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Student-Athletes' Causal Attributions for Sport and School Achievement in Relation to Sport Dropout and Grade Point Average

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Abstract

The present study longitudinally examined stability and change in the attributional profiles of Finnish student-athletes (n = 391) in upper secondary sport school. Moreover, it examined the extent to which these profiles, and changes in them, were associated with athletes' level of sport competition and school achievements and dropouts at the end of upper secondary sport school. Using latent profile analysis, five different and highly stable attributional profiles were identified for student-athletes: (1) depressive (6.9 %), (2) athletic self-serving (23.0 %), (3) average (16.4 %), (4) learned helplessness (30.9 %), and (5) responsible (22.8 %). The results further showed that over the three-year study period the responsible attributional style where individuals take responsibility for successes and failures predicted student-athletes' subsequent high grade point average and low sport dropout rates even after controlling for the impacts of their earlier grade point average, gender, and type of sport.

Keywords: attributional style, senior high school, upper secondary school, ability, effort, responsible

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Adolescent athletes face the challenge of performing successfully in sports while at the same time achieving academic success. However, previous sport and education research has shown that succeeding in both is not guaranteed due to, for example, conflicting goals, time constraints, and overlapping schedules (Stambulova & Wylleman, 2019). These challenges mean that athletes are often at risk of motivational problems in both the sport and school domains, leading to the early termination of athletic and/or academic careers (Aunola et al., 2018). Therefore, it is important to understand why some student-athletes experience such problems, while others manage to maintain high levels of motivation, and to assist student-athletes in maintaining their motivation in both domains. *Causal attributions* are the causes individuals assign to justify their performance outcomes. Attributions are typically considered *adaptive* and crucial for maintaining motivation in any field (Weiner, 1985; 2018) when successes are attributed to internal and stable factors (e.g., ability) and the causes of failures to unstable factors (e.g., luck). Yet, little is known about the attributional profiles of student-athletes, how stable these profiles are across the first year of upper secondary sport school, and how these profiles relate to their subsequent level of sport competition, school achievements, and dropouts. The current study sets out to explore these issues with student-athletes aged 15-19, admitted to prestigious upper secondary sport high schools in Finland.

Causal Attributions

Attribution theory is a motivational theory that has received considerable attention in recent decades. It holds that causal attributions for success or failure guide future efforts (Weiner, 1985, 2018). Performance outcomes may be related to many factors (e.g., ability, effort, luck, or task difficulty), but typically, individuals attribute succeeding or failing in competitive situations mostly to ability and effort (Weiner, 1985, 2018). According to

attribution theory, factors that may account for performance outcomes can be classified across three dimensions: locus of causality (internal/external), controllability (controllable/uncontrollable), and stability (stable/unstable). Ability is typically considered as internal, stable, and uncontrollable; effort is considered as internal, unstable, and controllable; task difficulty is considered as external, stable, and uncontrollable; and luck is considered to be external, unstable, and uncontrollable (Weiner, 1985, 2018). Since effort and ability are the typical attributions individuals assign to their achievements, the present study focuses particularly on these attributions.

Attributional Styles

The term *attributional style* refers to the ways individuals habitually explain the causes of positive and negative performance outcomes (Abramson et al., 1978). In general, an attributional style is referred to as *adaptive* when the causes of successes are attributed to internal and stable factors, such as ability, and the causes of failures are attributed to external and unstable causes, such as luck (Allen et al., 2020; Weiner, 2018). These types of attributions are also coined *self-serving* (Mezulis et al., 2004) and may positively impact athletes' perceptions of own ability, leading to higher hopes for and expectations of future success and increasing efforts to succeed in the future. *Learned helplessness* is an example of an assumably *maladaptive* attributional style, meaning that individuals fail to see connections between their own efforts and achievements (Abramson et al., 1978; Yee et al., 2003). Another well-recognized maladaptive attributional style is the *depressive* attributional style, which involves a chronic style of attributing failures to internal, stable, and uncontrollable factors like lack of ability without attributing successful outcomes to one's own ability and/or efforts (Seligman et al., 1979).

