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The Relationship Between Motivation Profiles for Health-Oriented Physical Activity, Basic Psychological Needs and Emotional Regulation

Abstract

The study of motivation towards health-oriented physical activity helps to know the reasons that guide people to practice physical activity. Moreover, different types and levels of motivation may coexist. As such, this paper aimed to analyze the combination of motivation for health-oriented physical activity profiles and examine whether profiles differed in emotional regulation and basic psychological needs. A sample of 808 Spanish adults between 18 and 65 years old (Mage=33.90; Standard Deviation=12.91; 366 men) participated in a cross-sectional study. Results revealed the existence of three different motivational profiles: (a) Low scores in self-determined motivation and average-high scores in non-self-determined motivation; (b) Average scores in self-determined and non-self-determined motivation; (c) High scores in self-determined motivation and average-high in non-self-determined motivation. Furthermore, participants differed in the satisfaction of basic psychological needs and cognitive-emotional regulation strategies depending on the profiles combination that they perceive. In conclusion, practitioners need to enhance an optimal combination of motivation profiles to satisfy better basic psychological needs and the use of functional cognitive-emotional regulation strategies since this could help improve psychological and emotional health in adults.

Keywords: Latent profile analysis, emotional control, health, adults.
The Relationship Between Motivation Profiles for Health-Oriented Physical Activity, Basic Psychological Needs and Emotional Regulation

Motivation has been widely studied in the research literature because it identifies what directs human behaviors toward specific purposes, such as physical activity (PA; Boiché et al., 2016; Deci and Ryan, 1985; Knittle et al., 2018). In this study, the focus is on motivations for health-oriented PA in adults, as several works have proved that there is a decrease in healthy habits in adulthood, with less motivation for PA as well as a high percentage of sedentarism (Haskell et al., 2007; La Rosa et al., 2021; Molanorouzi et al., 2015; Wullens et al., 2016). According to the World Health Organization, sedentarism is the fourth most important risk factor for mortality (World Health Organization, 2023). Moreover, sedentarism increases the incidence of diseases such as cancer, metabolic syndrome, cardiovascular diseases, obesity, among others (Guo et al., 2019; Lätt et al., 2015). This emphasizes the importance of motivation for health-oriented PA as a way to prevent sedentary behaviors and promote PA (Brunet and Sabiston, 2011).

According to self-determination theory (SDT) (Deci and Ryan, 1985), there are different forms of motivation: intrinsic, extrinsic and amotivation. Intrinsic motivation relates to behavior including internal strength, values, pleasure, personal beliefs and initiative (Deci and Ryan, 2000). Extrinsic motivation refers to behavior conditioned by external agents. Amotivation is defined by the absence of motivation. Deci and Ryan (2000) indicate that extrinsic motivation (ordered from lowest to highest degree of autonomy) includes external, introjected, identified and integrated regulation. External regulation occurs when people try to satisfy external demands, avoid punishment or are driven by material interest. Introjected regulation is considered a relatively controlling form of motivation in which a person is regulated toward seeking interpersonal approval and ego improvement. Identified regulation occurs when people perform an action
because the sociocultural environment values it. In integrated regulation, the behavior is carried out freely because it is congruent with personal values. The combination of all types of motivation in profiles may act as a way to summarize the coexistence of different motivation levels in people, which may explain their behavioral patterns. The same person can simultaneously perceive different levels of all the subtypes of motivation, which explains their behavior. Moreover, combining motivational variables according to a person’s perception may help to detect dysfunctional profiles that could be reversed through specific interventions.

SDT postulates that emotional regulation (ER) strategies can be predicted depending on the motivation that people experience (Ryan and Deci, 2017). This happens because emotions indicate the relevance of people's purposes and objectives, influencing their behavior and choice capabilities (Roth et al., 2019). In addition, it has been demonstrated the influence of ER on mental health variables (Cisler and Olatunji, 2012), obesity (Fernandes et al., 2017; Garnefski et al., 2002; Martínez and Sánchez, 2021), and sedentary behavior (Bernstein and McNally, 2018; Isasi et al., 2013). Cognitive ER refers to the conscious cognitive techniques that people apply to handle emotionally arousing information (Garnefski et al., 2007). ER strategies are classified as adaptive (e.g., acceptance, positive refocusing, refocus on planning, positive reappraisal and putting into perspective), and less adaptive strategies (e.g., self-blame, rumination, catastrophizing and blaming others; Garnefski et al., 2002). According to Garnefski et al. (2001) acceptance involves having thoughts that accept the negative event that occurred. Positive refocusing arises when people think about pleasant situations instead of thinking about the problematic event (Garnefski and Kraaij, 2007). Refocus on planning consists of studying the steps to face a problem. Positive reappraisal allows people to learn from adverse situations experienced and perceive them as an opportunity for personal growth.
(Garnefski et al., 2001). Putting into perspective allows you to downplay negative situations experienced by comparing them with other events (Garnefski et al., 2002). Self-blame means attributing responsibility to oneself for an event (Garnefski and Kraaij, 2006). Rumination consists of repeatedly thinking about the feelings perceived during negative or unpleasant situations (Garnefski et al., 2002). Catastrophizing involves having thoughts that emphasize the fear of an experience that has happened. Blaming others involves considering other people responsible for the negative consequences suffered (Garnefski and Kraaij, 2007).

