



Original Research

Sport Commitment Among Adult Recreational Soccer Players: Test of an Expanded Model

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ABSTRACT

International Journal of Exercise Science 10(1): 4-24, 2017. Adult sport leagues provide opportunities for physical activity (PA), but little is known about adults' commitment to recreational sports. We proposed two expanded versions of Scanlan and colleagues' sport commitment model (SCM) to explore psychosocial factors related to adults' participation in these leagues. Model 1 proposed athletic identity and social cohesion as additional predictors of commitment. Previous research found these variables to be positively related to commitment, but had not systematically examined them within the context of the SCM. We also explored participation in moderate-to-vigorous physical activity (MVPA) as a behavioral manifestation of commitment. Model 2 explored athletic identity as a mediator between commitment and MVPA. Adult recreational soccer players (156 females, 196 males; *M* age = 29.5) completed valid measures following a game. Structural equation modeling revealed enjoyment and investments positively predicted commitment, and psychological commitment to soccer was indirectly related to weekly minutes of MVPA through the perceived importance of PA to self-identity. Players who reported greater enjoyment and invested more resources into participation reported greater resolve to continue playing. Players' desire to remain involved in soccer reinforced the salience of PA to their identities, which was related to participation in MVPA. This study extends SCM research by examining factors underlying commitment to adult recreational team sports, and by demonstrating sport commitment is related to MVPA. Similar to previous research with elite athletes, the strongest predictors of commitment were enjoyment and personal investments. Further research is needed to examine the proposed link between commitment, athletic identity, and MVPA.

KEY WORDS: Sport and exercise psychology, adult recreational soccer, physical activity

INTRODUCTION

Participation in physical activity (PA) across the lifespan enhances well-being and reduces the risk of chronic disease (58). However, fewer than 10% of U.S. adults obtain the recommended

30 minutes of moderate-to-vigorous physical activity (MVPA) per day (55, 56). Age-related declines in PA occur as early as adolescence, with team sport participation in particular decreasing during the transition into adulthood (23). As adults decrease their active participation in team sports, they increase their involvement in individualistic forms of PA (e.g., running, golf) and passive sport participation (i.e., spectatorship) (34). Whereas most PA interventions typically focus on increased participation in individualistic PA, research demonstrates that adults who play vigorous team sports, such as soccer, improve or maintain their cardiovascular fitness, bone density, leg strength, and postural balance to a similar or greater degree than adults who partake in traditional, individualistic endurance training (17, 32). Thus, it is important to promote community involvement in adult recreational sport leagues.

Although team sports enhance fitness and social relationships, most research on adult sport participation has focused on elite or Masters-level sports, such as swimming and track (4, 28). Adult recreational team sport leagues are a promising, yet under-studied, context for PA promotion (38). Adults commonly cite weight management, social interaction, and enjoyment as their initial, primary motives for participation in sport and other forms of PA, but little is known about factors specifically underlying adults' desires to remain actively involved in recreational team sport leagues (1). To address this gap in the literature, there is a need for theory-driven research that investigates psychosocial factors related to commitment to adult recreational team sports.

Rusbult's investment model argues that commitment, or the intent to remain in a relationship or activity, is strengthened by satisfaction, low availability of attractive alternatives, and the investment of intrinsic (e.g., emotional effort) and extrinsic (e.g., material possessions) resources (39, 40). Scanlan and colleagues adapted and expanded this model to examine psychosocial antecedents of sport commitment (42). According to the sport commitment model (SCM), commitment is positively predicted by enjoyment, valuable opportunities (benefits associated with involvement), personal investments, social constraints (pressure from significant others to continue sport involvement), and social support (42). Conversely, the perceived attractiveness or importance of other priorities detracts from commitment. Researchers have consistently found enjoyment and personal investments to be the strongest predictors of psychological commitment to sport (12, 59, 64). However, the majority of studies with adults have examined commitment among individual-sport or elite athletes (12, 44, 45, 46, 64). There is a lack of research regarding commitment to adult recreational team sports.

Researchers previously expanded the SCM to examine additional psychosocial predictors (e.g., perceived competence), behavioral outcomes (e.g., coaches' ratings of effort), and dimensions of commitment (e.g., attraction-based/"want to" commitment versus obligatory/"have to" commitment) (18, 20, 60, 64). For our present study, we proposed and tested two iterations of an expanded SCM. For the first proposed model, we expanded the SCM to include social cohesion and athletic identity as theoretically and contextually relevant predictors, and MVPA as a behavioral outcome of psychological commitment to an adult recreational team sport (i.e.,

soccer). Because our review of the literature uncovered two differing perspectives regarding the nature of the relationship between identity, commitment, and role-related behaviors, we tested an additional SCM in which athletic identity (AI) was posited as a mediator between sport commitment and weekly minutes of MVPA.

Social cohesion (i.e., perceived opportunities for positive social interactions and friendships on a team) is related to positive emotional, motivational, and behavioral outcomes that reinforce intentions to remain on a team (8, 9, 11, 48, 54). Social cohesion also predicts higher attendance in adult recreational team sport leagues, which is possibly a behavioral manifestation of commitment (11). Among adolescent team sport participants, social cohesion is positively correlated with commitment to a team (26).

Moreover, individuals are motivated to invest time and effort into activities that reinforce a positive sense of self (49). Therefore, athletic identity (AI), a multi-dimensional sense of self rooted in maintaining a fit/athletic appearance and being physically active, should reinforce on-going commitment to sport and PA (2). Empirical support for the inclusion of AI as a predictor of sport commitment comes from studies reporting positive correlations between AI and several SCM constructs, including enjoyment, investments, involvement opportunities, and commitment (5, 20, 24). Some researchers have interpreted these correlational findings to suggest that athletes who identify more strongly with the athletic role are thus more committed to their respective sport (20, 24). Hagiwara and Isogai supported this proposal using a structural equation modeling approach that found Japanese college athletes' AI was a psychosocial determinant of commitment, and commitment in turn was related to their sport participation and persistency (21). Thus, our first proposed model examined athletic identity as a predictor of commitment.

Finally, a positive relationship between psychological commitment (i.e., intentions) and behavioral commitment (i.e., participatory behaviors) has been found among adult sport and exercise participants (12, 18, 63). Although the outcomes from these studies suggest *sport* commitment predicts *sport* behavior, and *exercise* commitment predicts *exercise* behavior, researchers have yet to examine whether adults' psychological commitment to a sport predicts how often they engage in overall MVPA. Therefore, we explored whether recreational athletes' psychological commitment to soccer would be related to MVPA participation.

In contrast with our first hypothesized model, our second model examines whether AI mediates the relationship between sport commitment and MVPA. This alternative perspective stems from the theoretical frameworks of identity theory and the physical activity self-definition model (6, 29, 30, 47, 51, 52). According to identity theory, the perceived importance and salience of an identity (i.e., probability that the identity will be invoked across a variety of situations) determines the amount of time that individuals spend in identity- or role-related behaviors. Individuals are motivated to participate in activities that are congruent with their self-perceptions (52).