Earlier athletics studies have shown that athletes often have a self-serving attributional bias, attributing personal success in sport competitions to stable (ability) and controllable (effort) factors and personal failure to unstable and uncontrollable (e.g., bad

luck) factors (for a review, see Allen et al., 2020; Mezulis et al., 2004). In the academic context, studies have shown that students often ascribe both their achievements and failures to internal factors, such as ability and effort (Graham, 2004; Weiner, 1985). Interestingly, a recent variable-oriented study conducted among student-athletes in upper secondary sport school found that the student-athletes attributed their positive outcomes in sports more often to own efforts than positive outcomes in school (Van Yperen et al., 2021). This may be because student-athletes tend to prioritize sports and thus have a stronger desire for a positive athletic self-image than an academic one (Mezulis et al., 2004). Earlier sport studies also indicate that the self-serving bias in athletic contexts is not necessarily adaptive (Rees et al., 2005). In fact, Rees et al. (2005) argued that attributing failures to external factors can be maladaptive, since external factors are not under an individual's control. For instance, if an athlete is not in a position to change an ineffective coach, ascribing failure to this coach will not increase faith in a more successful future. Earlier attributional studies in sport psychology have often been cross-sectional and have focused on examining state attributions, that is, attributions that individuals make about a specific situation and/or at a specific point in time (Coffee & Rees, 2011; Rascle et al., 2015). However, the novel approach taken in this study is to explore attributional styles, that is, the general tendencies of individuals to account for failure and success (cf. Abramson et al., 1978; Enlund et al., 2015) to better understand how attributions can predict achievement outcomes over a longer period of time. While attributional styles are assumed to be relatively stable over time, the few earlier studies that have longitudinally examined the stability of causal attributions have focused only on the academic domain and were carried out among primary school children and lower secondary adolescents (Clem et al., 2018) or their parents (Enlund et al., 2015). Therefore, the development and the consistency of attributional profiles during the later adolescence years is not well understood. Understanding to what extent attributions are state-like or trait-like

characteristics and getting insight into the developmental trajectories of attributional styles is important because it can indicate whether and when interventions are needed to preserve adolescents' achievement motivation both in sport and school (Clem et al., 2018; Gordon, 2008; Weiner, 2018). Maintaining high levels of achievement motivation in both domains is crucial in terms of successful participation and attaining desired outcomes, such as progression of sport and completion of upper secondary school.

The Role of Gender and Type of Sport

Earlier studies provide conflicting evidence for the association between attributional styles and gender. For example, Seligman et al. (1990) found that female swimmers more often attributed failure in sport competition to lack of ability, whereas for males it was more typical to attribute failure in competition to lack of effort. More recent studies either did not find gender differences in attributions for athletic performance (Hanrahan & Cerin, 2009) or found that female athletes emphasize effort attributions more compared to males (Butler & Hasenfratz, 2017). In academic context, in turn, it has been found that it is more typical for girls than for boys to attribute failure to lack of ability, most often in activities that are stereotypically male dominant, such as math and science (for a meta-analysis, see Meece et al., 2006). A better understanding of whether girls and boys develop different attributional styles can help to design more specified attributional interventions to alter maladaptive attributional styles for each gender. Therefore, it is important to further investigate gender differences in attributional styles, and especially the extent to which such differences occur across the domains of sport and school.

Additionally, the type of sport influences athletes' causal attributions. More specifically, Hanrahan and Cerin (2009) found that individual sport athletes make more internal, stable, and global, and less externally controllable attributions for sports successes, and more internal attributions for negative sports events compared to team sport athletes. It seems logical for individual sport athletes to make more internal attributions

and perceive themselves as having a greater control and responsibility for their performance compared to team athletes as they do not have teammates to whom credit or blame can be attributed (Hanrahan & Biddle, 2002). Because team sport athletes may be at higher risk of developing a maladaptive attributional style than individual sport athletes, by better understanding the role of type of sport in causal attributions may provide means to effectively support team sport athletes' motivation and successful performance outcomes. As only few studies thus far have investigated the role of type of sports in causal attributions, and none of these have investigated whether athletes' attributions extend to the academic domain, the role of type of sport in causal attributions, and their implications for schooling, warrants further research.

Outcomes of Attributional Styles

Liu et al. (2009) found that high school students' attributions of academic success to effort predicted an increase in their school achievements across five school years, whereas attributions of success to ability did not. In contrast, Chen and Wu (2021) found that attributing academic success to ability was positively associated with academic achievement. Whereas attributions to academic success thus yield conflicting results, with regard to academic failures research has consistently shown that college students who attribute academic failures to controllable factors (e.g., effort or strategy) perform better and are likelier to persist in their programs than those who attribute failures to uncontrollable factors (Hamm et al., 2020; Parker et al., 2016).

