

Adolescent and Adult Time Inventory-Time Attitude Scales: Validity and Contributions to Physical Activity and Self-Concept in Spanish Adolescents

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In this study, we examined the psychometric properties for the time attitude subscales of the Adolescent and Adult Time Inventory-Time Attitude Scale–Spanish (AATI-TA–Spanish). We sought to determine the internal consistency, structural validity, gender and age invariance, and convergent validity of scores on the six subscales: Past Positive, Past Negative, Present Positive, Present Negative, Future Positive, and Future Negative. Participants were 789 Spanish adolescents. Reliability estimates indicated high internal consistency across the subscales. Confirmatory factor analyses provided strong support for the theorized 6-factor structure. Configural, metric, and scalar invariance was demonstrated for gender and early and late adolescent groups. Convergent validity was shown for physical activity and self-concept. Overall, results provided strong psychometric evidence that Adolescent and Adult Time Inventory-Time Attitude Scale–Spanish scores may be used effectively with Spanish adolescents.

Impact and Implications

This article introduces an instrument for assessing time attitudes (i.e., positive and negative feelings toward the past, present, and future) of adolescents in Spain. Time attitudes are an important aspect of identity-forming processes and associated with meaningful psychological and educational variables related to Sustainable Development Goal 4 (“Quality Education”). In the study, positive associations of favorable attitudes with physical activity and self-concept were found that contribute to Sustainable Development 3 (“Good Health and Well-being”).

Keywords: Adolescent and Adult Time Inventory, Spain, adolescents, time attitudes, validity and reliability

Time perspective is an individually varying and multidimensional construct that comprises thoughts and feelings toward the past, present, and future (Frank, 1939; Lewin, 1939, 1942, 1951; Mello & Worrell, 2015; Zimbardo &

Boyd, 1999). Adolescence is an especially important period to examine time perspective, given developmental processes (Mello & Worrell, 2015; Piquart & Silbereisen, 2000; Reinders, 2006; Secord & Peevers, 1974; Stein-

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berg et al., 2009). Early on, Lewin (1939) argued that adolescents have a more differentiated perspective of the past, present, and future than children. For example, adolescents will consider the future in terms of years, whereas children think in terms of days. Lewin also articulated how the influence of the past on the present and future would differ between adolescents and children because of differences in the accumulation of age-related experiences (i.e., adolescents have lived longer and therefore will have more to integrate into their present and future than children).

Developmental theories on identity formation and cognitive changes in adolescence indicate that time perspective is a salient construct for this period of the life span. Identity formation is the hallmark of adolescence and includes the integration of the past, present, and future selves, in which “conscious feeling of having a personal identity is based on . . . the perception of the selfsameness and continuity of one’s existence in *time* and space” (Erikson, 1968, p. 2, italics added). It should also be noted that successful developmental processes in adolescence lead to a strengthening of the personality and a positive sense of life (Erikson, 1968; Havighurst, 1952), whereas negative attempts are associated with identity diffusion that can cause a disorder of the sense of time, among others (Erikson, 1968). Cognitive advances enable adolescents to think abstractly, including the consideration of the relationships among the past, present, and future (Keating, 2012). Indeed, Piaget (1955) articulated how time concepts were an indicator of cognitive development.

Despite theoretical support for the examination of time perspective in adolescence, most research on the topic has been conducted with adult populations (Stolarski, Fieulaine, & van Beek, 2015; Zimbardo & Boyd, 1999). The most frequently used instrument to assess time perspective is the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999). The ZTPI was developed for college students and assesses orientations, feelings, and behaviors with five subscales: Past Positive, Past Negative, Hedonism, Fatalism, and Future. Studies have associated ZTPI scores with a variety of constructs, including aggression, depression, conscientiousness, sensation seeking (Zimbardo & Boyd, 1999), alcohol consumption (Keough, Zimbardo, & Boyd, 1999; McKay, Andretta,

Magee, & Worrell, 2014), hours studying (Zimbardo & Boyd, 1999), and risky driving (Zimbardo, Keough, & Boyd, 1997). However, attempts to use the ZTPI with adolescents have resulted in psychometric concerns, including low reliability estimates and structural validity issues (Perry et al., 2015; Worrell & Mello, 2007).

Recent theoretical and empirical research has emerged on time perspective in adolescents that provides support for the examination of the construct in adolescence. Mello and Worrell (2015) have proposed that adolescence is an especially pertinent period of the life span to examine time perspective based on developmental theory and that time perspective is a useful construct for predicting health outcomes in adolescents. New studies on time perspective in adolescents support this assertion. For example, time perspective was associated with self-efficacy and alcohol use in a study of adolescents (McKay, Percy, Cole, Worrell, & Andretta, 2016). In a more recent study, time perspective differentiated adolescent runaways from those who had not left home, and, among the runaways, time perspective was associated with healthier psychological outcomes and fewer risk behaviors (Mello, Oladipo, Paoloni, & Worrell, 2017).

