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

Lung Hung Chen

Department of Recreation and Leisure Industry Management

National Taiwan Sport University

Chia-Huei Wu

Department of Management

London School of Economics and Political Science

Shin-Huei Lin

Department of Hospitality Management,

Hsuan Chuang University

Yun-Ci Ye

Department of Somatics and Sport Leisure Industry

National Taitung University

1   Abstract

2   The present study aims to explore the relationship between athletes' team satisfaction and

3   their life satisfaction. Drawing on the top-down theory (i.e., overall satisfaction predicts domain

4   satisfaction) and bottom-up theory (i.e., overall satisfaction is predicted by domain satisfaction)

5   of subjective well-being, the authors propose that a reciprocal longitudinal relationship exists

6   between athletes' team satisfaction and their life satisfaction. A three-wave longitudinal study is

7   conducted with adolescent athletes from diverse sports. The results of latent difference score

8   modeling support the hypothesis by showing a reciprocal longitudinal relationship between

9   athletes' team satisfaction and their life satisfaction, but the effect from athletes' team

10   satisfaction to life satisfaction is more consistent across waves. Implications, limitations, and

11   future studies are discussed.

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

13

1   Top-down or bottom-up? The reciprocal longitudinal relationship between athletes' team

2   satisfaction and life satisfaction

3   Life satisfaction represents the comparison between self-imposed standards and real conditions

4   in one's overall life. The smaller the discrepancy, the more a person is satisfied with their life in

5   general. To athletes, cultivating higher life satisfaction is a crucial topic because it is a key

6   component in the attainment of positive mental health and is a determinant of many life

7   outcomes, such as high social competence, self-efficacy, and internal locus of control (Proctor,

8   Linley, & Maltby, 2009a, 2009b). Despite its importance, only a few studies to date have

9   investigated athletes' life satisfaction (Chen, Chang, & Chang, 2015). So far, studies have

10   indicated that athletes' individual attributes (e.g., maladaptive attachment styles; Felton & Jowett,

11   2015), affective traits (e.g., gratitude; Chen & Kee, 2008; Chen, Wu, & Chang, in press),

12   coaches' style (Carpentier & Mageau, 2013) , and retirement planning (Stambulova, Stephan, &

13   Jäphag, 2007) can determine athletes' life satisfaction.

14   These studies, however, neglected the role of the team in shaping athletes' life

15   satisfaction. "Sport teams generally are characterized by frequent, affectively pleasant

16   interactions among team members that occur in the context of a temporarily stable and enduring

17   framework of affective concern" (Terry et al., 2000, p. 245). Moreover, sport teams are more

18   than affective connections among numbers. Teammates also share common goals and values,

19   and the numbers are interdependent in regard to accomplishing specific tasks (Weinberg &

20   Gould, 2011). We suggest that satisfaction with the team is one of the most important aspects of

21   athletes' life experience (Seifriz, Duda, & Chi, 1992) from two perspectives. First, satisfaction

22   with the team to some extent represents the quality of the social interactions between the athlete

23   and the whole team. Most sports are interdependent in nature, as athletes usually train together,

1   play together, and even live together (Strachan, Cote, & Deakin, 2009). Even for those sports

2   classified as coactive, such as archery, athletes also have a day-to-day relationship with

3   teammates and coaches that shape their experiences relating to the team. Second, the degree of

4   team satisfaction indirectly represents the extent to which one's performance reaches or fails to

5   reach an expected level subjectively. As Riemer and Chelladurai (1998) claim, success

6   evaluation based on competition wins and losses is not a reliable indicator of the effectiveness of

7   an athletic enterprise because competition is often influenced by luck, teammates' mistakes, etc.

8   In addition to absolute success, they suggest one also needs to consider the athletes' perceptions

9   of goal attainment. In other words, athletes might lose a competition while being satisfied with

10 their effort or teamwork.