In support of this perspective, Stryker and Serpe found that perceived importance and salience of AI mediated the relationship between undergraduates' commitment to athletics and time spent playing sports (53). Students who were more committed to athletics viewed AI as being more salient and important to their sense of self, and therefore spent more time playing sports (53). To summarize this line of research, Leveto stated, "commitment has a stronger influence on identity salience than identity salience has on commitment" (33). Similarly, Kendzierski and colleagues found that recreational athletes' and exercisers' perceived commitment directly affected their physical activity self-definitions (PASD), which are "aspects of the self-concept related to physical activities in which people voluntarily engage for exercise, sport, or recreation" (30). Their PASD model contends that enjoyment and perceived commitment provide identity-relevant information that is used by individuals to make inferences about the salience and importance of their PASD or AI (29, 30). Additional support for including AI as a mediator between sport commitment and MVPA comes from a number of studies that have found a clear relationship between PA-related identities and participation in sports and exercise (2, 3, 29, 30, 50).

The primary purpose of this study was to examine an expanded model of sport commitment within the context of adult recreational soccer. We specifically examined commitment to soccer because it is a popular team sport for adults in the U.S., with roughly 250,000 adults playing in the U.S. Adult Soccer Association's recreational leagues (57). Based on previous research, we hypothesized that enjoyment, valuable opportunities, social support (from family and non-sport peers), personal investments, social cohesion, and athletic identity would be positively related to psychological commitment to soccer (see Figure 1). Perceived attractiveness of alternative activities was predicted to detract from soccer commitment. We omitted social constraints because researchers had previously found little support for its contribution to sport commitment among adults (12). We also hypothesized that psychological commitment to soccer would positively predict weekly minutes of MVPA.

Our secondary purpose was to test an alternative model informed by identity theory and physical activity self-definition research, which has demonstrated that in addition to commitment predicting the degree to which one identifies as a physically active individual, the salience of athletic identity mediates the relationship between commitment and time spent in role-related behaviors (30, 53). In Model 2 (see Figure 2), we propose the desire to remain involved in soccer reinforces the importance of athletic appearance and being physically active to one's

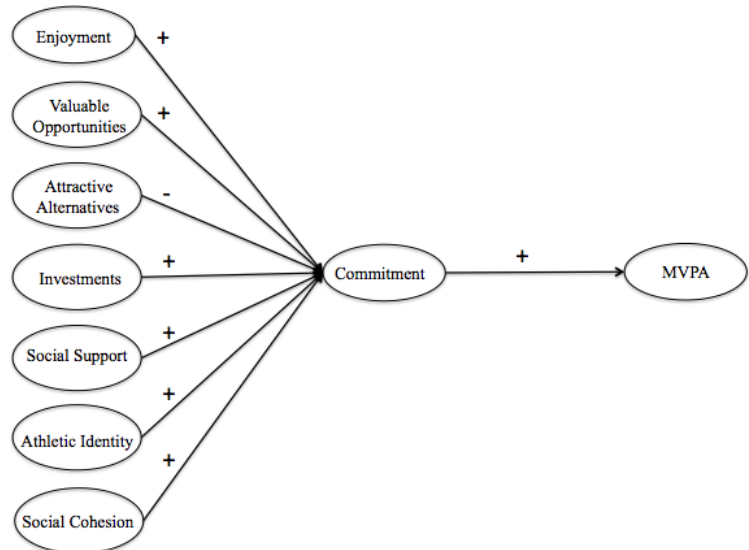


Figure 1. Model 1: Expanded SCM model with hypothesized direction of relationships

sense of self, thus motivating recreational soccer players to engage in higher levels of MVPA.

METHODS

To test the proposed models of commitment to adult recreational soccer, we utilized a cross-sectional survey design. Participants were recruited from the sidelines of a summer co-ed recreational soccer league.

Participants

Participants were 352 adults (156 females, 196 males) competing in a recreational co-ed soccer league in a large mid-western city. This league offers seven sessions throughout the year with eight games per session. The 50-min games are small-sided (7 vs. 7) with equal gender representation on the field (three males, three females, and a goalie of either gender). Teams are self-coached, do not hold practices, and feature a wide array of skill levels and ages. The mean age of the sample was 29.5 ± 6.2 yrs, with participants ranging in age from 18-51 yrs. The ethnic background of the sample was representative of the surrounding community: 81.3% White/Caucasian, 6.7% Asian/Pacific Islander, 4.9% Hispanic/ Latino(a), 4.7% Mixed/Other, 2.2% African-American/Black, and .2% Native American. Years of soccer experience ranged from less than one year to 45 years (17.65 ± 8.73). Participants reported playing with their current team for 6.36 ± 11.17 sessions, and played 2.0 ± 1.28 games per week.

Participants were asked to report their gender, age, ethnicity, years of soccer involvement, number of games played per week, and number of seasons with their team.

To assess SCM predictors and psychological commitment, we adapted thirty items from Scanlan and colleagues' original SCM survey for youth and its subsequent revisions for adults (12, 43, 63, 64). Items were adapted to be soccer-specific. Responses were indicated on a 5-point Likert scale ranging from 1 (not at all/nothing) to 5 (very/a lot), and were averaged together to calculate the following six subscale scores: Enjoyment, Valuable Opportunities, Attractive Alternatives, Personal Investments, Social Support, and Psychological Commitment to Soccer. Cronbach's alphas for each subscale in the present investigation are reported in Table 1.

Four items from Scanlan et al. assessed enjoyment of soccer (43). Developmental appropriateness and reliability of this scale were previously demonstrated with Masters swimmers and adult tennis players, with Cronbach's alphas ranging from .83 to .85 (12, 64).

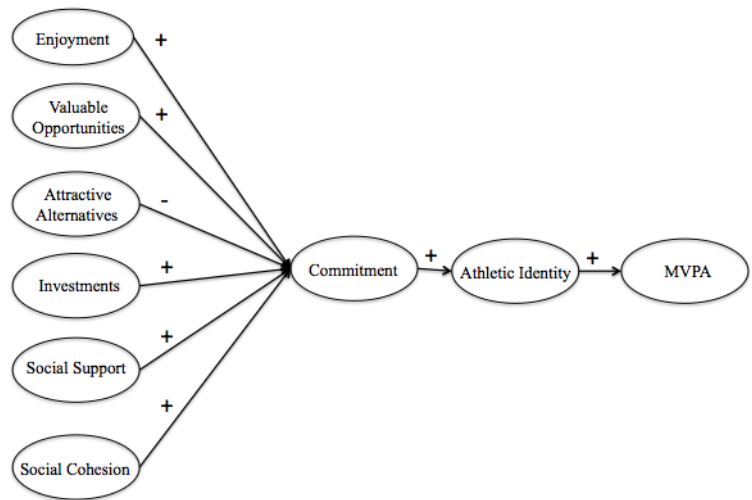


Figure 2. Model 2: Expanded SCM with AI as a mediator between commitment and MVPA.

Eight items assessing perceived benefits of participating in soccer were adapted from Young and Medic's scale, which displayed adequate internal consistency ($\alpha = .80$) in research using fit adults and Masters level swimmers (64). Given that participants in the current study were recreational athletes in a local, non-competitive league, we omitted the items, "My sport involvement gives me the opportunity to travel" and "Participating in my sport gives me the opportunity to get publicly recognized for my achievements".

Attractiveness of alternative activities was assessed with a 3-item measure previously validated with adult exercisers and Masters swimmers (63, 64). Internal consistency for this scale was previously found to be adequate, $\alpha = .75$ (12).