Previous studies addressed the relationship between motivation, ER and coping strategies; which is a related concept to ER. Nevertheless, it seems that literature relating motivation profiles and ER is scarce. This is particularly salient because much information is lost when motivation is measured from a bivariate approach rather than a person-centered one. A bivariate approach neglects the coexistence of different types of motivations in the same person. Thus, it is needed to examine the different degrees of motivation through a multivariate approach. To explain the relationship between motivation and ER it is specified that in some PA (like dance), the participants must overcome enormous psychological and physical tension, such as technical and physical demands, judgments from coaches, parents and public pressure, among others. For this reason, participants tend to use strategies that allow them to control and modify stressful situations, such as, adaptive emotional regulation strategies (Amado et al., 2011). These same researchers revealed in their study that participants who perceived dance as a pleasant and satisfying experience (self-determined motivation) tended to make use of adaptive ER (Amado et al., 2011). In other previous research, Delgado et al. (2016) found that intrinsic motivation is associated with positive reappraisal. Knee et al. (2002) revealed that self-determined motivations were positively linked to using positive
reassessment and acceptance. On the other hand, Ntoumanis et al. (2018) specified that extrinsically motivated people tended to employ behaviors oriented to problem-coping that were related to refocusing on planning. Otherwise, Amiot et al. (2004) found that non-self-determined motivation was positively associated with avoidance strategies, such as positive refocusing.

The influence of motivation on basic psychological needs (BPNs) is another of the pillars of SDT (Deci and Ryan, 2000), since SDT postulates that the satisfaction of BPNs depends on motivation and vice versa. Satisfied BPNs result in an energizing state that is conducive toward health and well-being. Otherwise, unsatisfied needs contribute to pathology and ill-being (Ryan and Deci, 2000). BPNs are inherent requirements that can guide behavior to achieve psychological well-being (Ryan and Deci, 2000). The BPNs are autonomy, competence and relatedness. Autonomy is the degree of initiative people feel in directing their actions. Competence is people’s perception of their ability to perform a task, while relatedness is the sensation of being included within a social environment.

Previous research that related motivation to BPNs in exercise revealed that autonomous motivations are related to perceived BPN satisfaction (Matsumoto and Takenaka, 2022). Likewise, other researchers found that intrinsic and extrinsic motivation with a high degree of self-determination correlates with BPN satisfaction (Vallerand and Losier, 1999; Wilson et al., 2002). More specifically, in the work of Teixeira et al. (2012) it was observed that many intrinsic reasons for the person to exercise are related to the search for relatedness. However, in the project of Matsumoto and Takenaka (2022) a positive relationship was found between autonomous and controlled motivations in exercise and relatedness BPN. On the other hand, Wilson and Rogers (2008) found that autonomously motivated athletes tended to feel competent in the exercise. However,
controlled motivations do not predict the satisfaction of competence (Matsumoto and
Takenaka, 2022). In addition, some people are extrinsically motivated to exercise to
improve their perception of ability and condition (Kirkland et al., 2011), that is, to try to
satisfy the BPN of competence. People perceive amotivation when they do not feel
competent in PA (Teixeira et al., 2012). Regarding the BPN of autonomy, in the project
of Matsumoto and Takenaka (2022) and Van der Burgt et al. (2019) it was found that the
satisfaction of the aforementioned BPN was positively related to intrinsic motivation and
identified regulation. However, amotivation was negatively related to autonomy
satisfaction. This may occur because when the sociocultural environment extrinsically
does not coerce but offers support (extrinsic motivation), people can make decisions,
satisfying autonomy (Mageau and Vallerand, 2003). However, exogenous control
enhances amotivation and autonomy is not satisfied (Amorose and Anderson-Butcher,
2007).