In athletic contexts, studies examining the relationship between attributional styles and sport achievements have typically been cross-sectional and have supported the self-serving attributional style: athletes who perform well are likelier than low-performing athletes to attribute success to internal and stable factors (Gordon, 2008; Seligman et al., 1990). More recent experimental studies focusing on attributional retraining have shown that encouraging athletes to attribute failures to controllable and unstable factors positively

influence their sport performance (Coffee & Rees, 2011; Rascle et al., 2015). Similarly, Parker et al.'s (2016) study focusing on first-year university students from Canada found that encouraging athletes to make controllable and unstable attributions for negative experiences in academic contexts significantly improved their academic performance and decreased their likelihood of course withdrawal over two semesters. Overall, although earlier research suggests that attributional styles can predict athletes' achievement levels and dropout rates in both sport and school, most of these findings are from short-term experimental studies focusing on attributional retraining in tightly controlled settings. Therefore, there is a need to examine student-athletes' attributional styles over longer periods of time and how these are related to real life outcomes, such as their sport competition level, school achievement and sport dropouts at the end of upper secondary school.

Aims of the Study

The present study had multiple aims. First, to identify student-athletes' attributional profiles at the beginning and end of the first year of upper secondary school, a person-centered approach was used (see Mäkikangas et al., 2018).This approach not only identifies different profiles, it also provides proportions of the sample belonging to identified subgroups at different measurement points. The second aim was to establish whether gender and type of sports were related to attributional profiles. The third aim was to assess how stable the attributional profiles were across the first year of upper secondary school. To establish long-term implications of attributional profiles, the final aim was to establish how attributional profiles were related to student-athletes' level of sport competition, school achievements and sport dropouts at the end of the third year of upper secondary school. Because previous studies suggest that talented elite athletes are likely to be highly motivated to perform well in both sports and education (Aunola et al., 2018), we expected (Hypothesis 1 [H1]) a large group of student-athletes to attribute success to

ability and effort across domains. However, we also expected (Hypothesis 2 [H2]) that in the sport domain student-athletes' attributions to effort would be stronger compared to school domain, but only for successful outcomes (Mezulis et al., 2004; Van Yperen et al., 2021). In line with earlier studies on the relation between gender and type of sport with athletes' attributional styles, we expected (Hypothesis 3 [H3]) girls to make more attributions to effort than boys (Arens & Watermann, 2021) and individual sport athletes to make more attributions to ability and effort for successes and failures compared to team sport athletes (Hanrahan & Cerin, 2009). As past studies have shown that students' attributions on school domain are relatively stable across primary and lower secondary school years (e.g., Aunola et al., 2018; Clem et al., 2018; Enlund et al., 2015), we hypothesized (Hypothesis 4 [H4]) that student-athletes' attributional profiles would also be relatively stable in upper secondary school years. Because no previous studies have longitudinally investigated the long-term outcomes of attributional styles in sports, it was hard to formulate any hypotheses regarding such outcomes. However, some previous studies indicate that students with adaptive attributional styles (i.e., those who attributed success to internal and stable factors, and the causes of failures to unstable factors) would have higher GPAs at the end of the third year of upper secondary school (Hypothesis 5 [H5]) (Hamm et al., 2020; Liu et al., 2009). Because gender and type of sport might be assumed to be related to the student-athletes' attributional profiles, school achievement and sport and school dropouts (Ryba et al., 2021; Hanrahan & Cerin, 2009) we accounted for the possible impact of these variables when predicting student-athletes' achievements and dropouts in relation to their attributional profiles.

Methods

Participants and Procedure

The present study is part of the ongoing Finnish Longitudinal Dual Career Study (Ryba et al., 2016) following talented adolescent student-athletes from the beginning to the

end of upper secondary school. Upper secondary education in Finland is equivalent to senior high school in the US as student-athletes are typically 15-16 years old when they enroll to these schools and 18-20 when they graduate. Upper secondary school lasts for 3-4 years and consists of grades 1-3 which are equivalent to the grades 10-12 in the US schooling system. Currently, 15 upper secondary schools in Finland are designated as sport schools according to the Ministry of Education and Culture. The Human Sciences Ethics Committee of the relevant university, Finland, approved this study in June 2015. The study began in fall 2015, and the sample consisted of 391 (51 % female, 49 % male) student-athletes from six different upper secondary sport schools across Finland. At the time the data was collected, there were a total of 13 upper secondary sports schools in Finland (i.e., schools providing structural support for talented athletes to combine upper secondary school education with an athletic career). The six sport schools were selected from across Finland, making up about 50% of all sport schools, indicating representative subset. Moreover, the sample size of the current study ($n > 300$) was - according to studies on statistical power - large enough to apply structural equation modelling and latent profile analyses (Boomsma & Hoogland, 2001; Nylund-Gibson & Choi, 2018). Prior to data collection, all participants were informed about their rights and provided written consent for their voluntary participation in the study. In Finland, informed consent from the parents/guardians of young people over 15 years old is not required. The data for the present study were collected during the first and third years of upper secondary school: at the beginning of Grade 1 (September, Time 1; $n = 391$), at the end of Grade 1 (March, Time 2; $n = 370$), and at the end of Grade 3 (March, Time 3; $n = 390$). At each measurement point (T1, T2, and T3), participants completed a self-report questionnaire. Ethical guidelines for human subjects were followed throughout the data collection process. Of the 391 participating student-athletes, 26 were excluded from the analyses due to missing values for one or more variables. Of the remaining 365 participants, 185 (50.7

%) were female and 180 (49.3 %) were male. At the beginning of upper secondary school, 50 % of the student-athletes played individual sports and 50 % played team sports at various levels (i.e., regional, national, and/or international).