11   The aim of this study is to examine the relationship between team satisfaction and life

12 satisfaction. Based on the top-down and bottom-up theories of subjective well-being (Diener,

13 1984), we suggest that team satisfaction and overall life satisfaction shape each other

14 reciprocally in a longitudinal process, as domain life satisfaction can influence and be influenced

15 by overall life satisfaction over time (Dyrdal, Røysamb, Nes, & Vittersø, 2011; Schyns, 2001).

16 We adopt a longitudinal design to examine their relationship. Athletes completed three waves of

17 a survey within a six-month interval. We focus on adolescent athletes specifically because they

18 are at a critical stage of life in terms of overall development (Arnett, 1999). Adolescent athletes

19 devote a considerable amount of time to their sport, and serious sport involvement can be a very

20 stressful experience for them. Therefore, discovering ways to make sport involvement and life

21 more positive is a worthwhile endeavor. In the sections below, we elaborate upon our rationale in

22 detail.

23 **Top-down and bottom-up processes of satisfaction**

1   The top-down process suggests that overall life satisfaction is a stable and stronger characteristic

2   of individuals and that it generally affects the interpretative and judgmental tendencies when

3   people have different encounters across domains (Headey, Veenhoven, & Wearing, 1991). In

4   other words, domain satisfaction is seen as a consequence of the stable overall life satisfaction in

5   specific events, contexts, and categories (Leonardi, Spazzafumo, Marcellini, & Gagliardi, 1999).

6   The top-down effect of the general satisfaction domain has been supported by previous studies.

7   For example, Schneider and Schimmack (2010) investigated pairs of participants (dating couples

8   and friends) to collect both self-ratings and informant ratings of life satisfaction and five

9   satisfaction domains (weather, family, health, academics, and friends) using a multi-method

10   approach. They found that life satisfaction significantly accounted for the five domains of

11   satisfaction. In addition, using data from a longitudinal survey of older people, Leonardi et al.

12   (1999) also found that life satisfaction significantly predicted seven domains of satisfaction

13   (health, leisure, mobility, economic situation, house, living area, and services).

14   In contrast, as the bottom-up pattern comes from a contextual perspective, only prior

15   domain satisfaction predicts later overall life satisfaction. This is the model that is compared with

16   the top-down model, which specifies that a lower level of domain satisfaction leads to a higher

17   level of overall life satisfaction (Leonardi, Spazzafumo, & Marcellini, 2005; Schimmack, Diener,

18   & Oishi, 2002; Schneider & Schimmack, 2010). According to the bottom-up approach, overall

19   life satisfaction is accumulated from and builds its integrality with domain satisfaction in

20   different domains derived from objective conditions (Leonardi et al., 2005; Schimmack et al.,

21   2002). In one classic study, Lance, Lautenschlage, Sloan, and Varca (1989) surveyed the faculty

22   at the University of Georgia and found that marital satisfaction significantly accounted for their

23   life satisfaction. On the other hand, life satisfaction did not predict marital satisfaction. In

1   addition, using data from a national probability sample of the Dutch population, Scherpenzeel

2   and Saris (1996) found that satisfaction with housing, the financial situation of the household,

3   and social contact predicted life satisfaction, while the reverse direction was not found in one of

4   the databases used. This evidence provides support for the bottom-up process.

5   It should be noted, however, that top-down and bottom-up processes might be bidirectional,

6   which suggests that they influence each other (Diener, 1984). In other words, later overall life

7   satisfaction could be predicted by previous domain satisfaction and vice versa. Therefore, the

8   reciprocal relationship highlights the importance of stable dispositional influences on domain-

9   specific satisfaction and the impact of each facet of life satisfaction on overall life satisfaction

10   (Headey et al., 1991; Lance et al., 1989). Supporting this perspective, the longitudinal

11   Norwegian Mother and Child Cohort Study investigated pregnant women's life satisfaction and

12   relationship satisfaction at 6 months (during pregnancy) and 36 months (postpartum) (Dyrdal et

13   al., 2011). Although relationship satisfaction predicted changes in life satisfaction more than life

14   satisfaction predicted changes in relationship satisfaction during pregnancy, the results

15   demonstrated a reciprocal relationship, which corresponded with the findings of several previous

16   studies (e.g., Lance et al., 1989; Nakazato, Schimmack, & Oishi, 2011; Schyns, 2001).