Adolescent and Adult Time Inventory

To address the absence of an adolescent age-appropriate measure of time perspective, Mello and Worrell (2007) developed the Adolescent Time Inventory, recently renamed the Adolescent and Adult Time Inventory (AATI) on the basis of recent research (Cole, Andretta, & McKay, 2017; Mello et al., 2016). The AATI was originally created in an effort to provide the field with a way to assess multiple dimensions of time perspective that are relevant to adolescents. Another goal in developing the AATI was to generate measures that assessed *distinct* elements of time perspective without introducing construct-irrelevant variance (Hubley & Zumbo, 2011). The AATI was created using a series of focus groups and survey studies (Mello et al., 2009; Mello, Finan, & Worrell, 2013; Worrell, Mello, & Buhl, 2013) and includes several dimensions of time perspective: time orientation, time relation, and time attitudes. The Time Orientation Scale and the Time Re-

lation Scale are measures that determine the relative emphasis and perceived relationships among time periods, respectively.

In two studies, [Mello et al. \(2013\)](#) showed how an orientation toward multiple time periods and an interrelated view of the time periods were associated with more adaptive outcomes in adolescence, including higher academic achievement, self-esteem, hope, and lower risky behaviors. More recent evidence on time relation comes from research on adolescents who have run away from home that shows how adolescent runaways were less likely to perceive time periods as related to one another compared with their nonrunaway counterparts ([Mello, Walker, et al., 2017](#)).

The Time Attitude Scales

The AATI also includes the Time Attitude Scales (AATI-TA; [Mello & Worrell, 2007](#)) that is the focus of the current study. The AATI-TA assess positive and negative feelings toward the past, present, and future with six five-item subscales: Past Positive, Past Negative, Present Positive, Present Negative, Future Positive, and Future Negative. Studies have indicated that AATI-TA yield internally consistent subscale scores and that the theoretically expected six-factor structure best fits the data when compared with alternate models ([Worrell et al., 2013](#)). Psychometric evidence for scores on the English version of the AATI-TA has been shown in studies that have included adolescent participants in New Zealand ([Alansari, Worrell, Rubie-Davies, & Webber, 2013](#)), Nigeria ([Mello, Oladipo, et al., 2017](#)), the United Kingdom ([McKay, Cole, Percy, Worrell, & Mello, 2015](#)), and the United States ([Worrell et al., 2013](#)).

Previous research has indicated convergent validity with time perspective and physical exercise. For example, a study of college students showed that the future subscale of the ZTPI ([Zimbardo & Boyd, 1999](#)) was positively related to vigorous physical exercise ([Henson, Carey, Carey, & Maisto, 2006](#)). Further, in a sample of adolescents from Trinidad and Tobago, [Mello and Worrell \(2008\)](#) showed a positive association between perceived life chances, a future-oriented concept, and extracurricular activities, which included athletics. [Krumer, Shavit, and Rosenboim \(2011\)](#) compared Israeli professional athletes with non-

athletes in a study of delay discounting, a concept that can be considered conceptually similar to time perspective. Results showed that nonathletes were more likely to delay than professional athletes, as indicated by their choice of a greater monetary reward in the future than a lesser monetary reward in the present. Theoretical perspectives have also posited a connection between time perspective and sports activity. For example, [Reinders \(2006\)](#) suggested that present-oriented adolescents would especially favor sports activities because they are oriented toward leisure activities that occur in the present time period. In contrast, [Zimbardo and Boyd \(2008\)](#) argued that sports activities will be particularly attractive for future-oriented individuals due to their willingness to invest in a healthy lifestyle.

Convergent validity evidence has also been shown for the AATI-TA with psychological and educational outcomes. For example, studies with adolescent participants have shown meaningful associations between the AATI-TA and psychological variables, including self-esteem, hope, and perceived stress ([Andretta, Worrell, & Mello, 2014](#); [Worrell & Mello, 2009](#)). Other studies have demonstrated relationships with the AATI-TA and educational outcomes, including attitudes toward school, attitudes toward teachers ([Alansari et al., 2013](#)), self-reported grade point average, and educational expectations ([Andretta et al., 2014](#)).

In Spain, sports are one of the main leisure-time activities among adolescents. Spanish adolescents engage in sports more than playing instruments, painting, writing, or visiting museums ([Departamento de Comunicación Corporativa SM, 2010](#); [Injuve, 2010](#)). [García Ferrando and Llopis Goig \(2011\)](#) reported that Spanish individuals aged 15 to 24 years had not only the highest interest in sports but also were the most active group, with 61% participating compared with 36% among older individuals. Sports activities and physical self-concept are particularly relevant to the developmental period of adolescence, given the salience of body self-image for adolescent self-concept ([Brettschneider & Heim, 1997](#); [Gerlach, 2008](#)) and the identity formation process ([Brettschneider & Heim, 1997](#); [Späth & Schlicht, 2000](#)).