Measurements

Causal Attributions

Students' causal attributions were assessed at T1 and T2 separately for athletic and academic performance. To measure athletic attributions, we used the scale of Aunola et al. (2015). First, the section measuring attributions for athletic performance included questions concerning both failures and successes. A distinction was made between the practice and competition contexts, so attributions were measured separately for competition and practice performance. Second, the questionnaire assessing attributions for academic performance covered both mathematical and language skills. The questionnaire was a modified version of Rytkönen et al.'s (2007) scale. The questions were specifically related to language and mathematics as school subjects rather than overall school performance. Attributions to successes and failures were assessed separately for these two academic domains. The students were asked to answer questions across domains (athletic: "If I fail/succeed in practice/competition, it is mainly because . . ."; academic: "If I fail/succeed in language/mathematics, it is mainly because . . .") by rating four items on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). The alternatives covered ability ("I am/am not skillful"), effort ("I have/have not practiced a lot"), task difficulty ("It was too easy/difficult"), and teaching ("The level of teaching/coaching is good/poor"). For failure in the sport domain, an additional fifth option of injury ("I am sick/injured") was included.

To understand the students' general attributional styles for athletic and academic performance, four mean score variables (success ability, success effort, failure ability, and failure effort) were calculated separately for two time points, and for athletic and academic

domains, by combining the scores for practice and competition situations in an athletic context and scores for language and mathematics in an academic context. In the athletic domain, the Cronbach's alphas for success-ability, success-effort, failure-ability, and failure-effort were .81, .84, and .80, and .83 at T1, and .87, .82, .85, and .89 at T2. In the academic domain, the alphas for success-ability, success-effort, failure-ability, and failure-effort were .56, .75, .60, .83 at T1, and .59, .73, .60, and .80 at T2, respectively.

Type of Sport

The students were asked to report their types of sports on the questionnaire at T1. In the analyses, the types of sports were divided into individual sports (50 %) and team sports (50 %).

Level of Sport Competition

We assessed participants' level of sport competition by asking them whether they had participated in different kinds of competitions (ranging from regional to international). Based on the answers, we created a new variable with five categories: 0 = no competition experience, 1 = competing on a regional level, 2 = competing on a national level (Finnish national championships), 3 = competing on a European level (e.g., European tournaments/championships), and 4 = competing on a worldwide level (e.g., world championships).

Levels of School Achievements

We assessed participants' school achievement levels using their Grade Point Average (GPA)s, which were measured by asking them to report their latest GPAs at T1 and T3.

Dropouts

Sport dropouts were measured at T3 by asking the participants: "Are you still participating in competitive sports?", to which 75.5% answered "yes" (value 1) or "no" (value 0). Similarly, school dropouts were measured at T3 by asking the participants: "Are you continuing your upper secondary education?", to which they answered "yes" (1) or

"no" (0). However, because only five of the participants dropped out of school (two of the athletes quit school due to a lack of interest; one wanted to pursue a professional athletic career; one was spending a year as an exchange student abroad, and one changed to a vocational education), this variable did not provide useful information for this study.

Data Analysis

The statistical analyses were carried out as follows: First, we examined the causal attribution profiles of student-athletes'. A latent profile analysis (LPA) was conducted using ability and effort attributions for success and failure in both sports and school as the criterion variables. Since the data were gathered at two different time points, I-states-as-objects analysis (ISOA; Bergman & El-Khouri, 1999) was employed for the LPA (Lazarides et al., 2016). In this procedure, the latent profiles were created independently of the time points by reorganizing the data so that each student-athlete was coded at each measurement point as a separate case (I-states). These reorganized data were then used in the LPA. The criterion variables for the recoded data were standardized, and outliers (n = 25) exceeding the absolute values of standardized scores of -3 or 3 were identified and forced into the -3–3 range. The following four criteria were used to select the number of latent profiles: (1) model fit, (2) distinguishability of the latent groups, (3) latent class sizes, and (4) theoretical justification. The following methods were used to evaluate the model fit: (a) the Bayesian information criterion (BIC), (b) the adjusted Bayesian information criterion (aBIC), (c) Akaike's information criterion (AIC), (d) a Vuong–Lo–Mendell–Rubin likelihood ratio test (VLMR), and (e) a Lo–Mendell–Rubin adjusted likelihood test (LRM).