17   **Reciprocal relationship between team satisfaction and life satisfaction**

18   To date, no investigation has been conducted to examine the directionality of the relationship

19   between team satisfaction and life satisfaction. It might be due to the tradition in sports of

20   pursuing achievement, rather than the cultivation of well-being. However, clarifying the

21   directionality is critical because practitioners could understand which one should be enhanced

22   first. In this regard, an effective intervention to enhance athletes' well-being becomes possible.

1   Although the relationship between domain-specific satisfaction and overall life satisfaction

2   does not seem to be identical, we reason that the relationship between athletes' team satisfaction

3   and life satisfaction might be reciprocal. The reciprocal assumption was founded upon the

4   statement that overall life satisfaction and general life evaluation are shaped by and developed

5   from an individual's life experience, while domain-specific satisfaction is at least partially

6   determined by disposition (Diener, 1984; Headey et al., 1991). The bottom-up approach suggests

7   that athletes' judgments about whether their life is happy involve the mental calculation of the

8   sum of momentary experiences of pleasure. For example, a baseball player might feel satisfied if

9   he pitches well, even if he ultimately loses the game. Furthermore, Diener (1984) suggested that

10   a person would develop an optimistic outlook to carefully accumulate positive experiences that

11   enhances life satisfaction, which is indirectly supported by empirical research (Wu, Tsai, & Chen,

12   2009). From this reductionist view, thus, athletes' overall life satisfaction is an accumulation of

13   momentary pleasurable experiences in sports. On the other hand, overall life satisfaction

14   represents a stable propensity to experience all things in a positive way. Furthermore, this

15   propensity influences the momentary experiences of pleasure that an individual has in the world.

16   This perspective suggests that athletes enjoy pleasure because they are happy, not dependent

17   upon external circumstances. Thus, athletes' team satisfaction will develop from the positive bias

18   that occurs repeatedly.

19   In the current research context, sport is a highly competitive context. Athletes work closely

20   with their team to experience positive and negative events in daily life repeatedly. Thus, those

21   momentary experiences boost life satisfaction over time. On the other hand, it should be noted

22   that a stable level of life satisfaction also determines the degree of one's satisfaction within a

23   specific context. Previous research in similarly competitive conditions such as the workplace

1   found that job satisfaction and life satisfaction have a reciprocal relationship (Lance et al., 1989),

2   which indirectly supports our hypothesis. Specifically, we propose that higher life satisfaction

3   will lead athletes to increase their team satisfaction over time. At the same time, we also expect

4   that higher team satisfaction will lead athletes to increase their life satisfaction over time.

5   **Method**

6   **Participants and procedure**

7   Adolescent athletes participated in an ongoing longitudinal study supervised by one of

8   the authors[1]. The first wave of data collection involved 459 athletes (203 females, 256 males)

9   who were recruited from diverse sports (swimming, track and field, baseball, judo, basketball,

10   volleyball, softball, archery, and cycling) and ranged in age from 12 to 20 years, with a mean age

11   of 16.14 (SD = .84). After three and six months, the second and third waves of data were

12   collected, respectively. Questionnaires were administered to these athletes in classrooms before

13   practice. Athletes' confidentiality and anonymity were ensured. They were rewarded with 100

14   New Taiwan dollars at each wave of data collection to increase the response rate.

15   In addition, participants were chosen based on the following criteria. Participants

16   provided demographic data, such as their gender and age, for inclusion as control variables in our

17   model to predict latent change variables. Attrition was high because some of the athletes

18   graduated from their high schools before the second wave of data collection or did not fill out the

19   questionnaire completely.