International Applications

The AATI-TA has been used extensively and effectively internationally with adolescent populations, as it has been translated into over a dozen languages (Worrell, Mello, & International Collaborators, 2015). Psychometric support has been shown in international studies of adolescents for scores on the AATI-TA–Albanian and AATI-TA–Italian (Worrell et al., 2015), the AATI-TA–Chinese (Worrell et al., 2015), the AATI-TA–German (Buhl & Lindner, 2009; Worrell et al., 2013), the AATI-TA–Farsi (Mello, Rashid, Worrell, & Fathi, 2014), the AATI-TA–Japanese (Chishima, Murakami, Worrell, & Mello, 2017), and the AATI-TA–Turkish (Şahin-Baltacı, Tagay, Worrell, & Mello, 2017).

Despite the increasing application of the AATI-TA internationally, a version appropriate for adolescents in Spain is yet to be introduced to the literature. In fact, we could identify only one study that examined time-related concepts in Spain. Specifically, Díaz-Morales (2006) examined the future goals of 454 individuals in four age groups (i.e., 15–18, 19–28, 30–59, and 60–88). Results indicated that adolescents had more future goals than other age groups. Although this study provides some information about the future, it does not demonstrate how Spanish adolescents think and feel about the past or present. Understanding the time perspective of adolescents in Spain would be consistent with the charge to the field of adolescent development to conduct research that represents adolescents more globally (Arnett, 2008).

The Present Study

To address the absence of a time attitude scale appropriate for Spanish-speaking adolescents, we examined the psychometric properties of AATI-TA–Spanish in a sample of adolescents in Spain. Based on previous studies (Chishima et al., 2017; Worrell et al., 2013; Worrell et al., 2015), we expected to observe internally consistent scores and a six-factor structure that corresponded to the theoretical model. We also examined gender and age invariance (younger vs. older adolescents) to assess if the AATI-TA–Spanish yields similar scores across genders and adolescent age groups. We sought to provide convergent evidence by examining as-

sociations with physical activity and self-concept, in which we expected positive associations with favorable attitudes and negative associations with unfavorable attitudes, given previous research on educational and psychological outcomes (Alansari et al., 2013; An-dretta et al., 2014).

Method

Participants

Participants were a convenience sample from Galicia, Spain that were recruited from eight high schools. High schools were identified through the professional network of the third author. School personnel were contacted via email, and those that agreed to participate served as the settings for the current study. High schools that were large in size were sought after to maximize the sample size and were diverse in public/private stature and geographic location (metropolitan area/suburb) to increase variation in the sample. Seven of the schools were located in Vigo, a large city, and one in a suburb of Vigo. Seven schools were public, and one was private. As recommended by Wirtz (2004), participants with more than 30% of missing values in total or on individual scales were excluded from analyses ($n = 31$), which reduced the percentage of missing values from 1.26% to .45%. The remaining missing values were replaced by using the EM-Algorithm (Software Norm version 2.03 for Windows, created by Joseph L. Schafer of the Department of Statistics, The Pennsylvania State University, with assistance from Maren K. Olsen) as recommended (Graham, 2009).

The final sample consisted of 789 Spanish adolescents between the ages of 12 and 18 years ($M = 14.79$, $SD = 1.53$). The sample was 49% female ($n = 386$). Based on self-reported origin, 87% ($n = 678$) were born in Spain, 10% ($n = 76$) were born in Latin America, and 3% ($n = 23$) in other European countries. Student reports of parental education indicated that 20% ($n = 156$) had parents with a compulsory degree (i.e., the most basic type), 35% ($n = 278$) had parents with a high school degree or professional qualification, and 41% ($n = 325$) had parents who had a higher education entrance qualification but did not study at a university or had a university degree.

Measures

Time attitudes. The present study included the short version of the AATI-TA–Spanish (Mello, Worrell, Anguiano, & Mendoza-Denton, 2010). As the AATI-TA–Spanish was originally developed for use in Latin America, several of the items were reworded for the present study to make them more appropriate for adolescents in Spain. Overall, seven items remained the same, five items were modified with nonmeaningful changes (e.g., “Estoy contento con mi vida en este momento” was changed into “Estoy contento con mi vida en este momento”), and 12 items were modified with dialect-based changes (e.g., “Pensando en mi futuro me emociona” was changed into “Pensar en mi futuro, me alegra”). The modifications were made by a bilingual native Spanish speaker from Spain, and the modified items were back-translated afterward. Further, the total number of items in the AATI-TA was reduced, given evidence that a version with four-item subscales (i.e., 24 total items) yielded valid and reliable scores in a German sample (Buhl et al., 2011). Similar to other versions of the AATI-TA, a 5-point Likert-type scale was used with verbal anchors ranging from 1 (*strongly agree* [*completamente de acuerdo*]) to 5 (*strongly disagree* [*completamente en desacuerdo*]), although the response options differ in direction from the original AATI-TA (Mello & Worrell, 2007). To make results comparable across the literature, means were recoded. The version of AATI-TA used in this study is included in the Appendix.

