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Top-down or button-up? The reciprocal longitudinal relationship between athletes' team satisfaction and life satisfaction

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Top-down or button-up? The reciprocal longitudinal relationship between athletes' team satisfaction and life satisfaction

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Abstract

The present study aims to explore the relationship between athletes' team satisfaction and their life satisfaction. Drawing on the top-down theory (i.e., overall satisfaction predicts domain satisfaction) and bottom-up theory (i.e., overall satisfaction is predicted by domain satisfaction) of subjective well-being, the authors propose that a reciprocal longitudinal relationship exists between athletes' team satisfaction and their life satisfaction. A three-wave longitudinal study is conducted with adolescent athletes from diverse sports. The results of latent difference score modeling support the hypothesis by showing a reciprocal longitudinal relationship between athletes' team satisfaction and their life satisfaction, but the effect from athletes' team satisfaction to life satisfaction is more consistent across waves. Implications, limitations, and future studies are discussed.

Keywords: subjective well-being, top-down, bottom-up, directionality.

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Life satisfaction represents the comparison between self-imposed standards and real conditions in one's overall life. The smaller the discrepancy, the more a person is satisfied with their life in general. To athletes, cultivating higher life satisfaction is a crucial topic because it is a key component in the attainment of positive mental health and is a determinant of many life outcomes, such as high social competence, self-efficacy, and internal locus of control (Proctor, Linley, & Maltby, 2009a, 2009b). Despite its importance, only a few studies to date have investigated athletes' life satisfaction (Chen, Chang, & Chang, 2015). So far, studies have indicated that athletes' individual attributes (e.g., maladaptive attachment styles; Felton & Jowett, 2015), affective traits (e.g., gratitude; Chen & Kee, 2008; Chen, Wu, & Chang, in press), coaches' style (Carpentier & Mageau, 2013) , and retirement planning (Stambulova, Stephan, & Jäphag, 2007) can determine athletes' life satisfaction.

These studies, however, neglected the role of the team in shaping athletes' life satisfaction. "Sport teams generally are characterized by frequent, affectively pleasant interactions among team members that occur in the context of a temporarily stable and enduring framework of affective concern" (Terry et al., 2000, p. 245). Moreover, sport teams are more than affective connections among numbers. Teammates also share common goals and values, and the numbers are interdependent in regard to accomplishing specific tasks (Weinberg & Gould, 2011). We suggest that satisfaction with the team is one of the most important aspects of athletes' life experience (Seifriz, Duda, & Chi, 1992) from two perspectives. First, satisfaction with the team to some extent represents the quality of the social interactions between the athlete and the whole team. Most sports are interdependent in nature, as athletes usually train together, play together, and even live together (Strachan, Cote, & Deakin, 2009). Even for those sports classified as coactive, such as archery, athletes also have a day-to-day relationship with teammates and coaches that shape their experiences relating to the team. Second, the degree of team satisfaction indirectly represents the extent to which one's performance reaches or fails to reach an expected level subjectively. As Riemer and Chelladurai (1998) claim, success evaluation based on competition wins and losses is not a reliable indicator of the effectiveness of an athletic enterprise because competition is often influenced by luck, teammates' mistakes, etc. In addition to absolute success, they suggest one also needs to consider the athletes' perceptions of goal attainment. In other words, athletes might lose a competition while being satisfied with their effort or teamwork.

The aim of this study is to examine the relationship between team satisfaction and life satisfaction. Based on the top-down and bottom-up theories of subjective well-being (Diener, 1984), we suggest that team satisfaction and overall life satisfaction shape each other reciprocally in a longitudinal process, as domain life satisfaction can influence and be influenced by overall life satisfaction over time (Dyrdal, Røysamb, Nes, & Vittersø, 2011; Schyns, 2001). We adopt a longitudinal design to examine their relationship. Athletes completed three waves of a survey within a six-month interval. We focus on adolescent athletes specifically because they are at a critical stage of life in terms of overall development (Arnett, 1999). Adolescent athletes devote a considerable amount of time to their sport, and serious sport involvement can be a very stressful experience for them. Therefore, discovering ways to make sport involvement and life more positive is a worthwhile endeavor. In the sections below, we elaborate upon our rationale in detail.

