MS MATILDA SORKKILA (Orcid ID : 0000-0002-2144-1767)

DR TATIANA V. RYBA (Orcid ID : 0000-0002-3218-4938)

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The Co-developmental Dynamic of Sport and School Burnout among Student-Athletes: The Role of Achievement Goals

Matilda Sorkkila[a], Kaisa Aunola[a], Katariina Salmela-Aro[a,b], Asko Tolvanen[a,c], & Tatiana V. Ryba[a]

[a]University of Jyvaskyla
Department of Psychology
P.O. Box 35
FI-40014, Finland

[b]University of Helsinki
Cicero Learning
P.O. Box 9
FI-00014, Finland

[c]University of Jyvaskyla
Methodology Center for Human Sciences
P.O. Box 35
FI-40014, Finland

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Correspondence concerning this article should be addressed to Matilda Sorkkila, Tel: +358408054709, E-mail: matilda.2.sorkkila@jyu.fi

Abstract

Student-athletes who strive for success in high level sports while pursuing upper secondary education may be prone to sport and school burnout. The present study examined the co-developmental dynamic of sport and school burnout in Finnish adolescent student-athletes ($N^{time\ 1} = 391$; $N^{time\ 2} = 373$) across the first year of upper secondary school by using cross-lagged structural equation modeling (SEM). Furthermore, we used sport and school-related achievement goals as predictors of sport and school burnout, namely, sport and school-related exhaustion, cynicism, and feelings of inadequacy. The results showed that burnout dimensions in a particular domain were substantially stable within the same domain during the first year of upper secondary school, and that school-related exhaustion at the beginning of upper secondary school predicted sport-related exhaustion at the end of the school year. Mastery goals in sport and school were negatively associated with cynicism and feelings of inadequacy within the same domain. Furthermore, performance goals in school were positively associated with school-related cynicism. The results can be used by healthcare professionals for early prevention of student-athletes' burnout.

Introduction

Student-athletes who combine high-level sport career with upper secondary education may be prone to sport and school burnout due to pressure from two intertwined domains. Only few athletes ever become professional, and in order to secure transition into the labor market, student-athletes need to strive for success in both sport and school. A recent study

showed that student-athletes demonstrate sport and school burnout symptoms already in the very beginning of upper secondary school.[1] The two types of burnout can have serious consequences for adolescents, including mental health problems[2,3] and dropping out of sport[4] and school.[5] Nevertheless, the co-developmental dynamic of sport and school burnout has not yet been investigated. Consequently, the aim of the present study is to investigate the developmental dynamic of school and sport burnout across the first year of upper secondary school. Because achievement goals, conceptualized as the purpose of competence-related behavior,[6] have previously been independently associated with sport[7] and also school burnout[8,9] the aim of the present study was also to examine how school and sport related achievement goals predict the development of sport and school burnout.

Development of Sport and School Burnout in Student-Athletes

Adolescent athletes aiming at elite athletic career devote a significant amount of physical and psychological effort to reach their goal. In most sports, during the age of 16-18 athletes begin their critical transition from junior to senior sports, during which training and competitions intensify.[9] For some athletes, the pressure to succeed may result in chronic stress and even burnout.[10] Sport burnout has been defined as (1) sport-related exhaustion (i.e., chronic fatigue related to overtaxing in sport); (2) sport-related cynicism (i.e., indifferent or distal attitude towards sport); and (3) feelings of inadequacy as an athlete (i.e., perception of not performing as well as one used to in sport).[11] Although it has been repeatedly argued that burnout is a condition that evolves over time, only few studies have investigated the development of sport burnout.[12,13] It has been shown that sport burnout among adolescent athletes may be relatively stable over time[12] although it has been noted that the phenomenon needs to be investigated with a longer time frame.[12,13] It has been suggested that in the long run, sport burnout might generalize to other life areas as well, as one may lose interest in activities that used to be enjoyable.[14]

Athletes, who pursue their sport career simultaneously with education, may be at risk of burning out in two life domains, that is, sport and school. Transition to upper secondary school has been shown to be particularly stressful for adolescents, possibly due to increasing academic demands and changes in sources of social support.[15] It was recently shown that within the past 2 years, school burnout increased 30% among Finnish upper secondary school girls.[16] School burnout has been defined in parallel to sport burnout as a three dimensional construct consisting of: (1) school-related exhaustion (i.e., chronic fatigue related to overtaxing in school); (2) school-related cynicism (i.e., indifferent or distal attitude towards school); and (3) feelings of inadequacy as a student (i.e., perception of not performing as well as one used to in school).[17,18] School burnout has been shown to increase across upper secondary school.[15,19] Furthermore, cross-lagged studies have shown that over time school burnout spills over to other life domains.[3,20] Generalization of burnout has been shown also in clinical settings, and it has been suggested that in the long run, burnout may overlap with depression influencing nearly all life domains.[21]

Although it has been shown that student-athletes demonstrate sport and school burnout symptoms already in the beginning of upper secondary school,[1] the co-development of sport and school burnout in adolescent student-athletes has not been yet investigated. It has been shown that sport and school burnout are context-dependent phenomena, that is, they are associated but separate concepts.[1] Although both concepts are stress-related, they refer to different contexts of stress (i.e., in sport burnout the context of stress is sport, and in school burnout the context of stress is school). It is possible that among student-athletes, school burnout may impact the development of sport burnout and sport burnout may impact the development of school burnout. This reasoning stems from cognitive-affective model of stress and burnout, which posits that when situational demands exceed the available resources, athlete's prolonged stress may lead to burnout associated with loss of interest in

nearly all activities used to be enjoyable.[14] Burnout symptoms in one domain may, therefore, trigger burnout symptoms also in the other domain. For example, experiencing exhaustion (i.e., chronic fatigue) in school may lead to less energy available for sport and, thus, generalize to sport-related exhaustion. Moreover, feeling inadequate as a student may spread to feelings of inadequacy also as an athlete, as across time one's overall self-esteem, defined as the overall evaluation of one's value as a person,[23] may deteriorate after experiencing failures. Furthermore, having cynical and distant attitude towards one domain (e.g., sport) may over time develop into cynical attitude also towards the other domain (e.g., school) as one, as a consequence of prolonged stress, loses interest in nearly all activities.[14] Furthermore, in the case of student-athletes, it is possible that one domain, sport or school, may be initially dominant in burnout symptoms, which then spills over to the other domain, but not the other way around. In this case, sport burnout symptoms, for example, could be merely result of being burned out in school. Consequently, treating symptoms of burnout in sport context may not have an effect because the source of stress is misplaced, which may then result into more serious conditions, such as depression, which has been shown to result from prolonged burnout.[3] The information about direction of sport and school burnout is particularly important for sport policy makers, and has practical implications for coaching and healthcare staff to enable early detection and prevention of burnout in dual career athletes. The first aim of the present study was, therefore, to investigate the co-developmental dynamic of sport and school burnout in student-athletes during the first year of upper secondary school.

