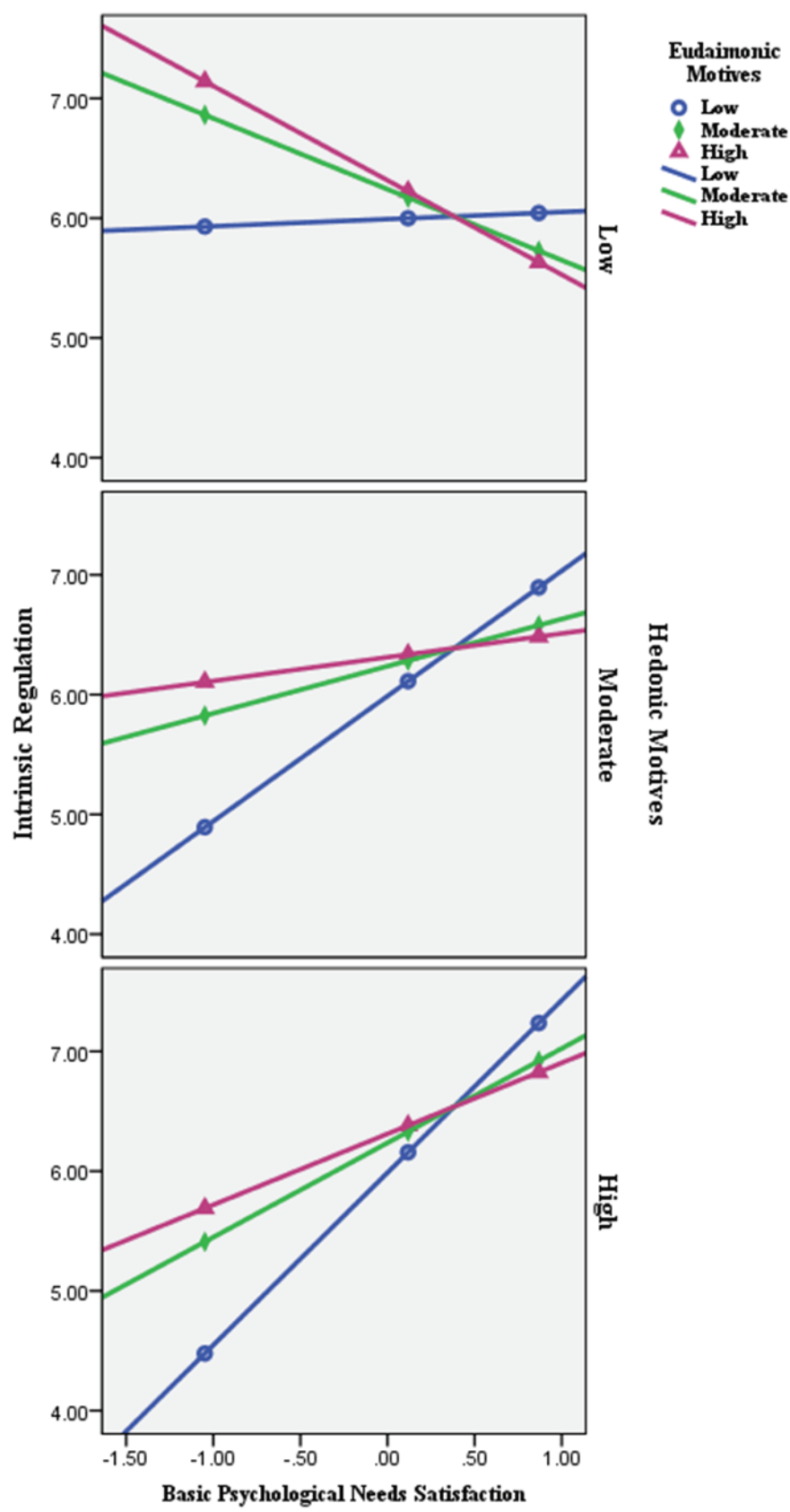


Figure 2. The results of simple slope analyses

Implications

Several implications arise from this study. First, hedonic motives are important for youth to improve their internalization for sport participation. This may counter the belief from many sport coaches in Japan that contend enjoyment is not as important as winning in competitive sports (Allen, 2019; Story, 2018). This is a very important message for youth sport developers including coaches and parents as youth sport development in Japan is not facilitated by healthy ways. According to one of the Japanese MLB players, Yoshitomo Tsutsugo, the number of young baseball population is decreasing six to 10 times faster than the decline in Japanese birth rate. Moreover, he indicated that it is due to the excessive training and injuries in the youth sport populations (Allen, 2019). He also claimed that the problem is players' winning orientations and the coaches' controlling interpersonal style at even in the youth category although the present study did not assess the winning orientation and interpersonal styles of coaches or significant others. Such a pressuring way of coaching (e.g., corporal punishment) in Japan is very common and the abuse of power caused a death of a 17-years-old high school basketball player by suicide in Japan, which happened only 8 years ago (Story, 2018). To prevent further tragic events from occurring, sport program developers should strongly recommend the adults surrounding youth sport participants to educate the youth on the importance of nurturing hedonic motives rather than winning orientation in their sport participation. Future research is needed to investigate the relationships.

Furthermore, although the results showed that the importance of eudaimonic motives of the youths with a low level of hedonic motives, the combination of high eudaimonic motives and low hedonic motives would be cause of less feeling of positive psychological experience (Huta & Ryan, 2010). As such, educating only eudaimonic perspectives for youths could be harmful to facilitate their positive psychological experiences. Hence, the eudaimonic perspective should be educated with the importance of hedonic motives in sport participation. BPNS is strongly affected by social environmental factors such as parents and coaches (Behzadnia et al., 2018; Ryan, & Deci, 2000, 2017). However, social factors were not necessarily controllable for youth athletes. As the findings showed that eudaimonic motives were more important for the youths with low BPNS, sport program developers or sport psychological practitioners can introduce the youths some practices to improve eudaimonic motives. While more research is needed in terms of how to enhance a person's eudaimonic motives, eudaimonism-focused interventions based on well-being therapy, framed by Ryff's (1989) multidimensional model of psychological well-being, including self-observation, structured diaries, and self-discovery strategies on identity exploration have shown important impacts on a person's experiences (e.g., Ruini, Ottolini et al., 2009).

Limitation and conclusion

We only used self-report measurements. Although this approach has some advantages, it does not provide objective measurements, which can be a cause of bias. Future studies can use more objective variables such as hormone (e.g., dopamine, serotonin, endorphin, or oxytocin) as a biological marker of psychological variables (Fredrickson, 2018).

Recent SDT-related research claims that the feeling of BPN satisfaction does not necessarily coexist with low levels of the BPN frustration (Vansteenkiste & Ryan, 2013). Thus, it is important to distinguish BPN satisfaction from BPN frustration (Costa, Ntoumanis, & Bartholomew, 2015), which allows us a more comprehensive understanding of the relationships between the SDT-related variables and outcomes. Consequently, future studies should include both BPN satisfaction and frustration to more comprehensively understand the motivational mechanism underlying youth sport participation and development.

Our findings revealed that the higher in hedonic motives were shown, the more positive relationships between BPNS and intrinsic regulation was detected regardless of the level of eudaimonic motives. Moreover, the findings represented that the combination of a low level of hedonic motives and higher eudaimonic motives negatively affected the process of internalization (BPNS → intrinsic regulation). The results indicated that the important motivation perspectives for development of youth sport program.

Ethics approval and informed consent

Ethical approval for this study was obtained via the university ethics board (H-01-19-1444).

Competing interests

There are no competing interests from any of the authors in conducting this research.

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