Top-down and bottom-up processes of satisfaction

The top-down process suggests that overall life satisfaction is a stable and stronger characteristic of individuals and that it generally affects the interpretative and judgmental tendencies when people have different encounters across domains (Headey, Veenhoven, & Wearing, 1991). In other words, domain satisfaction is seen as a consequence of the stable overall life satisfaction in specific events, contexts, and categories (Leonardi, Spazzafumo, Marcellini, & Gagliardi, 1999). The top-down effect of the general satisfaction domain has been supported by previous studies. For example, Schneider and Schimmack (2010) investigated pairs of participants (dating couples and friends) to collect both self-ratings and informant ratings of life satisfaction and five satisfaction domains (weather, family, health, academics, and friends) using a multi-method approach. They found that life satisfaction significantly accounted for the five domains of satisfaction. In addition, using data from a longitudinal survey of older people, Leonardi et al. (1999) also found that life satisfaction significantly predicted seven domains of satisfaction (health, leisure, mobility, economic situation, house, living area, and services).

In contrast, as the bottom-up pattern comes from a contextual perspective, only prior domain satisfaction predicts later overall life satisfaction. This is the model that is compared with the top-down model, which specifies that a lower level of domain satisfaction leads to a higher level of overall life satisfaction (Leonardi, Spazzafumo, & Marcellini, 2005; Schimmack, Diener, & Oishi, 2002; Schneider & Schimmack, 2010). According to the bottom-up approach, overall life satisfaction is accumulated from and builds its integrality with domain satisfaction in different domains derived from objective conditions (Leonardi et al., 2005; Schimmack et al., 2002). In one classic study, Lance, Lautenschlage, Sloan, and Varca (1989) surveyed the faculty at the University of Georgia and found that marital satisfaction significantly accounted for their life satisfaction. On the other hand, life satisfaction did not predict marital satisfaction. In addition, using data from a national probability sample of the Dutch population, Scherpenzeel and Saris (1996) found that satisfaction with housing, the financial situation of the household, and social contact predicted life satisfaction, while the reverse direction was not found in one of the databases used. This evidence provides support for the bottom-up process.

It should be noted, however, that top-down and bottom-up processes might be bidirectional, which suggests that they influence each other (Diener, 1984). In other words, later overall life satisfaction could be predicted by previous domain satisfaction and vice versa. Therefore, the reciprocal relationship highlights the importance of stable dispositional influences on domain-specific satisfaction and the impact of each facet of life satisfaction on overall life satisfaction (Headey et al., 1991; Lance et al., 1989). Supporting this perspective, the longitudinal Norwegian Mother and Child Cohort Study investigated pregnant women's life satisfaction and relationship satisfaction at 6 months (during pregnancy) and 36 months (postpartum) (Dyrdal et al., 2011). Although relationship satisfaction predicted changes in life satisfaction more than life satisfaction predicted changes in relationship satisfaction during pregnancy, the results demonstrated a reciprocal relationship, which corresponded with the findings of several previous studies (e.g., Lance et al., 1989; Nakazato, Schimmack, & Oishi, 2011; Schyns, 2001).

Reciprocal relationship between team satisfaction and life satisfaction

To date, no investigation has been conducted to examine the directionality of the relationship between team satisfaction and life satisfaction. It might be due to the tradition in sports of pursuing achievement, rather than the cultivation of well-being. However, clarifying the directionality is critical because practitioners could understand which one should be enhanced first. In this regard, an effective intervention to enhance athletes' well-being becomes possible.

Although the relationship between domain-specific satisfaction and overall life satisfaction does not seem to be identical, we reason that the relationship between athletes' team satisfaction and life satisfaction might be reciprocal. The reciprocal assumption was founded upon the statement that overall life satisfaction and general life evaluation are shaped by and developed from an individual's life experience, while domain-specific satisfaction is at least partially determined by disposition (Diener, 1984; Headey et al., 1991). The bottom-up approach suggests that athletes' judgments about whether their life is happy involve the mental calculation of the sum of momentary experiences of pleasure. For example, a baseball player might feel satisfied if he pitches well, even if he ultimately loses the game. Furthermore, Diener (1984) suggested that a person would develop an optimistic outlook to carefully accumulate positive experiences that enhances life satisfaction, which is indirectly supported by empirical research (Wu, Tsai, & Chen, 2009). From this reductionist view, thus, athletes' overall life satisfaction is an accumulation of momentary pleasurable experiences in sports. On the other hand, overall life satisfaction represents a stable propensity to experience all things in a positive way. Furthermore, this propensity influences the momentary experiences of pleasure that an individual has in the world. This perspective suggests that athletes enjoy pleasure because they are happy, not dependent upon external circumstances. Thus, athletes' team satisfaction will develop from the positive bias that occurs repeatedly.