Achievement Goals as Predictors of Sport and School Burnout

From a social cognitive perspective, individuals' achievement goals are crucial determinants of achievement behavior and may, therefore, provide a basis for understanding the development of burnout.[24] Achievement goals consist of two goal orientations, *mastery*

and *performance*[6] (also labeled as *task* and *ego*[25]) which act as criteria by which individual assesses success in achievement context. Mastery-oriented individuals are primarily motivated by improvement and personal mastery. Performance-orientation takes place when individual actions are mainly motivated by demonstrating normative competence, such as superiority or winning. It has been shown that athletes who are mastery-oriented are more likely to demonstrate adaptive achievement behaviors, such as persisting in the face of failure and showing more positive emotions than those who are performance-oriented.[7] Furthermore, performance-oriented athletes may be more prone to burnout than mastery-oriented athletes, because their self-worth might be dependent on constantly demonstrating one's ability.[24] Unsatisfactory performance may thus result in perceiving competitive situations as threatening, which then leads to chronic stress and burnout symptoms. Indeed, Lemyere and colleagues[24] showed that among adult elite athletes, a "maladaptive" profile consisting of high performance orientation, performance-involving climate, low mastery-orientation and mastery-involving climate, was associated with sport burnout. Similarly, Isoard-Gautheaur and others[26] found that among adolescent elite athletes, mastery approach goals were negatively related to sport devaluation, and performance approach goals were positively related to emotional and physical exhaustion.

Achievement goals have been also associated with school burnout.[8,27] Two person-oriented studies conducted among Finnish secondary and upper secondary school students showed that mastery-oriented students reported various sides of subjective wellbeing and low level of cynicism and inadequacy.[8,27] In turn, performance-oriented students were more likely to show symptoms of school-related exhaustion, cynicism, and inadequacy than their mastery-seeking peers.[8,27] It is possible that among student-athletes the goals interact between the two domains, that is, school and sport. It has been previously shown that, among student-athletes, high success expectations in one domain (e.g., sport) are negatively associated with

sport burnout, but positively associated with burnout in another domain (in this case, school).[1] Although success expectations differ from achievement goals in such that they do not investigate athlete' s achievement motivation but more so how athlete expects to succeed on a certain domain, they still capture athlete's motivational drive towards one domain or another. For example, in the case of achievement goals, it is possible that sport mastery-oriented or sport performance-oriented individual is passionate about sport and wants to invest time and energy on that particular domain (for goals of personal mastery or winning others), whereas school aside is seen as compulsory or entrapment. Therefore, the more goal-oriented individual is in one domain, the more she/he might like to invest in this particular domain, but at the same time the more 'burden' the *other* domain becomes, resulting in burnout symptoms. Indeed, previous research has shown that dual career athletes often experience tensions and goal conflicts between their passion for sport and time they need to spend on school which they recognize as important for their vocational future.[22] However, the role of achievement goals on sport and school burnout has not yet been investigated. Consequently, the second aim of the study was to investigate the role of sport and school related achievement goals in the development of sport and school burnout.

The Present Study

The purpose of the present study was to investigate the co-developmental dynamic of sport and school burnout in student-athletes across the first year of upper secondary school, and to further examine how achievement goals in sport and school predict the development of sport and school burnout. With autoregressive paths we aimed to predict changes in variables and, thus, establish directionality. The following research questions were investigated:

(1) How does sport and school burnout, that is, sport and school related exhaustion, cynicism, and inadequacy, co-evolve across the first year of upper secondary school

among student-athletes? In line with the previous findings,[12,13] it was expected that sport burnout at the beginning of the school year predicts sport burnout at the end of the school year (hypothesis 1). It was further hypothesized that school burnout at the beginning of the first school year predicts school burnout at the end of the school year (hypothesis 2).[15,19] Because previous studies have shown that burnout may spill over from one domain to another,[3,20] it was expected that school burnout at the beginning of the first school year predicts sport burnout at the end of the school year (hypothesis 3) and sport burnout at the beginning of the first school year predicts school burnout at the end of the school year (hypothesis 4).

(2) To what extent do achievement goals in sport and school predict sport and school burnout at the beginning and end of the first school year? Based on the previous research,[24,26] sport mastery-orientation was expected to negatively predict sport burnout (hypothesis 5) and sport performance-orientation to positively predict sport burnout (hypothesis 6) at both T1 and T2. It was further hypothesized, in line with previous findings,[8,27] that school mastery-orientation would negatively predict school burnout (hypothesis 7) and school performance-orientation would positively predict school burnout (hypothesis 8) at T1 and T2. Finally, based on the findings of the cross-domain relationship between burnout and success expectations[1] it was hypothesized that school mastery and school performance orientation would predict sport burnout (hypotheses 9 and 10, respectively), and sport mastery and sport performance orientation would predict school burnout (hypotheses 11 and 12, respectively).

Method

Participants and Procedures

The present study is part of the longitudinal Finnish Dual Career project, in which talented student-athletes are followed throughout upper secondary sport school.[x] Ethical approval for the study was obtained from the ethics committee of the relevant university. The sample consisted of 391 Finnish-speaking student-athletes (51% females) from six upper secondary sport schools, aged 15-16 (M = 16, SD = 0.17). In Finland, there are currently 13 upper secondary sport schools, which provide structural support for talented athletes to combine upper secondary school education with an athletic career. The selected schools are linked to the largest elite development centers and were contacted through the national network of sports academies. The six schools (two from Central, two from Southern, and two from Northern Finland) are also geographically representative of the country. As the schooling system in Finland is very homogeneous and monitored, six schools were considered adequate to represent Finnish upper secondary sport schools. Admission to upper secondary sport schools is competitive, and in addition to demonstrating academic ability evident by secondary school reports, adolescents must demonstrate high potential in their sport. Prior to data collection, the participants signed informed consent as the indication of their voluntary participation in the study. In Finland, parental informed consent is not required for participants of over 15 years of age. All incoming athletes agreed to participate in the study. The participants completed a battery of questionnaires during class time at the beginning of their first year in upper secondary sport school (T1) and again, six months later (T2). At T2, 18 participants had dropped out, which resulted in 373 student-athletes (52% females). Fifty percent of the participants practiced individual sports and 50% team sports, and they had been competing at least in the regional level for at least 7 years, on average (*SD*

= 2.41). The participants' Grade Point Average (GPA; possible range from 4 to 10) was 8.85, (*SD* = 0.62) and 68% of the participants expected to obtain a university Master's degree.

