



Validation of the motivation scale towards Health-Oriented physical activity (EMAPS) in Spanish Population

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Abstract

The aim of the present study was to examine the psychometric properties of the motivation scale towards health-oriented physical activity (EMAPS) in the Spanish Population. A sample of 808 participants ($M_{age}=33.90$; $SD=12.91$; 366 men and 440 women), participated to ensure the structural, methodological, and external correlates of EMAPS scale validation. Results of the structural stage of analyses confirmed 6 dimensions of EMAPS (i.e., intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation). In conclusion, results provided evidence for the reliability and validity of the Spanish version of the EMAPS scores. Thus, this instrument may serve to provide a measure of the motivation towards health-oriented physical activity purposes in the Spanish population.

Keywords Cfa · Esem · Health · Adults

Introduction

The study of motivation in physical activity is a widely studied topic through the last three decades (Boiché et al., 2016; Deci & Ryan, 1985; Gillison et al., 2019; Knittle et al., 2018; Ntoumanis et al., 2020). Moreover, in the last twenty years there is an increasing interest in literature to examine the influence of motivation in physical activity with health-oriented purposes (Boiché et al., 2016; Gillison et al., 2019; Knittle et al., 2018; Ntoumanis et al., 2020). Even, during the context of the COVID-19 epidemic, the study of motivation made sense from a health-oriented perspective as there were distinct works that examined this subject (Jordan & Smith, 2022; Šakan et al., 2020). In that line, the most number of studies that examined motivation

in physical activity were grounded in Self-Determination Theory (SDT), which is one of the most salient theories that has studied motivation in several domains apart from physical activity (Deci et al., 2017; Williams et al., 1999). The aforementioned theory describes the social and contextual factors that involve the conditions to promote motivation in people (Vallerand & Rousseau, 2001). The SDT divides the motivation into intrinsic (when people carry out the behavior for the pleasantness and satisfaction to its performance), extrinsic motivation (when people carry out an activity for avoiding the negative outcome or the positive state that provokes an external benefit) and amotivation (when there are no chances to reach a positive benefit through the behaviour in itself) (Deci & Ryan, 2008).

However, the previously describe extrinsic motivation is subdivided into other four types of extrinsic motivation: external regulation, introjected regulation, identified regulation and integrated regulation (Deci & Ryan, 1985). External regulation is when the behaviour is a response to an external requirement such as rewards or punishments, and when people comply to social pressure (Boiché et al., 2016). Introjected regulation is related to a personal behaviour that is oriented towards the search for interpersonal approval and ego improvement (Deci & Ryan, 2008). The identified regulation is highly valued by the sociocultural environment and this causes the person to judge it as crucial (Deci & Ryan, 2008). Integrated regulation is carried out freely

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because it is congruent with personal values, such as the pursuit of well-being because it is the lifestyle that coincides with personal beliefs (Moreno-Murcia & Martínez, 2006).

Several works have proved the sustainability of SDT in health-oriented purposes in different domains such as: physical activity, tobacco consumption, healthcare treatment adherence, pandemics, among others (Deci & Ryan, 2012; Gillison et al., 2019; Knittle et al., 2018; Ntoumanis et al., 2020). In line with that Deci and Ryan (2012) concluded that SDT is crucial in health care contexts as it is the only postulate that has profoundly examined autonomy using empirical methods. Also, they provided that SDT practitioners were more autonomy supporters and the patients became more autonomous in their motivation to convert their habits to positive ones. In particular, autonomous motivation is related to behavioural changes in physical activity, long-term maintenance of physical activity and other health-related behaviors (Gillison et al., 2019; Hagger & Chatzisarantis, 2009; Knittle et al., 2016; Ng et al., 2012; Ntoumanis et al., 2020; Teixeira et al., 2012). On the contrary, external regulation and introjected regulation were related to less behavioral maintenance and poorer psychological well-being (Gillison et al., 2019; Hagger & Chatzisarantis, 2009; Knittle et al., 2016; Ng et al., 2012; Ntoumanis et al., 2020; Teixeira et al., 2012). Thus, due to the presence of SDT for health purposes it is needed to have instruments that measure this construct in a health purpose environment.

According to the need of having reliable measures grounded on SDT for health purposes, it was created the EMAPS french version by Boiché et al. (2016). Besides, it was created as there was a scarcity of instruments to measure motivation in the french language as well as the necessity to measure all SDT factors in one scale with health-oriented purposes (Boiché et al., 2016). However, in the Spanish context, several instruments measure motivation in sports context from SDT perspective, but no one has measured motivation for health-oriented purposes and following the SDT main factors. To cite some of the previous instruments that have measured motivation in the Spanish context, we can highlight: The Behavioral Regulation in Sport Questionnaire (BRSQ; Lonsdale et al., 2008; Moreno-Murcia et al., 2011), The Behavioral Regulation Questionnaire in Exercise Questionnaire-2 (BREQ-2; Markland & Tobin, 2004; Moreno-Murcia et al., 2007), the Behavioral Regulation in Exercise Questionnaire-3 (BREQ-3; González-Cutre et al., 2010; Wilson et al., 2006), Sports Motivation Scale (SMS; Núñez et al., 2006; Pelletier et al., 1995), the Perceived Locus of Causality Scale (PLOC; Goudas et al., 1994; Moreno-Murcia et al., 2009), the Motivational Strategies Measurement Questionnaire (Cervelló et al., 2007), the Motivational Questionnaire in Physical Education (CMEF; Pulido González et al., 2015) and the Perceived Motivational

Climate Questionnaire in Sport-2 (PMCSQ-2; Cecchini et al., 2005; Newton et al., 2000). Thus, the aforementioned instruments are not considered to be used in health-oriented contexts and, as a consequence, it enhances the necessity of a new Spanish measurement.