Previous studies that examined the influence of motivation in ER (Gillet et al.,
2010; Moreno and Martínez, 2006) and the satisfaction of BPNs (Amorose and Anderson-
Butcher, 2007; Teixeira et al., 2012) did not use the profiling methodology or examine
these variables simultaneously. It means that previous research did not take into account
that the same person can simultaneously perceive different types and levels of motivation.
It limits the possibility of intervening when the perceived motivations play a
dysfunctional role in ER and the BPNs. Earlier works found that motivations with a high
degree of self-determination are associated with behavior oriented to the problem
strategies involved in ER (Amado et al., 2011; Delgado et al., 2016) and the satisfaction
of BPNs (Losier et al., 1993; Vallerand and Losier, 1999; Wilson et al., 2002). In addition,
motivations with a low degree of self-determination are associated with avoidance
strategies or less adaptive ER strategies (Amiot et al., 2004) and the dissatisfaction of
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BPNs (Van der Burgt et al., 2019). Therefore, this paper aimed to analyze motivation for health-oriented PA by identifying the related profiles and to examine whether participants from distinct profiles significantly differed in ER and BPNs. As previous studies found that intrinsic motivation (Delgado et al., 2016) and self-determined motivations (Knee et al., 2002) are related to adaptive ER strategies and non-self-determined motivation is related to non-adaptive ER (Amiot et al., 2004). Besides, a high degree of self-determination motivation is associated with the satisfaction of BPN (Vallerand and Losier, 1999) unlike controlled motivations (Matsumoto and Takenaka, 2022) and amotivation (Amorose and Anderson-Butcher, 2007). The established hypotheses were: (1) Profiles with high scores in an intrinsic and high degree of self-determined motivation will develop functional ER and BPN satisfaction; and (2) Profiles with low scores in intrinsic motivations and low degree of self-determined motivation will develop dysfunctional ER and BPN dissatisfaction.

Method

Participants

The study sample consisted of 808 Spanish participants aged between 18 and 65 years old (Mage=33.90; standard deviation=12.91; 366 men and 440 women) and a simple random sampling method was used. Therefore, it was possible to access a large population and obtain a high and representative sample size. Regarding the characteristics of the sample, most of the participants worked part time or full time (n=406), while some were students (n=284), and a minority were unemployed (n=94) or retired (n=24). Most of the participants engaged in PA (walked or did some kind of physical exercise; n=606) and the rest were sedentary (they did not carry out any type of exercise, they did not have a habit of walking and they used passive transport to get around; n=202). Concerning the hours spent engaged in PA, a number of them carried out between 0 and 10 hours (n=580),
others between 10 and 15 hours ($n=175$), and some between 15 and 20 ($n=35$) or more than 20 hours ($n=18$).

In terms of inclusion criteria, the Spanish population older than or equal to 18 years old and those under 65 years old were selected. The aim was to discover whether the action of motivation influenced ER and the satisfaction of BPNs in adulthood in a sample of Spanish adults. As such, people with different types of lifestyles (more or less physically active) participated to ensure the greatest replicability of the results obtained. Hence, the motivation profiles obtained will be similar to a greater percentage of the Spanish population compared to the option of choosing participants who are only physically active or sedentary.

**Instruments**

**Sociodemographic Variables**

To measure the PA levels and the sociodemographic variables, an *ad hoc* instrument was created. The questionnaire examined the following aspects: biological variables (gender, and age), sociodemographic variables (marital status and employment) and variables related to PA (PA vs. sedentary behavior, number of daily steps and type of PA practiced). It was made up of seven items. Some questions were closed-ended, but there were also dichotomous (e.g., gender), and open ones (e.g., height, weight, age). For instance: “What is your gender?” (male/female), “What is your height?”,” “What is your weight?”,” “What is your age?”,” “Do you carry out PA?” (yes, no), “Do you count your number of daily steps?” (less than 5000 – sedentary, between 5000 and 7499 – little active, between 7500 and 9999 – somewhat active, more than 12500 very active or I do not count this variable) (Tudor-Locke and Bassett, 2004) and “What type of intensity of PA do you practice?” (moderate, vigorous, I alternate between moderate and vigorous PA
or none). This previous classification of the type of intensity of PA was according to Macintosh et al. (2021). However, we also wanted to find out if there were participants who combined both intensities of PA or were completely sedentary.

Motivation for Health-Oriented PA

This study utilized the Spanish version (González-García et al., 2023) of the scale evaluating motivation for health-oriented PA (ÉMAPS) (Boiché et al., 2016). It is an instrument with 30 items used to examine intrinsic motivation (five items; $\alpha=.90$; e.g., “I exercise for the pleasure I feel”), external regulation (five items; $\alpha=.87$; e.g., “I exercise to avoid receiving reproach from others”), introjected regulation (five items; $\alpha=.80$; e.g., “I exercise because I will feel bad if I do not exercise”), identified regulation (five items; $\alpha=.91$; e.g., “I exercise because I think PA is good for my personal development”), integrated regulation (five items; $\alpha=.90$; e.g., “I exercise because PA is part of my identity”), and amotivation (five items; $\alpha=.86$; e.g., “I do it but I wonder what it brings me”). The responses correspond to a Likert-type scale ranging from 1 (does not correspond at all) to 7 (corresponds very strongly). Previous studies confirmed the sufficient reliability and validity of the ÉMAPS Spanish version (González-García et al., 2023; García-Vélez and Carrasco-Martínez, 2023).