Measurements

Sport burnout. Sport burnout was investigated by using the Sport Burnout Inventory - Dual Career Form (SpBI-DC).[11] The SpBI-DC is a modified version of the School Burnout Inventory (SBI)[17,18] and can be considered optimal for examining sport burnout in a dual career context. The scale consists of 10 items, out of which 4 measures sport-related exhaustion (e.g., *I often sleep poorly because of matters related to my sport),* 3 measures cynicism towards the meaning of one's sport (e.g., *Sport doesn't interest me anymore*), and 3 measures feelings of inadequacy as an athlete (e.g., *I used to achieve more in my sport).* All items were rated on a 5-point Likert scale (1 = *completely disagree*; 5 = *completely agree).* Mean scores for each subscale were created. The Cronbach alpha reliabilities for the three subscales were 0.74, 0.80, and 0.78 in T1, and 0.77, 0.88, and 0.81 in T2, respectively.

School burnout. School burnout was measured using the SBI.[17,18] The scale consists of 10 items, out of which 4 measure exhaustion at school (e.g., *I often sleep poorly because of matters related to my schoolwork*), 3 measure cynicism towards the meaning of school (e.g., *School doesn't interest me anymore*) and 3 measuring feelings of inadequacy as a student (e.g., *I used to achieve more in school*). All items were rated on a 5-point Likert scale (1 = *completely disagree*; 5 = *completely agree).* Mean scores for each subscale were created. The Cronbach alpha reliabilities for the subscales were in 0.82, 0.80, and 0.78 in T1, and 0.83, 0.83, and 0.82, in T2, respectively.

Achievement goals in sport. Achievement goals in sport were measured by using the Perception of Success Questionnaire.[25] The scale consists of 10 questions, out of which six measure mastery orientation in sport (e.g., *When playing sport, I feel most successful when I try hard*) and four measure performance orientation in sport (e.g., *When playing sport, I feel*

most successful when I beat other people). The Cronbach alpha reliability coefficient for mastery orientation subscale was 0.74, and for performance orientation subscale 0.86.

Achievement goals in school. To measure achievement goals in school, the Perception of Success Questionnaire[25] was modified into school context. The scale consists of 10 questions, six of which measure mastery orientation in school (e.g., *When studying, I feel most successful when I really improve*) and four performance orientation in school (e.g., *When studying, I feel most successful when I get better grades than others*). The Cronbach alpha reliability coefficient for mastery orientation subscale was 0.88 and for the performance orientation subscale 0.91.

Analysis Strategy

The statistical analyses were carried out with M-plus package.[28] The full-information maximum likelihood (MLR) procedure was used to estimate the parameters of the models. A missing-data method was applied, which uses all available data to estimate the model without inputting data. Initial data screening revealed no outliers (i.e., there were no values outside the distribution and all values were within the range of -/+ 3 standard deviations from the mean).

The analyses were carried out according to the following steps: First, measurement models were specified according to the theoretical background of sport and school burnout (separate models for exhaustion, cynicism and inadequacy). Also measurement models were specified for achievement goals (simultaneous estimation for school mastery, school performance, sport mastery and sport performance). The goodness-of-fit was assessed by using four indicators: (1) χ^2-test, (2) Bentler's comparative fit index (CFI), TLI (3) the Tucker-Lewis Index (TLI), (4) Root Mean Square Error of Approximation (RMSEA), and (5) Standardized Root Mean Square Residual (SRMR). Values above 0.95 for CFI and TLI and

value below 0.06 for RMSEA and 0.08 for SRMR were considered to indicate a good fit between the hypothesized model and the observed data.[29]

Second, invariance of factor loadings, intercepts and residuals across time in burnout subscales was tested. The invariance was tested by estimating four models step by step. Model M1 was freely estimated model. In the model M2 the factor loadings were set equal across time, and in the model M3 the factor loadings and intercepts were set equal across time. In the model M4 factor loadings, intercepts and residual variances were set equal across time. Successive models were compared by using the Satorra and Bentler corrected chi-square difference test. If the difference test was shown to be significant, the amount of difference was evaluated by comparing the RMSEA values. A small RMSEA difference indicates that the invariance between the factors holds across time.[30] By using the method of MacCallum, Browne, and Cai,[30] the chi-square difference test value was compared to non-central chi-square distribution instead of usual chi-square distribution. The non-central value for chi-square distribution was calculated by allowing the increase in RMSEA values between time points to be .01 (from .05 to .06).[30] With these small differences in RMSEA values, we obtained the critical value for chi-square (χ^2) differences and the corresponding p-value. If the p-value was not statistically significant, the difference was small and we accepted the more stringent model (for example, invariance in factor loadings). In all these models, autocorrelations over time between the same items were allowed.[31]

Third, cross-lagged models for sport and school burnout were constructed separately for each burnout subscale. Fourth, performance and mastery goals (separately for school and sport domains) were included into the previous models as predictors of sport and school burnout dimensions at T1 and T2. In this context, the impact of common method variance on the results was tested by adding a latent factor including all the items measuring achievement goals and sport and school burnout to the model.[32,33]