According to the necessity of validating a scale that measures motivation in health-oriented purposes, to carry out this target two distinct populations were chosen that participated in different measures. First, sample 1 fulfilled the EMAPS, a basic psychological needs questionnaire and a physical self-concept questionnaire. In particular, the aforementioned variables were chosen together with the EMAPS due to their differentiate conceptualization to establish possible correlations to see the EMAPS external validity. In line with that, basic psychological needs are understood as an inherent requirement of the human being that is capable of guiding their behavior in order to achieve their psychological and social well-being (Ryan & Deci, 2000). The three universal basic psychological needs are competence (the perception that people have about their ability to perform a task in a given context), autonomy (the degree of initiative that people feel to direct and control their behaviors) and relationship (the perceived feeling of belonging and being included in a specific group or social environment) (Ryan & Deci, 2000). On the contrary, self-concept is a variable that describes the generally positive feelings that a person perceives about themselves (Balaguer et al., 2008). Within this variable, it should be referred to one of its areas, the physical self-concept, understood as the global opinion that a person has about their physique on the domains of ability, competence, condition and physical appearance (Hagger et al., 2010). It is a multidimensional variable configured by the four previously detailed dimensions (Goñi et al., 2004). Thus, basic psychological needs and physical self-concept were selected according to their differentiate meaning to be correlated with EMAPS scores within the sample 1.

Second, sample 2 completed the EMAPS, a parental education styles questionnaire and emotional regulation. Parental educational styles are measured through the Parental Acceptance-Rejection Theory (PARTheory; Rohner, 2005; Del Barrio et al., 2014) which differentiates two opposite poles: Acceptance at one extreme (defined by warmth, support and parental care) and rejection at the other (physical and psychological). The variables analyzed within the PARTheory are: Affect (provide affection for their children), indifference-neglect (the absence of warm gestures and by the deprivation of praise), hostility-aggression (When parents use physical knocks or shoves) and verbal violence (screams) and control (the degree of supervision that parents do on the behavior adopted by their children) (Del Barrio et al., 2014; Rohner, 2005). Another variable selected due to their different conceptualization with motivation is

emotional regulation which could be divided into two types of strategies (functional and dysfunctional) (Garnefski et al., 2002). In this way, within dysfunctional strategies we may find cognitive mechanisms, such as blaming others, self-blaming, rumination or catastrophizing. On the other hand, the sub-strategies that are included within the functional tools are positive refocusing and acceptance (Garnefski et al., 2002). Therefore, parental education and emotional regulation were selected according to their different meaning with EMAPS scores in sample 2.

As aforementioned, the scarcity of measures to evaluate motivation in health purposes and the efficiency of SDT intervention in health contexts, claim the necessity of having Spanish measures of this construct. As such, the present study intends to validate the EMAPS scores to the Spanish context, due to the lack of measures that has examined the motivation towards health purposes. Moreover, the increasing of sedentarism and the evolution of new physical activities to health purposes, has enhanced the necessity to develop physical activity measures according to the new ways of physical exercises and health problems. Subsequently, the aim of the present study was to examine the psychometric properties of the motivation scale towards health-oriented physical activity (EMAPS) in the Spanish Population.

Method

Participants

An initial population of 399 participants ($M_{age}=37.98$; $SD=11.92$; 79 men and 320 women) was used. Most of the participants were physical activity practitioners ($n=371$) and a small proportion were competitors ($n=28$). Particularly, 4 at the national level, 6 at the regional level and 18 at the local level. Regarding the hours of exercise, 300 participants practiced less than 10 h per week, 77 between 10 and 15 h per week, 16 between 15 and 20 h per week and 6 practiced more than 20 h per week.

A second sample of 409 participants ($M_{age}=33.90$; $SD=12.91$; 287 men and 120 women) was used. Most of the participants were physical activity practitioners ($n=343$) and a small proportion were competitors ($n=66$). Particularly, 6 at the international level, 7 at the national level, 15 at the regional level and 38 at the local level. Regarding the hours of exercise, 280 participants practiced less than 10 h per week, 98 between 10 and 15 h per week, 19 between 15 and 20 h per week and 12 practiced more than 20 h per week.

As an inclusion criterion for the distinct participants, it was only selected people older than 18 years old as the

original version of the EMAPS scale (Boiché et al., 2016) was targeted to measure motivation in the health context in adults. Moreover, to ensure the generability of the results obtained it was selected a sample of heterogeneous participants from distinct physical activity modalities and types of practice.

Instruments

The Motivation Scale for Physical Activity for Health Purposes (EMAPS; Boiché et al., 2016) is an instrument used to find out the motivations that guide individuals towards the practice of physical activity in search of well-being. It consists of a set of 30 items and each one presents seven Likert-type response options ranging from 1 (does not correspond at all) to 7 (corresponds very strongly). Among the types of motivation evaluated are intrinsic ($\alpha=0.90$), integrated ($\alpha=0.90$), identified ($\alpha=0.91$), introjected ($\alpha=0.80$), external regulation ($\alpha=0.87$) and amotivation ($\alpha=0.86$). To translate the scale direct translation procedures were carried out (Carretero-Dios & Pérez, 2005), which implies the translation of the scale to Spanish and in a second moment, another group of translators judged the equivalence.