In the current research context, sport is a highly competitive context. Athletes work closely with their team to experience positive and negative events in daily life repeatedly. Thus, those momentary experiences boost life satisfaction over time. On the other hand, it should be noted that a stable level of life satisfaction also determines the degree of one's satisfaction within a specific context. Previous research in similarly competitive conditions such as the workplace found that job satisfaction and life satisfaction have a reciprocal relationship (Lance et al., 1989), which indirectly supports our hypothesis. Specifically, we propose that higher life satisfaction will lead athletes to increase their team satisfaction over time. At the same time, we also expect that higher team satisfaction will lead athletes to increase their life satisfaction over time.

Method

Participants and procedure

Adolescent athletes participated in an ongoing longitudinal study supervised by one of the authors[1]. The first wave of data collection involved 459 athletes (203 females, 256 males) who were recruited from diverse sports (swimming, track and field, baseball, judo, basketball, volleyball, softball, archery, and cycling) and ranged in age from 12 to 20 years, with a mean age of 16.14 (*SD* = .84). After three and six months, the second and third waves of data were collected, respectively. Questionnaires were administered to these athletes in classrooms before practice. Athletes' confidentiality and anonymity were ensured. They were rewarded with 100 New Taiwan dollars at each wave of data collection to increase the response rate.

In addition, participants were chosen based on the following criteria. Participants provided demographic data, such as their gender and age, for inclusion as control variables in our model to predict latent change variables. Attrition was high because some of the athletes graduated from their high schools before the second wave of data collection or did not fill out the questionnaire completely.

Measurements

Satisfaction with Life Scale. The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) is a self-report measure of global life satisfaction with 5 items. Its validity and reliability have been supported (Erdogan, Bauer, Truxillo, & Mansfield, 2012; Pavot

& Diener, 1993; Proctor et al., 2009b). In addition, the SWLS-Taiwan version has been found to correlate with appropriate criterion measures (See Chen, Ye, Chen, & Tung, 2010; Lin, 2013; Wu, Chen, & Tsai, 2009a), and gender and time invariance have been demonstrated (Wu, Chen, & Tsai, 2009b; Wu & Yao, 2006), all of which support its validity and reliability. Sample items are "The conditions of life are excellent" and "I am satisfied with my life". Participants indicated their responses on a 6-point Likert scale, with responses ranging from *strongly disagree* (1) to *strongly agree* (6). In this study, the reliability coefficients were .79, .74, and .73 at the three different time points, respectively. Additionally, we used three confirmatory factor analyses at the three time points to assess the validity of the SWLS. The results indicated that the data fit well with a single factor (see Table 2).

Team Satisfaction Scale. The Chinese version of the Team Satisfaction Scale (TS; 3 items), originally developed by Walling, Duda, and Chi (1993), was used to assess athletes' perceived team satisfaction. The Team Satisfaction Scale was translated from English to Chinese, and its reliability has been reported by its translators, with a reported Cronbach's alpha of .83 (Huang & Chi, 1994). Sample items include "I'm very glad that I have played on this team this year" and "I am proud of being a team number". The Chinese version of the Team Satisfaction Scale has been widely adopted in research involving Taiwanese people and has been deemed a reliable tool, according to previous studies (Chen, Tsai, & Chen, 2004; Li, 2003). Participants indicated their responses on a 6-point Likert scale, with responses ranging from *strongly disagree* (1) to *strongly agree* (6). The internal consistency was .84, .85, and .86 at the three different time points, respectively. We did not use a CFA model to test the factor structure of the team satisfaction scale, because a CFA model consisting of three items is a just-identified model, which does not provide information for model testing.

Analytic Strategy

First, we examined the longitudinal invariance of the SWLS and TS to ensure that the change phenomena captured in this study related to the changes in constructs (Golembiewski, Billingsley, & Yeager, 1976). There are several levels of longitudinal invariance (Chan, 1998; Meredith, 1993; Vandenberg & Lance, 2000). The first level is configural invariance (Model 1). It requires the same item to be associated with the same factor at each measurement occasion. After establishing configural invariance, the second level is weak invariance (Model 2). It includes factor loadings that are constrained to be equal across time points to test the invariance of the factor loadings. Based on the weak invariance model, the third level is strong invariance (Model 3). It indicates that intercepts are constrained to be equal across time points. In addition, for tests of longitudinal invariance, in addition to the chi-square differences between pairs of nested invariance models (Chan, 1998), we also adopted the difference in CFI, which is increasingly recommended in invariance testing ((ΔCFI; values $\leqq$ 0.01 indicate invariant; Cheung & Rensvold, 2002) because the chi-square difference is sensitive to sample size. Therefore, measurement invariance was estimated using configural, weak, strong, and strict invariance in the current study, allowing us to provide an unambiguous interpretation of change (Chan, 1998).

