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# Time perspective, sports club membership, and physical self-concept among adolescents: A person-centered approach

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ABSTRACT

*Introduction:* Time perspective is defined as thoughts and feelings about the past, present, and future and is theorized to underlie human behavior. Prior research has shown relationships among time perspective and academic achievement, substance use, and risky-driving. In this study, time perspective was extended to sports club membership and physical self-concept among adolescents.

*Methods:* Time perspective was assessed with a scale that measures positive and negative feelings about the past, present, and future. Latent time attitude profiles were generated with data that included sports club membership and physical self-concept. Participants were German ($N$ = 901; 46.2% female), Luxembourgian ($N$ = 661; 46.7% female), and Spanish ($N$ = 789; 49.0% female) adolescents (12–18 years-old).

*Results:* Latent profile analyses indicated that across the three samples the same number and type of profiles were observed: Ambivalent, Balanced, Optimistic, Past Negative, and Positive. Time attitude profiles were related to sports club membership and physical self-concept. Adolescents with positive attitudinal profiles were more engaged in sports clubs and reported a higher physical self-concept than adolescents in negative attitudinal profiles.

*Conclusions:* Time perspective was conceptualized as time attitudes and operationalized as positive and negative feelings about the past, present, and future. Results showed that five latent time attitudes profiles were observed and that profile membership was associated with sports club membership and physical self-concept. These associations were demonstrated with three independent samples. Findings were discussed in light of implications for intervention programs that use time perspective to promote physical health among adolescents.

Time perspective has been theorized to be a multidimensional construct referring to how the consciousness of time influences emotion, cognition, and behavior (e.g., Frank, 1939; Zimbardo & Boyd, 1999). Research with adults has shown how time perspective predicts a wide array of human behaviors including risky driving (Zimbardo, Keough, & Boyd, 1997), substance use (Linden, Lau-Barraco, & Hollis, 2013), and physical exercise (Griva, Tseferidi, & Anagnostopoulos, 2015). Recently, a conceptualization of time perspective has been proposed that is particularly relevant to adolescents (Mello & Worrell, 2015). In this model, time perspective comprises multiple time periods (the past, present, and future) and dimensions (thoughts and feelings). Adolescence is highlighted as an especially important developmental period to examine time perspective, given advances in cognitive abilities and identity

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formation at this age (Erikson, 1966; Pinquart & Silbereisen, 2000).

Studies using Mello and Worrell's (2015) model of time perspective with adolescents have shown how time perspective is associated with numerous developmental outcomes, including academic achievement (Andretta, Worrell, & Mello, 2014; Mello & Worrell, 2006), psychological well-being (Andretta et al., 2014; Mello, Finan, & Worrell, 2013), and risky behaviors (Mello, Oladipo, Paoloni, & Worrell, 2018). Whereas, other studies have used the model to examine special populations including Olympic athletes (Konowalczyk, 2017) and adolescents who run away from home (Mello, Walker, et al., 2018). Increasingly, person-centered analytic approaches (e.g., Magnusson & Bergman, 1990) have been employed to address the multi-temporal and multi-dimensional nature of Mello and Worrell's (2015) time perspective model. These studies have yielded meaningful findings about the relationships among time perspective and mental health (Konowalczyk, McKay, Wells, & Cole, 2018), self-efficacy, and sensation seeking (Morgan, Wells, Andretta, & McKay, 2017).

Despite the surge of studies on time perspective and various topics about adolescents, there has been sparse attention to its connections with physical activity. Gulley (2013) indicated that negative feelings about the past was inversely associated with attitudes toward physical activity, whereas focusing on the present was positively associated with strenuous exercise. However, research conducted with college students has shown that time perspective was associated with physical exercise among young adults (Henson, Carey, Carey, & Maisto, 2006). Importantly, other research with adults has indicated that time perspective can be used to promote physical activity (Hall & Fong, 2003). Thus, we sought to address the knowledge about the adolescent associations between time perspective and physical activity. Ultimately, this information could be used to inform the development of intervention programs that use time perspective to promote physical health among adolescents.

## 1. Time perspective

Time perspective has been broadly defined as individuals' thoughts and feelings about the past, present, and future, and is theorized to influence behaviors (Mello & Worrell, 2015; Zimbardo & Boyd, 1999). Zimbardo and Boyd (1999) argued that an orientation toward time provides a temporal organization to life experiences and proposed that the following five factors captured the construct: *Past Positive*, a favorable view about the past; *Past Negative*, an unpleasant view of the past; *Present Hedonism*, an emphasis toward the present without attention to future consequences; *Present Fatalism*, a despairing view, where circumstances are beyond one's control; and, *Future*, a focus on actions and goals. Numerous studies have employed this model with adult participants and have shown associations with many outcomes including depression, aggression, and conscientiousness (e.g., McKay, Andretta, Magee, & Worrell, 2014; Zimbardo & Boyd, 1999).

