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Validity evidence for the adaptation of the State Mindfulness Scale for Physical Activity (SMS-PA) in Spanish youth

Sarah Ullrich-French[1], Juan González Hernández[2] and María Dolores Hidalgo Montesinos[2]
[1] Washington State University and [2] Universidad de Murcia

Abstract

Background: Mindfulness is an increasingly popular construct with promise in enhancing multiple positive health outcomes. Physical activity is an important behavior for enhancing overall health, but no Spanish language scale exists to test how mindfulness during physical activity may facilitate physical activity motivation or behavior. This study examined the validity of a Spanish adaption of a new scale, the State Mindfulness Scale for Physical Activity, to assess mindfulness during a specific experience of physical activity. **Method:** Spanish youths (N = 502) completed a cross-sectional survey of state mindfulness during physical activity and physical activity motivation regulations based on Self-Determination Theory. **Results:** A high-order model fit the data well and supports the use of one general state mindfulness factor or the use of separate subscales of mindfulness of mental (e.g., thoughts, emotions) and body (physical movement, muscles) aspects of the experience. Internal consistency reliability was good for the general scale and both sub-scales. The pattern of correlations with motivation regulations provides further support for construct validity with significant and positive correlations with self-determined forms of motivation and significant and negative correlations with external regulation and amotivation. **Conclusions:** Initial validity evidence is promising for the use of the adapted measure.

Keywords: Motivation, well-being, youth.

Resumen

Adaptación y validez de la State Mindfulness Scale for Physical Activity (SMS-PA) en jóvenes españoles. **Antecedentes:** la atención plena (mindfulness) es un constructo cada vez más popular con prometedores resultados en la mejora de la salud. La actividad física es también importante para mejorar el estado de salud general, pero no se dispone de una escala en español para obtener evidencias de cómo la atención plena durante la práctica de actividad física puede facilitar la motivación de la misma. Este estudio examina la validez de la adaptación española de la State Mindfulness Scale for Physical Activity (SMS-PA). **Método:** 502 jóvenes completaron el cuestionario de mindfulness durante la realización de una actividad física y un cuestionario de regulación motivacional de realización de actividad física. **Resultados:** los datos ajustaron a un modelo factorial de orden superior, y apoyan el uso del factor general de atención plena y dos subescalas separadas referidas a experiencias relacionadas con la mente (pensamientos y emociones) y el cuerpo (movimiento del cuerpo y los músculos). La consistencia interna fue buena para el total y subescalas. Las correlaciones con la regulación motivacional apoyan la validez de constructo, con correlaciones positivas y significativas con autorregulación y negativas con regulación externa y desmotivación. **Conclusiones:** estas evidencias iniciales de validez son prometedoras para el uso de la versión adaptada.

Palabras clave: motivación, bienestar, jóvenes.

Young people in Spain are receiving increased interest from health organizations (World Health Organization [WHO], 2010). There is an important agenda to follow to help understand ways of encouraging and fostering positive health behaviors. One important health behavior that has the potential to positively impact physical, social, emotional, and cognitive well-being, is physical activity (Standage, Gillison, Ntoumanis, & Treasure, 2012). Physical activity refers to any bodily movement made by skeletal muscles that requires energy expenditure. It is very important to foster regular physical activity because physical inactivity is the fourth-leading risk factor for global mortality causing an estimated 3.2 million deaths globally (WHO, 2010). Because physical activity behavior patterns track across the lifespan, it is vital that we understand factors that contribute to physical activity in youth (Telama, Yang, Viikari, Välimäki, Olli, Wanne, & Raitakari, 2005).