Results

First, measurement models for sport and school burnout subscales (exhaustion, cynicism, and inadequacy) at T1 and T2 were constructed from the relevant items. Based on the criteria of Hu and Bentler[29] all models demonstrated a good fit (see Table 1). Next, measurement model for achievement goals (sport mastery and performance goals and school mastery and performance goals within the same model) was investigated. As shown in Table 1, the fit of the model was not sufficient. Consequently, we also investigated sport and school achievement goals by using exploratory factor analysis (EFA) in order to gain deeper understanding to the results. It has been suggested that in the case of poorly fitting models, instead of relying on extensive model modifications of the CFA, it may be better to carry out the analyses using EFA.[34] In EFA, theoretical hypotheses about the patterns between variables is not needed (i.e., in EFA, factor loadings of measured variables to all factors are calculated). The results of EFA model (fit indices = χ^2 (164) = 494.33; $p < .01$; CFI = 0.898; TLI = 0.882; RMSEA = 0.072; SRMR = 0.070) showed that the standardized factors loadings for sport performance goals were between 0. 70 and 0.82 (the largest cross-loading -0.14) and for sport mastery goals between 0.43 and 0.73 (the largest cross-loading 0.04) In school performance goals, the standardized factors loadings were between 0.80 and 0.89 (the largest cross-loading -0.14) and for school mastery goals 0.62 and 0.86 (the largest cross-loading 0.07). These results indicate that the theoretical structure of achievement goals fits well with the data although many small cross-loadings result poor fit in the confirmatory model. Since the fit of the EFA model (RMSEA = .072) was nearly equal to the fit of the CFA model (RMSEA = .075) and the CFA model was considered more interpretable and in line with the theory of measurement modeling, we continued using the theoretical structure of achievement goals in the confirmatory factor analysis (CFA).

Second, invariance of factor loadings, intercepts and residuals across time in sport and school burnout subscales was investigated. The fit indices of all tested successive models are presented in Table 1. As can be seen from the table, with those models with significant difference test the RMSEA differences were small (i.e., from .05 to .06),[30] indicating that the model invariance holds in all burnout subscales.[30]

Third, the cross-lagged models were constructed separately for each subscale (sport and school exhaustion at T1 and T2; sport and school cynicism at T1 and T2; and sport and school inadequacy at T1 and T2, respectively). A model with sport and school exhaustion had a good fit (see Figure 1), similarly to the model with sport and school cynicism (χ^2 (56) = 75.541; p = 0.042; CFI = 0.987; TLI = 0.985; RMSEA = 0.030; SRMR = 0.038) and sport and school inadequacy (χ^2 (56) =110.444; p < 001; CFI = 0.965; TLI = 0.959; RMSEA = 0.050; SRMR = 0.043). The results concerning exhaustion showed first that both sport exhaustion at and school exhaustion showed statistically significant stability from T1 to T2. Second, school exhaustion at T1 predicted sport exhaustion at T2 (see Figure 1 for parameter estimates): the higher the school exhaustion at T1, the higher the subsequent sport exhaustion at T2, after controlling for the level of sport exhaustion at T1. Sport exhaustion at T1, however, did not predict school exhaustion at T2 (standardized parameter estimate = .13, p = .07).

The results for sport and school cynicism showed that sport and school cynicism at T1 predicted cynicism in the same domain at T2 (standardized parameter estimates = 0.53, p < .001; 0.64, p < .001, respectively) but there were no statistically significant cross-lagged associations between the two domains (standardized parameter estimates = -.02, p = .71; .05, p = .38, respectively). Similarly, sport and school inadequacy in T1 predicted inadequacy in the same domain in T2 (standardized parameter estimates = 0.58, p < .001; 0.59, p < .001,

respectively) but no cross-lagged associations were found between the two domains (standardized parameter estimates = .06, p = .40; .07, p = .23, respectively).

Fourth, achievement goals in sport and school were included into the previous models as predictors of symptoms of sport and school burnout. Because goals on two different domains (sport and school) correlated with each other relatively strongly ($r^{mastery\ goals}$ = .49, p < .001; $r^{performance\ goals}$ = .58, p < .001), we used Cholesky decomposition to test the independent contribution of each subscale.[33] The results showed that sport mastery goals predicted negatively sport-related cynicism (see Figure 2) and sport-related inadequacy (see Figure 3) at T1, whereas school mastery goals predicted negatively school cynicism (see Figure 2) and school-related inadequacy (see Figure 3) at T1: the higher the level of the mastery goals on a particular domain, the lower the level of cynicism and inadequacy on that domain at T1. Besides of these effects of mastery goals, school performance goals predicted positively school cynicism in T1 (see Figure 2): the higher the level of performance goals on the school domain athletes reported, the more cynicism they also reported in school at T1. No significant associations were found between achievement goals and sport and school exhaustion. Finally, a latent factor measuring possible bias do the common method was added to the model. The indicators of the factor included all items measuring achievement goals and sport and school burnout. The results showed that only few of the items (four out from 20) loaded significantly on the common factor. Moreover, the loadings of the items varied from positive to negative. Consequently, no common variance related to method used in this study was found.[32,33]

Discussion

The purpose of this study was to investigate the co-developmental dynamic of sport and school burnout among adolescent student-athletes. Furthermore, the relationship between achievement goals and burnout development was investigated. The results showed that

dimensions of sport and school burnout, that is exhaustion, cynicism, and inadequacy, showed all substantial stability during the first year of upper secondary school. Furthermore, the level of school exhaustion at the beginning of upper secondary school predicted subsequent sport exhaustion at the end of the school year. The results showed further that mastery-orientation was negatively associated with cynicism and feelings of inadequacy within the same domain and school performance orientation, in turn, was positively associated with school cynicism.

Developmental Dynamic of Sport and School Burnout

The first aim of the study was to examine how sport and school burnout would co-evolve across the first year of upper secondary school in student-athletes. As we expected (hypotheses 1), sport burnout at the beginning of school predicted sport burnout at the end of the first year of upper secondary school, and (hypothesis 2) school burnout in the beginning of upper secondary school predicted school burnout in the end of the school year. The findings are in line with previous research, which has shown that sport burnout[12,13] and school burnout[8,25] show stability over time. Furthermore, school exhaustion at the beginning of upper secondary school predicted sport exhaustion at the end of the first school year, as we expected (hypothesis 3). However, our hypothesis was only partially supported, since school-related cynicism and inadequacy did not predict similar symptoms on the sport domain. The pattern of results may be due to the fact that exhaustion is characterized as the initial and central part of burnout[35,36] and therefore the effect of exhaustion is likely to be evident first. Thus, it is possible that over time cynicism and inadequacy also become significant predictors of later similar symptoms of sport burnout. Interestingly, symptoms of sport burnout did not predict subsequent symptoms of school burnout (hypothesis 4). This finding suggests that during the first year of upper secondary school student-athletes may be particularly exhausted from school, which then spills over to sport. This may be due to the increasing study demands

of upper secondary schools[15] as athletes may not have sufficient amount of time to rest and recover from school, and are therefore more exhausted also in sport. This information that symptoms of sport exhaustion may partly result from exhaustion of school is important for sport and upper secondary school policy makers, and also for coaches and parents, and should be taken into account in treatment and recovery in order to prevent student-athletes from burning out.