Four items assessed perceptions of how much time, energy, effort, and money had been invested into playing soccer (43, 63). A 3-item version of the current scale (excluding monetary investments) was found to be reliable ($\alpha = .89 - .94$) among adult exercisers and Masters swimmers (63, 64). Casper et al. also found adequate internal consistency ($\alpha = .76$) for a 4-item measure that included monetary investments (12).

A six-item social support scale assessed participants' perceived level of encouragement from family and non-sport peers (63). Internal consistency was previously reported with alphas ranging from .73 to .90 (63, 64).

Commitment to soccer was assessed with five items (43). Inter-item reliability has been previously demonstrated, with alphas ranging from .85-.87 (12, 60).

The Athletic Appearance and Importance of Exercise/ Sports/ Physical Activity subscales of the Athletic Identity Questionnaire (AIQ) measured strength of athletic identity (2). The AIQ consists of two additional subscales (Competence and Encouragement from Others), however, to fit with our interest in whether sport commitment would be impacted by the degree to which an individual perceives one's self as an athlete and the importance he/she places on maintaining AI, regardless of their perceived sport competence, we chose to only utilize the Appearance and Importance of Exercise/ Sports/ Physical Activity subscales. Furthermore, we believed that the Encouragement from Others subscale conceptually overlapped with the Social Support subscale of the Sport Commitment Questionnaire. Items were rated on a 5-point Likert scale ranging from 1 (not at all descriptive of me) to 5 (very descriptive of me). Internal consistency and validity for these two subscales have been previously demonstrated by alpha coefficients of .89 and strong correlations with PA ($r = .56-.90$) (2, 3).

Nine items from the two social cohesion subscales of the Group Environment Questionnaire (GEQ) assessed participants' attractions toward the social aspects of their team (Attractions to Group- Social) and perceptions of team's closeness (Group Integration- Social) (9). Responses were indicated on a 9-point scale ranging from 1 (strongly disagree) to 9 (strongly agree). Reliability and validity of the social cohesion subscale have been established in numerous studies (10).

Participation in MVPA was assessed with a two-item Leisure Time Exercise Questionnaire (LTEQ) (19). The LTEQ is a valid and reliable PA recall questionnaire that assesses the frequency of moderate and strenuous (i.e., vigorous) PA performed during a typical week. Initial psychometric testing of the LTEQ with healthy adults found it was correlated with maximal aerobic capacity ($r = .38$ for strenuous and $r = .24$ for total score) and had adequate test-retest reliability of $r = .74$ (19). We added an additional question regarding the average duration of PA sessions in order to calculate participants' average weekly minutes of MVPA.

Protocol

The current study was conducted in accordance with ethical guidelines and was approved by the university's Institutional Review Board. The principal investigator obtained permission from the league director prior to participant recruitment. To control for possible timing effects, recruitment and data collection were scheduled for the second or third game of the season. Recruitment was carried out over the course of five days in July 2012. Research assistants stood in between the two playing fields with boxes of paper-and-pencil questionnaires and sports beverages. For convenience of time and to minimize interruptions to games, researchers approached teams after their respective games had ended. Research assistants explained the purpose of the study, offered beverages, and assured participants that their responses would remain anonymous and confidential. Players were also given the option to be entered into a drawing for a \$50 gift card. Participants took roughly 15 minutes to complete the consent forms and survey packets.

Of the 616 players who were approached, 68% ($n = 416$) volunteered to participate. Among those who agreed to participate, 98% ($n = 407$) provided viable surveys (more than 50% of the questionnaires completed). Research assistants immediately filed consent forms and surveys in separate folders on-site, and assigned anonymous identification numbers to the survey packets for data entry.

Statistical Analysis

Our intended sample size for the structural equation models was calculated using Westland's algorithm, which included the anticipated effect size, statistical power, significance, and proposed number of latent ($k = 9$) and indicator variables ($p = 52$) (61). This power analysis indicated $N = 184$ was the minimum required sample size to have a power of .80 and alpha value of .05 to detect a medium effect ($ES = .30$). After entering data from 407 viable surveys, we screened the dataset for missing values and extreme outliers. Missing values were replaced with mean substitution ($n = 79$) if there was only one missing item per multi-item measure. The two-item LTEQ was excluded from analyses if a response column was left blank. Analyses were performed using list-wise deletion; fifty-five surveys were dropped due to incompleteness (i.e., participant was missing more than one item per scale) or for reporting levels of MVPA that were unusually high (i.e., > 960 min/wk or 3 SD from the mean; $n = 5$). Therefore, the following analyses were conducted with a final sample size of $N = 352$, which exceeded our originally intended sample size of $N = 184$ and yielded a $N:q$ ratio of 39:1. This

ratio is more robust than the 20:1 ratio (minimum $N = 180$ for $q = 9$ model parameters) recommended for structural equation modeling (27).

Descriptive statistics, internal consistency reliability estimates (Coefficient α), and correlation matrices were obtained using the Statistical Package for Social Sciences (SPSS) 20.0 program (SPSS, 2011) (16). An exploratory factor analysis (EFA) was conducted to determine the initial composition and structure of the determinant items and to inform the creation of item parcels. Structural covariance modeling was used to verify the EFA's multidimensional factor structure of the model constructs. Structural equation modeling (SEM) with maximum-likelihood (ML) estimation assessed the proposed models' relationships among predictor variables, commitment, and weekly minutes of MVPA. We used bootstrapping with bias-corrected confidence estimation (95% confidence intervals) to further examine whether athletic identity mediated the relationship between commitment and MVPA in Model 2 (37). An alpha-level of .05 was used to determine significant relationships.

Structural covariance modeling and SEM were conducted using LISREL 8.72 (Joreskog & Sorbom, 2004). Maximum likelihood (ML) estimation procedures were utilized for structural covariance modeling and SEM analyses. The first loading of each set of indicators was set to 1.0 for identification, and the exogenous latent variables were specified to correlate with one another (7). Relationships between commitment constructs, commitment, and MVPA were examined for the two hypothesized models using SEM procedures. Items were loaded exclusively on relevant latent factors. Uniqueness and error variances were not free to correlate, and unidirectional paths were specified between determinants and commitment, from commitment to the outcome variables of MVPA (Model 1) and AI (Model 2).

The fit of the measurement and structural models to the observed data were tested with several fit indices: chi-square (X^2), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), non-normed fit index (NNFI), incremental fit index (IFI), and comparative fit index (CFI) (25). Cutoff values of $RMSEA \leq .05$, $SRMR \leq .08$, and $NNFI, IFI, \text{ and } CFI \geq .95$ are interpreted to indicate good model fit; a reasonable model fit is indicated by $RMSEA < .08$, $SRMR \leq .08$, and $NNFI, IFI, \text{ and } CFI \geq .90$ (25). Furthermore, parameter estimates (factor loadings, path coefficients) were examined for statistical significance ($t > 1.96$), and effect sizes (R^2) were examined to determine practical significance (14). Finally, to compare the fit of the two models, we contrasted the following fit indices for non-nested models: Akaike Information Criterion (AIC), Consistent AIC (CAIC), Expected Cross-validation Index (ECVI), and RMSEA (36). The model with smaller relative values was interpreted as the better fitting model.