Second, because our goal was to understand whether athletes' TS shapes their SWLS over time and vice versa, we used latent difference score modeling (LDSM; McArdle, 2009) for the data analysis. LDSM focuses on within-individual change of variables between adjacent time points and individual differences in such within-individual change, enabling us to examine the development of and changes in TS and SWLS for each individual (Grimm, An, McArdle, Zonderman, & Resnick, 2012; Selig & Preacher, 2009). For example, an LDSM approach creates latent difference scores between variables measured at adjacent time points and then examines how variables measured at previous time points (e.g., TS and SWLS at Time 1) can shape within-individual changes over two adjacent time points (e.g., changes in TS and SWLS from Time 2 to Time 3). An LDSM approach is more appropriate than a cross-lagged modeling (CLM) approach for our research purpose because CLM does not consider changes occurring at the individual level or individual differences around within-individual change. Although a latent growth curve modeling (LGCM) approach also focuses on within-individual change and individual differences in such within-individual change, an LDSM approach is preferred because it considers changes between adjacent time points.

Third, all models were estimated using Mplus (Muthen & Muthen, 2010). Given the non-normality of the data and missing data, we used maximum likelihood estimation to produce covariance matrices with robust standard errors (the MLR estimator in Mplus). This estimation method yields robust calculation against non-normality of data and can also handle missing data in calculations. Moreover, because these data were collected from different teams, potential bias may have been introduced by the shared variance between athletes on the same team. To deal with this non-independence in the data, we employed a design-based modeling approach that, "takes the multilevel data or dependency into account by adjusting for parameter estimate standard errors based on the sampling design" (Wu & Kwok, 2012, p. 17). This design-based modeling approach is appropriate for our research because it handles non-independence data structures. We used the TYPE = COMPLEX option in Mplus (Muthén & Satorra, 1995; Wu & Kwok, 2012) to account for the clustered data (i.e., athletes nested in teams).

Finally, all analyses in the current study were estimated using full-information maximum likelihood estimation (FIML). FIML is regarded as a more reasonable estimation method to use when dealing with missing data (Graham, 2009; Schafer & Graham, 2002). Therefore, the FIML estimate with robust standard error correction (i.e., MLR estimator) in Mplus was used to obtain a consistent standard error estimate. From this, it could produce the correct statistical inference for the parameter estimate (Schlomer, Bauman, & Card, 2010, p. 189). To assess the overall model goodness-of-fit to the data, we used four fit indices: comparative fit index (CFI), Tucker–Lewis index (TLI) (CFI & TLI values > 0.90 indicate acceptable fit, > 0.95 indicate excellent fit), root mean square error of approximation (RMSEA) with 90% confidence intervals (RMSEA < 0.08 is acceptable, < 0.05 is excellent), and standardized root mean square residual (SRMR; < 0.10 is acceptable) as recommended by Hu and Bentler (1999). Hence, in the current study, the rules that they proposed were used for reference. In addition, we included age (years) and gender (0 = female; 1 = male) as control variables in the analyses.

Results

Attrition analyses

We conducted several analyses to evaluate whether non-responses in our data were systematic. First, we compared the demographic variables between the respondents and non-respondents (Ployhart & Vandenberg, 2010). We employed dummy variables to categorize the respondents into three groups: Group 1 contained 91 athletes who only completed T1; Group 2 included 130 athletes who completed T1 and T2; and Group 3 contained 238 athletes who completed T1, T2, and T3. The comparisons revealed that the groups did not differ from each other in terms of gender ($\chi^2 = 1.57$, $df = 2$, $p > .05$) or age ($F_{(2,456)} = 2.58$, $p > .05$). Second, we examined differences in the TS and SWLS at each time point. The first MANOVA had TS and SWLS items (eight items in total) as dependent variables for all three groups at T1. The second MANOVA included the team satisfaction and life satisfaction items for Groups 2 and 3 at T2.