There is an increased likelihood of engaging in physical activity when one has autonomous reasons or chooses to be active of one's own volition (Ryan & Deci, 2007; Wilson, Rodgers, Fraser, & Murray, 2004). Intrinsic motivation, represents the most autonomous form of motivation according to self-determination theory (Ryan & Deci, 2007) and is believed to be the best predictor of long-term adherence to physical activity behavior (Teixeira, Carraça, Markland, Silva, & Ryan, 2012). Sustaining long-term physical activity behaviors is easier when they are motivated by the inherent rewards of the activity itself rather than reliance on external contingencies (e.g., exercising to lose weight or to please other people). The internal rewards of physical activity that drive intrinsic motivation include satisfaction and enjoyment of experiencing physical sensations and the feelings

Received: July 7, 2016 • Accepted: November 29, 2016
Corresponding author: Sarah Ullrich-French
Washington State University
PO Box 641410
99164 Pullman (Estados Unidos)
e-mail: sullrich@wsu.edu

of accomplishment when exerting effort. In order to obtain these internal rewards, one must notice and be aware of one's physical experience while participating in physical activity. A study with young Spanish athletes supports these contentions, finding that when the experience focused more on the task, intrinsic motivation was higher (Cecchini, González, & Contreras, 2004). Mindfulness represents a construct that gives insight into this intrinsic motivational experience.

Mindfulness is defined as awareness and attention to the present moment with characteristics of non-judgment, curiosity, acceptance and openness (Bishop et al., 2004; Brown & Ryan, 2003). There is a rapidly increasing interest in the role of mindfulness in facilitating many positive health outcomes (Brown, Ryan, & Creswell, 2007; Sánchez-López & Dresch, 2008). One powerful outcome of mindful practice might be in fostering intrinsic motivation. Until recently, we lacked the ability to measure the specific experience of mindfulness during physical activity in order to substantiate this suggestion. The State Mindfulness Scale for Physical Activity (SMS-PA) was recently developed to fill this gap in the literature (Cox, Ullrich-French, & French, 2016).

The SMS-PA is a 12-item scale to measure mindfulness during a specific bout of physical activity (Cox et al., 2016). The scale was based on the State Mindfulness Scale (Tanay & Bernstein, 2013) which assesses the objects (mental and physical) and quality (e.g., openness) of state mindfulness. The original scale did not adequately capture the breadth of the physical experience and therefore the SMS-PA was developed to 1) assess mindfulness of both mental and physical aspects of the experience that are relevant *during physical activity* and 2) focus on a specific physical activity experience (i.e. the state) rather than dispositional tendencies. There are six items that tap into mindfulness of mental objects of the experience and six items that tap into mindfulness of physical or body-related objects of the experience. The SMS-PA demonstrated a bi-factor structure supporting the use of either subscales (mental and body) or the use of an overall score of state mindfulness.

Initial evidence of the SMS-PA supports a positive association between state mindfulness and state intrinsic motivation during physical activity and internal reasons for exercise (e.g., mood/enjoyment) and a negative association with state body surveillance (reflecting concern about one's body during physical activity; Cox et al., 2016). State mindfulness was also higher during yoga participation compared to other forms of physical activity and for those with more experience in yoga (Cox et al., 2016). The evidence shows promise in the use of the SMS-PA to help us understand physical activity experiences that might uncover insight into motivational processes and ultimately might be used to help foster intrinsic motivation for physical activity.

Mindfulness is becoming a popular concept in Spanish populations for promoting well-being in mental health (Gallego, Aguilar-Parra, Cangas, Langer, & Mañas, 2014; Tran, Cebolla, Glück, Soler, García-Campayo, & Von Moy, 2014), in the prevention and rehabilitation of sports injuries (Sole, Carranca, Serpa, & Palmi, 2014), effects on primary care professional burnout (Asuero, Blanco, Pujol-Ribera, Berenguera, & Queralto, 2013), pain management (Rodero, Pereira, Pérez-Yus, Casanueva, Serrano-Blanco, Ribeiro, …, & García-Campajo, 2013), and self-realization (Franco, De la Fuente, & Salvador, 2011). A recent review of research on mindfulness in sport identified 11 studies that confirm preliminary support for the importance of mindfulness in performance, anxiety, burnout, and flow (Palmi & Solé, 2016).

There is psychometric evidence supporting the use of a number of Spanish language mindfulness scales; however, these scales assess trait, or dispositional, mindfulness (e.g., Barajas & Garra, 2014; Cebolla, García-Palacios, Soler, Guillén, Baños, & Botella, 2012; Cebolla, Luciano, DeMarzo, Navarro-Gil, & Campayo, 2013; Tejedor, Feliu-Soler, Pascual, Cebolla, Portella, Trujols, ..., & Soler, 2014; Tran et al., 2014). There is only one report of a Spanish language measure of state mindfulness, or specific experiences of mindfulness, and this study does not provide any information on the adaptation process or validity of the Spanish version of the measure (Tolbaños, Miró, & Ibáñez, 2016). More specifically, there are no Spanish language measures that were designed to be used to assess the experience of mindfulness within a physical activity context, like the SMS-PA.