Achievement Goals as Predictors of Sport and School Burnout

Our second aim was to examine how achievement goals would predict the development of sport and school burnout among student-athletes. As we expected (hypothesis 5), mastery-orientation in sport was negatively associated with sport-related cynicism and inadequacy at the beginning of upper secondary school. This finding is in line with previous studies[7] suggesting that those who are motivated by personal growth and mastery are less likely to show sport-related cynicism or feelings of inadequacy than those who are not. Although no direct effect was found between mastery goals in sport and sport-related cynicism and inadequacy at the *end* of the school year, due to a high stability of the burnout subscales between the two measurement points, the effect is likely to carry over to the second measurement point via the first one. Unlike expected, mastery-orientation in sport was not related to sport exhaustion, which in line with some of the past findings.[26] This is interesting as exhaustion has been shown to be the central part of sport burnout.[36,37] Recently, there have been arguments that exhaustion should be investigated separately from cynicism and inadequacy, as they do not measure the same construct.[10,36] Whereas exhaustion is a physical state resulting from overtaxing in a domain, cynicism and inadequacy are attitudes towards the domain. Hence it is plausible that mastery goals, characterized by personal mastery and growth seeking would be negatively related to cynical attitude and feelings of inadequacy as an athlete, but not necessarily to exhaustion.

Unlike we expected, performance-orientation was not associated with sport burnout symptoms (hypothesis 6). In previous studies, performance-orientation in adolescent athletes has been associated with sport burnout symptoms,[22,24] although contradictory evidence also exists. Appleton, Hill and Hall found among junior male-elite athletes (in a study that investigated the moderating role of achievement goals in perfectionism-burnout relationship) that neither mastery nor performance-orientation predicted burnout.[38] One reason for contradicting findings could be differences among the samples, as some studies have been conducted with elite adult athletes[24] and some with elite junior athletes[38]. Our study was conducted with adolescent student-athletes from various competition levels (i.e., not only elite-level).

In school context, similarly, mastery-orientation was negatively associated with school-related cynicism and inadequacy at the beginning of upper secondary school. This was in line with our hypothesis (7) and with the previous studies[8,27] indicating that those who are motivated by personal mastery may be less likely to experience symptoms of school-related cynicism or inadequacy as a student. However, similarly to sport domain and previous findings on school domain [8,27], school mastery goals were not related to school-related exhaustion, making room for ongoing discussion whether exhaustion should be investigated separately from cynicism and inadequacy.[10,36] As anticipated (hypothesis 8) performance-orientation in school was associated with school-related cynicism. This finding is in line with the previous findings,[8,27] suggesting that having school achievement goals based on winning others may result into symptoms of cynicism towards school. This may be the case particularly if one is not performing as well as expected, as one's self-value, which is dependent on feeling superior to others, becomes threatened.[24] It might be interesting, consequently, to investigate whether student-athletes' school performance (i.e., grade point average), might moderate the relationship between performance-orientation and school

burnout. However, unlike in the previous studies,[8,27] school performance goals were not related to school exhaustion or feelings of inadequacy as a student. One reason for this contradicting finding could be differences in the sample: student-athletes are a specific population and may not be directly comparable to students. A second reason, which also applies to sport settings, could be due to differences in conceptualization. In the present study achievement goals were investigated as a two-dimensional construct (mastery/performance), whereas research in both sport[26] and school[27] settings has investigated achievement goals more recently with 2 x 2 model (mastery-approach/avoidance; performance-approach/avoidance) which suggest that motivation can be either appetitive (e.g., mastery-approach) or aversive (e.g., mastery-avoidance).[6] In this model, perceived competence is believed to be a central characteristic differentiating approach goals from avoidance goals. The impact of achievement goals on sport and school burnout should be investigated in the future by using the 2 x 2 model in order to have a more holistic view of the phenomenon.

Limitations of the Study

The present study had several strengths. First, we were able to provide meaningful, novel knowledge about the simultaneous development of sport and school burnout symptoms among student-athletes by using a longitudinal design. Second, the sample was large and the selected schools were located on geographically different sides of Finland. Third, by using structural equation modeling (SEM) we were able to investigate latent variables instead of observed variables and thus account for measurement error. However, we also faced several limitations. First, we used adapted measures of achievement goals, which were not yet validated in the modified context. Second, we used self-reports of student-athletes and, thus, have only partial view of the phenomenon. Future studies should investigate the development of school and sport burnout by including, for example, reports from parents and coaches, and possibly also physiological burnout measures. Third, we did not have clinical or any other

kind of cutoff values for sport and school burnout, making it hard to interpret what the scores actually mean. This problem has been recognized by burnout researchers[10,35], and it is highly encouraged that in the future cut off scores for student-athletes' burnout would be created. It would be also interesting to investigate the relationship between burnout scores and, for example, real-world performance (e.g., GPA, competition success) and motivation outcomes in order to gain greater understanding to the real-world meaning of burnout scores. Third, the time frame of the investigation was only six months and we had only two measurement points. By having only two measurement points we were not able to separate between within- and between-person effect, possibly rendering bias for the cross-lagged and autoregressive effects.[39] Furthermore, another measurement occasion would allow tests of mediator effects, on the one hand, and growth curves of burnout measures, on the other. For future research, longer time frames and more measurement points are required to investigate the co-development of sport and school burnout across school years. Fourth, although the power to detect unequal factor loadings from T1 to T2 for sport exhaustion and cynicism were high, for inadequacy it was low and, consequently, one should be cautious about the findings concerning inadequacy subscale. It should be noted, however, that from a total of 28 tests only one demonstrated low power and, thus, the result may have also appeared randomly. Fifth, the study was conducted in Finland, and it is unknown how sport and school burnout co-evolves in other countries where systems regarding schooling and organized sports differ. Consequently, the topic should be investigated also in other cultural contexts. Finally, although the statistical methods in the present study were carefully chosen, we cannot conclude causality for this type of study. For example, the participants were not randomly selected from all Finnish student-athletes (more so, they were members of certain schools) nor can we be sure that the relationships between the variables are not impacted by other variables.[40] This needs to be noted when interpreting the results.