Convergent validity. Physical activity was used to determine convergent validity and included three scales that were translated into Spanish.¹ First, sports activity significance was measured with an instrument developed by Dickhäuser and Schrahe (2006). The scale includes Likert-type response options from 1 (*full agreement*) to 5 (*strong disagreement*). Item analysis indicated that one reverse-coded item did not function well, so it was excluded. Thus, four items remained. The sample average was 1.97 ($SD = .70$, $\alpha = .75$). Second, membership in a sports club was ascertained. Third, self-concept was assessed with a modified version of the Self-Description Questionnaire II (SDQ II; Marsh, 1992). The three subscales used included four items each: general self-concept

($M = 1.81$, $SD = .61$, $\alpha = .85$), physical ability self-concept ($M = 1.95$, $SD = .64$, $\alpha = .82$), and physical appearance self-concept ($M = 2.33$, $SD = .65$, $\alpha = .73$). The response options for the self-concept items ranged from 1 (*full agreement*) to 4 (*strong disagreement*).

Procedure

The study was completed in 2012. Students were provided a description of the study, consent forms, and the procedures for completing the questionnaire. Surveys were completed in classrooms on a voluntary basis. Measures other than the AATI-TA were translated into Spanish by separate individuals using back-translation methods and by soliciting feedback from adolescents.

Results

Descriptive Statistics

Table 1 displays the descriptive statistics for all subscales of the AATI-TA–Spanish. The means ranged from 1.69 on a negative scale to 3.99 on a positive scale with standard deviations from .72 to .87. Muthén and Kaplan (1985) recommended using the ML-Estimator with factorial analysis if skewness and kurtosis values are less than |1|. West, Finch, and Curran (1995) suggested that values less than |2| for skewness and less than |7| for kurtosis can be used without violating the assumption of a normal distribution. As Table 1 shows, only the Past Negative and Future Negative subscales were slightly positively skewed, and the Past Positive and Future Negative subscales had slightly high kurtosis.

Internal Consistency

All subscale scores achieved an acceptable Cronbach’s α value (Table 1; Nunnally & Bernstein, 1994). Omega estimates (ω), which ranged from .84 to .92, are also shown in Table 1; these were based on the factor coefficients reported in Figure 1. Item-to-total correlations ranged from .45 to .77, which Weise (1975) and

¹ Given the nested nature of the data, that students were from eight schools, we examined intraclass correlations and all coefficients (ICCs) were $<.01$.

Table 1
Descriptive Statistics and Internal Consistency Estimates for the Spanish Adolescent and Adult Time Inventory-Time Attitude Scale-Short

Subscale	<i>M</i>	<i>SD</i>	<i>Skewness</i>	<i>Kurtosis</i>	α	95% CI (α)	ω
Past Positive	3.99	.80	-0.96	1.10	.87	.85,.88	.91
Past Negative	1.87	.87	1.07	0.81	.83	.81,.85	.86
Present Positive	3.99	.72	-0.67	0.32	.84	.82,.86	.92
Present Negative	2.35	.80	0.36	-0.15	.75	.72,.78	.84
Future Positive	3.88	.73	-0.35	-0.03	.82	.80,.84	.89
Future Negative	1.69	.73	1.19	1.26	.85	.83,.86	.92

Note. CI = confidence interval. The omega values were based on the coefficients from the six-factor model reported in Table 2.

Zaichkowsky (1985) indicated are acceptable. Table 3 includes the intercorrelations among the six subscales. Correlations were positive among subscales with the same algebraic sign and negative among subscales with the different algebraic sign, and ranged from $|.14|$ to $|.69|$. Consistent with expectations, correlations were higher between subscales in the same time period.

Confirmatory Factor Analyses

Using *Mplus* version 7.11 (Muthén & Muthén, 2012), we tested several different models including a two-factor valence model (positive and negative items), a three-factor temporal model (i.e., past, present, and future items), and the theorized six-factor model. In keeping with best practice (Byrne, 2012), multiple indicators were used to assess model fit. The χ^2 test was significant, which is common in confirmatory factor analyses, given the large sample sizes. Acceptable fit is indicated by comparative fit index (CFI) and nonnormed fit index (NNFI) values $\geq .90$ and by root mean square error of approximation (RMSEA) and standardized root-mean-square residual (SRMR) values $\leq .08$ (Browne & Cudeck, 1993; Byrne, 2008, 2012; Hooper, Coughlan, & Michael, 2008; Marsh, Hau, & Wen, 2004). CFI and NNFI values $\geq .95$ and RMSEA and SRMR values $\leq .05$ are indicative of excellent fit. As can be seen in Table 2, the six-factor model best fit the data on all indices (Amelang, Bartussek, Stemmler, & Hagemann, 2006; Bentler & Bonett, 1980; Marsh et al., 2004).