20   **Measurements**

21   **Satisfaction with Life Scale.** The Satisfaction with Life Scale (SWLS; Diener, Emmons,

22   Larsen, & Griffin, 1985) is a self-report measure of global life satisfaction with 5 items. Its

23   validity and reliability have been supported (Erdogan, Bauer, Truxillo, & Mansfield, 2012; Pavot

1   & Diener, 1993; Proctor et al., 2009b). In addition, the SWLS-Taiwan version has been found to

2   correlate with appropriate criterion measures (See Chen, Ye, Chen, & Tung, 2010; Lin, 2013;

3   Wu, Chen, & Tsai, 2009a), and gender and time invariance have been demonstrated (Wu, Chen,

4   & Tsai, 2009b; Wu & Yao, 2006), all of which support its validity and reliability. Sample items

5   are "The conditions of life are excellent" and "I am satisfied with my life". Participants indicated

6   their responses on a 6-point Likert scale, with responses ranging from *strongly disagree* (1) to

7   *strongly agree* (6). In this study, the reliability coefficients were .79, .74, and .73 at the three

8   different time points, respectively. Additionally, we used three confirmatory factor analyses at

9   the three time points to assess the validity of the SWLS. The results indicated that the data fit

10   well with a single factor (see Table 2).

11   **Team Satisfaction Scale.** The Chinese version of the Team Satisfaction Scale (TS; 3

12   items), originally developed by Walling, Duda, and Chi (1993), was used to assess athletes'

13   perceived team satisfaction. The Team Satisfaction Scale was translated from English to

14   Chinese, and its reliability has been reported by its translators, with a reported Cronbach's alpha

15   of .83 (Huang & Chi, 1994). Sample items include "I'm very glad that I have played on this team

16   this year" and "I am proud of being a team number". The Chinese version of the Team

17   Satisfaction Scale has been widely adopted in research involving Taiwanese people and has been

18   deemed a reliable tool, according to previous studies (Chen, Tsai, & Chen, 2004; Li, 2003).

19   Participants indicated their responses on a 6-point Likert scale, with responses ranging from

20   *strongly disagree* (1) to *strongly agree* (6). The internal consistency was .84, .85, and .86 at the

21   three different time points, respectively. We did not use a CFA model to test the factor structure

22   of the team satisfaction scale, because a CFA model consisting of three items is a just-identified

23   model, which does not provide information for model testing.

1   **Analytic Strategy**

2   First, we examined the longitudinal invariance of the SWLS and TS to ensure that the change

3   phenomena captured in this study related to the changes in constructs (Golembiewski,

4   Billingsley, & Yeager, 1976). There are several levels of longitudinal invariance (Chan, 1998;

5   Meredith, 1993; Vandenberg & Lance, 2000). The first level is configural invariance (Model 1).

6   It requires the same item to be associated with the same factor at each measurement occasion.

7   After establishing configural invariance, the second level is weak invariance (Model 2). It

8   includes factor loadings that are constrained to be equal across time points to test the invariance

9   of the factor loadings. Based on the weak invariance model, the third level is strong invariance

10   (Model 3). It indicates that intercepts are constrained to be equal across time points. In addition,

11   for tests of longitudinal invariance, in addition to the chi-square differences between pairs of

12   nested invariance models (Chan, 1998), we also adopted the difference in CFI, which is

13   increasingly recommended in invariance testing ((ΔCFI; values $\leqq$ 0.01 indicate invariant;

14   Cheung & Rensvold, 2002) because the chi-square difference is sensitive to sample size.

15   Therefore, measurement invariance was estimated using configural, weak, strong, and strict

16   invariance in the current study, allowing us to provide an unambiguous interpretation of change

17   (Chan, 1998).