Second, log linear models were used to examine the stability of and change in the latent attributional profiles across the two time points. At this stage, the data were reorganized successively (at the first and second measurement points, each student-athlete was once again handled as two consecutive measurements of the same participant). A

Pearson's chi-squared test was used to indicate significant associations between categorical variables across two time points, and adjusted standardized residuals were used to indicate significant differences between the observed and expected counts. Third, cross-tabulation was used to examine the associations between attributional profiles and gender at Time 1 and the associations between attributional profiles and type of sport at Time 1. Fourth, the outcomes associated with different attributional profiles were examined using ANCOVA to predict the outcome variables, that is, level of sport competition and GPA at Time 3 (a separate analysis for both) with cluster membership at Time 2, after controlling for the impacts of earlier level of sport competition or school achievement at Time 2, respectively, and gender and type of sport. Finally, the relation between attributional profiles and sport dropouts at Time 3 was investigated by cross-tabulating the attributional profile membership at Time 2 with sport dropouts at Time 3. Logistic regression analyses were further used to examine how cluster membership at Time 2 predicted sport dropouts at Time 3, after controlling for gender and type of sport. The LPA was carried out using MPlus statistical software (version 8; Muthén & Muthén, 1998, 2017). Assuming missingness at random (MAR), the parameters of the models were estimated using full-information maximum likelihood estimation with standard errors that were robust for non-normal distributions (MLR estimator; Muthén & Muthén, 1998, 2017). Log linear models, logistic regressions, cross-tabulations, and ANCOVAs were performed using IBM® SPSS® Statistics 20 software.

Results

Attributional Profiles

The goodness-of-fit indices for the LPAs of student-athletes' attributions for sports and school across the two time points suggested that a five-class solution was appropriate (see Table 1). The five-class solution had smaller BIC and AIC values than the other class solutions, and the entropy value was also better than for two-, three-, or four-class

solutions. However, the VLMR and LMR tests indicated that a six-class solution was no better than a five-class solution; therefore, the five-class solution was selected as the final solution.

Insert Table 1 about here

The first and smallest (5 % of I-states) attributional profile (see Table 2 for raw scores and Figure 1 for standardized scores) was characterized by weak effort attributions for sport and school success and weak ability attributions for school success. This profile of attributions was labeled "Depressive." The second profile (22 % of I-states) was characterized by strong effort and ability attributions for sport success and weak effort and ability attributions for sport failures. This profile was labeled "Athletic self-serving." The third profile (18 % of I-states) was characterized by neither particularly strong nor weak attributions to ability and effort for success or failure across domains and was thus labeled "Average." The fourth profile (31 % of I-states) was characterized by weak effort attributions for sport and school success and was labeled as "Learned helplessness" to describe an attributional style where individuals fail to see the connection between their own effort and achievement. Finally, the fifth profile (23 % of I-states) was characterized by strong effort attributions for sport success and strong effort attributions for sport and school failures. This profile was labeled "Responsible" to describe the individual taking personal responsibility for both successes and failures.

Insert Table 2 about here

Insert Figure 1 about here

An examination of the gender distribution in the five groups showed no statistically significant association between group membership and gender at Time 1 (χ^2 [4] = 7.347, p = .115). However, inspection of adjusted residuals revealed that girls were overrepresented (adj. res. = 2.3, $p < .05$) in the "Responsible" group, whereas boys were underrepresented (adj. res. = -2.3, $p < .05$). Examination of the association between the type of sport and

group membership at Time 1 showed a statistically marginally significant association (χ^2 [4] = 8.965, p = .062). Team sport athletes were overrepresented (adj. res. = 2.6, $p < .05$) in the "Learned helplessness" group, whereas individual-level athletes were underrepresented in this group (adj. res. = -2.6, $p < .05$).

Stability and Change in Attributional Profiles Over Time

The statistically significant stability of, and change in, the attributional profiles from Time 1 to Time 2, analyzed using log linear models, are shown in Figure 2 (frequencies; straight line for changes that were likelier than by chance; dotted lines for changes that were less likely than by chance; $p < .05$). The results showed statistically significant associations between group membership at Time 1 and Time 2. All five attributional profiles exhibited considerable stability across the two measurement points. This meant that student-athletes with a particular attributional profile at Time 1 more likely had the same attributional profile at Time 2 rather than some other profile. The only exception was for student-athletes in the "Depressive" group, who were statistically likely to either stay in the same group or move to the "Learned helplessness" group between Time 1 and Time 2. The percentages of student-athletes in the "Depressive" but also the "Athletic self-serving" groups actually decreased across the two time points, whereas the percentages of student-athletes in the "Average," "Learned helplessness," and "Responsible" groups increased over time.