Both MANOVAs yielded non-significant results ($F_{(16,900)}$ = .90 and $F_{(8,359)}$ = 1.80). These findings suggested the mean scores of the TS and SWLS items were not different across groups. Subsequent analyses were based on data from 459 unique respondents, of which 238 responded on all three occasions, 130 responded on two occasions, and 91 responded on only one occasion.

Descriptive Statistics and Longitudinal Invariance

Table 1 presents the means, standard deviations, reliability coefficients, and correlations of the variables, including the SWLS and TS mean scores across time points. Then, we tested the longitudinal invariance of the items for TS and SWLS[2]. Table 2 presents the results indicating the extent to which the invariance models fit the data. First, the baseline models of TS and SWLS (Model A) were acceptable. The factor loadings were constrained to be equal across time points to test for weak invariance.

The weak invariance models for both TS and SWLS (Model B) were acceptable because of the satisfactory values of the fit indices. Both the SB-χ^2 difference test and the comparison of CFI between the configural invariance and weak invariance models were invariant (ΔSB-χ^2 = 11.35, p > .0.5; ΔCFI = 0.00), revealing that weak invariance was supported.

Second, equality of the intercepts across time points was imposed on the model to test for strong invariance. The strong invariance models for both TS and SWLS (Model C) were acceptable because of the satisfactory values of the fit indices. Both the SB-χ^2 difference test and the comparison of CFI between the weak invariance and strong invariance models were invariant (ΔSB-χ^2 = 30.36, p < .05; ΔCFI = 0.00), revealing that strong invariance was supported.

Latent Difference Score Modeling

To test the effects across different constructs over time, we selected variables at Time 1 to predict latent change scores between Time 1 and Time 2 and variables at Time 2 to predict latent change scores between Time 2 and Time 3. We included correlations between constructs at Time 1 to acknowledge their cross-sectional relationship and correlations between latent difference scores of constructs in the same time period to acknowledge associations between changes in different constructs. The error terms of the indicators at T1 were allowed to covary with the error terms of the corresponding indicators at T2 and T3. This model fit the data well (SB-$\chi 2$ = 435.81, *df* = 269; CFI = .96; TLI= .95; RMSEA = .037; SRMR = .052).

Regarding the effects of TS itself, we found that TS at Time 1 negatively predicted the latent difference score of TS between Time 1 and Time 2, and that TS at Time 2 negatively predicted the latent difference score of TS between Time 2 and Time 3. Similarly, we found that SWLS at Time 1 negatively predicted the latent difference score of SWLS between Time 1 and Time 2, and that SWLS at Time 2 negatively predicted the latent difference score of SWLS between Time 2 and Time 3. These findings reveal that participants who had higher TS or SWLS at one time point had lower degrees of change in the following period of time.

Partially supporting the idea of a top–down process, SWLS at Time 1 positively predicted the latent difference score of TS between Time 1 and Time 2, but SWLS at Time 2 was not a statistically significant predictor of the latent difference score of TS between Time 2 and Time 3. These findings suggest that having higher SWLS at one time point can drive athletes to increase TS in the first time period. Supporting the idea of bottom–up process, TS at Time 1 positively predicted the latent difference score of SWLS between Time 1 and Time 2, and TS at Time 2 positively predicted the latent difference score of SWLS between Time 2 and Time 3. These findings suggest that having higher TS at one time point can drive athletes to increase SWLS over time. Finally, the correlations between the latent difference scores of TS and SWLS in the same time period were all positive, suggesting that changes in TS or SWLS were associated with changes in the other.

We also examined an alternative LDSM model by including parameters from the latent difference score of TS (or SWLS) between Time 1 and Time 2, to the latent difference score of SWLS (or TS) between Time 2 and Time 3. This model was acceptable (SB-χ^2 = 434.49, *df* = 267; CFI = .96; TLI = .95; RMSEA = .037; SRMR = .051), but the two parameters were non-significant (change TS -> change SWLS: *b* = .03, *β* = .03, *p* = .68; .69; change SWLS -> change TS: *b* = −.03, *β* = −.02, *p* = .47; .49). Moreover, this alternative model did not have a better fit than our hypothesized LDSM model (ΔSB-χ^2 = .49, Δ*df* = 2, *p* = .78).