More recently, Mello and Worrell (2015) proposed a conceptual model of time perspective that is specific for adolescents. This model posits that the construct comprises three time periods, including past, present, and future, and multiple dimensions, including *time orientation*, an emphasis toward a particular time period; *time relation*, the relationships among time periods; and *time attitudes*, the positive and negative feelings one has about each time period. In this current study time attitudes were examined, including Past Positive, Past Negative, Present Positive, Present Negative, Future Positive, and Future Negative subscales. Existing studies have shown bivariate associations among time attitudes and indicators of psychological well-being including self-esteem (Past Positive, $r = 0.36$; Past Negative, $r = -0.41$; Present Positive, $r = 0.46$; Present Negative, $r = -0.45$; Future Positive, $r = 0.41$; Future Negative, $r = -0.46$; all $p \leq .006$) and perceived stress (Past Positive, $r = -0.27$; Past Negative, $r = 0.33$; Present Positive, $r = -0.45$; Present Negative, $r = 0.56$; Future Positive, $r = -0.30$; Future Negative, $r = 0.23$; all $p \leq .006$; Andretta et al., 2014). Time attitudes have also been shown to differ between adolescents who run away from home from those who do not (Mello, Walker, et al., 2018). Specifically, runaways had higher past, present, and future negative scores and lower past, present, and future positive scores than their counterparts, even when controlling for academic achievement and maternal education. Notably, research on time perspective builds on studies that have examined future orientation by including multiple time periods (past, present, and future) and dimensions (e.g., orientations and feelings).

## 2. Time perspective profiles

Person-centered research approaches are particularly valuable for research on time attitudes because the analytic strategy yields a “profile” of adolescents' positive and negative feelings toward the past, present, and future. Person-centered approaches provide unique information about subgroups that supplement traditional variable-based strategies (Bergman & Trost, 2006; Magnusson & Bergman, 1990; von Eye & Bogat, 2006). To date, several studies have generated time attitude profiles (Andretta et al., 2014; Buhl, 2014; Buhl & Lindner, 2009; Konowalczyk, McKay, et al., 2018; Morgan, Wells, Adretta, & McKay, 2017; Wells, Morgan, Worrell, Sumnall, & McKay, 2018). Across these studies, the following profiles have been observed: *Balanced*, neutral feelings about each time period; *Ambivalent*, strong favorable and unfavorable feelings toward the time periods; *Positive*, favorable feelings about each time period, and *Negative* unfavorable feelings about each time. Other profiles have also been reported in some studies. An *Optimistic* profile, defined as favorable feelings about the future and unfavorable feelings about the past and present was identified in some prior studies (e.g., Andretta et al., 2014; Buhl, 2014; Buhl & Lindner, 2009).

However, a few other profiles have been observed in single studies. Buhl and Lindner (2009) indicated a *Past Pessimistic-Future Optimistic* profile, defined as unfavorable feelings about the past, but favorable feelings about the future and a *Tangentially Pessimistic* profile, defined as more unfavorable feelings than favorable feelings about each time period. Further, a *Negative-Future* profile, defined as mostly unfavorable feelings about the time periods, neutral feelings about the past and present, and favorable feelings about the future was identified in other studies (Konowalczyk, McKay, et al., 2018; Morgan et al., 2017; Wells et al., 2018). Overall,

there have been several studies that have observed time attitude profiles. Findings have yielded mostly similar types of time attitude profiles. Although these studies have all included adolescent participants, samples of at least 300, and almost equal genders (i.e., 40–60% female), there have been some particular profiles that have emerged with just some research (e.g., Konowalczyk, McKay, et al., 2018). The current study aims to clarify the literature about the types of adolescent time attitude profiles.

Person-centered approaches have also been used to examine relationships among time attitudes and developmental outcomes. Morgan et al. (2017) found that adolescents with positive attitudinal profiles had higher self-efficacy and lower sensation seeking than those with negative attitudinal profiles. Other studies have shown that time attitude profiles have been associated with educational expectations (Andretta et al., 2014; Buhl & Lindner, 2009), life-satisfaction (Buhl & Lindner, 2009), self-efficacy (Buhl & Lindner, 2009; Morgan et al., 2017), and perceived stress and self-esteem (Andretta et al., 2014). Furthermore, staying in positive attitudinal profiles (i.e., *Positives*) across the school year was associated with less alcohol use and fewer drinking behaviors among adolescents (Wells et al., 2018).

### 2.1. Sports club membership, physical self-concept, and time perspective

Sports club membership and physical self-concept are particularly relevant for adolescents, given both the amount of time spent in leisure activities including sports (Grgic, Holzmayer, & Züchner, 2013; Leven & Schneekloth, 2015) and the salience of body-image for this age group (Alfermann, 1998; Brettschneider & Heim, 1996; Gerlach, 2008; Mrazek & Hartmann, 1989; Tajfel, 1982). Therefore, it is relevant to consider that the construct of physical ability includes physical activity, as indicated by sports club membership, as well as one's evaluation of their physical self (Martins, Marques, Sarmento, & da Costa, 2015).

**Sports club membership.** Sports clubs are important contexts for adolescent development (Gerlach & Brettschneider, 2013; Neuber, 2011). Adolescents choose to be sports club members for various reasons. Macphail, Gorely, and Kirk (2003) indicated that adolescents reported athletics, competition, friendship, and socializing as sources of motivation for sports club participation. Hence, sports club membership indicates an interest in belonging to a group in a sports context, in addition to actually playing sports. Participation in sports clubs has also been positively associated with physical activity (Kokko et al., 2018) and sports activities (Tietjens, 2009) among adolescents.

**Sports activity and time perspective.** Scholars have posited connections between sports activity and time perspective. 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, other scholars have suggested that future-orientated individuals may be more drawn to sports activities due to their investment in a healthy lifestyle (Mouratidis & Lens, 2015; Zimbardo & Boyd, 2008). Luszczynska, Gibbons, Piko, and Tekozel (2004) indicated that future orientation was a significant predictor of health-promoting behaviors, including physical activity. Neuber (2007) examined informal sports activities without any supervision (e.g., jogging), sports activities in school, and sports activities in clubs that were assisted by a trainer. Results showed that informal sports activities were positively associated with both present and future orientation, sports activities in school were not related to either time period, and sports activities in clubs were more related to a future than a present orientation. Lastly, Gulley (2013) indicated a greater intention to participate in physical activity for adolescents with a future time perspective compared to those with a negative attitude toward the past.