Insert Figure 2 about here

Outcomes Associated with the Attributional Profiles

Next, to examine how the attributional profiles were associated with athletes' subsequent level of sport competition and GPA at Time 3, we conducted ANCOVAs to determine statistically significant group differences in level of sport competition and GPA at Time 3, after controlling for the dependent variable at Time 1 (level of sport competition and GPA, respectively). From a possible range of 4 (insufficient) to 10 (excellent), the

participants' GPAs were, on average, 8.85 (*SD* = 0.62; *Range* = 7.25–10) at Time 1, and 8.05 (*SD* = 0.87; *Range* = 5–9.90) at Time 3. The results showed no statistically significant associations between attributional profile membership at Time 2 and level of sport competition at Time 3 after controlling for level of sport competition at Time 1, gender, and type of sport (F[4, 229] = 0.057, p = .994). However, the attributional profile group membership at Time 2 predicted athletes' GPA at Time 3 after controlling for the GPA, gender, and type of sport at Time 1 (F[4, 298] = 2.949, p = .021). The pairwise comparisons revealed that athletes in the "Responsible" group at Time 2 had higher GPAs at Time 3 than athletes in the "Learned helplessness" group at Time 2.

Next, to examine how the attributional profiles at Time 2 predicted athletes' sport dropouts at Time 3, cross-tabulation between the group membership at Time 2 and sport dropout at Time 3 was analyzed. At T3, 75.5 % of participants reported that they still participated in competitive sports, whereas 24.5 % had dropped out of sports.

The results showed that there was an underrepresentation of student-athletes who had dropped out of sports in the "Responsible" group (n = 9; adj. res. = -3.4, p < .01), whereas there was an overrepresentation of student-athletes who continued sports (n = 72; adj. res. = 3.4, p < .01) in this group. In contrast, there was an overrepresentation of student-athletes who had dropped out of sports in both the "Average" (n = 22; adj. res. = 2.4, p < .05) and the "Depressive" group (n = 6; χ^2 (4) = 16.579, p < .01).

Finally, logistic regression analysis was used to examine how group membership at Time 2 predicted sport dropouts at Time 3 after controlling for gender and type of sport. The results showed that gender statistically significantly predicted dropouts with dropout from sport being more typical for females than for males (B = -.915; Wald (df) = 10.028; p = .002; Exp (B) = 0.400), whereas type of sport did not (B = .333; Wald (df) = 1.497; p = .221; Exp (B) = 1.395). In line with the cross-tabulation analyses, attributional profile significantly predicted sport dropouts, even after controlling for gender and type of sport

(Wald = 14.856, df = 4, p = .005). More specifically, athletes belonging to the "Responsible" group were less likely to drop out of sports than athletes in any other group.

Discussion

The present study applied a person-oriented approach to identify diverse subgroups of student-athletes with different attributional profiles for success and failure situations in the sport and school domains. Five different and highly stable attributional profiles were identified in the sample: "Learned helplessness" (30.9 %), "Athletic self-serving (23.0 %), "Responsible" (22.8 %), "Average" (16.4 %), and "Depressive" (6.9 %). The most common profile was "Learned helplessness," mostly characterized by weak effort attributions for sport success and relatively weak effort attributions for school success. At the beginning of upper secondary school, this profile was typical for about 30 % of the student-athletes. Since the admission process for upper secondary sport schools in Finland is competitive, and athletic and academic demands increase when athletes enter secondary education, requiring more effort for students to succeed, it is somewhat concerning that a third of the student-athletes did not believe that their own efforts contributed to their school and sport achievement. A possible explanation is that when entering upper secondary sport school, many talented athletes may start to realize that effort alone is not enough to succeed, as they enter an environment in which all student-athletes devote a lot of time and effort to sports.