Discussion

The present study extended the top-down and bottom-up theories of subjective well-being in the realm of sports. With a longitudinal design, the results supported the reciprocal relationship between athletes' team satisfaction and life satisfaction from Time 1 to Time 2. It is suggested that athletes who have higher team satisfaction tend to have increased life satisfaction over time, which, in turn, leads to an increase in their team satisfaction. However, it should be noted that this reciprocal effect transfers into a bottom-up process from Time 2 to Time 3. That is, athletes who had higher team satisfaction at Time 2 had an increase in life satisfaction at Time 3, while higher life satisfaction did not contribute to the subsequent development of team satisfaction. Our study might make two major contributions to the literature. One is introducing the top-down and bottom-up theories of subjective well-being into sports to emphasize the need to care about athletes' life satisfaction. The other is identifying the possible directionality between team satisfaction and life satisfaction, although our data were correlational in nature.

We first introduced the top-down and bottom-up theories (Diener, 1984) into sports to highlight the importance of athletes' overall life satisfaction and domain-specific satisfaction, which was team satisfaction in this study. Since researchers have indicated that well-being is closely related or even parallel to career success (Boehm & Lyubomirsky, 2008; Lyubomirsky, King, & Diener, 2005), life satisfaction might serve as one of the important indicators of well-being that needs to be further investigated by sport psychologists. More importantly, the top-down and bottom-up theories provide a useful framework for understanding the sources of overall life satisfaction.

Indeed, researchers have proposed that there are many facets of domain-specific satisfaction for athletes such as individual performance, ability utilization, team social contribution, team budget, external agents, etc. (Chelladurai & Riemer, 1997; Riemer & Chelladurai, 1998). Those sport-specific domains of satisfaction reflect how athletes evaluate their satisfaction with a task or social-related works, processes and outcomes of the individual or the team. Accordingly, adapting a holistic perspective to assess athletes' satisfaction might not be sufficient, and future research assessing multiple facets of athletes' satisfaction is warranted to acquire deeper insights.

In addition, another major contribution involves the identification of the possible directionality between team satisfaction and life satisfaction. Interestingly, two patterns were observed at different time points. From Time 1 to Time 2, a reciprocal relationship was identified, which suggested that overall life satisfaction and sport-specific satisfaction simultaneously enhance each other. With time, only the bottom-up process emerged from Time 2 to Time 3. Therefore, we concluded that team satisfaction had a more consistent impact on life satisfaction. This finding might correspond with the importance of *scope* and *centrality* in individuals' life experiences (Bharadwaj & Wilkening, 1977).

The scope is the extent to which the domain encompasses one or a few persons and activities (e.g., athletes' teammate). The centrality means the extent to which the domain is persistently in the forefront of the individual's consciousness (Cragin, 1983, p. 265). It is suggested that facets of life satisfaction that are narrower in scope and centrality are more likely to contribute to overall life satisfaction. On the other hand, satisfaction with less critical and central facets of life satisfaction are more likely to be affected by satisfaction with life in general (Lance et al., 1989). Based on this logic, we reasoned that living with members of a sports team is a specific and central facet of life satisfaction for athletes and, thus, the athletes' satisfaction with the team becomes more salient over time, which supports our results.

It should be mentioned that we argued that this complex and dynamic relationship between overall life satisfaction and domain-specific satisfaction might not have been properly investigated in the previous studies because most of the early research heavy relied on cross-sectional design (e.g., Scherpenzeel & Saris, 1996; Schneider & Schimmack, 2010), which only describes the static relationship, rather than capturing the change in the target constructs. In addition, our analytic strategies took changes occurring at the individual level, individual differences around within-individual change, and changes between adjacent time points into consideration, which resulted in a more reliable conclusion than in previous research.

In terms of practical implications, the current study was designed to answer the important question of directionality. Given that a reciprocal relationship was found, we suggest that intervention aims at increasing the life satisfaction or team satisfaction are useful for athletes. For example, a benefit of mindfulness interventions include an increase in individuals' overall life satisfaction (e.g., Brown & Ryan, 2003; Good et al., 2016; Keng, Smoski, & Robins, 2011). On the other hand, indirect evidence has indicated that team building skills would contribute to domain-specific satisfaction such as job satisfaction (Amos, Hu, & Herrick, 2005; Ponzin et al., 2015). That is, using existing approaches, we can trigger the mutual growth of athletes' well-being.