The evaluation of parental educational styles was carried out through the Child PARQ Scale/Control (Rohner, 2005) in the Spanish version of 29 items (Del Barrio et al., 2014). The ChildPARQ/Control scale is used to measure: Hostility-aggression perceived by the children and inquires about whether the parents perceive themselves as possible physical or verbal aggressors (e.g., “My father/mother gets angry and hurts my feelings”); Indifference/neglect, which reveals the level of attention that parents pay to their children, their involvement in their problems and the coldness of the relationship (e.g., “My father/mother ignores me”); Perceived rejection in the form of indifference, which investigates rejection shown by disaffection, aggression, and neglect (e.g., “My father/mother really does not love me”) and perceived control, which reveals the supervision that parents exert on their children (e.g., “My father/mother wants to control everything I do”). There is homogeneity in the PARQ/Control questions for both maternal and paternal figures, but they are formulated separately. The internal consistency coefficients measured by Cronbach’s alpha are the following: Affect (mother, $\alpha=0.92$; father, $\alpha=0.94$), undifferentiated rejection (mother, $\alpha=0.86$; father, $\alpha=0.89$), hostility/aggression (mother, $\alpha=0.89$; father, $\alpha=0.91$), indifference/neglect (mother, $\alpha=0.78$; father= 0.80), control (mother, $\alpha=0.46$; father= 0.80) and undifferentiated rejection (mother, $\alpha=0.86$; father= 0.89). The items are evaluated using a 4-point Likert-type scale ranging from 1 (almost never true) to 4 (almost always true).

The Brief Physical Self-Concept Questionnaire (CAF-A; Fox & Corbin, 1989) in the Spanish abbreviated version (Goñi et al., 2006) contains 8 items grouped into four factors: Physical capacity (e.g., “I look clumsy in sports activities”); Physical condition (e.g., “I can run and exercise for a long time without getting tired”); Physical attractiveness (e.g., “I am happy with my body image”) and Strength (e.g., “I am strong”). The Cronbach alphas revealed acceptable reliability of CAF-A scores: Physical capacity ($\alpha=0.68$), physical condition ($\alpha=0.81$), physical attractiveness ($\alpha=0.86$) and strength ($\alpha=0.81$).

The short Spanish version of the cognitive emotion regulation questionnaire (CERQ) (Garnefski & Kraaij, 2006) is a scale used to measure nine emotional regulation strategies to face negative or unpleasant events. It consists of 18 items that presents five responses in a Likert-type scale with a range from 1 (almost never) to 5 (almost always). Some scholars showed that Cronbach’s alpha tends to increase with a higher number of items in a scale (e.g., Clark & Watson, 1995). As the CERQ is a brief measure with 2 items per CERQ scores, the item correlation was taken as a marker of internal consistency (Clark & Watson, 1995) offered a rule of thumb that recommends an item correlation that ranges from 0.15 to 0.50. The item correlations provided evidence for the reliability of CERQ scores: Self-blame ($r=.36$), acceptance ($r=.50$), rumination ($r=.44$), positive reinterpretation ($r=.49$), focus on planes ($r=.44$), positive reassessment ($r=.41$), catastrophizing ($r=.40$), put into perspective ($r=.42$) and blaming others ($r=.43$).

The Spanish version of the Basic Needs Satisfaction in General Scale (BNSG-S; Gagné, 2003; González-Cutre et al., 2015). The original scale is made up of 21 items that measure the satisfaction of competency needs ($\alpha=0.69$; 6 items, e.g., “Most days I feel that I am successful in what I do”), autonomy ($\alpha=0.76$; 7 items, e.g., “I feel that I am free to decide for myself how to live my life”) and relationship ($\alpha=0.84$; 8 items, e.g., “I really like the people that I interact with”). The participants had to answer all the items thinking about how they related to their life and indicating how true they were for them on a Likert-type scale from 1 (not true) to 7 (totally true).

Procedure

The study complied with international ethical regulations and anonymity was preserved. In addition, the participants signed informed consent before the study was carried out. All participants followed the same procedure. First, the participants were contacted online and they ensured their consent and interest in participating in the research. Then, they received the link to the research questionnaire. Subsequently, the participants answered the form questions with

absolute freedom through the link available in their email. When a user completed the survey and sent it, the data was automatically stored in the application and the new information was visible to the researcher.

Data analyses

To carry out the distinct analyses, the software Mplus 7.3 (Muthén & Muthén, 1998–2015) was taken. The initial stage of the analyses examined the EMAPS Scale in the comparison of confirmatory factor analysis (CFA), Bifactor analysis and exploratory structural equation modelling (ESEM), according to Marsh et al. (2009). Regarding the CFA model, a correlated six-factors CFA model was displayed in which (1) the items were allowed to load onto their expectedly first-order factor, and (2) all cross-loadings were constrained to be exactly zero. In the bifactor model, each item was specified to load in a general EMAPS factor as well as their a priori main factor in the distinct EMAPS dimensions. In the ESEM model, the different item loadings were unforcedly evaluated on their a priori EMAPS variables, and all cross-loadings were also unforcedly estimated and aimed to be the closest to 0. To test the goodness of the model was used the chi-square (χ^2), comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA) with their confidence interval, Akaike information criteria (AIC), Bayesian information criterion (BIC), and sample size-adjusted BIC (ABIC). Regarding CFI and TLI, values higher than 0.90 were acceptable, and 0.95 revealed an outstanding fit, whereas RMSEA values minor than 0.08 provided acceptable goodness and 0.06 showed excellent fit (Hu & Bentler, 1999).

To assess the reliability of EMAPS scores, Cronbach’s alpha coefficients were worked out, average variance extracted (AVE), and composite reliability values (ρ). AVE (i.e., $[(\text{sum of standardized loadings})^2]/[(\text{sum of standardized loadings})^2 + (\text{sum of indicator measurement errors})]$) values described the variance captured by measurement errors as opposed to the variance attributable to the latent factors. A score of 0.50 or higher reveals sufficient fitness because the construct’s variance is higher than the error variance (Martinent et al., 2015). Composite reliability values (i.e., $\rho = [(\text{sum of standardized loadings})^2 / ((\text{sum of standardized loadings})^2 + (\text{sum of error variances}))]$) measure the overall reliability of a collection of heterogeneous but similar items. A value of 0.70 or higher shows acceptable reliability (Martinent et al., 2015). Finally, to work out the external validity of the EMAPS scores, a correlational analysis was performed between EMAPS scores and basic psychological needs (sample 1), physical self-concept (sample 1), parental educational styles (sample 2), and emotional regulation (sample 2).