RESULTS

Alpha coefficients for the Sport Commitment, AIQ, and GEQ subscales indicated acceptable internal consistency (see Table 1). An analysis of items, however, revealed that the social

cohesion item “I do not enjoy being part of the social activities of this team” demonstrated poor reliability. Removal of this item increased the GEQ’s alpha coefficient from 0.81 to 0.83.

We examined the latent factor structure and composition of the predictor variables using EFA procedures. Using Kaiser-Guttman (eigenvalues > 1) and scree plot stopping rules, we specified a seven-factor solution (13). However, the resulting pattern coefficients were problematic and had factor interpretability issues. Three factors could not be interpreted due to Valuable Opportunities items loading onto the Enjoyment (i.e., opportunities to do “something exciting”, “have a good time”, “to enjoy myself”), Social Cohesion (“opportunity to be with friends”), and Investments (i.e., opportunities for “physical skills” and “competitive goals”) factors. None of the Valuable Opportunities items loaded onto a unique factor, and the cross loading of items onto other factors indicated that this subscale was potentially measuring a higher-order factor with multiple dimensions. Therefore, the Valuable Opportunities subscale was dropped from the model and all subsequent analyses. Further examination of the EFA results indicated that items measuring support from family and non-sport peers loaded onto a single Social Support factor. Furthermore, because the two AIQ subscales loaded onto two separate factors, Appearance and Importance of PA were treated as separate, but correlated, constructs in the structural covariance modeling and SEM analyses. Additionally, the EFA supported the use of the 8-item GEQ subscale for the Social Cohesion factor.

Means, standard deviations, and correlations for study constructs are provided in Table 1. Participants reported high levels of enjoyment, investments, social support, and commitment to soccer, and rated the attractiveness of other activities to be relatively low. Players perceived moderately high levels of social cohesion on their teams. They also tended to rate athletic appearance and being physically active as being important to their sense of self. Overall, this was an active sample, with 89% of players reporting at least 150 minutes of MVPA per week. Correlations among latent variables tended to be in the expected direction, with the exception of the positive correlation between attractive alternatives and MVPA. Similar to previous studies with the SCM, enjoyment, investments, and commitment were highly correlated (7, 12).

Table 1. Reliabilities, correlations, means, and standard deviations for study variables.

Variable	1	2	3	4	5	6	7	8	9
1. Enjoyment	0.83								
2. Attractive alternatives	-0.37	0.76							
3. Investments	0.64	-0.29	0.84						
4. Social support	0.10	-0.17	0.26	0.82					
5. Appearance	0.20	-0.19	0.23	0.05	0.88				
6. Importance of PA	0.24	-0.07	0.29	0.07	0.54	0.85			
7. Social cohesion	0.15	-0.16	0.29	0.26	0.12	0.23	0.83		
8. Commitment	0.80	-0.38	0.81	0.22	0.16	0.29	0.22	0.86	
9. MVPA	0.05	0.10	0.11	0.07	0.17	0.40	0.21	0.12	-
M	4.70	2.69	3.94	3.97	3.92	3.54	5.96	4.23	324.19
SD	0.43	0.89	0.86	0.72	0.73	0.83	1.28	0.70	176.23
Scale range	1-5	1-5	1-5	1-5	1-5	1-5	1-9	1-5	-

Alpha coefficients are presented on the diagonal. $r > |.11|$ denote significant relationships ($p < .05$).

Prior to testing the measurement and structural models, parceling techniques were employed to create aggregate-level indicators. In the event that a factor was comprised of five or fewer items (i.e., Enjoyment, Attractive Alternatives, Investments, and Commitment), individual subscale items were utilized as indicators for the respective latent variables. To reduce the number of parameters to be estimated for the lengthier Social Support, Appearance, Importance of PA, and Social Cohesion measures, item parcels were used as indicators for these latent variables. Parcels were created using theoretically- and empirically-based rationale (22). For the Social Support variable, each Family Support item was paired with a similarly worded Peer Support item to create an item parcel. For both the 6-item Appearance and 6-item Importance of PA subscales, the three subscale items with the highest loadings from the EFA were selected to anchor the parcels and were successively paired with items with the lowest loadings to spread the influence of the primary factor (22, 35). Item parcels for Social Cohesion were created using a similar highest/lowest pairing, with the added requirement that each parcel be comprised of an Attraction to Group and Group Integration subscale item. This strategy was utilized to eliminate potential GEQ subscale effects. All of the indicators met the criteria for normal data; standardized values for skewness were $< |3.0|$ and kurtosis were $< |8.0|$ (31).

Structural covariance modeling results indicated the measurement model was a good fit to the data given the satisfactory global fit indices (chi-square (369) = 711.19 $p < 0.05$; RMSEA = 0.05 [90% CI = 0.05 - 0.06]; SRMR = 0.05; NNFI = 0.97; IFI = 0.97; CFI = 0.97) and the moderate-to-strong standardized parameter loadings (see Table 2).

Global fit indices suggested that the first hypothesized model (see Figure 3) was an acceptable fit to the data (chi-square (377) = 782.54 $p < 0.05$; RMSEA = 0.055 [90% CI = 0.050 - 0.061]; SRMR = 0.058; NNFI = 0.96; IFI = 0.97; CFI = 0.97). In the structural portion of the model, significant direct relationships were observed (see Table 3 and Figure 3), with enjoyment and investments emerging as the strongest predictors of commitment to soccer. The importance of PA to one's sense of self was also positively predictive of commitment, but the desire to maintain an athletic appearance was negatively related to commitment. The perceived attractiveness of alternative activities, social support, and social cohesion were not significantly associated with commitment. A weak, but significant, relationship was observed between commitment and MVPA. Enjoyment and investments were indirectly associated with MVPA through commitment. According to these findings, when players highly enjoyed soccer and invested more resources into participation, they expressed a greater intent to continue playing soccer and, in turn, engaged in higher levels of MVPA. Effect sizes (R^2) indicated that the model explained a large amount of variance in commitment (80%) and a small amount of variance in MVPA (1%) (14).

SEM techniques were utilized to test the fit and structural paths of the second hypothesized model (see Figure 4), which posited the AI variables (athletic appearance and importance of PA) as mediators between commitment and MVPA. Fit statistics suggested that Model 2 was

also a good fit to the data (chi-square (387) = 765.69 $p < 0.05$; RMSEA = 0.053 [90% CI = 0.047 - 0.058]; SRMR = 0.063; NNFI = 0.97; IFI = 0.97; CFI = 0.97).

Table 2. Completely standardized factor loadings

Parcel/Item	Latent variable	Factor loading	Uniqueness
ENJ1	Enjoyment	0.73 ^a	0.47
ENJ6	Enjoyment	0.71	0.50
ENJ11	Enjoyment	0.77	0.40
ENJ15	Enjoyment	0.75	0.44
ALT3	Attractive alternatives	0.77 ^a	0.41
ALT8	Attractive alternatives	0.73	0.47
ALT22	Attractive alternatives	0.64	0.58
INV4	Investments	0.87 ^a	0.25
INV9	Investments	0.82	0.32
INV13	Investments	0.90	0.19
INV17	Investments	0.55	0.70
SUPP1_7	Social support	0.73 ^a	0.47
SUPP4_9	Social Support	0.98	0.05
SUPP6_3	Social Support	0.72	0.47
APP10_5	Appearance	0.93 ^a	0.14
APP3_1	Appearance	0.84	0.30
APP12_9	Appearance	0.81	0.35
IMP2_7	Importance of PA	0.83 ^a	0.31
IMP6_8	Importance of PA	0.84	0.29
IMP11_4	Importance of PA	0.82	0.33
SOC2_6	Social cohesion	0.77 ^a	0.40
SOC3_5	Social cohesion	0.84	0.29
SOC9_7	Social cohesion	0.68	0.54
SOC4_8	Social cohesion	0.72	0.48
COM5	Commitment	0.83 ^a	0.31
COM10	Commitment	0.74	0.45
COM14	Commitment	0.88	0.22
COM19	Commitment	0.71	0.50
COM24	Commitment	0.65	0.57
MVPA	Minutes of MVPA	1.00 ^a	--

All loadings were significant, $t > |1.96|$.