There were limitations in this study. First, the sample in this study was comprised of young athletes, and research has indicated that aging is correlated with facets of life satisfaction in many domains that reveal different life trajectories across time (McAdams, Lucas, & Donnellan, 2012). Hence, researchers should be cautious when generalizing the results to athletes of different ages. Second, the results of this study were generated from self-report data, which might have been influenced by common method variance to some extent (Podsakoff, MacKenzie, Paine, & Bachrach, 2000). However, the present study represented an attempt to alleviate this problem by adopting a longitudinal design (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and employing SEM to account for measurement error (Podsakoff, MacKenzie, & Podsakoff, 2012) . Third, researchers can investigate different types of athletes such as national sports delegations, professional/amateur athletes, or injured athletes because dissimilar experiences might influence the directionality of the relationship between global and domain-specific satisfaction judgments (Leonardi et al., 2005). Fourth, the athletes' team satisfaction assessed in our study only partially represents one facet of their life experience. Future research may adapt Riemer and Chelladurai (1998) framework to assess multiple dimensions of athlete satisfaction so that we may gain a better understanding of the directionality. Fifth, the systematic attrition due to graduation might have threatened our internal validity. However, the attrition analyses did not show any statistically significant results and it is therefore likely that the attrition did not have a major influence on the results. Finally, we did not explore the issue of time in our study. We used three months as the only time periods during which to examine change. However, as there is no specific guidance for when such change would be more likely to occur, more studies are required to examine the issue of time in the future.

In summary, the present study explored the unexamined top-down/bottom-up controversy between life satisfaction and domains of satisfaction in sports with young athletes. The results did indicate a reciprocal association between team satisfaction and life satisfaction but the estimates were more consistent over time for the bottom-up process compared to the top-down process. We hope this study will encourage researchers to study athletes' life satisfaction and other domain satisfaction in sports in the future.

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Footnotes

1. The data for this study were collected in the context of a larger project supervised and funded by one of the authors. Neither the analyses nor the findings reported in the present research have been reported in any prior work.

Table 1

Descriptive Statistics and Correlation Matrix of Research Variables

	N	M	SD	α	1	2	3	4	5	6	7
1.gender	459	—	—	—							
2.age	459	16.14	.84	—	.11						
3.TS(t1)	458	4.69	.95	.84	-.13	-.11					
4.TS(t2)	360	4.63	.90	.85	-.07	-.07	.51				
5.TS(t3)	286	4.61	.94	.86	.02	.05	.42	.48			
6.SWLS(t1)	447	3.74	.98	.79	-.08	.03	.44	.35	.28		
7.SWLS(t2)	355	3.85	.91	.74	-.01	-.03	.44	.47	.28	.54	
8.SWLS(t3)	280	3.95	.80	.73	.04	.19	.29	.31	.52	.34	.39

Note.

1. Correlations among variables are based on pairwise deletion of missing data.

2. Correlations greater than 0.15 are significant at $p < 0.05$; those greater than 0.19 are significant at $p < 0.01$; those greater than 0.25 are significant at $p < 0.001$.