Cognitive ER

To measure cognitive ER, the Spanish version of the Cognitive ER Questionnaire (CERQ; Garnefski and Kraaij, 2006) was utilized. It is an 18-item questionnaire used to measure an individual’s personal capacity to face negative or unpleasant events. To answer the CERQ questionnaire, participants must indicate which of the statements on the questionnaire represents them, and which signify different strategies for coping with adverse situations. The CERQ questionnaire includes the factors of self-blame (two items;
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e.g., “I feel that I am to blame for what happened”), acceptance (two items; e.g., “I think I have to accept what happened”), rumination (two items; e.g., “I am worried about what I feel and think about what has happened to me”), positive refocusing (two items; e.g., “I think that this situation also has positive parts”), refocus on planning (two items; e.g., “I think about how to change the situation”), positive reappraisal (two items; e.g., “I think that this situation also has positive parts”), catastrophizing (two items; e.g., “I usually think that what happened to me is the worst thing that can happen to someone”), putting into perspective (two items; e.g., “I think it hasn’t been so bad compared to other things”) and blaming others (two items; e.g., “I think others are to blame for what happened to me”). Based on Garnefski et al. (2002), all these factors could be grouped into adaptive (acceptance, positive refocusing, refocus on planning, positive reappraisal, and putting into perspective; $\alpha=.80$) and less adaptive strategies (self-blame, rumination, catastrophizing and blaming others; $\alpha=.73$). The questionnaire is based on a Likert-type scale, with five response options ranging from 1 (rarely) to 5 (almost always).

**BPN Satisfaction**

To examine the satisfaction of the BPNs, the Spanish version (González-Cutre et al., 2015) of the Basic Needs Satisfaction in General Scale (BNSG-S; Gagné, 2003) was used. The scale is made up of 21 items that measure the satisfaction of autonomy (three items; $\alpha=76$; e.g., “I feel that I am free to decide for myself how to live my life”), competence (six items; $\alpha=.70$; e.g., “I often don’t feel very competent”) and relatedness (seven items; $\alpha=.84$; e.g., “I get on well with the people I usually interact with”). The BNSG-S is based on a Likert-type scale, with seven response options ranging from 1 (not true) to 7 (totally true). Previous studies have proved the reliability and validity of the BNSG-S Spanish version (González-Cutre et al., 2015; Martínez-Martínez et al., 2022).

**Procedure**
This study was approved by the ethics committee of Universidad Internacional de La Rioja (UNIR; No. 074/2022) and met the Helsinki principles. The sample participants were contacted online through the publication of an advertisement and posting of the study conditions on social networks (Facebook, Twitter and Instagram). The following information was provided in the announcement: purpose of the research, sample of participants to whom it was directed, and email of the main researchers. Recruitment takes place between August and September of 2021. The questionnaire was organized by the main researchers and was created through “Google Forms”. After ensuring the consent and interest in participating of the participants, they received a link to the questionnaires by email. Moreover, the participants completed an informed consent form. To preserve their anonymity, their IP addresses were not recorded. Then, the participants completed the questionnaire with the different instruments. Finally, all the data were stored and there were no missing data, as completing all the questions was compulsory to finish the survey.

**Data Analyses**

The statistical analyses were conducted through Mplus version 7.3 (Muthén and Muthén, 2012). A latent profile analysis (LPA) approach was used to test the profiles’ combination and the relationship among the motivational profiles, BPNs and ER.

First, LPA models are grounded in a series of modeling steps, starting with the specification of a one-class model until there is no further improvement, as adding another class would result in meaningless classes (Martinent and Nicolas, 2016). To ensure that the model followed good fit indexes in LPA, several statistical indicators were present. As such, a combination of statistical indicators was used to decide which model had the best fit: the log-likelihood value, Akaike information criterion (AIC; Akaike, 1987), Bayesian information criterion (BIC; Schwartz, 1978), adjusted BIC (ABIC; Sclove, 1987), entropy, and Lo, Mendell, and Rubin likelihood ratio test (LRT; Lo et al., 2001).
As a cut-off point, the model that contains the smallest values for the AIC, BIC, and ABIC, and the highest values for the log-likelihood value and the entropy, indicated the best-fitting model (Martinent and Nicolas, 2017). In addition, the LRT was used for model comparison (chi-square difference test). Although there are no firm rules of thumb concerning the required sample size in LPA, Collins and Wugalter (1992) suggested a minimum N of almost 250. Subsequently, this study was deemed to have a large enough sample to conduct this analysis. Another limitation in LPA is the number of indicators, because when this increases, it can raise the number of possible response patterns, which could lead to data sparseness (Collins and Lanza, 2010). Thus, researchers generally prefer using fewer indicators (from four to 10 indicators) with LPA (Collins and Lanza, 2010). Hence, this work abides by Collins and Lanza (2010), as there were six indicators.