Table 1 Results of models CFA, ESEM and Bi-Factor.

Model	χ^2	<i>p</i>	df.	CFI	TLI	AIC	BIC	ABIC	RMSEA	90%CI RMSEA	SRMR
CFA Sample 1	969.656	<0.001	390	0.919	0.91	41154.397	41573.238	41240.067	0.061	0.056–0.066	0.078
CFA Sample 2	871.297	<0.001	390	0.917	0.907	42036.235	42457.675	42124.492	0.055	0.050–0.060	0.084
ESEM Sample 1	469.236	<0.001	270	0.972	0.955	40777.879	41675.395	40961.458	0.043	0.036–0.049	0.019
ESEM Sample 2	435.865	<0.001	270	0.971	0.954	41645.821	42548.907	41834.942	0.039	0.032–0.045	0.020
Bi-factor Sample 1	731.390	<0.001	365	0.949	0.939	40922.414	41440.979	41028.482	0.050	0.045–0.055	0.061
Bi-factor Sample 2	694.017	<0.001	365	0.943	0.932	41818.673	42340.456	42340.456	0.047	0.042–0.052	0.069

Results

Factorial structure of EMAPS Scores

Confirmatory factor analysis (CFA)

First, a CFA was performed with the different samples (sample 1 and sample 2) to ensure that the factors of the instrument coincided with the previously established by the original version (Boiché et al., 2016) and other instruments based in SDT (Cecchini et al., 2005; Cervelló et al., 2007; González-Cutre et al., 2010; Moreno-Murcia et al., 2007, 2011; Núñez et al., 2006). The distinct indices of the correlated six-factors CFA model reached cut-off criterion values for an acceptable fit to the data in all samples (Table 1). The CFI, TLI and RMSEA revealed good indexes: sample 1 (CFI=0.919; TLI=0.910; RMSEA=0.061), sample 2 (CFI=0.917; TLI=0.907; RMSEA=0.055) (See Tables 1, 2, 3 and 4). Moreover, all standardized factor loadings (λ) revealed significance at $p < .05$ and fitted well in the different analysis of CFA (Tables 2 and 3). Thus, the results of the CFA confirmed that the structure of the EMAPS scores followed the same pattern that the first original version (Boiché et al., 2016).

Bifactor Analysis

Second, a bifactor analysis was performed with the different samples (sample 1 and sample 2) to know if the Spanish version of EMAPS was grouped in a first general dimension in addition to the different subdimensions previously established. The fit indices in the bifactor model revealed sufficient criterion scores in all samples (Table 1): sample 1 (CFI=0.949; TLI=0.939; RMSEA=0.050) and sample 2 (CFI=0.943; TLI=0.932; RMSEA=0.047). Nevertheless, λ were significant at $p < .05$ but were lower than 0.35 for most of the items concerning the general dimension of motivation (for interested reader, results of the bifactor analyses are available on request from the first author). Thus, the results of the bifactor model did not provide evidence of the existence of a general factor of motivation.

Exploratory structural equation modelling (ESEM)

Third, to ensure that there are no cross-loadings across the items of the several specific dimensions of motivation, an ESEM analysis was performed. The fit indices in the ESEM model revealed the sufficient criterion scores in all samples (Table 1): sample 1 (CFI=0.972; TLI=0.955; RMSEA=0.043), sample 2 (CFI=0.971; TLI=0.954; RMSEA=0.039). Moreover, all λ were significant at $p < .05$ and revealed the highest loadings in the factor in which they were theoretically attached (Tables 2 and 3). Thus, the results of the ESEM provided further evidence of the factorial structure of EMAPS scores.

Reliability of EMAPS Scores

The EMAPS spanish version revealed good indicators in the Alpha coefficients as they ranged from 0.82 to 0.92 in sample 1 and they ranged from 0.77 to 0.89 in sample 2. Besides, AVE and Composite Reliability values provided further evidence for the reliability of EMAPS scores as AVE ranged from 0.52 to 0.71 for sample 1 and from 0.40 to 0.64 for sample 2 whereas Composite Reliability values ranged from 0.81 to 0.90 for sample 1 and from 0.77 to 0.89 for sample 2 (Tables 2 and 3).

Correlational analyses

To analyse the external validity of the EMAPS scores, two correlational analyses were performed with the study samples. First, it was tested in sample 1 ($n = 399$) the correlations among EMAPS, basic psychological needs and self-concept. The results revealed that most EMAPS factors were positively correlated with basic psychological needs. However, introjected regulation was negatively correlated with autonomy, competence and relationship (Table 4). On the other hand, most of the EMAPS factors were positively correlated with Physical self-concept variables. However, Physical self-concept ability was negatively related to introjected regulation. Besides, external regulation was negatively correlated with physical self-concept condition.