^a Unstandardized factor loading was fixed to a value of 1.0.

An examination of Model 2's structural paths identified several significant direct and indirect relationships (see Table 3 and Figure 4). Similar to Model 1, attractive alternatives, social support, and social cohesion did not significantly predict commitment. Likewise, enjoyment and investments emerged as significant and positive predictors of commitment. Commitment to soccer was positively related to appearance and importance of PA. Whereas PA importance emerged as a strong positive predictor of MVPA, the relationship between appearance and MVPA was non-significant. Thus, we used bootstrapping to further examine PA importance as a mediator. This analysis confirmed that PA importance mediated the relationship between soccer commitment and MVPA ($ab = 24.62$, CI = 13.77, 38.70). Additionally, the direct relationship between soccer commitment and MVPA became non-significant when controlling for PA importance ($c = 9.38$, CI = -15.97, 34.73), suggesting full mediation.

Table 3. Completely standardized path coefficients for direct and indirect effects

Direct relationships	Coefficient	<i>t</i>	Indirect relationships	Coefficient	<i>t</i>
<i>Model 1</i>					
Enjoyment → Commitment	0.45	7.39	Enjoyment → MVPA	0.05	2.04
Alternatives → Commitment	-0.08	-1.92	Alternatives → MVPA	-0.01	-1.42
Investments → Commitment	0.49	8.57	Investments → MVPA	0.06	2.06
Social support → Commitment	0.04	0.98	Social support → MVPA	0.00	0.89
Appearance → Commitment	-0.11	-2.53	Appearance → MVPA	-0.01	-1.63
PA Importance → Commitment	0.11	2.30	PA Importance → MVPA	0.01	1.56
Social cohesion → Commitment	-0.02	-0.55	Social cohesion → MVPA	0.00	-0.53
Commitment → MVPA	0.12	2.11			
<i>Model 2</i>					
Enjoyment → Commitment	0.46	7.48	Enjoyment → Appearance	0.09	2.99
Alternatives → Commitment	-0.06	-1.47	Enjoyment → PA Importance	0.14	4.30
Investments → Commitment	0.50	8.73	Enjoyment → MVPA	0.05	3.72
Social support → Commitment	0.03	0.93	Alternatives → Appearance	-0.01	-1.34
Social cohesion → Commitment	0.01	0.19	Alternatives → PA Importance	-0.02	-1.41
Commitment → Appearance	0.19	3.22	Alternatives → MVPA	-0.01	-1.39
Commitment → PA Importance	0.30	5.06	Investments → Appearance	0.09	3.06
Appearance → MVPA	-0.07	-1.01	Investments → PA Importance	0.15	4.51
PA Importance → MVPA	0.44	6.46	Investments → MVPA	0.06	3.85
			Social support → Appearance	0.01	0.89
			Social support → PA Importance	0.01	0.91
			Social support → MVPA	0.00	0.91
			Social cohesion → Appearance	0.00	0.19
			Social cohesion → PA Importance	0.00	0.19
			Social cohesion → MVPA	0.00	0.19
			Commitment → MVPA	0.12	4.18

t values > |1.96| are significant ($p < .05$) and in boldface.

According to Model 2's significant pathways, soccer players who reported higher levels of enjoyment and investments expressed higher levels of commitment to soccer, rated athletic appearance and engagement in PA as important aspects of their identity, and engaged in higher levels of MVPA. These findings suggest that the positive impact of enjoyment, investments, and soccer commitment on levels of MVPA could be explained partly through the increased importance of being physically active to players' self-identity. Finally, Model 2 explained a large amount of variance in commitment (80%), a medium amount of variance in importance of PA (9%) and weekly minutes of MVPA (17%), and a small amount of variance in athletic appearance (3%).

To compare the fit of Model 1 to Model 2, we contrasted fit indices for non-nested models. Smaller values for these indices were interpreted to indicate better relative fit. A comparison of Model 1 fit indices (AIC = 958.54; CAIC = 1386.54; ECVI = 2.73; RMSEA = 0.060 [90% CI =

0.050 - 0.061]) to Model 2 fit indices (AIC = 921.69; CAIC = 1301.05; ECVI = 2.63; RMSEA = 0.053 [90% CI = 0.047 - 0.058]) indicated Model 2 was a more acceptable fit to the data. Thus, the positive relationship between psychological commitment to soccer and behavioral commitment to MVPA was mediated by the importance of PA to one's self-identity

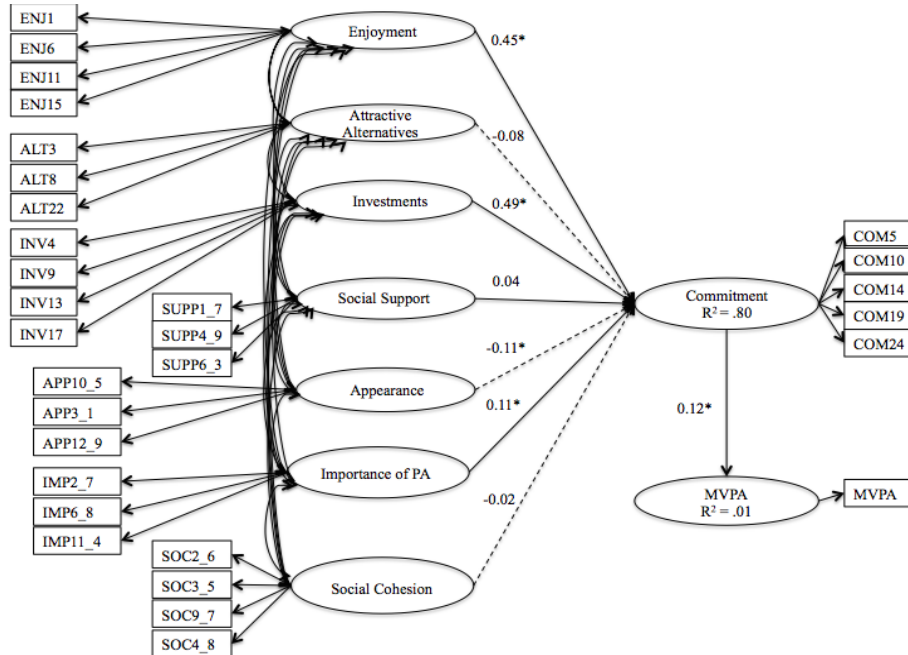


Figure 3. Model 1 with standardized path coefficients. Dashed lines represent negative relationships and solid lines represent positive relationships. Asterisks denote significant relationships ($p < 0.05$).