For the six-factor model, the χ^2 test gave a significant result with a value of 834.06. This metric may be standardized by dividing the

score with the degrees of freedom. According to Wheaton, Muthén, Alwin, and Summers (1977), a value < 5 indicates good model fit, and we observed a value of 3.52. Acceptable fit was indicated by the RMSEA, with a value of .057 based on Browne and Cudeck (1993) and RMSEA confidence intervals with a .061 upper limit (upper limit $\leq .07$; Steiger, 2007). Also, the SRMR supports a good fit of the theorized six-factor model ($< .08$; Hu & Bentler, 1999). With values greater than .9, the CFI (Amelang et al., 2006) and the NNFI (Bentler & Bonett, 1980) showed a perfect fitting model compared with the null model. Figure 1 illustrates the factor coefficients, factor intercorrelations, and single residual variances. The coefficients for items on the positive subscales ($Mdn = .77$) were marginally higher than the coefficients for the negative items ($Mdn = .72$). The lowest factor coefficient was .44. In summary, the indices reviewed show strong support for the validity for the scores from the Spanish version of the AATI-TA-Short.

Gender and Age Invariance

After establishing the acceptable fit of the six-factor model for the individual sample, gender and age differences were examined. First, configural invariance is assessed to test for the same baseline-model across groups. Second, if configural invariance is evident, metric invariance is considered by testing factor loadings to be equal across groups. Lastly, if metric invariance is met, scalar invariance is evaluated, which constrains intercepts to be invariant across groups. Both, the ΔCFI test and the χ^2 difference test were conducted to test for group invariances. A lack of invariance was assumed

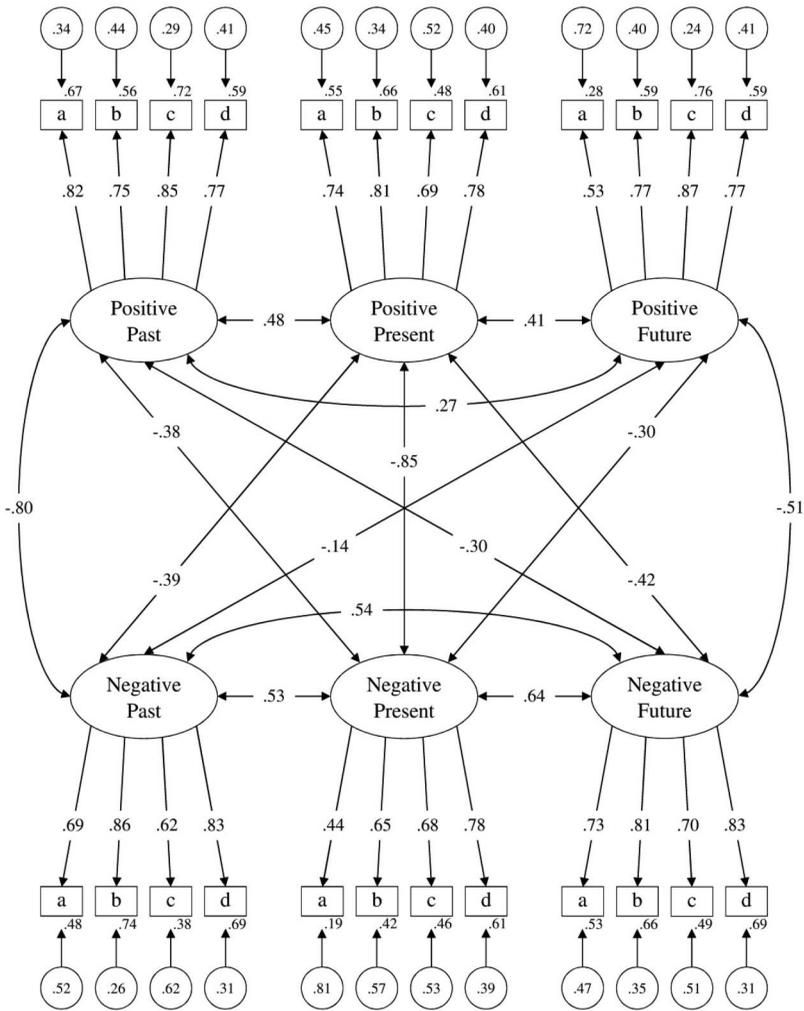


Figure 1. Six-factor model for the short version of the AATI-TA-Spanish. Coefficients are standardized maximum likelihood parameter estimates.

either if the CFI value for the more restrictive model decreased more than .002, as recommended by Meade, Johnson, and Braddy (2008), or if the χ^2 difference from the less restrictive to the more restrictive model was statistically significant, as suggested by Dimitrov (2006). When invariance was not attained, model modifications were conducted to evaluate the extent of differences among the groups. For this purpose, a free estimation of single parameters was successively performed, whereby parameters with the highest modification indices were released first. Parameters, which were estimated freely during metric in-

variance, were likewise released in the process of scalar invariance assessment as recommended (Christ & Schlüter, 2012).