Research that has examined future time constructs has also shown relationships with sports activities and related topics. Specifically, a life-long favorable attitude toward physical activity, motivation, and a range of future health benefits (e.g., general and mental health) was positively associated with physical activity in a review of studies with adolescents (Martins et al., 2015). Further, Mello and Worrell (2008) showed a positive association between perceived life chances, a future-oriented concept, and extra-curricular activities, which included athletics. Participants in this study were adolescents from Trinidad and Tobago.

Studies with adult samples have also indicated that negative feelings about the present or future are inversely associated with physical activity. Henson et al. (2006) showed that present fatalism, defined as negative feelings about the present, was negatively associated with health behaviors including physical exercise. Krumer, Shavit, and Rosenboim (2011) compared the temporal preferences between Israeli professional-athletes and non-athletes. Results showed that professional-athletes were more likely to concentrate on the present to the account of the future as a consequence of their win-orientation. Further, Shores and Scott (2007) used cluster analyses to show that participants who were either focused on the future or had a positive view on the past reported the healthiest behaviors, including physical fitness, compared to participants with a negative view on the past or a fatalistic view on the present, who reported the unhealthiest behaviors. Additionally, Guthrie, Lessl, Ochi, and Ward (2013) showed that participants who were oriented toward the future reported more frequent exercise habits than participants with a negative view on the present, defined as fatalism or hedonism.

**Physical self-concept and time perspective.** Although research has yet to examine relationships with time perspective and physical self-concept, specifically, studies have been conducted with general self-concept and time perspective. In particular, Buhl and Lindner (2009) showed that adolescents in an optimistic profile, defined as participants with favorable feelings toward the past, present, and future, reported the highest perceived self-efficacy. Whereas, adolescents in the pessimistic profile, defined as participants with unfavorable feelings, reported lowest self-efficacy. Reinders (2006) showed that adolescents who were future-oriented also had a higher self-esteem compared to adolescents who were not as oriented toward the future.

### 2.2. Adolescence

Developmentally, this is a particularly salient period to examine the topics in the current investigation. Specifically, time perspective becomes especially salient in adolescence (Mello & Worrell, 2015; Reinders, 2006). Individuals at this age are actively

forming an identity, a process that involves the integration of past, present, and future selves (Erikson, 1966; Pinquart & Silbereisen, 2000). Developmentally, young children describe themselves primarily in the present, hence why adolescence is a better stage to study identity, and, in turn, time perspective (Secord & Peevers, 1974). Further, physical activity is a relevant issue for studies with adolescents, given the importance of leisure time for individuals in this period of the life-span (e.g. Heim, 2011; Neuber, 2011).

### 2.3. The present study

In sum, previous research has shown some varying results for the types of time attitude profiles among adolescents. Further, studies on time attitudes and physical activities have mostly included studies with an emphasis toward the present and future time periods. To clarify the literature, the present study had two aims. First, it sought to clarify the discrepant findings regarding the number and type of profiles that have been reported with time attitudes (e.g., Andretta et al., 2014; Buhl, 2014). Once profiles were identified, the second aim was to examine associations between the time attitude profiles with sports club membership and physical self-concept. Based on extant research (e.g., Andretta et al., 2014; Gulley, 2013; Hall & Fong, 2003; Morgan et al., 2017), participants classified in positive attitudinal profiles were expected to be more likely to be sports club members and to have a higher physical self-concept than their counterparts in more negative attitudinal profiles.

## 3. Method

### 3.1. Participants and procedures

Participants included three convenience samples from Baden-Wuerttemberg (Germany, Sample 1), Luxembourg (Luxembourg, Sample 2), and Galicia (Spain, Sample 3). Sample 1 consisted of 901 adolescents ($M_{age}$ = 14.65, $SD$ = 1.60) and was 46.2% female ($n$ = 416). The majority of the sample was born in Germany ($n$ = 819, 91.9%). Sample 2 consisted of 661 adolescents ($M_{age}$ = 14.40, $SD$ = 1.79) and was 46.7% female ($n$ = 307, missing = 4). The majority of the sample was born in Luxembourg ($n$ = 588, 89.0%). Sample 3 consisted of 789 adolescents ($M_{age}$ = 14.79, $SD$ = 1.53) and was 49.0% female ($n$ = 386, missing = 2). The majority of the sample was born in Spain ($n$ = 678, 86.8%).

The same procedures were used across the samples. Specifically, secondary schools were contacted via email requesting participation. Secondary schools are equivalent to high schools in the United States. A total of seven German, three Luxembourgian, and nine Spanish schools agreed to participate. Parents were given passive consent forms (i.e., the lack of response/submission meant consent) and adolescents were provided assent forms to complete upon their interest. A description of the study was provided that included the study topics, the voluntary nature of participation, and that the data would be collected anonymously. Surveys were administered by trained research assistants and completed in the classrooms. The survey took about 20 min to complete. Incentives were not provided. The study procedures conformed to the policies required for good scientific practice at Heidelberg University in Germany.

### 3.2. Measures

Measures were administered in German for participants in Germany and Luxembourg and in Spanish for participants in Spain.