Perspectives

The present study contributed to the existing literature in three ways. First, we investigated the co-developmental dynamic of sport and school burnout among adolescent-athletes by using SEM and could therefore present a sophisticated description of the previously unexamined phenomenon. Second, we were able to show that exhaustion spills over from school to sport domain, which is of significant importance to policy makers of upper secondary schools, sport clubs and coaches in order to prevent student-athletes from burning out. Third, we showed that among adolescent student-athletes mastery-goals may protect from sport and school related cynicism and inadequacy within the same domain. Furthermore, we showed that performance goals in school predicted cynicism towards school. As a practical implication, student-athletes could be motivated in sport and school by teachers and coaches by using self-development and learning as a method.

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Table 1. *Measurement Models of Sport and School Burnout and Achievement Goals among Student-Athletes*

Subscale	χ^2	df	p-value	RMSEA	CFI	TLI	SRMR	$\Delta\chi^2$	Δdf	p-value
Sport										
Exhaustion M1	36.23	15	.001	.061	.97	.95	.035	-	-	-
Exhaustion M2	48.18	18	<.001	.065	.96	.94	.049	12.26	3	.007[a]
Exhaustion M3	53.71	21	<.001	.063	.96	.95	.046	5.24	3	.155
Exhaustion M4	55.52	25	<.001	.056	.96	.96	.051	2.49	4	.647
Inadequacy M1	5.28	5	.383	.012	1.0	1.0	.021	-	-	-
Inadequacy M2	16.92	7	.018	.060	.984	.965	.043	12.89	2	.002[b]
Inadequacy M3	20.91	9	.013	.058	.980	.967	.038	3.89	2	.143
Inadequacy M4	22.39	12	.033	.047	.983	.979	.036	2.92	3	.404
Cynicism M1	3.70	5	.593	<.001	1.0	1.0	.015	-	-	-
Cynicism M2	5.52	7	.597	<.001	1.0	1.0	.028	2.24	2	.999
Cynicism M3	7.76	9	.559	<.001	1.0	1.0	.027	2.78	2	.249
Cynicism M4	13.89	12	.308	.020	.996	.995	.039	5.49	3	.139
School										
Exhaustion M1	39.37	15	<.001	.064	.977	.957	.034	-	-	-
Exhaustion M2	40.91	18	.002	.057	.979	.967	.037	1.40	3	.705
Exhaustion M3	42.37	21	.004	.051	.980	.973	.036	1.01	3	.800
Exhaustion M4	48.54	25	.003	.049	.978	.975	.042	6.30	4	.178
Inadequacy M1	13.47	5	.019	.066	.988	.964	.028	-	-	-
Inadequacy M2	15.43	7	.031	.055	.988	.974	.033	1.85	2	.397
Inadequacy M3	19.64	9	.020	.055	.985	.975	.034	4.21	2	.122
Inadequacy M4	20.28	12	.062	.042	.988	.985	.041	1.43	3	.697
Cynicism M1	4.14	5	.530	<.001	1.0	1.0	.014	-	-	-

Cynicism M2	6.34	7	.501	<.001	1.0	1.0	.023	2.29	2	.318
Cynicism M3	11.01	9	.275	.024	.997	.995	.030	5.42	2	.067
Cynicism M4	12.15	12	.433	.006	1.0	1.0	.029	1.52	3	.678
Goals M1	531.16	164	<.001	.076	.89	.87	.065			
Goals M2	546.66	172	<.001	.075	.88	.87	.079			
Goals M3	615.58	180	<.001	.079	.87	.86	.097			
Goals M4	662.63	190	<.001	.080	.85	.85	.181			

Note. M1 = Freely estimated model; M2 = Factor loadings fixed equal; M3 = Factor loadings and intercept fixed equal; M4 = Factor loadings, intercept and residuals fixed equal; Goals = Sport and school achievement goals. The final three columns describe χ^2 differences between nested models; [a] = The power using the non-central χ^2- test was .73; [b] = The power using the non-central χ^2- test was .17.

Table 2. *Sport and School Achievement Goals as Predictors of Sport and School Burnout in T1 and T2*

	Sport burnout T1			Sport burnout T2			School burnout T1			School burnout T2		
	Exhaustion	Cynicism	Inadequacy	Exhaustion	Cynicism	Inadequacy	Exhaustion	Cynicism	Inadequacy	Exhaustion	Cynicism	Inadequacy
Goal orientation	Est (SE)	Est (SE)	Est (SE)	Est (SE)	Est (SE)	Est (SE)	Est (SE)	Est (SE)	Est (SE)	Est (SE)	Est (SE)	Est (SE)
Sport mastery	-.12(.06)	-.28(.06)***	-.23(.06)***	-.02(.05)	-.10(.06)	.02(.06)	-.04(.06)	-.10(.06)	-.11(.06)	-.01(.05)	-.02(.07)	.00(.05)
Sport performance	-.02(.06)	.01(.06)	-.03(.06)	-.04(.05)	.04(.04)	.00(.05)	.00 (.05)	.07(.05)	-.03(.06)	-.07(.04)	-.02(.05)	.04(.04)
School mastery	-.01(.07)	-.12(.06)	-.07(.07)	-.01(.06)	-.05(.07)	.02(.07)	-.03(.07)	-.39(.07)***	-.37(.06)***	-.04(.06)	-.07(.07)	.01(07)
School performance	-.06(.08)	-.01(.06)	-.01(.07)	-.00(.06)	-.04(.05)	-.06(.05)	-.06(.08)	.13(.06)*	.09(.07)	-.02(.05)	-.03(.05)	-.03(.06)

Note. *$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; T1 = measuring time; T2 = measuring time 2; Est = standardized parameter estimate; SE = standard error.