First, we assessed configural invariance across the gender groups, and configural invariance was obtained (CFI = .925, NNFI = .913, RMSEA = .063 [.058, .067], SRMR = .058, $\chi^2[474] = 1210.95, p < .001, \chi^2/df = 2.55$). Then, metric invariance was examined, and a lack of metric invariance was indicated ($\Delta CFI = -.002, \Delta \chi^2[18] = 41.98, p < .01$). Thus, we successively released two parameter estimates of the future negative subscale (Item 23 and Item 24, Table A1), and metric invari-

Table 2
Fit Indices for Adolescent and Adult Time Attitude Scale–Spanish Scores Derived From Confirmatory Factor Analyses (Maximum Likelihood)

Model	χ^2	<i>df</i>	χ^2/df	RMSEA	90% CI	SRMR	CFI	NNFI	A-BIC
1. Null	2,706.10*	252	10.74	.111	.107, .115	.246	.75	.72	44,585.51
2. Two-factor (valence)	4,455.03*	251	17.75	.146	.142, .149	.120	.57	.52	46,341.11
3. Three-factor (temporal)	2,128.74*	249	8.55	.098	.094, .102	.070	.81	.78	44,028.16
4. Six-factor (theorized)	834.06*	237	3.52	.057	.052, .061	.051	.94	.93	42,813.53

Note. RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean square residual; CFI = comparative fit index; NNFI = nonnormed fit index; A-BIC = sample-size adjusted Bayes Information Criterion.

* $p < .001$.

ance was obtained ($\Delta CFI = .000$, $\Delta\chi^2[16] = 22.43$, $p > .05$). On this basis, we assessed and found scalar invariance across the gender groups ($\Delta CFI = -.001$, $\Delta\chi^2[18] = 26.40$, $p = .05$).

Results for invariance analyses across younger ($n = 362$; 12–14 years old) and older ($n = 427$; 15–18 years old) adolescents indicated not only configural ($CFI = .932$, $NNFI = .920$, $RMSEA = .060$ [.055, .064], $SRMR = .057$, $\chi^2[474] = 1140.18$, $p < .001$, $\chi^2/df = 2.41$) but also metric ($\Delta CFI = .000$, $\Delta\chi^2[18] = 13.97$, $p > .05$) and scalar ($\Delta CFI = .000$, $\Delta\chi^2[18] = 20.44$, $p > .05$) invariance.

Convergent Validity

To assess convergent validity, correlations between the subscales of the AATI-TA and several outcome variables were examined. These results are presented in Table 3. Scores on all positive subscales of the AATI-TA had statistically significant associations with sports

significance, but effect sizes were small. Scores on the negative subscales were inversely associated with sports significance, but these correlations were small, and none attained the Bonferroni-adjusted α of .001. Sports club members reported higher scores on the Past Positive ($d = .33$) and Present Positive ($d = .25$) subscales, whereas participants who were not a member of a sports club reported higher scores on the Past Negative ($d = .22$) and Future Negative ($d = .15$) subscales. However, as can be seen, effect sizes were small (Cohen, 1988).

All positive subscales of the AATI-TA had statistically significant correlations with general self-concept, physical ability self-concept, and physical appearance self-concept, but only the correlations with general self-concept were practically significant (i.e., $r \geq .30$) or just shy of practical significance. By contrast, all negative subscales of the AATI-TA had statistically significant negative correlations with general self-concept and physical appearance self-

Table 3
Correlations Among Adolescent and Adult Time Attitude Scales–Spanish, Sports Significance, and Self-Concept Scores

Subscale	Past Positive	Past Negative	Present Positive	Present Negative	Future Positive	Future Negative	Sports significance	G-SC	PAB-SC	PAP-SC
Past Positive	1.00	−0.80	0.48	−0.38	0.27	−0.30	0.20	.35	.18	.23
Past Negative	−0.69	1.00	−0.39	0.53	−0.14	0.54	−0.07	−.28	−.09	−.20
Present Positive	0.42	−0.34	1.00	−0.85	0.41	−0.42	0.19	.51	.18	.34
Present Negative	−0.29	0.41	−0.65	1.00	−0.30	0.64	−0.10	−.36	−.09	−.23
Future Positive	0.25	−0.14	0.37	−0.26	1.00	−0.51	0.15	.29	.18	.18
Future Negative	−0.27	0.47	−0.37	0.48	−0.49	1.00	−0.06	−.35	−.14	−.23

Note. Sports Sign. = Sports Significance; G-SC = General Self-Concept; PAB-SC = Physical Ability Self-Concept; PAP-SC = Physical Appearance Self-Concept. For AATI-TA subscales, intercorrelations below the diagonal are for the manifest variables; intercorrelations above the diagonal are for latent variables and were obtained from the six-factor model reported in Table 2. All correlations $> .13$ were significant after adjusting α for inflation ($p < .001$).

concept, but only Future Positive had a statistically significant association with physical ability self-concept. As with the positive subscales, only the associations with general self-concept were practically significant or just shy of practical significance.