Given the importance of understanding young people's physical activity motivation and behavior processes, the purpose of this study was to examine validity evidence of a Spanish adaptation of the SMS-PA in a sample of Spanish youth. We hypothesized that the Spanish adaptation of the SMS-PA would demonstrate a similar bi-factor structure to that supported in the original measure. We further expected that the SMS-PA would associate with intrinsic motivation for physical activity and that those with experience in yoga, meditation, and relaxation would have higher state mindfulness compared to those that do not have experience practicing these activities related to mindfulness.

Methods

Participants

A total of 519 participants completed the study survey. Participants were from private (n = 233) and public (n = 124) secondary schools or were university students (n = 162). Participants (N = 502) who completed the items for the constructs used in this study (17 cases were eliminated due to problems identified at data collection). Of the students who reported sex, 46% were female. Participants ranged in age from 14 to 58, but most were young (M = 17.44, SD = 5.00). For the psychometric analysis participants over 25 years old were excluded, thus the final sample size was 482 (54.1% were female, mean age 16.60, SD=2.40). Almost half (42.70%) reported no participation in competitive sport, 24.50% reported doing sport for enjoyment, and 32.80% participated in organized sport (in school, club, or competition).

Instruments

State Mindfulness was assessed with the adapted SMS-PA (Cox et al., 2016) as previously described. The 12-item scale uses a 5-point Likert scale with responses ranging from "0 = *not at all*" to "4 = *very much*". The original measure supported a bi-factor structure and evidence supports the internal consistency reliability and construct validity (Cox et al., 2016).

Physical Activity Motivation was assessed with the Spanish BREQ-2 (Moreno, Cervelló, & Martínez, 2007). There are five subscales assessing reasons why one engages in physical activity that reflect internal sources of motivation that are inherent in the activity (intrinsic motivation), internalized reasons, but that are external to activity (identified regulation), internalized guilt or shame (introjected regulation), external pressures (external regulation), and lack of intentionality (amotivation). Responses

fall on a 5-point Likert scale ranging from "1 = *totally disagree*" to "5 = *by totally agree*." Moreno and colleagues (2007) provide evidence supporting psychometric properties of the Spanish BREQ-2. In the current study the internal consistency reliability was good (α = .89).

Physical activity experience and current levels of physical activity were assessed with single item indicators. To assess the amount of physical activity performed regularly, participants reported if they regularly participated in "1 = no activity or some activity", "2 = physical activity 1 or 2 times a week", or "3 = physical activity 3 or more times a week". Dichotomous items (1 = yes; 0 = no) assessed whether each participant had experience in yoga, meditation, or relaxation. Finally, competitive sport experience was assessed as "0 = none", "1 = for fun", or "2 = organized competitive sport".

Procedures

The SMS-PA items were translated into Spanish by a multi-disciplinary expert group composed of two sport psychologists with more than 15 years of experience, two psychometricians with more than 20 years of experience in test translations, an author from the original scale, and a native Spanish speaker with high proficiency in English who was not involved in this area of research. Through discussions, consensus was reached on an initial translation of the items. Next, two individuals with competence in both English and Spanish languages performed a back-translation of the Spanish items into English. The back-translations were very similar to the original items and only required minor editing to obtain a final Spanish adaptation of the SMS-PA. To obtain stronger validity evidence of the items cognitive interviews were conducted with native Spanish speakers (see Padilla, Hidalgo, & Ullrich-French, in preparation). Ten interviews (7 men and 3 women) were conducted with participants age 15 to 51 years-old. One participant practiced yoga, one practiced mindfulness, four were elite athletes, and four did sport or physical activity regularly. One item was modified following the cognitive interviews. The Spanish version of the items used in the current study appear in Table 2 (the Spanish scale is available by contacting the first author). Guidelines for test translation and adaptation were taken into account in the process (Balluerka, Gorostiaga, Alonso-Arbiol, & Haranburu, 2007; Muñiz, Elosua, & Hambleton, 2013).