Second, BPNs and ER were incorporated as time-varying covariates of the motivation profiles. In the analyses, a significance interval of $p<.05$ was used in the logistic regression. In addition, coefficients and the odds ratio (OR) were utilized in the different statistical analyses.

**Results**

**Latent Profile Analysis**

Table 1 includes the fit information (log-likelihood ratio, AIC, BIC, ABIC, entropy, and LRT) for LPA models ranging from one to five classes to examine the profiles’ combinations. In balancing the statistical and theoretical considerations, the three-class profile solution made more theoretical sense than the two-class one, whereas a fourth class did not add anything substantive (Figure 1). Three profiles were chosen as the correct solution because greatest drops in AIC, BIC, and ABIC are seen and where the highest entropy value is reported.
The motivation profiles were defined as: (a) low scores in self-determined motivation, and average-high scores in non-self-determined motivation, comprising people with low scores in intrinsic and integrated motivation, average scores in identified and introjected motivation, and high scores in external regulation and amotivation \((n=148)\); (b) average scores in self-determined and non-self-determined motivation that included participants with average scores in intrinsic motivation, integrated, identified, introjected, external regulation, and amotivation \((n=287)\); and (c) high scores in self-determined motivation and average and high in non-self-determined motivation encompassing people with high scores in intrinsic motivation, integrated regulation, identified regulation, average in introjected regulation, and high in external regulation and amotivation \((n=373)\) (Table 2).

**Covariation of Motivation Profiles on BPNs and ER**

A logistic regression was performed to examine the established hypotheses: (1) Profiles with high scores in an intrinsic and high degree of self-determined motivation will develop functional ER and BPN satisfaction, and (2) Profiles with low scores in intrinsic motivations and low degree of self-determined motivation will develop dysfunctional ER and BPN dissatisfaction. In the logistic regression, the independent variables were the profiles, and the dependent variables were BPNs and ER (Table 3).

The logistic regression coefficients indicated that there were significant differences in competence \((-0.54; Z=-3.07; p<0.01; OR=0.58)\) and relatedness \((-0.60; Z=-3.81; p<0.01; OR=0.55)\) which indicates that for a one-unit increase in those constructs (i.e., the greater the perception of competence, the higher the relatedness), there were significant decreases in the odds of being in profile (a) to profile (b). In addition, the results indicated that there were significant differences in autonomy \((0.36; Z=2.26;\)
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$p<0.05; \ OR=1.43$) and adaptive regulation ($1.33; \ Z=5.84; \ p<0.01; \ OR=3.78$), which significant decreases in the odds of being in profile (b), compared to profile (a).

Furthermore, logistic regression coefficients revealed a significant difference between profile (a) and profile (c), in autonomy ($0.47; \ Z=3.01; \ p<0.01; \ OR=0.62$) and adaptive regulation ($1.29; \ Z=5.85; \ p<0.01; \ OR=0.27$), indicating that there were significant decreases in the odds of being in profile (c) compared to profile (a). Finally, the logistic regression coefficients results revealed significant differences between profile (b) and profile (c), in competence ($0.43; \ Z=3.02; \ p<0.01; \ OR=0.64$) and relatedness ($0.53; \ Z=3.93; \ p<0.01; \ OR=0.58$), in which there were significant decreases in the odds of being in profile (b) compared to profile (c).

**Discussion**

This study aimed to analyze motivational profiles relating to health-oriented PA and examine whether participants from distinct profiles significantly differed in ER and BPNs. The results revealed the coexistence of different motivational profiles with distinct combinations of ER and BPNs. Following Ryan and Deci (2000), in profile (a) defined as low scores in self-determined motivation, and average-high scores in non-self-determined motivation. This implies that this group has not developed a true internal self-determination that guides them toward the practice of PA for health purposes. This fact was directly related to the low levels registered in intrinsic and integrated regulation. In other words, PA is not part of the internal personal values of this group. Moreover, it does not seem that people with the aforementioned profile (a) have any real desire to improve their social acceptance with the practice of PA (introjected regulation is low). In addition, these participants are also defined by the presence of other subtypes of extrinsic motivation (average identified regulation, and high external regulation). In this case, people seek to be healthy for two reasons. The first is because people attempt to start
valuing something that they consider unpleasant because the rest of society interprets it as fundamental (Deci and Ryan, 2000; 2008). The second reason is related to the intention to satisfy external pressures, avoid punishment or obtain an exogenous reward (Boiché et al., 2016). Finally, the high level of amotivation reveals that there is no internal or external force that directs the behavior of the participants toward the practice of PA.