Discussion

Scholars have argued that time perspective is an especially salient topic in adolescence (Lewin, 1939, 1942, 1951; Mello & Worrell, 2015), given identity formation (Erikson, 1968) and cognitive advances (Piaget, 1955). However, most research on time perspective has included adult participants or measures developed for adults (e.g., ZTPI; Zimbardo & Boyd, 1999). Mello and Worrell (2007) created the AATI-TA to provide a measure that assessed positive and negative feelings toward the past, present, and future reliably and validly in adolescent samples. Although the AATI-TA has been used successfully in numerous nations (e.g., China, Germany, Iran, Japan, United Kingdom, and United States; Worrell et al., 2015), scores on a Spanish version are yet to be validated. In this study, we examined the psychometric properties of the AATI-TA–Spanish. Overall, results provided strong support that the AATI-TA–Spanish yields valid and reliable scores.

Psychometric Properties of AATI Scores

Internal consistency. Alpha internal consistency estimates based were high, based on recommendations by several scholars (Nunnally & Bernstein, 1994; Weise, 1975; Zaichkowsky, 1985), and these findings were in keeping with previous research with adolescents in Germany, New Zealand, and the United States (Alansari et al., 2013; Worrell et al., 2013). Omega estimates were also generally in keeping with previous research, with an average value of .89, and these findings are based on four-item rather than five-item subscales as in most previous studies. In some previous studies, Future Negative scores have yielded lower reliability estimates, including in Albania, Italy, Nigeria, Turkey, and the United Kingdom (McKay et al., 2015; Şahin-Baltacı et al., 2017; Worrell et al., 2015). However, in this study, Future Negative scores had strong internal consistency esti-

mates, including the highest omega value. This finding provides strong psychometric support for this construct.

Structural validity. Structural validity was demonstrated in a series of confirmatory factor analyses, and model comparisons indicated that the six-factor model fit the data better than alternate models. Overall, the six-factor model fit indices indicated good fit and thus high structural validity was confirmed. Again, these findings are similar to previous research on the factor structure of the AATI-TA in studies with samples in the United States (Worrell et al., 2013), New Zealand (Alansari et al., 2013), Germany (Worrell et al., 2013), Japan (Chishima et al., 2017), and Turkey (Şahin-Baltacı et al., 2017). The six-factor model also has important theoretical implications. In 1999, Zimbardo and Boyd hypothesized that it would be important to examine time perspective profiles rather than associations with individual time perspective subscales. They noted that “by focusing on but one dimension,” researchers “fail to provide assessments of the relative strengths of the other dimensions within individual temporal profiles. Moreover, they assume, incorrectly, that scoring low on a scale of future orientation is equivalent to scoring high on a scale of present orientation” (Zimbardo & Boyd, 1999, p. 1273). A multidimensional scale with strong psychometric properties is required to examine profiles. Interpretable AATI-TA profiles have already been found in several countries, and the current findings indicate that we can examine time attitude profiles in Spain.

We examined measurement invariance by gender and by early versus late adolescence. Based on established guidelines (Christ & Schlüter, 2012; Dimitrov, 2006; Meade et al., 2008), we showed configural, metric, and scalar invariance by age, as well as by gender with some modification of Future Negative items. The findings by age are particularly intriguing. Invariance across early and late adolescence provides a strong basis for using AATI-TA scores in longitudinal studies across the adolescent time period. This finding complements the findings in a recent study, which found AATI-TA scores to be invariant across three time periods (at ages 12.5, 13.5, and 14.5 years) in a longitudinal study of British adolescents (Worrell, McKay, & Andretta, 2017).

Moreover, as mentioned previously, the AATI represents a recent change of name for the instrument. Although initially developed for use with adolescents, Mello et al. (2016) reported support for the internal consistency of AATI-TA scores and the structural validity of the six-factor model in three samples of adults, ages 18 to 24, 25 to 59, and 60 to 85. Mello et al. (2016) also found that scores on five of the AATI-TA subscales—all but Future Negative—showed scalar invariance in the 18 to 24 and 25 to 59 age-groups, suggesting that AATI-TA scores can be used in longitudinal studies from ages 12 to 59. Importantly, evidence supporting the use of AATI-TA scores with adults is not limited to the United States (Mello et al., 2016). Cole et al. (2017) recently examined AATI-TA scores in a sample of 410 adults (18–65) in the Northwest of England. They found (a) strong alpha and omega internal consistency estimates (.78–.90) for scores on the six factors; (b) good fit via confirmatory factor analyses (CFI = 0.94, NNFI = 0.93, RMSEA = 0.05 [0.04, 0.05]); (c) convergent and discriminant validity with anxiety, depression, and several temporal constructs, including the ZTPI; and (d) interpretable AATI-TA profiles, which differed in theoretically congruent ways with anxiety, depression, time perspective, temporal focus, and consideration of future consequences. All of these findings raise interesting and important questions that can now be asked in Spanish samples.