This study was reviewed and approved by the University of Murcia Ethical Committee. The sample of young people was recruited for participation in a cross-sectional survey including the adapted SMS-PA to Spanish, along with related constructs, as part of a larger study. Parents of under 18 year-olds were informed about the study. Informed consent was obtained for all participants. Two secondary schools participated in the study, one was private and one was public. Secondary students completed a multi-section survey during normal school hours under the direction of trained research assistants. University students from public universities in Spain were emailed a link to an online survey and invited to participate. Both secondary and university samples were included to examine a range of Spanish youth.

Data analysis

Data screening was conducted to assess missing data, normality, and outliers. Missing data (.001%) was imputed at the item level using Expectation Maximization. No problems with normality or outliers were identified. Descriptive statistics were calculated along with internal consistency reliability. To test factorial validity, we conducted a cross-validation dividing the sample into two random subsamples (N_1=N_2=241). A exploratory factor analysis (EFA) using Iterative Principal Axis method was conducted using N_1 sample, then with N_2 a confirmatory factor analysis (CFA) using MPLUS (Muthén & Muthén, 1998-2015) was performed. Weighted Least Squares Mean and Variance adjusted (WLSMV) estimation method for ordinal variables was used. Model fit was examined using several fit indices (Hu & Bentler, 1999): (1) chi-square significance, (2) root mean square error of approximation (RMSEA) value of .06 or lower indicate a good fit and values as high as .08 represent an adequate fit, (3) comparative fit index (CFI) of 0.90 or higher, (4) Tucker-Lewis fit index (TLI) of .95 or higher indicate good fit and (5) weighted root mean square residual (WRMR) where values less than 1.0 indicate good fit (Yu & Muthén, 2002).

Next, to test construct validity, we conducted bivariate correlations using the SMS-PA subscales and total score with intrinsic motivation. Finally, we tested known group differences using analysis of variance (ANOVA) to test whether those with more experience in competitive sport, yoga, meditation, or relaxation had higher levels of state mindfulness during physical activity.

Results

Validity Evidence Based on the Internal Structure of the SMS-PA: EFA and CFA

To evaluate the factor structure of the SMS-PA, both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were utilized.

Exploratory Factor Analysis

An iterative principal axis factor with varimax rotation was conducted (N_1 = 241). The rotated factor solution was composed for two factors that accounted for 57% of the variance. Factor 1 (eigenvalue= 3.44) accounted for 28.63% of the variance and included items 7 to 12 (factor loadings ranged .63 to .80). Factor 2 (eigenvalue= 3.40) accounted for 28.37% of the variance included items 1 to 6 (factor loadings ranged .51 to .78).

Confirmatory Factor Analysis

Four alternative factor models were evaluated (N_2 = 241): one-factor model, two-factor uncorrelated model with items 1 to 6 loading in the mindfulness mind factor and items 7 to 12 loading in mindfulness body factor, higher-order factor and finally a bi-factor model reported by Cox et al., (2016). In the bi-factor model all items load on one global factor as well as their respective physical or mental factor, which is consistent with the conceptual definition of mindfulness (see Myers, Martin, Ntoumanis, Celimli, & Bartholomew, 2014). Results from CFA showed that the probability levels of all chi-square statistics were less than 0.01, indicating a rather poor absolute fit (see Table 1). The best relative fit of the estimated models was found for the bi-factor model but factor loading estimation for three items were not statistically

significant. Finally, the higher-order factor model fitted the data well (see Table 1) and all parameter estimates were moderate to high (range .51 - .92) and statistically significant (see Table 2). The composite reliability coefficient (rho) was .88.

Reliability Evidence of Scores on the SMS-PA

Coefficients for internal consistency were good for all mindfulness scale scores (i.e., α>.80 see Table 3).