Second, EMAPS was correlated with parental education styles and emotional regulation. Regarding parental

Table 2 Standardized Factor Loadings for Confirmatory Factor Analysis (CFA) and Exploratory Structural Equation Modeling (ESEM) for the EMAPS Spanish Validation in the sample 1 ($N=399$)

Items	CFA		ESEM						δ	AVE	Composite Reliability
	λ	δ	Factor 1 (λ)	Factor 2 (λ)	Factor 3 (λ)	Factor 4 (λ)	Factor 5 (λ)	Factor 6 (λ)			
MINT											
Item 1	0.833	0.367	0.610	0.442	0.439	0.246	0.096	0.108	0.279	0.667	0.909
Item 2	0.814	0.36	0.513	0.271	0.205	0.042	0.074	0.190	0.358		
Item 3	0.897	0.252	0.652	0.315	0.402	0.201	0.116	0.251	0.172		
Item 4	0.788	0.369	0.459	0.412	0.367	0.098	0.012	0.022	0.384		
Item 5	0.826	0.374	0.659	0.359	0.104	0.182	-0.012	0.020	0.263		
MEINT											
Item 1	0.765	0.45	0.480	0.513	0.324	0.267	0.013	0.153	0.404	0.710	0.907
Item 2	0.859	0.309	0.372	0.773	0.159	0.120	-0.056	0.111	0.220		
Item 3	0.879	0.299	0.375	0.828	0.264	0.354	-0.088	0.156	0.152		
Item 4	0.884	0.324	0.394	0.696	0.258	0.137	-0.028	-0.056	0.229		
Item 5	0.856	0.3	0.466	0.647	0.261	0.256	-0.069	0.072	0.280		
MEID											
Item 1	0.835	0.293	0.315	0.286	0.606	0.179	0.005	0.123	0.295	0.670	0.890
Item 2	0.796	0.397	0.427	0.278	0.778	0.140	0.116	0.221	0.296		
Item 3	0.904	0.245	0.463	0.166	0.733	0.098	-0.251	-0.007	0.191		
Item 4	0.876	0.296	0.414	0.290	0.731	0.033	0.143	0.035	0.236		
Item 5	0.750	0.428	0.246	0.298	0.733	0.457	0.178	0.153	0.331		
MEIY											
Item 1	0.718	0.537	0.086	0.189	0.180	0.640	-0.159	0.006	0.416	0.527	0.816
Item 2	0.670	0.571	0.217	0.170	0.116	0.726	-0.182	-0.067	0.399		
Item 3	0.745	0.245	0.147	0.185	0.116	0.556	-0.111	-0.195	0.463		
Item 4	0.631	0.296	0.244	0.168	0.144	0.543	-0.147	-0.127	0.497		
Item 5	0.707	0.592	0.111	0.248	0.178	0.507	-0.147	-0.076	0.409		
MER											
Item 1	0.690	0.435	0.082	-0.073	0.071	0.005	0.589	0.293	0.506	0.613	0.853
Item 2	0.864	0.264	0.050	-0.018	0.123	-0.100	0.685	0.471	0.271		
Item 3	0.357	0.743	0.079	-0.044	0.130	-0.224	0.337	0.305	0.759		
Item 4	0.871	0.229	-0.011	0.015	0.060	-0.387	0.760	0.445	0.239		
Item 5	0.858	0.256	0.036	-0.086	-0.047	-0.150	0.762	0.471	0.237		
AMOT											
Item 1	0.575	0.595	0.072	0.121	0.052	-0.100	0.335	0.440	0.670	0.579	0.845
Item 2	0.762	0.412	0.089	0.047	0.048	-0.168	0.453	0.493	0.433		
Item 3	0.682	0.444	0.139	0.007	0.101	-0.046	0.174	0.581	0.444		
Item 4	0.706	0.467	0.137	0.070	0.060	-0.168	0.375	0.572	0.453		
Item 5	0.836	0.303	0.107	0.120	0.134	0.065	0.352	0.691	0.265		

Notes. MINT = Intrinsic Motivation. MEINT = Integrated Regulation. MEID = Identified Regulation. MEIY = Introjected Regulation

MER = External Regulation. AMOT = Amotivation.

educational variables, intrinsic motivation was negatively related to mother control and integrated motivation was negatively related to mother control. Also, introjected regulation was negatively correlated with mother and father hostility, mother and father negligence, mother and father undifferentiated rejection. Furthermore, external regulation was negatively related to father affect, mother and father control. Finally, amotivation was negatively related to mother and father control.

Concerning emotional regulation variables, intrinsic motivation was negatively related to self-blame, focus on

thought, catastrophizing and others blame. The integrated motivation was negatively related with self-blame, focus on thought, catastrophizing and others blame. Identified motivation was negatively related with self-blame, focus on thought, catastrophizing and others blame. Introjected regulation was negatively related to self-blame, acceptance, focus on thought, reappraisal, catastrophizing and others blame. External regulation was negatively correlated with focus on thought, positive refocusing and planning. Amotivation was negatively correlated with focus on thought, positive refocusing and planning.

Table 3 Standardized Factor Loadings for Confirmatory Factor Analysis (CFA) and Exploratory Structural Equation Modeling (ESEM) for the EMAPS Spanish Validation in the sample 1 ($n = 409$)