18   Second, because our goal was to understand whether athletes' TS shapes their SWLS over

19   time and vice versa, we used latent difference score modeling (LDSM; McArdle, 2009) for the

20   data analysis. LDSM focuses on within-individual change of variables between adjacent time

21   points and individual differences in such within-individual change, enabling us to examine the

22   development of and changes in TS and SWLS for each individual (Grimm, An, McArdle,

23   Zonderman, & Resnick, 2012; Selig & Preacher, 2009). For example, an LDSM approach creates

1   latent difference scores between variables measured at adjacent time points and then examines

2   how variables measured at previous time points (e.g., TS and SWLS at Time 1) can shape

3   within-individual changes over two adjacent time points (e.g., changes in TS and SWLS from

4   Time 2 to Time 3). An LDSM approach is more appropriate than a cross-lagged modeling (CLM)

5   approach for our research purpose because CLM does not consider changes occurring at the

6   individual level or individual differences around within-individual change. Although a latent

7   growth curve modeling (LGCM) approach also focuses on within-individual change and

8   individual differences in such within-individual change, an LDSM approach is preferred because

9   it considers changes between adjacent time points.

10   Third, all models were estimated using Mplus (Muthen & Muthen, 2010). Given the non-

11   normality of the data and missing data, we used maximum likelihood estimation to produce

12   covariance matrices with robust standard errors (the MLR estimator in Mplus). This estimation

13   method yields robust calculation against non-normality of data and can also handle missing data

14   in calculations. Moreover, because these data were collected from different teams, potential bias

15   may have been introduced by the shared variance between athletes on the same team. To deal

16   with this non-independence in the data, we employed a design-based modeling approach that,

17   "takes the multilevel data or dependency into account by adjusting for parameter estimate

18   standard errors based on the sampling design" (Wu & Kwok, 2012, p. 17). This design-based

19   modeling approach is appropriate for our research because it handles non-independence data

20   structures. We used the TYPE = COMPLEX option in Mplus (Muthén & Satorra, 1995; Wu &

21   Kwok, 2012) to account for the clustered data (i.e., athletes nested in teams).

22   Finally, all analyses in the current study were estimated using full-information maximum

23   likelihood estimation (FIML). FIML is regarded as a more reasonable estimation method to use

1   when dealing with missing data (Graham, 2009; Schafer & Graham, 2002). Therefore, the FIML

2   estimate with robust standard error correction (i.e., MLR estimator) in Mplus was used to obtain

3   a consistent standard error estimate. From this, it could produce the correct statistical inference

4   for the parameter estimate (Schlomer, Bauman, & Card, 2010, p. 189). To assess the overall

5   model goodness-of-fit to the data, we used four fit indices: comparative fit index (CFI), Tucker–

6   Lewis index (TLI) (CFI & TLI values > 0.90 indicate acceptable fit, > 0.95 indicate excellent fit),

7   root mean square error of approximation (RMSEA) with 90% confidence intervals (RMSEA <

8   0.08 is acceptable, < 0.05 is excellent), and standardized root mean square residual (SRMR; <

9   0.10 is acceptable) as recommended by Hu and Bentler (1999). Hence, in the current study, the

10   rules that they proposed were used for reference. In addition, we included age (years) and gender

11   (0 = female; 1 = male) as control variables in the analyses.

<div align="center">

Results

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13   **Attrition analyses**

14   We conducted several analyses to evaluate whether non-responses in our data were

15   systematic. First, we compared the demographic variables between the respondents and non-

16   respondents (Ployhart & Vandenberg, 2010). We employed dummy variables to categorize the

17   respondents into three groups: Group 1 contained 91 athletes who only completed T1; Group 2

18   included 130 athletes who completed T1 and T2; and Group 3 contained 238 athletes who

19   completed T1, T2, and T3. The comparisons revealed that the groups did not differ from each

20   other in terms of gender ($\chi^2 = 1.57$, $df = 2$, $p > .05$) or age ($F_{(2,456)} = 2.58$, $p > .05$). Second, we

21   examined differences in the TS and SWLS at each time point. The first MANOVA had TS and

22   SWLS items (eight items in total) as dependent variables for all three groups at T1. The second

23   MANOVA included the team satisfaction and life satisfaction items for Groups 2 and 3 at T2.

1   Both MANOVAs yielded non-significant results ($F_{(16,900)}$ = .90 and $F_{(8,359)}$ = 1.80). These

2   findings suggested the mean scores of the TS and SWLS items were not different across groups.