Validity Evidence Based on SMS-PA Scores- BREQ-2 Scores Associations

Bivariate correlations between SMS-PA and BREQ-2 scores were calculated. Scores for general mindfulness and both mindfulness of the mind and of the body related positively to intrinsic motivation, identified regulation and introjected regulation subscales scores (see Table 4). These correlations were statistically significant (p<.01) and moderate between scores for general mindfulness and mindfulness of the body with intrinsic and identified regulation scores, and low in the other cases. Furthermore, general mindfulness and both mindfulness of the mind and of the body related negatively and weakly to external regulation and amotivation subscales scores. These correlations were statistically significant except for mindfulness mind with external regulation.

Validity Evidence Via Expected Mean Differences

Mean differences for general mindfulness, mind and body subscales between those who had experience in yoga, relaxation and/or meditation compared to those who did not have this

Table 1
Confirmatory factor analyses model fit (N = 241)

Model	Chi-square	df	p	RMSEA	CFI	TLI	WRMR
1 factor	540.93	54	<.001	0.19 (0.18-0.21)	0.86	0.83	2.02
2 factors	1079.69	54	<.001	0.28 (0.27-0.30)	0.71	0.65	4.10
High-Order	230.37	53	<.001	.12 (0.10-0.13)	0.95	0.94	1.23
High-Order*	122.16	52	<.001	.08 (0.06-0.09)	0.98	0.98	0.85
Bi-factorial	91.60	42	<.001	.07 (0.05-0.10)	0.99	0.98	0.64

Notes: Chi-square statistic test; df=degrees of freedom, RMSEA= root mean square error of approximation; CFI= comparative fit index; TLI= Tucker-Lewis fit index; WRMR= weighted root mean square residual. * Errors for Items 7 and 8 are correlated

Table 2
High-order confirmatory factorial analysis results (N = 241)

	Item	Specific factor loadings	Standard error	R^2
	State Mind Factor			
1	Fui consciente de las diferentes emociones que se dieron en mí [I was aware of different emotions that arose in me]	.85	.03	.72
2	Me di cuenta de las emociones agradables y desagradables [I noticed pleasant and unpleasant emotions]	.86	.02	.74
3	Me di cuenta de los pensamientos agradables y desagradables [I noticed pleasant and unpleasant thoughts]	.74	.03	.54
4	Noté cómo las emociones fluían iban y venían [I noticed emotions come and go]	.77	.03	.60
5	Noté cómo los pensamientos iban y venían [I noticed thoughts come and go]	.67	.04	.44
6	Fue interesante ver el proceso de mis pensamientos [It was interesting to see the patterns of my thinking]	.64	.05	.41
	State Body Factor			
7	Me concentré en el movimiento de mi cuerpo [I focused on the movement of my body]	.51	.05	.26
8	Me sentí conectado con mi cuerpo [I felt present in my body]	.64	.04	.42
9	Escuchaba lo que mi cuerpo me estaba diciendo [I listened to what my body was telling me.]	.73	.03	.54
10	Fui consciente de cómo mi cuerpo sentía [I was aware of how my body felt]	.87	.02	.76
11	Me di cuenta de las sensaciones de mi cuerpo [I noticed the sensations in my body]	.92	.02	.85
12	Estuve en sintonía con la dureza (esfuerzo) de mi trabajo muscular [I was in tune with how hard my muscles were working]	.59	.04	.35
	High-Order Factor (Mindfulness)			
	State Mind Factor	.68	.04	.46
	State Body Factor	.99	<.001	.99

Note: All loadings were significant at p<.01

Table 3
Descriptive statistics, correlations and internal consistency (N = 482)

Secondary sample (*N*= 340)	**Mindfulness**	**Mind**	**α**	**Range**	**Mean**	**SD**
Mindfulness			.89	0-4	2.60	.78
Mindfulness (mind)	.88**		.87	0-4	2.48	.88
Mindfulness (body)	.89**	.56**	.86	0-4	2.73	.90
University sample (*N*= 142)	**Mindfulness**	**Mind**	**α**	**Range**	**Mean**	**SD**
Mindfulness			.89	0-4	2.83	.65
Mindfulness (mind)	.86**		.84	0-4	2.77	.69
Mindfulness (body)	.89**	.54**	.86	0-4	2.90	.79

Notes: Mindfulness = average of all 12 state mindfulness items; Mindfulness (mind) = state mindfulness of mental events; Mindfulness (body) = state mindfulness of physical events; α= Cronbach reliability coefficient; SD= Standard Deviations
* $p<.05$; ** $p<.01$