CFA Items	CFA		ESEM						AVE	Composite Reliability	
	λ	δ	Factor 1 (λ)	Factor 2 (λ)	Factor 3 (λ)	Factor 4 (λ)	Factor 5 (λ)	Factor 6 (λ)			δ
MINT											
Item 1	0.738	0.455	0.241	0.243	0.064	0.005	0.151	-0.065	0.410	0.602	0.883
Item 2	0.774	0.402	0.213	0.154	0.150	-0.073	-0.01	0.039	0.397		
Item 3	0.832	0.308	0.402	0.372	0.164	0.107	0.068	0.111	0.318		
Item 4	0.796	0.367	0.441	0.266	0.384	0.117	0.021	-0.017	0.340		
Item 5	0.736	0.458	0.440	0.523	0.340	0.376	-0.04	-0.018	0.434		
MEINT											
Item 1	0.697	0.514	0.626	0.563	0.294	0.403	-0.02	-0.065	0.464	0.570	0.868
Item 2	0.780	0.391	0.550	0.714	0.215	0.199	0.031	0.039	0.334		
Item 3	0.765	0.415	0.479	0.639	0.285	0.293	0.043	0.111	0.378		
Item 4	0.730	0.468	0.418	0.489	0.271	0.057	-0.06	-0.017	0.470		
Item 5	0.800	0.359	0.481	0.461	0.139	0.250	-0.08	-0.091	0.314		
MEID											
Item 1	0.841	0.293	0.366	0.314	0.811	0.190	0.141	0.166	0.225	0.640	0.898
Item 2	0.764	0.416	0.496	0.146	0.712	0.072	0.087	0.233	0.399		
Item 3	0.824	0.321	0.465	0.364	0.724	-0.017	-0.01	0.056	0.319		
Item 4	0.800	0.36	0.359	0.325	0.632	0.073	0.151	0.056	0.336		
Item 5	0.770	0.407	0.391	0.190	0.692	0.360	0.146	0.169	0.337		
MEIY											
Item 1	0.618	0.619	0.054	0.052	0.082	0.471	-0.19	-0.149	0.538	0.405	0.772
Item 2	0.643	0.587	0.064	0.184	-0.003	0.520	-0.21	-0.122	0.522		
Item 3	0.673	0.547	0.133	0.229	0.043	0.509	-0.288	-0.134	0.511		
Item 4	0.684	0.532	0.257	0.267	0.141	0.483	-0.13	-0.232	0.456		
Item 5	0.557	0.690	0.100	0.302	0.178	0.431	-0.198	-0.215	0.473		
MER											
Item 1	0.781	0.39	0.033	0.056	0.116	-0.107	0.547	0.418	0.388	0.633	0.895
Item 2	0.836	0.302	0.072	-0.025	0.114	-0.320	0.594	0.410	0.312		
Item 3	0.633	0.6	0.119	-0.033	0.078	-0.339	0.453	0.456	0.580		
Item 4	0.864	0.253	0.081	-0.106	0.064	-0.386	0.960	0.400	-0.011		
Item 5	0.844	0.288	-0.110	-0.039	0.131	-0.072	0.631	0.545	0.296		
AMOT											
Item 1	0.707	0.5	0.056	-0.036	0.076	-0.173	0.484	0.510	0.476	0.565	0.866
Item 2	0.745	0.445	0.023	-0.009	0.109	-0.235	0.532	0.570	0.428		
Item 3	0.783	0.387	0.116	-0.021	0.203	-0.136	0.354	0.654	0.325		
Item 4	0.706	0.502	-0.039	0.065	0.143	-0.375	0.215	0.566	0.419		
Item 5	0.814	0.338	0.044	0.029	-0.004	-0.052	0.486	0.518	0.351		

Notes. MINT = Intrinsic Motivation. MEINT = Integrated Regulation. MEID = Identified Regulation. MEIY = Introjected Regulation

MER = External Regulation. AMOT = Amotivation.

Discussion

The aim of the present study was to examine the psychometric properties of motivation scale towards health-oriented physical activity (EMAPS) in Spanish Population. Results revealed in the present work provided evidence of the adequacy criterion for the ESEM and CFA models. Not only do they provided good indexes in the models, but they also provided good factors loadings in the different analyses. According to similar previous studies (Boiché et al., 2016; Cece et al., 2019; González-Cutre et al., 2010; Howard et

al., 2016; Litalien et al., 2017; Moreno-Murcia et al., 2007, 2009, 2011; Núñez et al., 2006; Stenling et al., 2015), results provided followed the theoretical tenets included in the SDT, as showed in the adequate target factor loadings, lower non-target factor loadings, and the factor loading pattern. To cite one example, the intrinsic motivation latent factor was robustly correlated to the intrinsic motivation items, fairly correlated to the identified regulation items, weakly correlated to the introjected regulation, external regulation and amotivation items. Nevertheless, this study was the first article that provided the ESEM results to support the

Table 4 Correlation among the study variables to test the external validity of EMAPS.

Variables Sample 1	Intrinsic Motivation	Integrated Regulation	Identified Regulation	Introjected Regulation	External Regulation	Amotivation
Autonomy	0.24**	0.17**	0.18**	-0.11*	0.28**	0.30**
Competence	0.26**	0.25**	0.17**	-0.021	0.17**	0.18**
Relationship	0.23**	0.17**	0.19**	-0.035	0.26**	0.25**
Physical Self-Concept. Ability	0.20**	0.19**	0.20**	-0.066	0.25**	0.31**
Physical Self-Concept. Condition	0.56**	0.64**	0.40**	0.36**	-0.048	0.10*
Physical Self-Concept. Attractiveness	0.31**	0.31**	0.22**	0.021	0.071	0.075
Physical Self-Concept. Strength	0.42**	0.50**	0.34**	0.28**	-0.088	0.053
<i>M (SD)</i>	4.50 (1.78)	4.01 (1.84)	5.33 (1.55)	3.38 (1.49)	5.63 (1.33)	5.52 (1.38)
Variables Sample 2	Intrinsic Motivation	Integrated Regulation	Identified Regulation	Introjected Regulation	External Regulation	Amotivation
Mother Affect / Father Affect	0.27**/0.20**	0.22**/0.18**	0.25**/0.19**	0.15**/0.09*	0.062/-0.009	0.083/0.023
Mother Hostility-aggression / Father Hostility aggression	0.16**/0.12**	0.084/0.035	0.24**/0.19**	-0.17**/-0.20	0.42**/0.40**	0.45**/0.41**
Mother Indifference-Negligence / Father Indifference Negligence	0.068/0.12*	0.004/0.048	0.17**/0.16**	-0.23**/-0.18**	0.41**/0.34**	0.41**/0.31**
Mother Control / Father Control	-0.017/0.075	-0.011/0.094	0.009/0.083	0.031/0.072	-0.07/-0.063	-0.003/-0.038
Mother Indifferentiated Rejection / Father Indifferentiated Rejection	0.15**/0.097	0.077/0.012	0.25**/0.16**	-0.18**/-0.20**	0.40**/0.35**	0.43**/0.36**
Self-blame	-0.033	-0.083	-0.029	-0.34**	0.31**	0.33**
Acceptance	0.23**	0.16**	0.38**	-0.004	0.15**	0.13
Focus on thought	-0.24**	-0.17**	-0.34**	-0.12**	-0.087	-0.09*
Positive refocusing	0.12**	0.17**	0.024	0.33**	-0.34**	-0.40**
Planning	0.15**	0.17**	0.11*	0.27**	-0.21**	-0.26**
Reappraisal	0.33**	0.26**	0.47**	-0.006	0.22**	0.22**
Perspective	0.26**	0.21**	0.38**	0.13**	0.085	0.079
Catastrophizing	-0.038	-0.068	-0.049	-0.24**	0.23**	0.22**
Others Blame	-0.068	-0.12*	-0.08	-0.35**	0.33**	0.33**
<i>M (SD)</i>	4.88 (1.42)	4.60 (1.44)	5.27 (1.34)	3.99 (1.33)	4.79 (1.61)	4.70 (1.56)