3   Subsequent analyses were based on data from 459 unique respondents, of which 238 responded

4   on all three occasions, 130 responded on two occasions, and 91 responded on only one occasion.

5   **Descriptive Statistics and Longitudinal Invariance**

6   Table 1 presents the means, standard deviations, reliability coefficients, and correlations of the

7   variables, including the SWLS and TS mean scores across time points. Then, we tested the

8   longitudinal invariance of the items for TS and SWLS[2]. Table 2 presents the results indicating

9   the extent to which the invariance models fit the data. First, the baseline models of TS and

10   SWLS (Model A) were acceptable. The factor loadings were constrained to be equal across time

11   points to test for weak invariance.

12   The weak invariance models for both TS and SWLS (Model B) were acceptable because of

13   the satisfactory values of the fit indices. Both the SB-χ^2 difference test and the comparison of

14   CFI between the configural invariance and weak invariance models were invariant (ΔSB-χ^2 =

15   11.35, $p > .0.5$; ΔCFI = 0.00), revealing that weak invariance was supported.

16   Second, equality of the intercepts across time points was imposed on the model to test for

17   strong invariance. The strong invariance models for both TS and SWLS (Model C) were

18   acceptable because of the satisfactory values of the fit indices. Both the SB-χ^2 difference test and

19   the comparison of CFI between the weak invariance and strong invariance models were invariant

20   (ΔSB-χ^2 = 30.36, $p < .05$; ΔCFI = 0.00), revealing that strong invariance was supported.

21   **Latent Difference Score Modeling**

22   To test the effects across different constructs over time, we selected variables at Time 1 to

23   predict latent change scores between Time 1 and Time 2 and variables at Time 2 to predict latent

1   change scores between Time 2 and Time 3. We included correlations between constructs at Time

2   1 to acknowledge their cross-sectional relationship and correlations between latent difference

3   scores of constructs in the same time period to acknowledge associations between changes in

4   different constructs. The error terms of the indicators at T1 were allowed to covary with the error

5   terms of the corresponding indicators at T2 and T3. This model fit the data well (SB-$\chi 2$ = 435.81,

6   *df* = 269; CFI = .96; TLI= .95; RMSEA = .037; SRMR = .052).

7   Regarding the effects of TS itself, we found that TS at Time 1 negatively predicted the

8   latent difference score of TS between Time 1 and Time 2, and that TS at Time 2 negatively

9   predicted the latent difference score of TS between Time 2 and Time 3. Similarly, we found that

10   SWLS at Time 1 negatively predicted the latent difference score of SWLS between Time 1 and

11   Time 2, and that SWLS at Time 2 negatively predicted the latent difference score of SWLS

12   between Time 2 and Time 3. These findings reveal that participants who had higher TS or SWLS

13   at one time point had lower degrees of change in the following period of time.

14   Partially supporting the idea of a top–down process, SWLS at Time 1 positively predicted

15   the latent difference score of TS between Time 1 and Time 2, but SWLS at Time 2 was not a

16   statistically significant predictor of the latent difference score of TS between Time 2 and Time 3.

17   These findings suggest that having higher SWLS at one time point can drive athletes to increase

18   TS in the first time period. Supporting the idea of bottom–up process, TS at Time 1 positively

19   predicted the latent difference score of SWLS between Time 1 and Time 2, and TS at Time 2

20   positively predicted the latent difference score of SWLS between Time 2 and Time 3. These

21   findings suggest that having higher TS at one time point can drive athletes to increase SWLS

22   over time. Finally, the correlations between the latent difference scores of TS and SWLS in the

1   same time period were all positive, suggesting that changes in TS or SWLS were associated with

2   changes in the other.