Fit indices: χ^2 (110) = 212.193; p < 001; CFI = 0.955; TLI = 0.951; RMSEA = 0.049; SRMR = 0.047

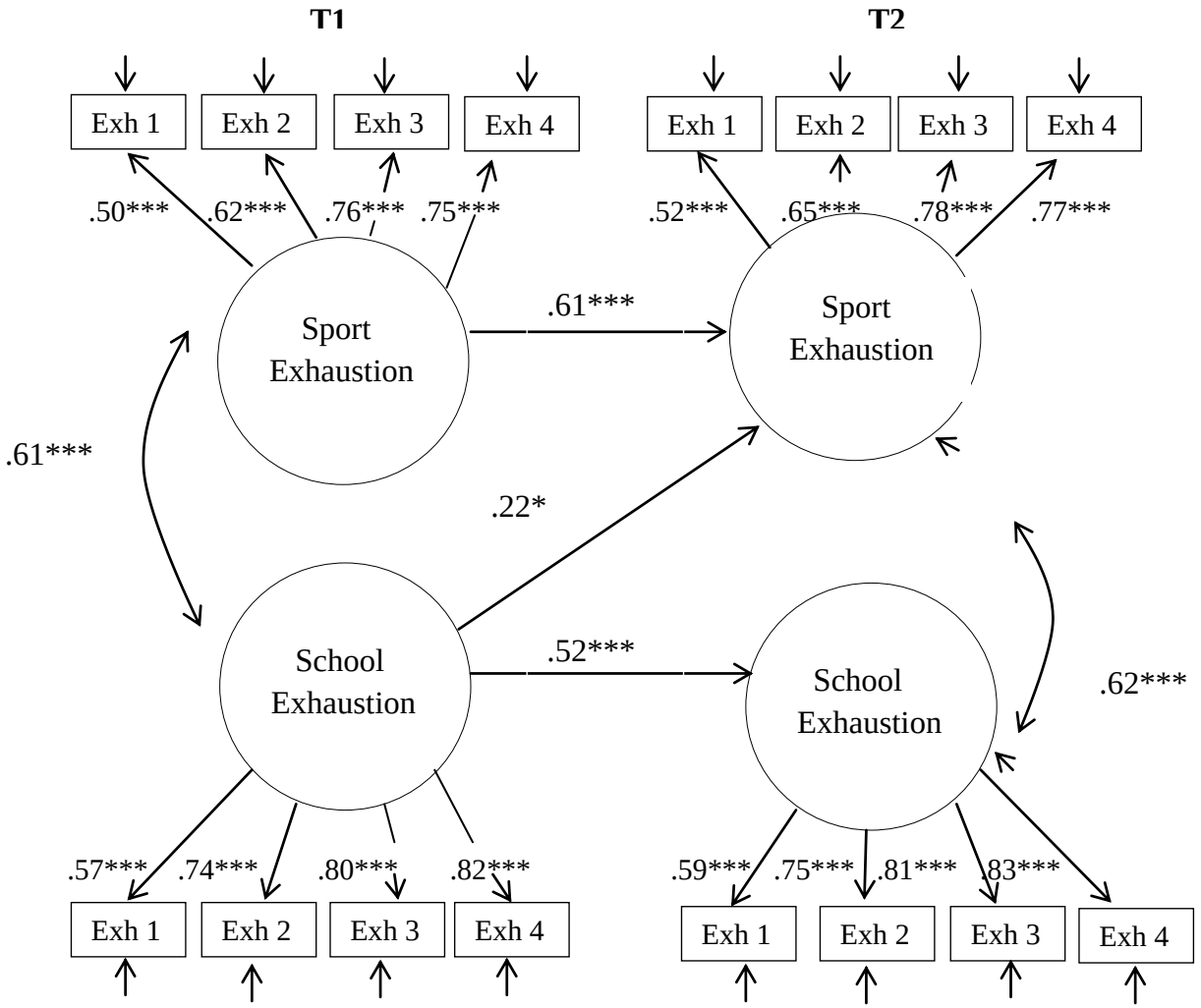

Figure 1. The Developmental Dynamic of Sport and School Exhaustion (Standardized Parameter Estimates) at T1 (N = 391) and T2 (N = 373).

Note. Only the statistically significant regression coefficients are included. * p <.05, **p <.01, ***p <.001; T1 = measuring time 1; T2 = measuring time 2; Exh = exhaustion.