Moreover, at the beginning of upper secondary school, almost 25 % of the student-athletes demonstrated an "Athletic Self-serving" attributional style, characterized by strong effort and ability attributions for sport success but weak effort and ability attributions for sport failures. This finding aligns well with previous literature showing that athletes, most typically those who prioritize sports over school - often have a domain-specific self-serving bias (Allen et al., 2020; Mezulis et al., 2004). This implies that they ascribe their positive outcomes in sports more often and/or more strongly to their own ability and effort

than in the school domain and attribute failures in sports more often to external factors (Van Yperen et al., 2021). The results showed that nearly 25 % of the student-athletes had a “Responsible” profile characterized by attributing successes and failures in sports and failures in school strongly to their ability and effort. The existence of a high personal responsibility group in which students take credit for their successes and hold themselves responsible for failures has also been reported previously (Houston, 2016). Finally, almost 7 % of the student-athletes demonstrated a “Depressive” attributional style characterized by low effort attributions for sport success and relatively low effort attributions for school success, combined with low-ability attributions for school success at the beginning of upper secondary school.

Generally, while the attributions student-athletes made where consistent across the sport and school domain, they made stronger ability and effort attributions for sport success compared to school success especially in the “Athletic self-serving” group. This can be explained by the highly competitive selection procedure adopted by sport schools which require athletes to perform at a very high level, leading to more conscious evaluations of one’s own sport performances.

We also examined the role of gender and type of sport in student-athletes’ attributional profiles. The results indicated a nonsignificant trend in the predicted direction for both variables; it was more typical for girls than boys to demonstrate a “Responsible” attributional style (Arens & Watermann, 2021). The “Learned helplessness” attributional style proved to be more typical for team sport athletes than for individual sport athletes (Hanrahan & Cerin, 2009). This is in line with the notion that individual athletes are more likely to hold themselves responsible for performance outcomes (Hanrahan & Cerin, 2009). Since the results were marginal, future studies should clarify the roles of gender and type of sport in the ways athletes explain their successes and failures. Adding knowledge

on these issues would be important when aiming to efficiently support the development of an adaptive attributional profile, especially among boys and team sport athletes.

The results also showed that student-athletes' attributional profiles were stable across the first year of upper secondary school: the profile typical for a student-athlete at the beginning of the first year was likely to be the same at its end (see also, Aunola et al., 2018; Clem et al., 2018; Enlund et al., 2015). This finding, as well as the fact that attributions were found to be relatively consistent across domains, both support the idea that for many adolescents the attributional style may be a trait-like characteristic that has stabilized before the first grade of upper secondary school and does not alter under intensified academic and athletic circumstances. This means that it is especially important for different actors (i.e., coaches, teachers) who work with young athletes to focus on preventing the development of a maladaptive attributional style. However, because attributional profiles were not set in stone for all student-athletes, and a substantial amount of them developed a different attributional profile during the first year of upper secondary school it is important that an adoption of an adaptive attributional style is also promoted in upper secondary school.

The final research question asked how causal attribution profiles relate to student-athletes' level of sport competition and school achievement and sport dropout at the end of the third year of upper secondary sport school when gender and type of sport were controlled for. The results showed that athletes' attributional styles were found to predict sport dropouts: student-athletes with a "Responsible" attributional style were less likely to drop out of sports than athletes in other groups. This may be because athletes with this profile are typically achievement oriented and willing to learn despite failures, leading to clear improvements, which, in turn, increase enjoyment of an activity and may prevent dropout (Duda & White, 1992). Second, student-athletes' attributional profiles were not associated with upper secondary third year level of sport competition after controlling for

the earlier levels of sport competition, gender, and type of sport. While this result is somewhat surprising, bearing in mind the positive results of earlier attributional retraining studies (Coffee & Rees, 2011; Rascle et al., 2015), it may be explained by unequally distributed dropout rates across profiles. That is, it is possible that the dropout cases were athletes who did not achieve much, increasing the overall achievement levels of all but the responsible group, which had almost no dropout cases.

Finally, the results showed that student-athletes' attributional profiles predicted their school achievement: athletes with a "Responsible" attributional style during the first year had higher GPAs than the other groups at the end of the third year of upper secondary school (Houston, 2016). This was true even after controlling for earlier school achievement, gender, and type of sport. This suggests that the attributions individuals make to account for their successes and failures play important roles in guiding future motivation, effort, and achievements.

Overall, while the self-serving attributional style is generally considered as the most adaptive one (attributing successes to internal and stable factors, such as ability, and failures to external and unstable factors, such as luck) (e.g., Allen et al., 2020; Mezulis et al., 2004), the current study shows that from a longitudinal perspective it may be the most beneficial to attribute both successes and failures to one's own effort, that is, to adopt a responsible attributional style. While previous research has often suggested that attributing success both to ability and effort can be considered adaptive, according to the present study individuals may especially benefit from attributing successful events to effort (Weiner, 2018). This may be especially important in a failure situation because it has been found that too much focus on ability may be counterproductive and lead to anxiety over future performance or depressive symptoms (Gordon, 2008). In fact, when adopting a responsible attributional style individuals take credit for successful performance outcomes and are motivated to maintain behavior but also can learn and effectively change behavior after a

negative experience and use that as a starting point for improvement (Hamm et al., 2020). Practically, the results of the present study suggest that it is important to develop interventions especially among younger athletes to internalize responsible attributional style. This means that the role of effort should be promoted above ability when accounting for successful and less successful performance outcomes in different sport and educational settings and interactions among teachers and coaches (Hamm et al., 2020). Because attributional styles tend to stabilize prior to upper secondary school, interventions should target youngsters and/or their coaches and/or teachers at an earlier stage to efficiently enable the change of maladaptive profiles (Clem et al., 2018).