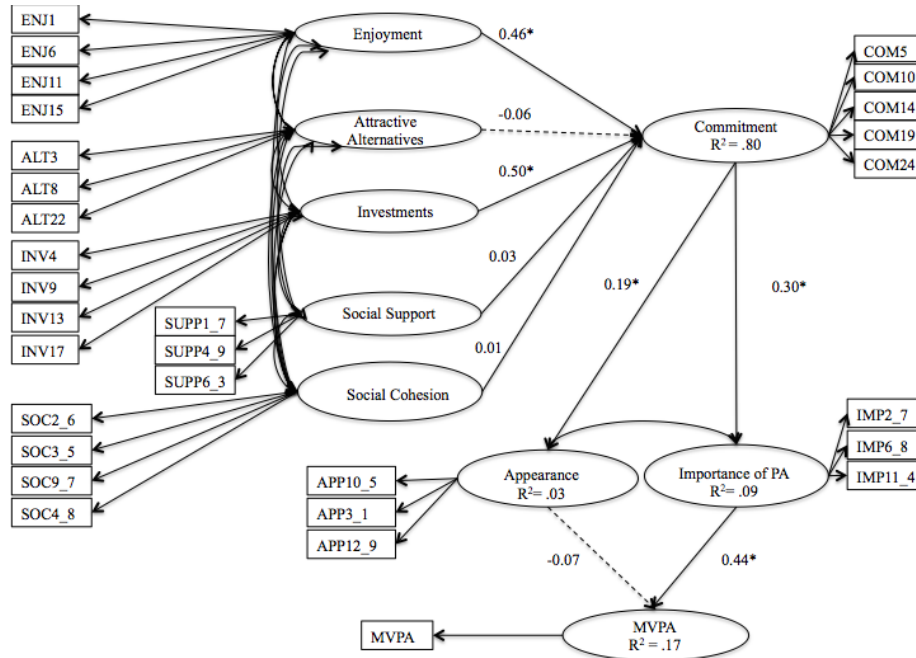


Figure 4. Model 2 with standardized path coefficients. Dashed lines represent negative relationships and solid lines represent positive relationships. Asterisks denote significant relationships ($p < 0.05$).

DISCUSSION

The results of the present study partially support the use of an expanded sport commitment model (SCM) to understand adult recreational athletes' motives for on-going participation in soccer and MVPA. The hypothesized predictor variables accounted for a large amount of the variance in commitment (80%), with enjoyment and investments emerging as strong, positive predictors of soccer commitment. Players who had more fun playing soccer and who had invested more time, money, effort, and energy into participation had a greater desire to continue playing. The hypothesized relationship between players' level of soccer commitment and their participation in MVPA was best explained through a mediational model. Whereas the model that specified a direct relationship between commitment and MVPA only accounted for 1% of the variance in weekly minutes of MVPA, the model that posited athletic identity as a mediator between commitment and MVPA explained 17% of the variance in MVPA. According to this model, commitment to soccer was positively related to the degree to which players viewed PA as an important part of their identity and their self-reported participation in MVPA.

Consistent with previous SCM studies involving adult samples, several hypothesized antecedents of commitment (i.e., involvement opportunities, attractive alternatives, social support, and social cohesion) failed to significantly explain players' psychological resolve to remain involved in soccer (15, 63, 64). These findings provide preliminary support for Scanlan and colleagues' suggestion that the salience of commitment constructs differ as a function of developmental factors and level of competition (42). Similar to our study, Casper et al. observed adult tennis players' commitment to tennis was not diminished by alternative activities (12). Because adult recreational sport leagues are less time intensive than youth sports and elite athletics, participants may not perceive their sport participation to conflict with their ability to engage in alternative activities. For recreational athletes, their voluntary participation in sport may be a valued and enjoyable escape from other priorities.

In regard to the lack of support for the social constructs (i.e., social support and cohesion), social support may be more salient for sport commitment among youth than among adult athletes. Whereas youth require instrumental and esteem support from parents and coaches (e.g., reward effort and progress, provide encouragement, pay league fees, buy equipment, and transport youth to practices and games), adults are more independent. For example, adult athletes in one study stated that although they appreciated social support, other variables were more important to their commitment (45). Other studies with adult tennis players and exercisers have not found social support to play a significant role in commitment (12, 63). The lack of support for social cohesion in the model may be due to a number of factors. It is possible that although social cohesion did not predict commitment to soccer per se, it might play a role in players' commitment to continue playing with a particular team (11, 26). Furthermore, other team-related variables (e.g., task cohesion) may be more important for commitment than social cohesion. For example, Scanlan et al. reported that elite rugby and netball players' sport commitment was influenced by desires to uphold team traditions of

excellence, leave a legacy through elite team membership, and prove their worth as team members (46). Although the present sample was not elite, similar feelings may also impact recreational athletes' commitment to remain on teams that are successful or have been together for multiple seasons.

The emergence of enjoyment and investments as the only significant SCM predictor variables also supports Williams' observation that Rusbult's original investment model is a more parsimonious framework for understanding sport/PA commitment (62). A synthesis of our findings with Gabriele et al. and Wilson et al. suggests that in order to encourage adult recreational athletes to increase or maintain their PA involvement, it is best to facilitate sport commitment through the provision of enjoyable experiences and by reminding participants of the "non-refundable" resources (e.g., effort and time) they have invested into the activity (18, 63). In contrast with these two studies, the current study did not assess obligatory versus attraction-based dimensions of commitment (18, 63). We assumed that commitment to an adult recreational sport would be more volitional than obligatory in nature. This assumption was corroborated by the predictive strength of enjoyment and investments, the uniformly high levels of commitment and enjoyment, and the finding that other priorities did not significantly detract from commitment.

The current study demonstrates that the psychological desire to remain involved in a recreational sport is related to participants' levels of MVPA. Previous studies reported positive links between exercise commitment and MVPA and between sport commitment and sport-related behaviors (12, 18, 60, 63). However, to our knowledge, this is the first time that the SCM has been utilized to contend that psychosocial predictors of adult recreational sport commitment are related to participation in health-enhancing MVPA. Furthermore, although previous applications of the sport commitment and investment models specified a direct relationship between psychological commitment and behavioral outcomes, a comparison of models within the current study found that this relationship was best explained through a mediational model. This mediational model, which incorporates tenets of identity theory and the physical activity self-definition model, proposes that commitment to a sport increases the importance of PA to one's sense of self. Thus, committed individuals are potentially motivated to participate in PA behaviors that re-affirm and strengthen identification with the physically active/athletic role (6, 53). Further support for identity as a mediator between commitment and MVPA comes from Kendzierski and colleagues' work on PA self-definitions, which contends that commitment to a sport or exercise activity is a prerequisite for identification with a PA-related role (29, 30). In the present study, soccer commitment explained a medium amount of variance (9%) in the perceived importance of PA to one's self-identity.

Although these findings suggest that adult recreational soccer players' psychological commitment to soccer was related to their PA behaviors, the cross-sectional nature of the current study limits the ability to infer cause-and-effect relationships. Longitudinal studies are needed to establish the temporal nature of the relationships between model constructs. Furthermore, because our sample was comprised of highly active and committed players

currently involved in soccer, our results shed little light on how active these individuals were prior to joining the league and do not capture the experiences of players who discontinued their involvement. Future longitudinal studies with this population should examine commitment from a multi-dimensional perspective (e.g., attraction-based/ “want to” commitment versus obligatory/“have to” commitment) and assess constructs such as social constraints, burnout, and injury to understand retirement from adult recreational sports. Given the present study’s observation that enjoyment and investments were most strongly related to commitment, research should examine factors that negatively impact these constructs, and whether lower levels lead to retirement. This research should also examine whether sport retirement leads to decreases in MVPA, or if sport is replaced by alternative physical activities. Finally, the self-report MVPA measure did not clearly delineate between time spent in soccer and other activities. Future studies should utilize objective PA measures in conjunction with more detailed self-report measures.