evidence of the EMAPS Spanish version scores. Moreover, the previously obtained results provided evidence for the continuum of self-determination postulated within the SDT framework (Boiché et al., 2016; Cece et al., 2019; Deci & Ryan, 1985; Moreno-Murcia et al., 2007, 2011). Thus, these results revealed that the EMAPS scores Spanish version may be a useful scale to measure variables of motivation towards health-oriented purposes.

The results of the structure scores of the EMAPS revealed poor standardised factors loadings for the bifactor model, despite the acceptable fit revealed by the goodness-of-fit indices (CFI, TLI, RMSEA). These results are in line with the previously established dimensions by Boiché et al. (2016) that only revealed the existence of the six main dimensions of motivation (e.g., intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation). Thus, the present study did not provide evidence for the existence of a general factor of motivation. It is noteworthy that previous studies grounded on SDT had the same inconsistency in the existence of a bifactor model (Boiché et al., 2016; Cece et al., 2019; González-Cutre et al., 2010; Howard et al., 2016;

Litalien et al., 2017; Moreno-Murcia et al., 2007, 2009, 2011; Núñez et al., 2006; Stenling et al., 2015).

The validity analysis revealed that most EMAPS factors (Boiché et al., 2016) were positively correlated with basic psychological needs and with physical self-concept variables. Confirming the postulates of the SDT (Deci & Ryan, 2000), introjected regulation was negatively correlated with autonomy, competence and relationship. In addition, it was rather surprising that basic psychological needs variables (competence, autonomy and relationship) were positively correlated with amotivation. These outcomes contradict previous works that found the opposite relationship among those variables (Hevia et al., 2006; Mageau & Vallerand, 2003). Nevertheless, it is important to highlight that a person may fulfill their basic psychological needs in a different context outside of exercise (Reeve & Lee, 2018; Van den Broeck et al., 2016). This means that not only does exercise influence basic psychological needs, but it also influences several dimensions of our daily life, such as work, family, groups, or leisure activities. Nevertheless, previous studies have shown differences in sedentary and active people only in the factor autonomy (Crocker et al., 2000; Hayes et al.,

1999; Martínez et al., 2013). Thus, this relationship may be mediated by other variables that influence basic psychological needs.

Regarding the perceived physical self-concept (physical condition, physical ability, attractiveness and strength), physical self-concept ability was negatively related with introjected regulation. Besides, external regulation was negatively correlated with physical self-concept condition. Self-concept is highly conditioned by levels of physical activity practice (Cuevas et al., 2014) and, in turn, adherence to active lifestyles is highly influenced by the personal perception of all self-concept domains (bidirectional relationship) (Moreno-Murcia et al., 2007). Thus, the adoption of non-sedentary habits and viceversa, depends on the motivation experienced by the person (Rosa, 2015). Considering these premises, it is established that introjected regulation is present in a person when their behavior is guided by purposes such as avoiding feelings of guilt (Muyor et al., 2009). Motivation for external regulation is triggered by the desire to obtain rewards or by attempts to avoid punishment (Muyor et al., 2009). Regardless of the reason that guides the behaviors, in both, there are extrinsic motivations (little lasting over time) (Gillet et al., 2009). Thus, it is needed to promote a more intrinsic motivation that may intermediate to have a better self-concept ability.

On the other hand, intrinsic motivation was negatively related to mother control. Excess of parental control is usually associated with the appearance of anxiety in children and is also linked to educational models where their decisions are disapproved (Aguilar-Yamuza et al., 2019; Cuervo, 2010). Bearing this in mind, it is not surprising to find a negative relationship between integrated extrinsic motivation and parental control. Also, extrinsic introjected regulation was negatively correlated with mother and father hostility, mother and father negligence, and mother and father undifferentiated rejection. The high levels of stress and low personal self-esteem (Belsky et al., 2005) that these parents create in children may reduce introjected extrinsic motivation (in which the actions carried out precisely seek to reduce anxiety and increase pride) (Ryan & Deci, 2000).

Furthermore, extrinsic external regulation was negatively related to father affect, mother and father control. Finally, amotivation was negatively related to mother and father control. External regulation is a type of motivation that appears in people when they feel highly controlled and, through which they try to establish behaviors that prevent them from suffering punishment (Deci & Ryan, 2000). As affect and control are related negatively it makes sense from a theoretical point of view (Torio et al., 2008). Particularly, if parental control is so high it has been related to less physical activity practice and sports dropout (González-García et al., 2018). As such, the excess of control may lead to less

physical activity which may hinder motivation. Thus, these results provided enough evidence that the EMAPS scores Spanish version followed the same pattern of the previous French version (Boiché et al., 2016) and it follows the theoretical background of SDT (Deci & Ryan, 1985, 2008).