Table 4
Correlations with motivation scales (N = 482)

	Mindfulness	**Mind**	**Body**	**Range**	**Mean**	**SD**
Intrinsic motivation	.38**	.25**	.41**	1-5	4.15	.95
Identified regulation	.32**	.22**	.36**	1-5	3.77	.81
Introjected regulation	.18**	.14**	.17**	1-5	2.76	1.17
External regulation	-.12**	-.06	-.16**	1-5	1.57	0.74
Amotivation	-.22**	-.15**	-.25**	1-5	1.44	0.77

Notes: Mindfulness = average of all 12 state mindfulness items; Mindfulness (mind) = state mindfulness of mental events; Mindfulness (body) = state mindfulness of physical events
* $p<.05$; ** $p<.01$

Table 5
Means and standard deviations for subgroups

	Mindfulness of mind ***M/SD***	**Mindfulness of body** ***M/SD***	**General mindfulness** ***M/SD***
Yoga / Meditation / Relaxation			
Experience (n = 83)	2.68/0.80	2.96/0.71	2.82/0.65
No experience (n = 368)	2.51/0.85	2.75/0.88	2.63/0.76
Statistical significance	p=.052	p=.044	p=.024
Physical Activity Level			
No or sometimes (n = 97)	2.26/0.93[a]	2.36/0.92[a]	2.31/0.81[a]
1 or 2 times a week (n = 126)	2.50/0.75	2.74/0.80[a]	2.62/0.68[a]
3 or more times a week (n = 213)	2.70/0.83[a]	3.02/0.77[a]	2.86/0.69[a]
Statistical significance	p<.001	p<.001	p<.001
Competitive Sport Experience			
No participation (n =195)	2.47/0.88	2.67/0.92	2.57/0.80
For enjoyment (n =112)	2.64/0.78	2.88/0.79	2.76/0.67
Organized sport (n =145)	2.56/0.84	2.88/0.80	2.72/0.72
Statistical significance	p= .149	p= .024	p =.038

Note: Bonferroni adjusted alpha criterion was used p<=.017. [a] subscript represents statistically significant Tukey post-hoc tests

experience were calculated. Bonferroni adjusted alpha criterion for conducting three analysis (α= .017) was used. ANOVA results were not significant for mind ($F(1,429)= 3.79$; $p= .052$; $\tau^2 = .009$, body ($F(1,429)= 4.10$; $p=.044$; $\tau^2 = .01$ and general mindfulness ($F(1,429)= 5.11$; $p= .024$; $\tau^2 = .01$). However, means were higher for the group with experience in yoga, relaxation and/or meditation that group without experience (see Table 5).

Next, we tested for differences in the calculated average scores for mindfulness of the mind, the body, and general mindfulness by level of physical activity. The three groups compared were group of *no or sometimes (n= 97)*, *1 or 2 times a week (n=126)* and *3 or more times a week (n= 213)*. ANOVA results were statistically significant for mind ($F(2,433)= 9.88$; $p<.001$; $\tau^2 = .04$), body ($F(2,433)= 24.06$; $p<.001$; $\tau^2 = .10$), and general mindfulness ($F(2,453)= 10.78$; $p<.001$; $\tau^2 = .09$). Tukey post hoc tests indicated that those who do not practice physical activity or only sometimes do so reported lower mindfulness of the mind, body and general mindfulness compared to those who practice physical activity *3 or*

more times a week. Moreover, Tukey post hoc tests indicated that those do not or only sometimes practice physical activity reported lower mindfulness of the body and general mindfulness compared to those who practice physical activity *1 or 2 times a week*. Finally, we tested for differences in the calculated average scores for mindfulness of the mind, the body, and general mindfulness by level of competitive sport experience. Bonferroni adjusted alpha criterion for conducting three analysis (α= .017) was used. ANOVA results were not significant for mind (F(2,430)= 1.91; p= .149; τ^2 = .01), body (F(2,430)=3.78; p= .024; τ^2 = .02) and general mindfulness (F(2,430)= 3.30; p= .038; τ^2 = .02). All subgroup means and standard deviations are in Table 5.