**Time attitudes.** Time attitudes were measured with the Adolescent Time Attitude Scale (ATAS-Short) which is a component of the Adolescent and Adult Time Inventory (Mello & Worrell, 2007). The ATAS-short comprises six four-item subscales: Past Positive (e.g., “I have very happy memories of my childhood”), Past Negative (e.g., “My past is a time in my life that I would like to forget”), Present Positive (e.g., “I am happy with my current life”), Present Negative (e.g., “I am not satisfied with my life right now”), Future Positive (e.g., “I look forward to my future”), and Future Negative (e.g., “I doubt I will make something of myself”). In Samples 1 and 2, a German version of the ATAS-Short (Mello, Worrell, & Buhl, 2008) was used, whereas a Spanish version of the ATAS-Short (Mello, Worrell, Anguiano, & Mendoza-Denton, 2010) was used in Sample 3. Prior studies have shown that both scales yield reliable and structurally valid scores among adolescent samples (Buhl & Lindner, 2009; Konowalczyk, Mello, Röske, Buhl, Heim, & Worrell, 2018).

Table 1 displays all descriptive statistics and internal consistency estimates for the ATAS in each sample. A 5-point Likert-type scale was used with verbal anchors ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The means ranged from 1.66 on a negative scale to 4.21 on a positive scale with standard deviations from 0.67 to 0.96. All subscales but one (0.61 at Present Negative in Sample 2) achieved a Cronbach's Alpha > .7 which indicated strong reliability (Nunnally & Bernstein, 1994). Prior studies have shown measurement invariance for the ATAS across age, gender, and socioeconomic status (Konowalczyk, 2017).

Given that this study was the first to use the ATAS-German with Luxembourgian adolescents, psychometric analyses were completed. Confirmatory factor analyses (CFA) showed good model fit. The $\chi^2$-Test gave a significant result with a value of 627.387. 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, but a value of 2.65 was observed in this sample. Good model fit was also indicated by the Root Mean Square Error of Approximation (RMSEA = 0.50) based on Browne and Cudeck (1993) and RMSEA confidence intervals from 0.05 to 0.06 (Hooper, Coughlan, & Michael, 2008). The Standardized Root Mean Square Residual (SRMR = 0.04) with a value lower than 0.1 indicated a good fit of the theorized six-factor model. With values greater than 0.9, the Comparative Fit-Index (CFI = 0.94; Amelang, Bartussek, Stemmler, & Hagemann, 2006) as well as the Non-normed Fit Index (NNFI = 0.94; Bentler & Bonett, 1980) also indicated a good fitting model.

**Table 1**
Descriptive statistics and internal consistency estimates for the time attitude scores in German, Spanish, and Luxembourgian adolescents for the six-factor-model.

| Subscale | *M* | *SD* | *Skewness* | *Kurtosis* | α | 95% CI (α) | ω |
|---|---|---|---|---|---|---|---|
| German Adolescents (*N* = 901) | | | | | | | |
| Past Positive | 3.91 | .90 | -.77 | .03 | .88 | .87–.89 | .91 |
| Past Negative | 2.15 | .96 | .87 | .49 | .78 | .76–.81 | .78 |
| Present Positive | 3.86 | .84 | -.76 | .45 | .88 | .87–.90 | .93 |
| Present Negative | 2.43 | .89 | .48 | -.13 | .75 | .73–.78 | .81 |
| Future Positive | 3.95 | .82 | -.66 | -.08 | .87 | .85–.88 | .91 |
| Future Negative | 1.74 | .77 | 1.23 | 1.57 | .76 | .73–.78 | .87 |
| Luxembourgian Adolescents (*N* = 661) | | | | | | | |
| Past Positive | 4.07 | .81 | −1.10 | 1.37 | .86 | .84–.88 | .91 |
| Past Negative | 2.08 | .87 | .77 | .49 | .71 | .67–.75 | .75 |
| Present Positive | 4.21 | .68 | -.97 | 1.00 | .82 | .81–.85 | .91 |
| Present Negative | 2.31 | .78 | .30 | -.39 | .61 | .56–.66 | .75 |
| Future Positive | 4.17 | .73 | -.89 | .67 | .86 | .83–.87 | .92 |
| Future Negative | 1.66 | .67 | 1.04 | .74 | .71 | .67–.75 | .88 |
| Spanish Adolescents (*N* = 789) | | | | | | | |
| Past Positive | 3.99 | .80 | -.96 | 1.10 | .87 | .85–.88 | .91 |
| Past Negative | 1.87 | .87 | 1.07 | .81 | .83 | .81–.85 | .86 |
| Present Positive | 3.99 | .72 | -.67 | .32 | .84 | .82–.86 | .92 |
| Present Negative | 2.35 | .80 | .36 | -.15 | .75 | .72–.78 | .84 |
| Future Positive | 3.88 | .73 | -.35 | -.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.

**Sports club membership.** Sports activity was assessed by ascertaining sports club membership. Sports club membership was a dichotomous variable that indicated the participant was or was not a member of a sports club. Sports clubs were defined as non-governmental and non-profit organizations that offer various sports, including gymnastics, swimming, and fitness (Breuer, Feiler, Llopis-Goig, & Elmose-Østerlund, 2017). Sample 1 included 549 (62.0%), Sample 2 included 498 (76.7%), and Sample 3 included 395 (50.5%) adolescents who were members of a sports club.