3   We also examined an alternative LDSM model by including parameters from the latent

4   difference score of TS (or SWLS) between Time 1 and Time 2, to the latent difference score of

5   SWLS (or TS) between Time 2 and Time 3. This model was acceptable (SB-χ^2 = 434.49, df =

6   267; CFI = .96; TLI = .95; RMSEA = .037; SRMR = .051), but the two parameters were non-

7   significant (change TS -> change SWLS: b = .03, β = .03, p = .68; .69; change SWLS -> change

8   TS: b = −.03, β = −.02, p = .47; .49). Moreover, this alternative model did not have a better fit

9   than our hypothesized LDSM model (ΔSB-χ^2 = .49, Δdf = 2, p = .78).

10   **Discussion**

11   The present study extended the top-down and bottom-up theories of subjective well-being in

12   the realm of sports. With a longitudinal design, the results supported the reciprocal relationship

13   between athletes' team satisfaction and life satisfaction from Time 1 to Time 2. It is suggested

14   that athletes who have higher team satisfaction tend to have increased life satisfaction over time,

15   which, in turn, leads to an increase in their team satisfaction. However, it should be noted that

16   this reciprocal effect transfers into a bottom-up process from Time 2 to Time 3. That is, athletes

17   who had higher team satisfaction at Time 2 had an increase in life satisfaction at Time 3, while

18   higher life satisfaction did not contribute to the subsequent development of team satisfaction.

19   Our study might make two major contributions to the literature. One is introducing the top-down

20   and bottom-up theories of subjective well-being into sports to emphasize the need to care about

21   athletes' life satisfaction. The other is identifying the possible directionality between team

22   satisfaction and life satisfaction, although our data were correlational in nature.

1   We first introduced the top-down and bottom-up theories (Diener, 1984) into sports to

2   highlight the importance of athletes' overall life satisfaction and domain-specific satisfaction,

3   which was team satisfaction in this study. Since researchers have indicated that well-being is

4   closely related or even parallel to career success (Boehm & Lyubomirsky, 2008; Lyubomirsky,

5   King, & Diener, 2005), life satisfaction might serve as one of the important indicators of well-

6   being that needs to be further investigated by sport psychologists. More importantly, the top-

7   down and bottom-up theories provide a useful framework for understanding the sources of

8   overall life satisfaction.

9   Indeed, researchers have proposed that there are many facets of domain-specific satisfaction

10 for athletes such as individual performance, ability utilization, team social contribution, team

11 budget, external agents, etc. (Chelladurai & Riemer, 1997; Riemer & Chelladurai, 1998). Those

12 sport-specific domains of satisfaction reflect how athletes evaluate their satisfaction with a task

13 or social-related works, processes and outcomes of the individual or the team. Accordingly,

14 adapting a holistic perspective to assess athletes' satisfaction might not be sufficient, and future

15 research assessing multiple facets of athletes' satisfaction is warranted to acquire deeper insights.

16   In addition, another major contribution involves the identification of the possible

17 directionality between team satisfaction and life satisfaction. Interestingly, two patterns were

18 observed at different time points. From Time 1 to Time 2, a reciprocal relationship was identified,

19 which suggested that overall life satisfaction and sport-specific satisfaction simultaneously

20 enhance each other. With time, only the bottom-up process emerged from Time 2 to Time 3.

21 Therefore, we concluded that team satisfaction had a more consistent impact on life satisfaction.

22 This finding might correspond with the importance of *scope* and *centrality* in individuals' life

23 experiences (Bharadwaj & Wilkening, 1977).

1   The scope is the extent to which the domain encompasses one or a few persons and

2   activities (e.g., athletes' teammate). The centrality means the extent to which the domain is

3   persistently in the forefront of the individual's consciousness (Cragin, 1983, p. 265). It is

4   suggested that facets of life satisfaction that are narrower in scope and centrality are more likely

5   to contribute to overall life satisfaction. On the other hand, satisfaction with less critical and

6   central facets of life satisfaction are more likely to be affected by satisfaction with life in general

7   (Lance et al., 1989). Based on this logic, we reasoned that living with members of a sports team

8   is a specific and central facet of life satisfaction for athletes and, thus, the athletes' satisfaction

9   with the team becomes more salient over time, which supports our results.