Profile (b), defined as average scores in self-determined and non-self-determined motivation, includes participants with average scores in intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation (self-determined motivations being slightly higher). In this case, the highest scores in intrinsic motivation and integrated regulation mean that the participants view PA as part of their internal personal values. On the other hand, the average scores in identified regulation reflect that part of the value given to PA is because it is positively considered by the environment. Likewise, it seems that participants within this profile have a desire to improve their social acceptance with the practice of PA (average scores for introjected regulation). The slightly lower scores in external regulation and amotivation show that few participants practice PA because they are controlled by external agents or directly, they are not interested in PA practice.

Profile (c) refers to high scores in self-determined motivation and average-high in non-self-determined motivation, and comprises people with high scores in intrinsic motivation, integrated regulation, identified regulation, external regulation and amotivation, and average introjected regulation. In this case, there are people who are highly motivated towards PA by internal forces (intrinsic and integrated regulation). Likewise, these participants are highly motivated by PA because it is highly valued by the context (identified regulation) and are moderately driven to achieve social approval (introjected regulation). Finally, some people with this profile practice PA because they
are pressured by the environment (external regulation) or are not interested in PA practice (amotivation). To sum up, the coexistence of the different motivational variables in the profiles revealed the continuum of SDT, as proved by previous studies grounded on this theory (Boiché et al., 2016; Cece et al., 2019; Deci and Ryan, 2002; Moreno and Martínez, 2006). As such, as confirmed in this study, self-determined motivation, non-self-determined motivation and amotivation may coexist to a certain degree in the same person. This information may encourage practitioners to put more emphasis on working to create the most self-determined motivation contexts possible (Sheldon and Filak, 2008) because this kind of motivation has revealed better outcomes in the practice of PA for health purposes (Amado et al., 2011; Delgado et al., 2016).

Second, there were significant differences between profile (a), which refers to low scores in self-determined motivation and average-high scores in non-self-determined motivation, and profile (b), average scores in self-determined and non-self-determined motivation regarding the BPNs of autonomy, competence and relatedness in PA. The results revealed that individuals were more likely to have greater autonomy, competence and relatedness levels in profile (b) with respect to profile (a). In particular, for profile (a), it was not expected that positive scores in autonomy would be found, because exogenous control enhances external regulation and does not help to satisfy this BPN (Amorose and Anderson-Butcher, 2007). In the same way, in profile (b) there are scores higher than in profile (a) in two autonomous forms of motivation (intrinsic motivation and identified regulation). Previously, Matsumoto and Takenaka (2022) and Van der Burgt et al. (2019) found that the satisfaction of autonomy in PA was satisfied when participants were motivated by intrinsic motivation and identified regulation.

Regarding the BPN of competence, Wilson and Rogers (2008) found that autonomously motivated athletes tended to feel competent in the exercise. Therefore, it
is logical that profile (b) scores higher in competence, given that self-determined motivations (intrinsic, integrated, and identified regulation) are higher. This coincides with what was stated by Matsumoto and Takenaka (2022), who affirmed that controlled motivations do not predict the satisfaction of competence in exercise. Likewise, it should be considered that within the profile (b) there are high presence of external regulation. Hence, this type of person performs a behavior under pressure and tends to abandon it early, hindering the possibility of dominating the action developed (in this case, PA).

Moreover, profile (a) includes individuals with high scores in amotivation, which usually arises when someone considers themselves unable to perform a task (Pope and Wilson, 2012).

In the case of relatedness, it is vital to specify that the coercion that people feel when they are extrinsically pressured (external regulation) makes them perceive a lack of affection from the environment, and they do not try to satisfy the need for affiliation (relatedness; Deci and Ryan, 2002). Likewise, amotivation does not enhance the development of good interpersonal relationship skills (Deci and Ryan, 2002; Vlachopoulos and Michailidou, 2006), which could hinder being included in the group of PA practitioners. On the other hand, in the work of Teixeira et al. (2012) it was observed that many intrinsic reasons for the person to exercise are related to the search for affiliation (relatedness). Intrinsic motivation is higher in profile (b) than in profile (a), which could indicate that participants perform PA to feel affiliated with a group. Thus, the higher presence of amotivation and non-self-determined motivation may hinder the experience of competence, autonomy and relatedness in PA practice. As such, this may advert practitioners the need to minimize those external factors that may foster amotivation and non-self-determined motivation, such as, undemocratic treatment of the coach, uncaring environment, etc (Akyüz et al., 2016; Troncoso et al., 2015).
In addition, logistic regression analysis revealed significant differences between individuals with profile (a), classified as low scores in self-determined motivation and average-high scores in non-self-determined motivation and profile (b), average scores in self-determined and non-self-determined motivation, in the use of adaptive regulation strategies. Specifically, the results revealed that participants with profile (b) were more likely to develop adaptive ER strategies. The use of adaptive ER strategies in the aforementioned profile (b) can be explained because of the presence of higher self-determined motivation than in profile (a) (Amado et al., 2011; Knee et al., 2002). Moreover, individuals with profile (a) have higher scores in external regulation, a non-self-determined form of motivation (that is not associated with the use of adaptive ER; Amiot et al., 2004). Hence, Delgado et al. (2016) found that intrinsic motivation is associated with adaptive ER strategies and the highest scores in intrinsic motivation were in profile (b). Thus, the enhancement of a climate of intrinsic motivation (p.e., enjoying task processing, affection, positive emotions) from coaches may serve as a strategy to foster those adaptive ER strategies (Ruíz et al., 2019; Sarason, 1988) because motivation determines behavior and emotions (Vallerrand, 1997).