**Physical self-concept.** Self-concept was assessed with a modified version of the Self-Description Questionnaire II (SDQ II; Marsh, 1992). The questionnaire was adapted to measure self-concept about physical ability and physical appearance in two four-item subscales. Physical ability self-concept included items, such as "I have a lot of energy in sports" (Sample 1: $M = 2.18$, $SD = 0.79$, $\alpha = 0.85$; Sample 2: $M = 2.01$, $SD = 0.71$, $\alpha = 0.82$; Sample 3: $M = 1.95$, $SD = 0.64$, $\alpha = 0.82$). Physical appearance self-concept included items, such as "I like my body the way it is" (Sample 1: $M = 2.35$, $SD = 0.76$, $\alpha = 0.83$; Sample 2: $M = 2.33$, $SD = 0.76$, $\alpha = 0.86$; Sample 3: $M = 2.33$, $SD = 0.65$, $\alpha = 0.73$). The response option ranged from 1 (*full disagreement*) to 4 (*strong agreement*).

## 4. Results

### 4.1. Latent time perspective profiles

The first aim of the study was to analyze the number and type of profiles across three independent samples to clarify discrepant findings in prior research. Time attitude profiles were examined using latent profile analyses (LPA) with Mplus version 8. Profile solutions with two to six profiles were compared for model fit based on recommended guidelines (Collins & Lanza, 2010; Geiser, 2011; Nylund, Asparouhov, & Muthén, 2007). Table 2 shows the values for the LPA analyses. Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), adjusted BIC (aBIC), and Integrated Likelihood Criterion with Bayesian-Type Approximation (ICL-BIC) indicated the best fit for the model with six profiles in each sample. However, Lo-Mendell-Rubin Likelihood Ratio Test (LMR) and Bootstrapped Likelihood Ratio Test (BLRT) showed contrary results. Nylund et al. (2007) and Geiser (2011) state that, in addition to the fit indices, the interpretability and practical consideration of the profile solution should be taken into account. Therefore, the five-profile solution was selected not only because of the theoretical background but also because the sixth profile was too small in sample size.

Table 3 shows the number of adolescents per profile, as well as means for the profiles. The profiles are shown in Fig. 1 and were named with terms that are similar to prior studies (e.g. Buhl, 2014): Ambivalent, Balanced, Optimistic, Past Negative, and Positive. Ambivalent (5.7–9.5%) was characterized by both very high scores on the positive scales and high scores on the negative scales. Balanced (35.6–40.7%) had scores near the average rating on both positive and negative subscales. Optimistic (8.5–12.3%) had a very high positive attitude about the future, a negative attitude toward the past, and a positive attitude toward the present. Past Negative (2.7–5.7%) was signified by higher scores on the negative subscales than on the positive ones, especially for the past. Positives (34.2–42.1%) had high positive scores and low negative scores across the subscales.

**Table 2**
Selected fit indices for competing latent profile models.

| Model (df) | AIC | BIC | aBIC | ICL-BIC | aLMR *p* | BLRT *p* |
|---|---|---|---|---|---|---|
| Sample 1 | | | | | | |
| 4 Profiles (33) | 11654.007 | 11812.523 | 11707.720 | 11687.158 | 0.01 | < .001 |
| 5 Profiles (40) | 11484.817 | 11676.957 | 11549.923 | 11524.635 | 0.26 | < .001 |
| 6 Profiles (47) | 11376.508 | 11602.273 | 11453.009 | 11423.050 | 0.52 | < .001 |
| Sample 2 | | | | | | |
| 4 Profiles (33) | 7801.493 | 7949.787 | 7845.011 | 7832.720 | 0.03 | < .001 |
| 5 Profiles (40) | 7709.429 | 7889.179 | 7762.179 | 7746.991 | 0.34 | < .001 |
| 6 Profiles (47) | 7618.607 | 7829.813 | 7680.578 | 7662.455 | 0.09 | < .001 |
| Sample 3 | | | | | | |
| 4 Profiles (33) | 9502.645 | 9656.780 | 9551.988 | 9531.363 | 0.01 | < .001 |
| 5 Profiles (40) | 9354.709 | 9541.539 | 9414.519 | 9389.194 | 0.26 | < .001 |
| 6 Profiles (47) | 9273.889 | 9493.415 | 9344.166 | 9314.111 | 0.52 | < .001 |

*Note.* AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; aBIC = Sample Size Adjusted BIC; df = Number of free parameters; ICL-BIC = Integrated Likelihood Criterion with Bayesian Type Approximation; aLMR $p = p$ value from the Adjusted Lo-Mendell-Rubin Test; BLRT $p = p$ value from the Bootstrapped Likelihood Ratio Test.

**Table 3**
Frequencies, average latent class probabilities and means for the classes derived from latent profile analyses (Maximum Likelihood) for samples 1, 2, and 3.