Discussion

This study applied an adapted version of the SMS-PA in Spanish to a large sample of Spanish youth. The psychometric analyses provide support overall for the adapted version of the SMS-PA with good internal consistency reliability, a higher-order factor structure supporting the use of either one general factor or two specific subscales representing state mindfulness of mental and body aspects of a physical activity experience. Results provide promising evidence for the usefulness of the adapted version of the SMS-PA with young Spanish populations.

Although a bi-factor structure was not the best representation of our data, the conclusions for scale use are similar to the original SMS-PA. Specifically, Cox et al. (2016) suggest the SMS-PA bi-factor structure supports the use of either one general or two specific factors. The higher-order model supported in the adapted version of the SMS-PA also supports the use of the measure in this way. The primary difference is that the bi-factor structure would allow the use of all three scores derived from the SMS-PA simultaneously to represent unique constructs (Brown, 2015). The adapted version of the measure does not support the simultaneous use of all three scores, as the subscales, particularly the body subscale, did not support a unique factor after the general factor was taken into account. Although this is an important difference in how the scores are derived and used in subsequent analyses, we believe that the use of the adapted measure is still supported and does not differ substantively from the original measure.

Further validity evidence was supported through significant correlations of all three SMS-PA derived scores with physical activity motivation in expected directions. Specifically, the strongest positive correlations were observed with intrinsic motivation as hypothesized. Correlations decreased with decreasing levels of autonomy (i.e., identified and introjected regulation subscales) and were either non-significant or negative with external regulation and amotivation. This pattern of relationships is consistent with how SDT conceptualizes motivation regulations to represent a continuum of regulations with decreasing levels of autonomy from intrinsic motivation, identified regulation, introjected regulation, external regulation, to amotivation (Ryan & Deci, 2007). The level of autonomy of motivation regulation systematically decreases with increasing external focus away from the inherent rewards of the experience of physical activity itself. Therefore, this pattern of relationships demonstrates that more intrinsic and autonomous forms of motivation are more closely aligned with a stronger awareness and connection with the physical activity itself, as captured by the SMS-PA. Previous research has supported similar association with state intrinsic motivation (Cox et al., 2016).

Analyses comparing subsets of the sample on levels of SMS-PA scores also indicates that those who are more physically active and participate in competitive sport had higher state mindfulness. These findings suggest that those with more experience of physical activity are more likely to have a better ability to be in tune with the experience as reflected in being mindful during specific physical activity experiences. These findings are similar to findings of Cox et al. (2016) that those with more yoga experience have higher state mindfulness. Although our sample contained relatively few participants with yoga or related activity experience, we believe that level of physical activity experience is a consistent result. It should be noted that mean difference effect sizes were small and represent variability in sub-group levels of mindfulness. Further research is needed to better understand these processes amongst different groups.

The promising evidence provided in this study should be viewed in light of a number of limitations. Sex was not fully reported and did not allow analyses of mean sex differences or factor invariance. Although there was no reason to expect sex differences, future research can confirm this through tests of gender invariance. The SMS-PA is a state measure best assessed immediately following a physical activity experience. The length of time between a specific physical activity experience and completing the SMS-PA varied considerably with 51% the same or previous day, 29% within one week, and 20% of cases exceeding one week. We did ask participants to write down the last activity they did and when they did it to help focus on a specific experience, however, the longer the time between the experience the greater chance for error. It is recommended that this scale be used as proximal to a specific bout of physical activity as possible. The assessment of physical activity experience and sport experience was limited and stronger assessment would provide more valid representation of experience. Research to examine specific types of sports or activities as well as how long one has practiced a particular activity or sport would be an interesting future study. Further tests of validity are needed with more diverse samples as validity evidence is on ongoing process (American Educational Research Association, American Psychological Association & National Council on Measurement in Education, 2014).

The adapted SMS-PA scale to Spanish demonstrated good psychometric properties and is recommended for further use in Spanish speaking youth and young adult populations. It is important to learn more about physical activity experiences which may foster intrinsic motivation and in turn ultimately aid in fostering increased participation and optimal health for young Spanish people. The SMS-PA provides an easy to administer and useful tool to further research and practice to help increase optimal health and wellbeing.

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