Furthermore, the results revealed a significant difference between profile (a), classified as low scores in self-determined motivation and average-high scores in non-self-determined motivation, and profile (c), high scores in self-determined motivation and average-high in non-self-determined motivation, in autonomy and adaptive regulation. The findings revealed that the higher the autonomy and adaptative regulation levels are, the more likely an individual is to be grouped in profile (a) rather than (c). A priori, it does not seem logical that in profile (a) there are positive scores in autonomy as this is the profile with high amotivation (Matsumoto and Takenaka, 2022; Van der Burgt et al., 2019), which implies the absolute inexistence of personal initiative toward PA. Therefore,
the autonomy level should be low. Moreover, in profile (a) there are high scores in external regulation. According to Matsumoto and Takenaka (2022) and Van der Burgt et al. (2019) autonomy satisfaction occurs when people have self-determined motivations (e.g., something opposite to external regulation). However, it should be considered that the scores in external regulation and amotivation are lower than in profile (c). This could explain the greater probability of being in profile (a) based on the satisfaction of the BPN of autonomy. Regarding adaptive ER strategies, these tend to be presented as people perceive greater self-determined motivations (Amado et al., 2011). In this case, people who make use of adaptive ER strategies are more likely to belong to profile (a), achieving high scores in external regulation and amotivation, than profile (c), which refers to high motivation and amotivation, given that the scores in self-determined motivation are higher in profile (a).

Finally, significant differences were found between profile (b), defined as average scores in self-determined and non-self-determined motivation, and profile (c), which refers to high scores in self-determined motivation and average-high in non-self-determined motivation, in the BPNs of competence and relatedness. The results revealed that the higher the levels of competence and relatedness, the more likely an individual is to be grouped in profile (c) rather than (b). Theoretically, it seems more probable that the need for competence and relatedness in PA is satisfied in profile (c) because it is the one where the highest powers in self-determined motivations are differentiated, and this positively influences BPN satisfaction (Leo et al., 2022; Losier et al., 1993; Vallerand and Losier, 1999; Wilson et al., 2002). However, it should not be ignored that profile (c) is the one that reports the highest scores in external regulation and amotivation, two forms of non-self-determined motivation (Ryan and Decy, 2000). Based on the results obtained, perhaps it could be considered that in this sample, the BPNs are more influenced by
intrinsic motivations and other subtypes of motivations with a high degree of self-
determination than by external regulation and amotivation. This would explain why
profile (c), which encompasses high scores in self-determined motivation and average-
high in non-self-determined motivation is the one that reports the greatest satisfaction of
the BPNs of competence and relatedness.

One of the limitations of this research is that the variables examined were
evaluated with Spanish adults. Nevertheless, the sample taken was the one that better
aligned with the study purposes. Hence, the results may not be generalizable to people
from other nationalities and different age ranges. Therefore, in future research it would
be advisable to include samples from varying nationalities and age groups to check if the
most functional combinations of motivational types have the same effect on ER and
BPNs. Moreover, the methodology used is based on data analysis obtained from a self-
report questionnaire. Self-report measures may introduce small objectivity biases, such
as social desirability or memory biases. However, the instruments utilized were the most
appropriate for the examined variables and the target population. In addition, future
research could add psychophysiological variables to further examine affective states as a
wellness measure that may complement the self-reported variables.

In terms of practical implications, this work conveys that there is a connection
between motivation, ER, and BPN satisfaction, understanding motivation from a
multivariate perspective rather than a bivariate one. Hence, the scores for ER and BPNs
are modified depending on the combination of different types of motivation for health-
oriented PA that a person has. This means that people with a blend of motivations and a
high degree of self-determination will have functional ER skills that may help them
become more responsible for their behaviors in PA and, consequently, may help them
maintain an active lifestyle. In the same way, being able to intervene regarding the
In conclusion, different levels of motivation can coexist within the same person. The coexistence of different health-oriented PA motivations significantly influences ER and BPNs. In people where the combination of motivational variables presents higher scores in the more self-determined forms of health-oriented PA, better functional ER strategies are appreciated, and people actively face adversities. Likewise, the combination of health-oriented PA self-determined motivation variables aids in the satisfaction of the BPNs and the perception of a better psychological adjustment. Identifying functional motivational health-oriented PA profiles in adults could assist in improving emotional and psychological well-being in society.