Convergent validity. Convergent validity was investigated between the AATI-TA and several measures of physical activity and physical self-concept. Consistent with previous research (Henson et al., 2006; Krumer et al., 2011; Mello & Worrell, 2008), time attitude scores were associated with sports club membership, sports significance, physical ability, and physical appearance in theoretically expected directions. This study replicated findings showing that time attitudes were related to general and domain specific self-concepts (Andretta et al., 2014; Worrell & Mello, 2009). However, it is worth noting that effect sizes for the domain-specific self-concepts were generally small. It may be that time perspective measures that are domain-specific (i.e., include physical activity prompts) would have stronger effect sizes with domain-specific self-concepts. Another explanation for the small effects could

be the measures of physical activity. Sohns-meyer and Heim (2017) recently argued for a broad approach to measuring physical activity, including value- and affective-based aspects, and the intrinsic character of interest in sports. Nevertheless, even though the effect sizes were small, they are in keeping with theory and useful as indicators of validity.

Limitations and Conclusions

Although this study made several contributions to the literature, it also has some limitations. One limitation is that the data are not nationally representative of adolescents in Spain but are limited to a specific geographic region. Therefore, AATI-TA–Spanish scores will need to be examined in a more geographically representative sample in future studies. Second, given the correlational nature of this study, we cannot infer the causality of the observed relationships. It is important for additional longitudinal research be conducted so that direction of associations may be understood, and the data do provide evidence in support of using the scores longitudinally.

In conclusion, this study provides strong support for the psychometric properties of the AATI-TA–Spanish. Results indicated that the AATI-TA–Spanish yields scores that are reliable, structurally valid, invariant by gender and age, and associated with physical activity constructs in theoretically congruent ways. Thus, the AATI-TA–Spanish may be used by researchers to conduct studies on time attitudes in adolescents from Spain. There are several directions of research that may now be pursued. First, cross-national comparisons may be made among time attitudes in adolescents in Spain and other countries. This would address Arnett's (2008) charge for research on adolescents that is more international and less centered on participants in the United States. Second, studies on time attitudes of Spanish adolescents could determine how they are responding to the current economic challenges. Spain has a very high rate of youth unemployment (60.6% in 2016, aged 15–19; Eurostat, 2017). Conducting research on Spanish adolescents' views of their past, present, and future will inform educators, so that they can tailor programs to facilitate adolescents' occupational development. Third, research may be completed on additional topics

about physical activity and self-concept constructs. Given that sports activities promote the development of adolescents (Brettschneider & Heim, 1997), and time perspective is a malleable psychological construct (Frank, 1939; Sword, Sword, & Brunskill, 2015), these findings have implications for interventions targeting adolescent physical health.

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(Appendix follows)

Appendix

Spanish Adolescent and Adult Time Attitude Scale–Short

Primero nos gustaría saber cómo piensas sobre el pasado y el futuro. ¿En qué medida estás de acuerdo con las siguientes afirmaciones?	Completamente de acuerdo	De acuerdo	Neutral	En desacuerdo	Completamente en desacuerdo
1. Actualmente me siento feliz.	0	0	0	0	0
2. Tengo recuerdos muy felices de mi niñez.	0	0	0	0	0
3. Estoy contento con mi vida en este momento.	0	0	0	0	0
4. Espero cosas buenas de mi futuro.	0	0	0	0	0
5. Pensar en mi vida actual me preocupa.	0	0	0	0	0
6. Pensar en mi futuro me hace feliz.	0	0	0	0	0
7. Estoy satisfecho con mi pasado.	0	0	0	0	0
8. No estoy satisfecho con mi presente.	0	0	0	0	0
9. Mi pasado está lleno de recuerdos felices.	0	0	0	0	0
10. Pensar en mi futuro, me alegra.	0	0	0	0	0
11. Tengo sentimientos negativos hacia mi situación en este momento.	0	0	0	0	0
12. Me gusta pensar en mi pasado porque fue un tiempo muy feliz para mí.	0	0	0	0	0
13. En general, me siento feliz por lo que estoy haciendo ahora mismo.	0	0	0	0	0
14. Estoy contento con el presente.	0	0	0	0	0
15. Pensar en mi futuro me hace mucha ilusión.	0	0	0	0	0
16. Tengo pensamientos desagradables sobre mi pasado.	0	0	0	0	0
17. Mi futuro está condenado al fracaso.	0	0	0	0	0
18. Ojalá no tuviera el pasado que tuve.	0	0	0	0	0
19. Estoy descontento con mi pasado.	0	0	0	0	0
20. No creo que llegue a ser alguien cuando sea mayor.	0	0	0	0	0
21. Mi pasado es un tiempo de mi vida que me gustaría olvidar.	0	0	0	0	0
22. Ojalá no tuviera el presente que tengo.	0	0	0	0	0
23. Pensar en mi futuro me pone triste.	0	0	0	0	0
24. Dudo que llegue a ser alguien.	0	0	0	0	0

Note. Past Positive: 2, 7, 9, 12; Past Negative: 16, 18, 19, 21. Present Positive: 1, 3, 13, 14; Present Negative: 5, 8, 11, 22. Future Positive: 4, 6, 10, 15; Future Negative: 17, 20, 23, 24

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