| Profile | *n* (%) | ATAS Means | | | | | |
|---|---|---|---|---|---|---|---|
| | | Past Positive | Past Negative | Present Positive | Present Negative | Future Positive | Future Negative |
| Sample 1 | | | | | | | |
| Ambivalent | 79 (8.8) | 3.75 | 2.40 | 2.72 | 3.53 | 2.89 | 2.87 |
| Balanced | 351 (39.0) | 4.02 | 2.04 | 3.71 | 2.64 | 3.84 | 1.80 |
| Optimistic | 111 (12.3) | 2.70 | 3.31 | 4.00 | 2.33 | 4.37 | 1.50 |
| Past Negative | 52 (5.8) | 2.19 | 4.20 | 2.45 | 3.64 | 2.94 | 3.14 |
| Positive | 308 (34.2) | 4.54 | 1.46 | 4.50 | 1.76 | 4.35 | 1.24 |
| Sample 2 | | | | | | | |
| Ambivalent | 38 (5.7) | 3.79 | 2.44 | 2.68 | 3.51 | 3.25 | 2.32 |
| Balanced | 269 (40.7) | 4.06 | 2.09 | 4.00 | 2.53 | 3.97 | 1.83 |
| Optimistic | 56 (8.5) | 2.77 | 3.40 | 4.29 | 2.58 | 4.33 | 1.75 |
| Past Negative | 27 (4.1) | 2.40 | 3.69 | 3.20 | 3.43 | 3.15 | 2.87 |
| Positive | 271 (41.0) | 4.56 | 1.57 | 4.71 | 1.76 | 4.57 | 1.23 |
| Sample 3 | | | | | | | |
| Ambivalent | 75 (9.5) | 3.50 | 2.82 | 3.40 | 3.24 | 3.18 | 3.10 |
| Balanced | 281 (35.6) | 3.99 | 1.78 | 3.68 | 2.66 | 3.62 | 1.86 |
| Optimistic | 80 (10.1) | 2.98 | 3.04 | 3.89 | 2.45 | 4.25 | 1.48 |
| Past Negative | 21 (2.7) | 1.74 | 4.16 | 2.86 | 3.23 | 3.31 | 2.41 |
| Positive | 332 (42.1) | 4.50 | 1.29 | 4.47 | 1.80 | 4.20 | 1.23 |

*Note.* ATAS = Adolescent Time Attitude Scale (Mello & Worrell, 2007).

### *4.2. Time attitude profiles, sports club membership, and physical self-concept*

The second aim of the study was to examine the relationship between time attitude profiles, sports club membership, and physical self-concept. The five latent profiles were treated as independent variables for these analyses. To compute the differences regarding the sports club membership, a $\chi^2$-test was used. Effect size was interpreted with $w = 0.10$ as small, $w = 0.30$ as medium, and $w = 0.50$ as large (Cohen, 1988). Analyses of variances was used to examine associations between self-concept and the five profiles. Drawing from Cohen (1988), $\eta^2 = 0.0099$ was considered a small, $\eta^2 = 0.0588$ a medium, and $\eta^2 = 0.1379$ a large effect. Descriptive statistics for each of the profiles can be drawn from Table 4.

Time attitude profiles were associated with sports club membership. Table 4 shows that adolescents in the Positive profile were more often members of a sports club than the other profiles in Sample 1 ($p \leq .001$, $w = 0.15$), Sample 2 ($p \leq .05$, $w = 0.13$), and Sample 3 ($p \leq .001$, $w = 0.17$). However, effect sizes were generally small.

Time attitude profiles were associated with both physical ability and physical appearance self-concept, as indicated in Table 4. In all samples (Sample 1: $p \leq .001$, $\eta^2 = 0.04$; Sample 2: $p \leq .001$, $\eta^2 = 0.07$; Sample 3: $p \leq .01$, $\eta^2 = 0.02$), adolescents in the Positive profile had the highest physical ability self-concept, followed by adolescents in the Optimistic and Balanced profiles. The Ambivalent profiles reported the lowest physical self-confidence. The differences between the profiles were small in effect size in Sample 1 and Sample 3 and medium in effect size for Sample 2. Regarding physical appearance self-concept, adolescents in the Positive profiles had the highest self-concept, followed by Balanced, Optimistic (Optimistic, Balanced in the Luxembourgian sample), and Ambivalent.