Lastly, we only measured social cohesion, which is just one aspect of team dynamics. Future studies should investigate whether task cohesion and other aspects of team dynamics, such as social status and feelings of pride associated with team traditions and team membership, affect team sport commitment (9, 46). Furthermore, cohesion may be more salient for participants’ commitment to specific teams, rather than to the sport of soccer. A recent investigation with adolescent team sport participants found that both social and task cohesion were positively correlated with commitment to their teams, satisfaction with team performance, and intentions to not only keep playing on the same team, but to continue playing their sport (26). These findings suggest the utility of measuring predictors of both *sport* commitment and *team* commitment to understand the motives underlying on-going participation in adult recreational team sports.

Given the complex relationship that exists between identity and role-related behaviors, future SCM research should examine whether AI moderates the relationships between SCM variables, and whether there is a direct feedback loop between AI and sport commitment. Furthermore, researchers should use measures that make a clearer distinction between athletic identity and exercise identity to foster a greater understanding of recreational athletes’ sport commitment and PA motives.

Within the present investigation, it was found that participants in an adult recreational soccer league were highly active, with 89% of players reporting at least 150 minutes of MVPA per week. Although it is likely that many participants were already active outside of soccer, there may also be participants who found team sports to be more motivating and enjoyable than solitary exercise. Thus, future researchers should examine adult sport participants’ motives and enjoyment of various physical activities, and explore strategies for making exercise as “fun” as sports. Furthermore, researchers should examine whether regular participation in a fitness regimen prevents sport-related injuries and prolongs sport involvement of adult recreational sport participants. These findings should resonate among players who want to be

injury-free and healthy as they age, perhaps encouraging them to increase and prolong their involvement in sport and other forms of MVPA.

These results have practical implications for directors of adult recreational sport leagues. To strengthen players' commitment to leagues, league directors should focus on ways to maximize player enjoyment and awareness of investments. For example, leagues could offer different divisions for a wide range of age groups (e.g., Over-35) and competition levels (e.g., competitive and recreational), organize charity tournaments, sponsor league outings to professional sporting events and entertainment venues, and provide league t-shirts and memorabilia. These strategies would further reinforce players' athletic identities.

The current findings provide partial support for the use of an expanded sport commitment model to understand adults' motives for on-going participation in recreational soccer. Greater support was found for an investment model of commitment in which higher levels of enjoyment and investments positively influenced individuals' resolve to remain involved in soccer. These findings align with Williams' proposal that Rusbult's original investment model constructs are the most salient predictors of sport commitment (39, 40, 62). Our results provide compelling evidence that the relationship between psychological commitment to soccer and participation in MVPA is partly explained through the importance of PA to players' sense of self. More research is needed to understand the processes underlying long-term commitment to adult sport leagues.

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REFERENCES

1. Allender S, Cowbum G, Foster C. Understanding participation in sport and physical activity among children and adults: A review of qualitative studies. *Health Educ Res* 21(6): 826-835, 2006.
2. Anderson CB. Athletic identity and its relation to exercise behavior: Scale development and initial validation. *J Sport Exerc Psychol* 26: 39-56, 2004.
3. Anderson CB, Mâsse LC, Zhang H, Coleman KJ, Chang S. (2009). Contribution of athletic identity to child and adolescent physical activity. *Am J Prev Med* 37(3): 220-226, 2009.
4. Baker J, Horton S, Weir P, ed. *The masters athlete*. New York, NY: Routledge; 2010.
5. Baysden MF, Brewer BW, Petitpas AJ, Van Raalte JL. Motivational correlates of athletic identity. Paper presented at the Annual Meeting of the Association for the Advancement of Applied Sport Psychology, San Diego, CA, 1997.

6. Burke PJ, Reitzes DC. An identity theory approach to commitment. *Soc Psychol Q* 54(3): 239-251, 1991.
7. Carpenter PJ, Scanlan TK, Simons JP, Lobel M. A test of the sport commitment model using structural equation modeling. *J Sport Exerc Psychol* 15: 119-133, 1993.
8. Carron AV, Colman MM, Wheeler J, Stevens D. Cohesion and performance in sport: A meta analysis. *J Sport Exerc Psychol* 24: 168-188, 2002.
9. Carron AV, Widmeyer WN, Brawley LR. The development of an instrument to assess cohesion in sport teams: The group environment questionnaire. *J Sport Psychol* 7: 244-246, 1985.
10. Carron AV, Widmeyer WN, Brawley LR. The measurement of cohesiveness in sport groups. In: Duda JL, ed. *Advances in sport and exercise psychology measurement*. Morgantown, WV: Fitness Information Technology, 213-226; 1998.
11. Carron AV, Widmeyer WN, Brawley LR. Group cohesion and individual adherence to physical activity. *J Sport Exerc Psychol* 10(2): 127-138, 2002.
12. Casper JM, Gray DP, Babkes Stellino M. A sport commitment model perspective on adult tennis players' participation frequency and purchase intention. *Sport Management Review* 10: 253-278, 2007.
13. Cattell RB. *The scientific use of factor analysis*. New York: Plenum Press; 1978.
14. Cohen J. *Statistical power analysis for the behavioral sciences*, 2nd ed. Hillsdale, NJ: Lawrence Erlbaum; 1988.
15. Crocker PRE, Augaitis L. Commitment to age class adult triathletes: Examining gender differences in the sport commitment model. *IJSEP* 41: 177-194, 2010.
16. Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika* 16: 234-297, 1951.
17. Edgett BA, Ross JED, Green AE, MacMillan NJ, Milne KJ, Gurd BJ. The effects of recreational sport on VO_{2peak} , VO_2 kinetics and submaximal exercise performance in males and females. *Eur J Appl Physiol* 113: 259-266, 2013.
18. Gabriele JM, Gill DL, Adams CE. The roles of want to commitment and have to commitment in explaining physical activity behavior. *J Phys Act Health* 8: 420-428, 2011.
19. Godin G, Shephard RJ. A simple method to assess exercise behavior in the community. *Can J Appl Sport Sci* 10: 141-146, 1985.
20. Hagiwara G, Isogai H. Athletic identity and social supports in relation to formation of sports commitment. *Journal of Japan Society of Sports Industry* 23(4): 227-239, 2013.
21. Hagiwara G, Isogai H. Relationships between athletic identity and sport commitment linked to sport involvement. *ICCSPE Bull* 67: 91-99, 2014.
22. Hall, RJ, Snell AF, Foust MS. Item parceling strategies in SEM: Investigating the subtle effects of unmodeled secondary constructs. *ORM* 2: 233-256, 1999.
23. Ham SA, Kruger J, Tudor-Locke C. Participation by US adults in sports, exercise, and recreational physical activities. *J Phys Act Health* 6: 6-14, 2009.