10   It should be mentioned that we argued that this complex and dynamic relationship between

11   overall life satisfaction and domain-specific satisfaction might not have been properly

12   investigated in the previous studies because most of the early research heavy relied on cross-

13   sectional design (e.g., Scherpenzeel & Saris, 1996; Schneider & Schimmack, 2010), which only

14   describes the static relationship, rather than capturing the change in the target constructs. In

15   addition, our analytic strategies took changes occurring at the individual level, individual

16   differences around within-individual change, and changes between adjacent time points into

17   consideration, which resulted in a more reliable conclusion than in previous research.

18   In terms of practical implications, the current study was designed to answer the important

19   question of directionality. Given that a reciprocal relationship was found, we suggest that

20   intervention aims at increasing the life satisfaction or team satisfaction are useful for athletes.

21   For example, a benefit of mindfulness interventions include an increase in individuals' overall

22   life satisfaction (e.g., Brown & Ryan, 2003; Good et al., 2016; Keng, Smoski, & Robins, 2011).

23   On the other hand, indirect evidence has indicated that team building skills would contribute to

1   domain-specific satisfaction such as job satisfaction (Amos, Hu, & Herrick, 2005; Ponzin et al.,

2   2015). That is, using existing approaches, we can trigger the mutual growth of athletes' well-

3   being.

4   There were limitations in this study. First, the sample in this study was comprised of young

5   athletes, and research has indicated that aging is correlated with facets of life satisfaction in

6   many domains that reveal different life trajectories across time (McAdams, Lucas, & Donnellan,

7   2012). Hence, researchers should be cautious when generalizing the results to athletes of

8   different ages. Second, the results of this study were generated from self-report data, which

9   might have been influenced by common method variance to some extent (Podsakoff, MacKenzie,

10   Paine, & Bachrach, 2000). However, the present study represented an attempt to alleviate this

11   problem by adopting a longitudinal design (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and

12   employing SEM to account for measurement error (Podsakoff, MacKenzie, & Podsakoff, 2012) .

13   Third, researchers can investigate different types of athletes such as national sports delegations,

14   professional/amateur athletes, or injured athletes because dissimilar experiences might influence

15   the directionality of the relationship between global and domain-specific satisfaction judgments

16   (Leonardi et al., 2005). Fourth, the athletes' team satisfaction assessed in our study only partially

17   represents one facet of their life experience. Future research may adapt Riemer and Chelladurai

18   (1998) framework to assess multiple dimensions of athlete satisfaction so that we may gain a

19   better understanding of the directionality. Fifth, the systematic attrition due to graduation might

20   have threatened our internal validity. However, the attrition analyses did not show any

21   statistically significant results and it is therefore likely that the attrition did not have a major

22   influence on the results. Finally, we did not explore the issue of time in our study. We used three

23   months as the only time periods during which to examine change. However, as there is no

1   specific guidance for when such change would be more likely to occur, more studies are required

2   to examine the issue of time in the future.

3   In summary, the present study explored the unexamined top-down/bottom-up controversy

4   between life satisfaction and domains of satisfaction in sports with young athletes. The results

5   did indicate a reciprocal association between team satisfaction and life satisfaction but the

6   estimates were more consistent over time for the bottom-up process compared to the top-down

7   process. We hope this study will encourage researchers to study athletes' life satisfaction and

8   other domain satisfaction in sports in the future.

9

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10

1   Footnotes

2   1. The data for this study were collected in the context of a larger project supervised and funded

3   by one of the authors. Neither the analyses nor the findings reported in the present research

4   have been reported in any prior work.

1   Table 1

2   *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

3   Note.

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

5   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

6   are significant at $p < 0.001$.

1   Table 2

2   *Model Fits for Measurement Models of SWLS and Longitudinal Invariance*

Model	SB-χ2	df	p	CFI	TLI	ΔSB-χ2	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

1 **Figure Captions**

2 *Figure 1*

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

4 Note. Residual covariances of TS and SWLS are not shown for clarity. Gender and age are

5 included as control variables. The paths are unstandardized/standardized coefficients. ***$p <$

6 .001.

1