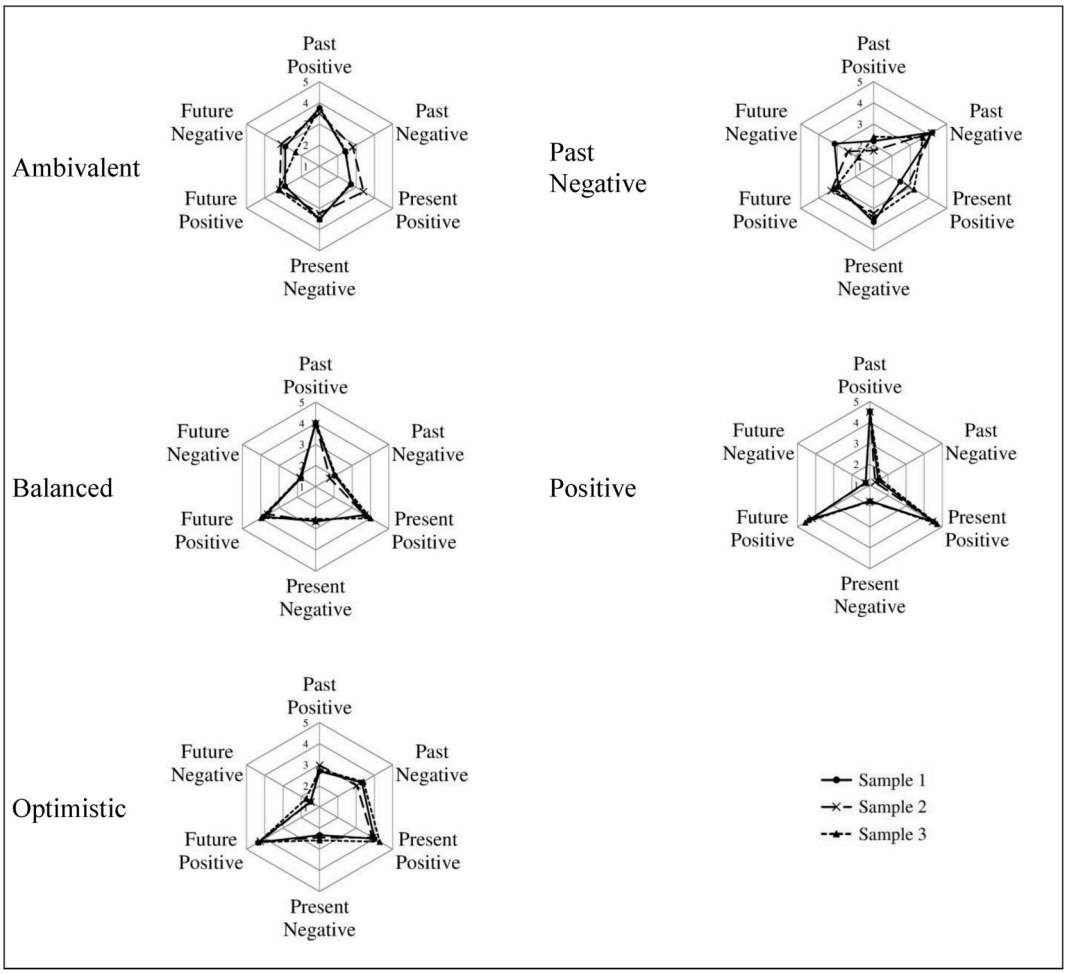


**Fig. 1.** Latent time attitude profiles derived from latent profile analysis (Maximum Likelihood).

Finally, adolescents in Past Negative profiles reported the lowest physical appearance self-concept (Sample 1: $p \leq .001$, $\eta^2 = 0.114$; Sample 2: $p \leq .001$, $\eta^2 = 0.114$; Sample 3: $p \leq .001$, $\eta^2 = 0.09$). Effect sizes were medium.

## 5. Discussion

This study aimed to make several contributions to the growing literature on time perspective in adolescence (Andretta et al., 2014; McKay et al., 2014; Mello & Worrell, 2015). First, latent profiles of time attitudes were generated with three independent samples to clarify the mixed findings in the literature. Second, we sought to extend research on time perspective to topics with implications for adolescent physical health. Specifically, the relationships between time attitude profiles and sports club membership and physical self-concept were investigated. This goal was intended to provide information about the connection between time attitudes and sports activities so that this knowledge could be used to better understand and ultimately promote adolescent health.

### *5.1. Time attitude profiles*

Latent time attitude profiles were generated using a person-centered approach (e.g., Bergman, Magnusson, & El-Khouri, 2003). This strategy is particularly well-suited for multidimensional constructs, such as time attitudes. Time attitudes include positive and negative feelings toward the past, present, and future. The approach identifies subgroups of adolescents with similar time attitudes. Latent profile analyses indicated five profiles: Ambivalent, Balanced, Optimistic, Past Negative, and Positive. Importantly, these profiles emerged across three independent samples. The number and type of time attitude profile was mostly consistent with prior research (Andretta et al., 2014; Buhl, 2014). The exception was that in this study, we observed a Past Negative profile, whereas in prior studies a Negative profile was observed (e.g., Konowalczyk, McKay, et al., 2018; Morgan et al., 2017; Wells et al., 2018). One reason might be that different analytical approaches were employed which can manifest in different specifications of covariance matrices. Other reasons might be different interpretations of profile solutions (cf., Nylund et al., 2007). Overall, this study showed a

**Table 4**
Latent time attitude profiles, sports club membership, and physical self-concept.

| Latent Time Attitude Profile | Sports Club Membership "yes" | | Physical Ability Self-Concept | | Physical Appearance Self-Concept | |
|---|---|---|---|---|---|---|
| Sample 1 | | | | | | |
| | *n* | % | *M* | *SD* | *M* | *SD* |
| Ambivalent | 37 | 48.7 | 2.48 | .91 | 2.63 | .86 |
| Balanced | 218 | 63.2 | 2.23 | .74 | 2.42 | .69 |
| Optimistic | 57 | 51.8 | 2.17 | .72 | 2.50 | .63 |
| Past Negative | 25 | 50.0 | 2.47 | .89 | 2.96 | .96 |
| Positive | 212 | 69.5 | 2.01 | .77 | 2.04 | .66 |
| | $\chi^2(886)$ | *w* | *F*(4,896) | $\eta^2$ | *F*(4,896) | $\eta^2$ |
| | 21.11*** | .15 | 8.95*** | .04 | 28.89*** | .114 |
| Sample 2 | | | | | | |
| | *n* | % | *M* | *SD* | *M* | *SD* |
| Ambivalent | 24 | 64.9 | 2.39 | .75 | 2.82 | .79 |
| Balanced | 200 | 76.9 | 2.10 | .64 | 2.46 | .73 |
| Optimistic | 39 | 69.6 | 2.09 | .75 | 2.41 | .72 |
| Past Negative | 17 | 63.0 | 2.33 | .94 | 2.85 | .90 |
| Positive | 218 | 81.0 | 1.81 | .68 | 2.05 | .67 |
| | $\chi^2(649)$ | *w* | *F*(4,656) | $\eta^2$ | *F*(4,656) | $\eta^2$ |
| | 10.65* | .13 | 11.69*** | .07 | 10.82*** | .114 |
| Sample 3 | | | | | | |
| | *n* | % | *M* | *SD* | *M* | *SD* |
| Ambivalent | 29 | 38.7 | 2.15 | .61 | 2.52 | .65 |
| Balanced | 137 | 49.1 | 1.99 | .61 | 2.41 | .61 |
| Optimistic | 33 | 41.8 | 1.98 | .66 | 2.48 | .59 |
| Past Negative | 4 | 20.0 | 2.10 | .91 | 3.02 | .74 |
| Positive | 192 | 58.4 | 1.95 | .63 | 2.14 | .62 |
| | $\chi^2(782)$ | *w* | *F*(4,784) | $\eta^2$ | *F*(4,784) | $\eta^2$ |
| | 22.40*** | .17 | 4.27** | .02 | 18.10*** | .09 |