This research has some limitations which should be discussed. First, the distinct items that comprise the EMAPS Spanish version have not been examined for face validity. As such, it would be interesting to ensure in further research the clarity or ambiguity of the items examined. Second, the samples in which the questionnaire was validated have their characteristics. Thus, it is needed to utilize the scale in different populations to see their values in different contexts. Third, the validation analysis of the study was carried out with correlation analysis among concrete variables. As such, it is needed to test the correlation with several variables to evaluate its external validity.

As practical implications, the EMAPS Spanish version has shown to be a reliable measure to evaluate motivation for health-oriented purposes. In particular, the psychometric indexes of the scale revealed enough values to consider the measure adequate. Moreover, the existence of the EMAPS Spanish version may help practitioners to have another measure of motivation in health contexts that might aid to evaluate this construct in a context distinct from sports. Otherwise, the inexistence of a specific measure of motivation in the aforementioned context may lead to biases in those practitioners that are evaluating intervention programs. Therefore, the existence of another measure of motivation for health-oriented purposes may provide a more accurate vision of motivation in health contexts as well as a new tool to evaluate distinct intervention programs.

In conclusion, the EMAPS Spanish version may be a reliable and valid instrument to measure motivation in physical activity towards health-oriented purposes. In particular, the results of CFA, Bifactor and ESEM confirmed the existence of the six factors in which SDT is divided in line with the previous studies (Boiché et al., 2016; Cece et al., 2019; González-Cutre et al., 2010; Moreno-Murcia et al., 2007, 2009, 2011; Núñez et al., 2006). Besides, the similar results shown in the different analyses in the subpopulations revealed the consistency of this measure. Finally, the current situation in which the paradigm of health is reaching an increasing necessity in society, enhances the need for measures to conduct the physical activity for health purposes. As such, it was needed a Spanish measure of motivation in physical activity towards health-oriented purposes. Thus, the EMAPS Spanish version complies with the social requirement of developing a Spanish instrument and enough reliability and validity to this extent.

Appendix. I. The EMAPS scale Spanish version

Indica en qué medida cada una de las siguientes afirmaciones es actualmente una de las razones por las que realiza actividades físicas.

No corresponde del todo	Corresponde Muy poco	Corresponde un poco	Corresponde Medianamente	Corresponde Bastante	Corresponde Fuertemente	Corresponde Muy fuertemente
1	2	3	4	5	6	7

De manera general ¿Por qué haces actividad física (AF EN ADELANTE)?

1. Por el placer que siento cuando practico AF	1	2	3	4	5	6	7
3. Porque la AF corresponde a muchos otros aspectos de mi vida.	1	2	3	4	5	6	7
4. Porque me sentiría mal si no hiciera este esfuerzo.	1	2	3	4	5	6	7
5. Porque creo que la actividad física es algo bueno para mi desarrollo personal.	1	2	3	4	5	6	7
6. Como no tengo muchas opciones, me dicen que tengo que hacerlo.	1	2	3	4	5	6	7
7. No lo sé realmente; Siento que estoy perdiendo el tiempo cuando estoy haciendo AF	1	2	3	4	5	6	7
8. Por la satisfacción que siento de progresar en este tipo de actividades	1	2	3	4	5	6	7
9. Porque me sentiría culpable si no empleara el tiempo de hacerlo.	1	2	3	4	5	6	7
10. Porque la AF es una parte integral del estilo de vida que elegí.	1	2	3	4	5	6	7
11. Francamente, hago AF pero no veo el interés.	1	2	3	4	5	6	7
12. Porque creo que la AF contribuye a preservar mi salud.	1	2	3	4	5	6	7
13. Para evitar tener que escuchar los reproches de algunas personas.	1	2	3	4	5	6	7
14. Porque considero que hacer AF es una parte de mi identidad.	1	2	3	4	5	6	7
15. Porque tengo que seguir las recomendaciones de mi médico.	1	2	3	4	5	6	7
16. Por las sensaciones agradables que me da la AF.	1	2	3	4	5	6	7
17. Porque personalmente lo considero un factor de bienestar	1	2	3	4	5	6	7
18. Lo hago pero me pregunto qué me trae.	1	2	3	4	5	6	7
19. Porque hacer AF es coherente con mis valores.	1	2	3	4	5	6	7
20. Porque me sentiría nervioso si no lo hiciera.	1	2	3	4	5	6	7
21. Porque creo que la AF me hará sentir mejor.	1	2	3	4	5	6	7
22. Porque me daría vergüenza no intentar evolucionar.	1	2	3	4	5	6	7
23. Porque algunas personas me presionan para que la haga	1	2	3	4	5	6	7
24. Por la satisfacción que siento al alcanzar mis metas en la actividad.	1	2	3	4	5	6	7
25. Porque AF es una parte importante de cómo yo me veo.	1	2	3	4	5	6	7
26. Porque estoy obligado por mi entorno.	1	2	3	4	5	6	7
27. Porque encuentro este tipo de actividades divertidas.	1	2	3	4	5	6	7
28. Porque tengo que hacerlo para sentirme bien conmigo mismo.	1	2	3	4	5	6	7
29. Porque es una forma de garantizar mi salud a largo plazo.	1	2	3	4	5	6	7
30. Realmente no entiendo por qué me estoy molestando en hacerlo.	1	2	3	4	5	6	7

1, 8, 16, 24, 27 Motivación intrínseca

3, 10, 14, 19, 25 Regulación integrada

5, 12, 17, 21, 29 Regulación identificada

4, 9, 20, 22, 28 Regulación introyectada

6, 13, 15, 23, 26 Regulación externa

2, 7, 11, 18, 30 Amotivación

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Conflict of interest There is no conflict of interest among the authors of this article.

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