Table 2

Model Fits for Measurement Models of SWLS and Longitudinal Invariance

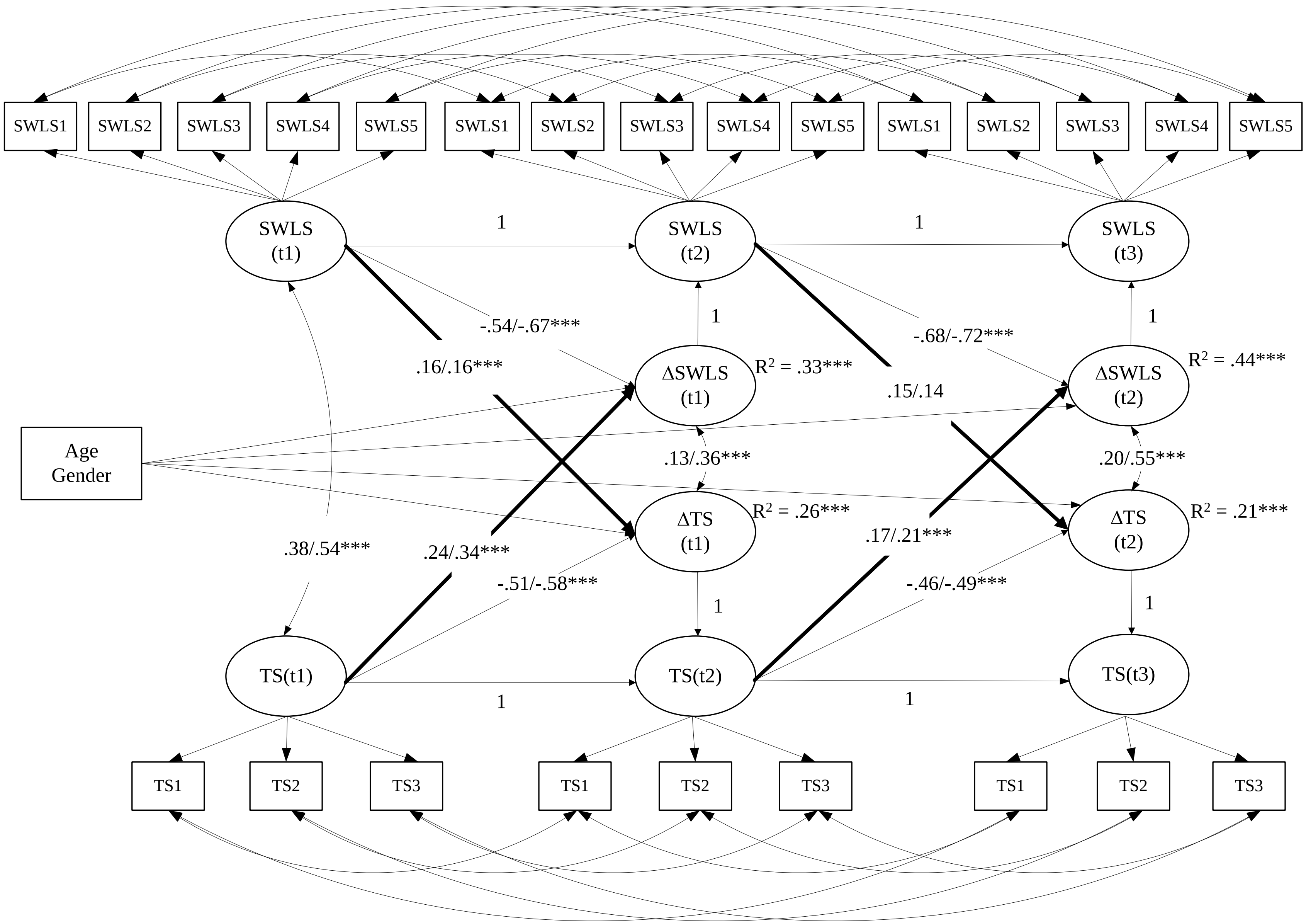
Model	SB-$\chi 2$	*df*	*p*	CFI	TLI	ΔSB-$\chi 2$	ΔCFI	RMSEA	SRMR
Measurement Models of SWLS									
SWLS(t1)	23.21	5	.00	.96	.91			0.089(0.055; 0.127)	.035
SWLS(t2)	15.50	5	.01	.96	.91			0.076(0.035; 0.120)	.034
SWLS(t3)	5.03	5	.41	1.00	1.00			0.005(0.000; 0.083)	.025
Models for Longitudinal Invariance									
Model A (baseline)	321.51	213	.00	0.96	0.95			0.033(0.026; 0.041)	0.046
Model B (weak invariance)	331.48	227	.00	0.96	0.96	11.35	0.00	0.032(0.024; 0.039)	0.053
Model C (strong invariance)	361.10	240	.00	0.96	0.95	30.36*	0.00	0.033(0.026; 0.040)	0.055

Figure Captions

Figure 1

Latent differences score modeling (model 2) for TS and SWLS.

Note. Residual covariances of TS and SWLS are not shown for clarity. Gender and age are included as control variables. The paths are unstandardized/standardized coefficients. ***$p < .001$.



SWLS1
SWLS2
SWLS3
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SWLS1
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SWLS4
SWLS5
SWLS1
SWLS2
SWLS3
SWLS4
SWLS5
SWLS (t1)
SWLS (t2)
SWLS (t3)
1
1
-.54/-.67***
-.68/-.72***
.16/.16***
.15/.14
ΔSWLS (t1)
ΔSWLS (t2)
R2 = .33***
R2 = .44***
Age
Gender
.13/.36***
.20/.55***
ΔTS (t1)
ΔTS (t2)
R2 = .26***
R2 = .21***
.38/.54***
.24/.34***
.17/.21***
-.51/-.58***
-.46/-.49***
TS(t1)
TS(t2)
TS(t3)
TS1
TS2
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TS1
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TS2
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1