24. Horton RS, Mack DE. Athletic identity in marathon runners: Functional focus or dysfunctional commitment? *J Sport Behav* 23(2): 101-119, 2000.
25. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equ Modeling* 6: 1-55, 1999.
26. Jackson B, Gucciardi DF, Dimmock JA. Toward a multi-dimensional model of athletes' commitment to coach-athlete relationships and interdependent sport teams: A substantive-methodological synergy. *J Sport Exerc Psychol* 36: 52-66, 2014.
27. Jackson DL. Revisiting sample size and number of parameter estimates: Some support for the N:q hypothesis. *Struct Equ Modeling* 10(1): 128-141, 2003.
28. Joubert YT, De Beer J. Benefits of team sport for organisations. *SAJR SPER* 33(3): 59-72, 2011.
29. Kendzierski D, Furr RM, Schiavoni J. Physical activity self-definitions: Correlates and perceived criteria. *J Sport Exerc Psychol* 20: 176-193, 1998.
30. Kendzierski D, Morganstein MS. Test, revision, and cross-validation of the physical activity self-definition model. *J Sport Exerc Psychol* 31: 484-504, 2009.
31. Kline RB. Principles and practice of structural equation modeling, 3rd ed. New York: Guilford Press; 2011.
32. Krstrup P, Aagaard, P, Nybo L, Petersen J, Mohr M, Bangsbo J. Recreational football as a health promoting activity: A topical review. *Scand J Med Sci Sports* 20(S1): 1-13, 2010.
33. Leveto JA. Happiness and identity theory. In: Stets JE, Serpe RT, eds. *New directions in identity theory and research*. New York: Oxford University Press; 2016.
34. Lim SY, Warner S, Dixon M, Berg B, Kim C, Newhouse-Bailty M. Sport participation across national contexts: A multilevel investigation of individual and systemic influences on adult sport participation. *Euro Sport Manag Q* 11(3): 197-224, 2011.
35. Little TD, Cunningham WA, Shahar G. To parcel or not to parcel: Exploring the question, weighing the merits. *Struct Equ Modeling* 9(2): 151-173, 2002.
36. Maruyama GM. *Basics of structural equation modeling*. Thousand Oaks, CA: Sage; 1998.
37. Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav Res Methods* 40: 879-891, 2008.
38. Priest N, Armstrong R, Doyle J, Waters E. Interventions implemented through sporting organisations for increasing participation in sport (review). *Cochrane Database Syst Rev* 3: CD004812. DOI: 10.1002/14651858.CD004812.pub3, 2008.
39. Rusbult CE. Commitment and satisfaction in romantic associations: A test of the investment model. *J Exp Soc Psychol* 16(2): 172-186, 1980.
40. Rusbult CE. A longitudinal test of the investment model: The development (and deterioration) of satisfaction and commitment in heterosexual involvements. *J Pers Soc Psychol* 45: 101-117, 1983.

41. Ryan RM, Deci EL. Self-determination and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol* 55: 68-78, 2000.
42. Scanlan TK, Carpenter PJ, Schmidt GW, Simons JP, Keeler B. An introduction to the sport commitment model. *J Sport Exerc Psychol* 15:1-15, 1993.
43. Scanlan TK, Carpenter PJ, Simons JP, Schmidt GW, Keeler B. The sport commitment model: Measurement development for the youth sport domain. *J Sport Exerc Psychol* 15: 16-38, 1993.
44. Scanlan TK, Russell DG, Beals KP, Scanlan LA (2003). Project on elite athlete commitment (PEAK): II. A direct test and expansion of the sport commitment model with elite amateur sportsmen. *J Sport Exerc Psychol* 25: 377-401, 2003.
45. Scanlan TK, Russell DG, Magyar TM, Scanlan LA. Project on elite athlete commitment (PEAK): III. An examination of the external validity across gender, and the expansion and clarification of the sport commitment model. *J Sport Exerc Psychol* 31: 685-705, 2009.
46. Scanlan TK, Russell DG, Scanlan LA, Klunchoo TJ, Chow GM. Project on elite athlete commitment (PEAK): IV. Identification of new candidate commitment sources in the sport commitment model. *J Sport Exerc Psychol* 35: 525-535, 2013.
47. Serpe RT. Stability and change in self: A structural symbolic interactionist explanation. *Soc Psychol Q*, 50: 44-55, 1987.
48. Spink KS. Cohesion and intention to participate of female sport team athletes. *J Sport Exerc Psychol* 17: 416-427, 1995.
50. Stets JE, Burke PJ. Identity theory and social identity theory. *Soc Psychol Q* 63: 224-237, 2000.
49. Strachan SM, Woodgate J, Brawley LR, Tse A. The relationship of self-efficacy and self-identity to long-term maintenance of vigorous physical activity. *J Appl Biobehav Res* 10(2): 98-112, 2005.
51. Stryker S. Symbolic interactionism: A social structural version. Menlo Park, CA: Benjamin/ Cummings; 1980.
52. Stryker S, Burke PJ. The past, present, and future of an identity theory. *Soc Psychol Q* 63(4): 284-297, 2000.
53. Stryker S, Serpe RT. Identity salience and psychological centrality: Equivalent, overlapping, or complementary concepts. *Soc Psychol Q* 57(1): 16-35, 1994.
54. Terry PC, Carron AV, Pink MJ, Lane AM, Jones GJW, Hall MP. Perceptions of group cohesion and mood in sport teams. *Group Dyn* 4(3): 244-253, 2008.
55. Troiano RP, Berrigan D, Dodd KW, Masse LC, Tilert T, McDowell M. Physical activity in the United States measured by accelerometer. *Med Sci Sports Exerc* 40: 181-188, 2008.
56. Tucker JM, Welk GJ, Beyler NK. Physical activity in U.S. adults: Compliance with the Physical Activity Guidelines for Americans. *Am J Prev Med* 40(4): 454-461, 2011.
57. United States Adult Soccer Association. 2015 Registration. Registration Stats. July, 2016. http://assets.ngin.com/attachments/document/0044/2053/USASA_Reg_July_2016.pdf. Accessed on September 10, 2016.

58. U.S. Department of Health and Human Services. 2008 Physical Activity Guidelines for Americans: Be active, healthy, and happy! Washington, DC, 2008. <http://health.gov/paguidelines/guidelines/default.aspx> Accessed on September 10, 2012.
59. Weiss WM, Weiss MR. Sport commitment among competitive female gymnasts: A developmental perspective. *Res Q Exerc Sport* 78(2): 90-102, 2007.
60. Weiss WM, Weiss MR, Amorose AJ. Sport commitment among competitive female athletes: Test of an expanded model. *J Sport Sci* 28(4): 423-434, 2010.
61. Westland JC. Lower bounds on sample size in structural equation modeling. *Electron Commer Res Appl* 9(6): 476-487, 2010.
62. Williams L. Commitment to sport and exercise: Re-examining the literature for a practical and parsimonious model. *J Prev Med Public Health* 46: S35-S42, 2013.
63. Wilson PM, Rodgers WM, Carpenter PJ, Hall C, Hardy J, Fraser SN. The relationship between commitment and exercise behavior. *Psychol Sport Exer* 5: 405-421, 2004.
64. Young BW, Medic N. Examining social influences on the sport commitment of Masters swimmers. *Psychol Sport Exerc* 12: 168-175, 2011.