*Note.* ***$p \leq .001$; **$p \leq .01$; *$p \leq .05$.

consistent number and type of time attitude profiles with three independent samples. Combined with prior research (Andretta et al., 2014; Buhl, 2014), this finding provides strong support for the five-group time attitude profile solution with adolescent samples.

### 5.2. Time attitude profiles, sports club membership, and physical self-concept

Relationships between time attitude profiles, sports club membership, and physical self-concept were observed. Consistent with theory (Reinders, 2006), adolescents in positive attitudinal profiles were more self-confident and reported a higher rate of sports club membership that their counterparts who exhibited other time attitude profiles. Our results are similar to past research that has shown positive relationships with physical activity and other conceptualizations of time perspective, such as present and future orientations (Neuber, 2007; Reinders, 2006) and perceived life chances (Mello & Worrell, 2008). Further, our study provides evidence for the notion that more positive and less negative attitudes toward multiple time corresponds to physical activities. This finding extends prior research that has focused on single time periods. Existing research has shown that participants with a past negative attitude had a lower intention to participate in physical activity (Gulley, 2013) and that participants with a positive orientation toward the past and future were more likely to have the healthiest behaviors including physical activity (Shores & Scott, 2007). The current study shows how sports club membership is associated with both positive and negative attitudes and multiple time periods including the past, preset, and future. Furthermore, the findings supplement research that has been conducted with special populations. In particular, Konowalczyk (2017) compared the time attitudes between adolescents who trained at an Olympic center with those in the general population. Findings indicated that participants at the Olympic center reported more positive and less negative feelings toward the time periods than their counterparts.

Results also indicated that time attitude profiles were related to physical self-concept. Findings showed that adolescents in more positive profiles reported higher physical self-concept in both ability and appearance compared to adolescents in more negative attitudinal profiles. This finding supplements existing research that has focused on general self-esteem by extending it to the domain of physical activity. Studies have reported a positive relationship using bivariate analyses between general self-esteem and time attitudes (Worrell & Mello, 2009) and future orientation (Reinders, 2006). Other research has shown how profiles of time attitudes are associated with self-efficacy (Buhl & Lindner, 2009; Morgan et al., 2017) and self-esteem (Andretta et al., 2014).

In summary, the current study contributes toward a growing body of research examining how time perspective predicts developmental outcomes (Andretta et al., 2014; Mello & Worrell, 2015; Zimbardo & Boyd, 2008) and extended this research to sports club membership and physical self-concept. This study included three independent samples of adolescents. Results showed that five time attitude profiles were observed and that these profiles were associated with sports club membership and physical self-concept.

### 5.3. Implications

Combined with research that has shown associations between time perspective and physical exercise in college students (e.g., Hall & Fong, 2003; Henson et al., 2006), the current study provides the field with evidence that there are meaningful associations between time perspective variables, including time attitudes, and sports club membership and physical self-concept. The results of this study have implications for interventions that use time perspective to target the promotion of adolescent physical health. Prior studies have modified time perspective. Adolescent and young adult participants were taught to think about multiple time periods and when compared to a control group they exhibited more awareness about careers (Marko & Savickas, 1998). Other conceptually-similar topics to time perspective, including future orientation, have also indicated that the construct may be modified (Oyserman, Terry, & Bybee, 2002).

Ultimately, the findings in this study may be used to inform the development of intervention programs that use time perspective to target physical health. Programs may be developed that use time perspective to encourage adolescents to participate in sports activities. Specifically, interventions could modify time attitudes among adolescents that would lead to increased participation in physical activities, including sports. An important direction of future research will be to generate sports-related interventions that incorporate time perspective.

Programs based on time perspective and physical activity might be particularly useful for adolescents, given the growing obesity epidemic in this age group (WHO, 2018). Sports activities and physical self-concept are important topics of investigation that may be used to combat the deleterious effects of obesity (Grao-Cruces, Fernandez-Martinez, & Nuviala, 2017; Rössner, 2002; Sanchez, Suarez, & Smith, 2018). Future studies might explore how time perspective may be changed through interventions to increase physical activity and thus reduce obesity among adolescents.

### 5.4. Limitations and future directions

This study made several contributions to the literature. However, it also had some limitations. First, the cross-sectional research design limits the ability for these findings to address the directionality of the relationships between time attitudes, sports club membership, and physical self-concept. Longitudinal research should be conducted to clarify the associations among these topics. Second, sports club membership had limitations as an indicator of physical activity. Specifically, membership requires financial payment. Although in many places applications may be submitted for reduced payment, access still requires money. This may limit the generalizability of the study's findings. However, sports club membership is not restricted to a particular athletic ability, so all adolescents are eligible regardless of physical ability. Overall, it would be fruitful for future research to include more detailed measures of physical ability to capture additional aspects of the topic than those examined in the current study.

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