Funding

Not applicable for that section.

Conflict of interest Statement

The Authors declare that there is no conflict of interest.

Ethic Statement

The participants were informed of the purpose of the research, signed a self-informed consent, and remained anonymous. The study was approved by the ethics committee of Universidad Internacional de La Rioja (UNIR; No. 074/2022).
References


MOTIVATION PROFILES


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Table 1. *Fit Indices for Latent Profile Analysis Models.*

<table>
<thead>
<tr>
<th>No. of classes</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of free parameters</td>
<td>log likelihood</td>
<td>-8363.227</td>
<td>-8363.227</td>
<td><strong>7702.052</strong></td>
<td>-7520.551</td>
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<tr>
<td>The Akaike information criterion (AIC)</td>
<td>16764.455</td>
<td>16764.455</td>
<td><strong>15456.103</strong></td>
<td>15107.101</td>
<td>14694.009</td>
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<tr>
<td>Bayesian information criterion (BIC)</td>
<td>16853.651</td>
<td>16853.651</td>
<td><strong>15578.162</strong></td>
<td>15262.022</td>
<td>14881.792</td>
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<tr>
<td>Akaike's Bayesian information criterion (ABIC)</td>
<td>16793.315</td>
<td>16793.315</td>
<td><strong>15495.597</strong></td>
<td>15157.228</td>
<td>14754.769</td>
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<tr>
<td>Likelihood Ratio Test (LRT)</td>
<td>-</td>
<td>1236.119*</td>
<td><strong>1322.351</strong>*</td>
<td>363.002*</td>
<td>431.205</td>
</tr>
<tr>
<td>Entropy</td>
<td>-</td>
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<td><strong>0.938</strong></td>
<td>0.916</td>
<td>0.914</td>
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<tr>
<td>Bootstrap Likelihood Ratio Test (BLRT)</td>
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<td>1236.119*</td>
<td><strong>1322.351</strong></td>
<td>363.002*</td>
<td>431.205</td>
</tr>
</tbody>
</table>

Notes. *p < 0.05
Table 2. Estimates of Latent EMAPS Scores and Prevalence of Motivation Profiles for the LPA Model.

<table>
<thead>
<tr>
<th>Motivation profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(a)</em> Low scores in self-determined motivation and average-high scores in non self-determined motivation <em>(n = 148)</em></td>
</tr>
<tr>
<td><em>(b)</em> Average scores in self-determined and non-self-determined motivation <em>(n = 287)</em></td>
</tr>
<tr>
<td><em>(c)</em> High scores in self-determined motivation and average-high in non-self-determined motivation <em>(n = 373)</em></td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
</tr>
<tr>
<td>Integrated Regulation</td>
</tr>
<tr>
<td>Identified Regulation</td>
</tr>
<tr>
<td>Introjected Regulation</td>
</tr>
<tr>
<td>External Regulation</td>
</tr>
<tr>
<td>Amotivation</td>
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</table>
### Table 3. Logistic Regression Coefficients for the LPCA Model with Basic Psychological Needs and Emotional Regulation.

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Logistic Regression Coefficients</th>
<th>Standard Errors</th>
<th>Z-values</th>
<th>P-values</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS 1 VS C2</td>
<td>Competence</td>
<td>-0.54</td>
<td>0.17</td>
<td>-3.07</td>
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<td></td>
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<td>0.15</td>
<td>2.26</td>
<td>0.023*</td>
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<td></td>
<td>Relatedness</td>
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<td>0.15</td>
<td>-3.81</td>
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<td>Adaptive Strategies</td>
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<td>5.84</td>
<td>0.00*</td>
</tr>
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<td></td>
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<td>0.09</td>
<td>0.92</td>
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<tr>
<td>CLASS 1 VS C3</td>
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<td>0.17</td>
<td>-0.59</td>
<td>0.54</td>
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<tr>
<td></td>
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<td>0.22</td>
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<td>0.00*</td>
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<td>CLASS 2 VS C3</td>
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<tr>
<td></td>
<td>Relatedness</td>
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<td>0.13</td>
<td>3.93</td>
<td>0.00*</td>
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<tr>
<td></td>
<td>Adaptive Strategies</td>
<td>-0.04</td>
<td>0.18</td>
<td>-0.21</td>
<td>0.82</td>
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<tr>
<td></td>
<td>Less Adaptive Strategies</td>
<td>0.17</td>
<td>0.15</td>
<td>1.13</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Notes. *p < 0.05.
Figure 1. Fit information for the model.

<table>
<thead>
<tr>
<th></th>
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<th>5</th>
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<tbody>
<tr>
<td>AIC</td>
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<td>31051</td>
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<td>BIC</td>
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<td>31687</td>
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<td>ABIC</td>
<td>32505</td>
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