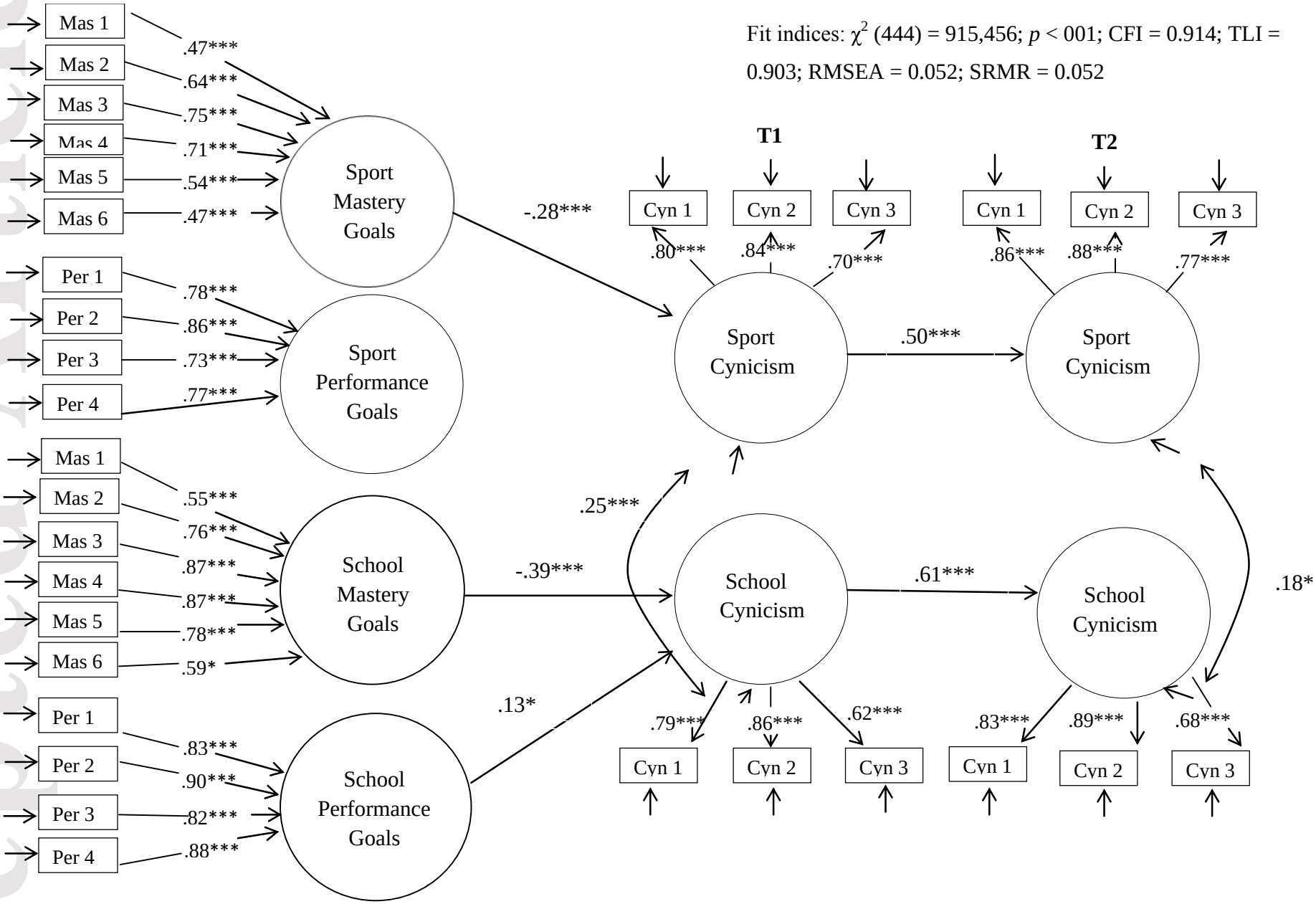

Figure 2. Sport and School Achievement Goals as Predictors of Sport and School Cynicism (Standardized Parameter Estimates) in T1 (N = 391) and T2 (N = 373).

Note. Only the statistically significant regression coefficients are included. * p <.05, **p <.01, ***p <.001; T1 = measuring time 1; T2 = measuring time 2; Mas = mastery goals; Per = performance goals; Cyn = cynicism.

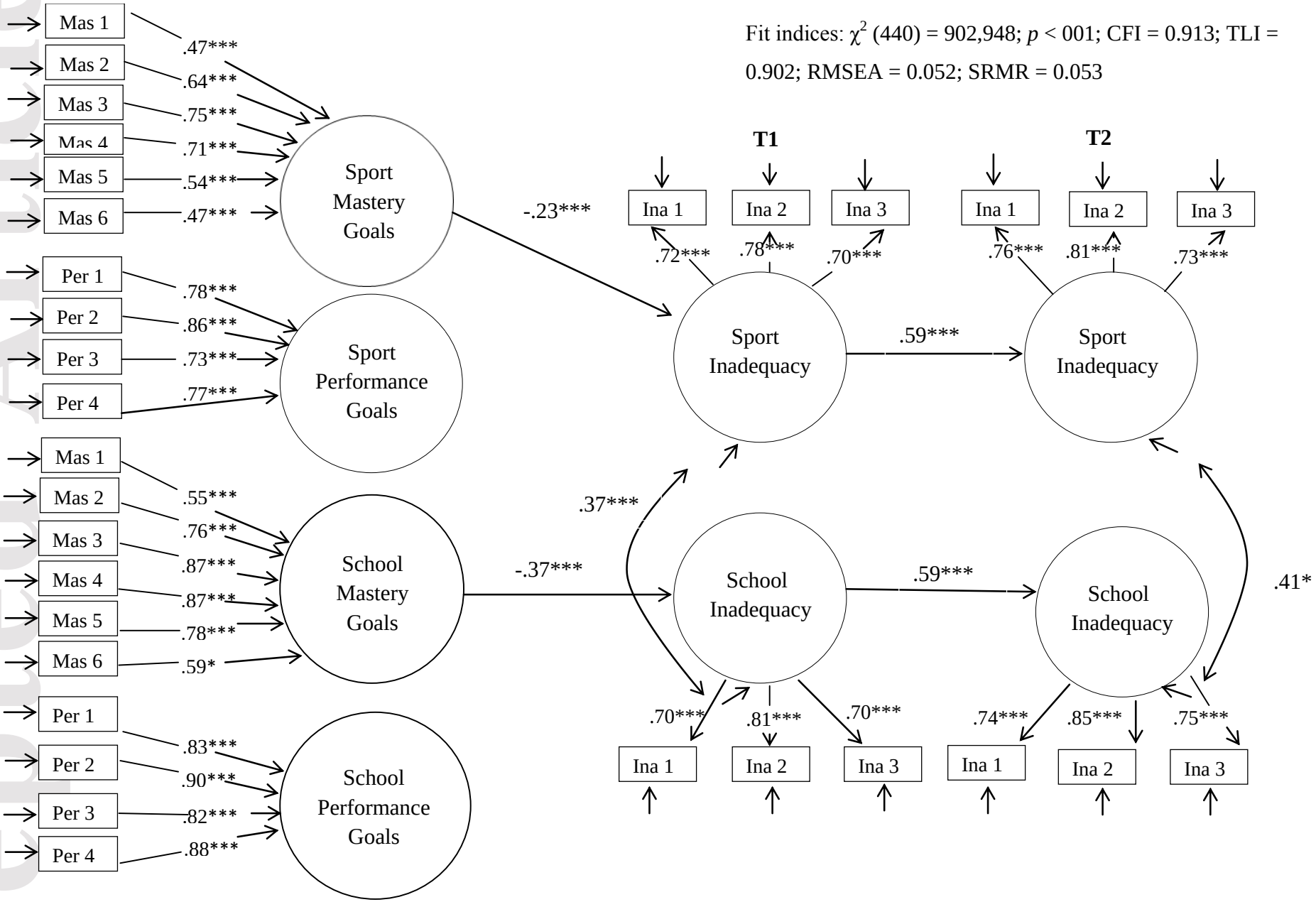

Figure 3. Sport and School Achievement Goals as Predictors of Sport and School Inadequacy (Standardized Parameter Estimates) in T1 (N = 391) and T2 (N = 373).

Note. Only the statistically significant regression coefficients are included. * p <.05, **p <.01, ***p <.001; T1 = measuring time 1; T2 = measuring time 2; Mas = mastery goals; Per = performance goals; Ina = Inadequacy.