Limitations

The present study has a number of limitations. First, only three years of upper secondary school were covered. Future studies should therefore examine stability and change in attributions, as well as their relation with level of sport competition, school achievement and sport/school dropout over a longer period of time, extending study to tertiary education (vocational high school, university) and/or working life. Second, the Cronbach alpha reliabilities for the success-ability (T1: 0.56; T2: 0.59) and failure-ability (T1: 0.60; T2: 0.60) scores in academic domain were low. This may be related to the fact that in the academic domain attributions were calculated across two school subjects (mathematics and language), whereas in the sport domain questions concerned sports only. Earlier studies showed that students sometimes make different attributions for mathematics and language, related to differences in self-concept of ability (Clem et al., 2018; Meece et al., 2006). We leave it to future studies to assess attributions related to mathematics and literature separately. Third, the sample consisted of academically high-performing student-athletes from upper secondary sport schools, which is a rather elite subpopulation not representative for this age category. Yet, most attributional profiles are quite common among other populations as well, so it can be assumed that the findings are at least to some

extent generalizable. Finally, the present study was conducted in a particular sociocultural context — Finland. Because the results may not fully apply to other educational and cultural settings, future cross-cultural studies are needed to establish to what extent there are similarities and differences in causal attributions, sport and school achievement, and sport dropout across countries.

Conclusions

The present study provides an important theoretical and empirical contribution to the existing attributional literature by longitudinally examining student-athletes' attributional profiles and the outcomes associated with these profiles during upper secondary school in two domains, sport and school. We identified five different and highly stable attributional profiles among the sample at the first year of upper secondary school and the profiles were predictive of student-athletes' school achievement and sports dropout at the end of the third year of upper secondary school. While earlier studies have often considered the self-serving bias as the most adaptive attributional style (e.g., Mezulis et al., 2004), the current study supports the view that from a longitudinal perspective it is most adaptive to adopt a responsible attributional style, that is, to explain both successes and failures in terms of one's own effort. This can help to maintain behavior after a successful outcome but also implies that taking personal responsibility after failures helps to learn and effectively change behavior (Houston, 2016). In order to support talented and elite athletes' successful combination of sports and school and to prevent their sports dropout at the level of elite sport or higher education, it is important to develop interventions targeted to help student-athletes to internalize responsible attributional styles in response to both successes and failures in both sport and education at an early age.

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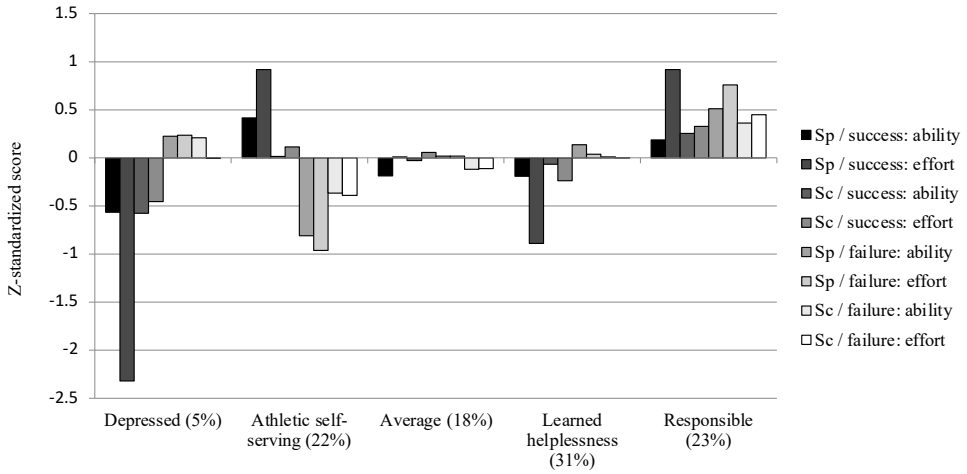
Figure 1

Standardized Scores of Criteria Variables in Different Attribution Profiles.

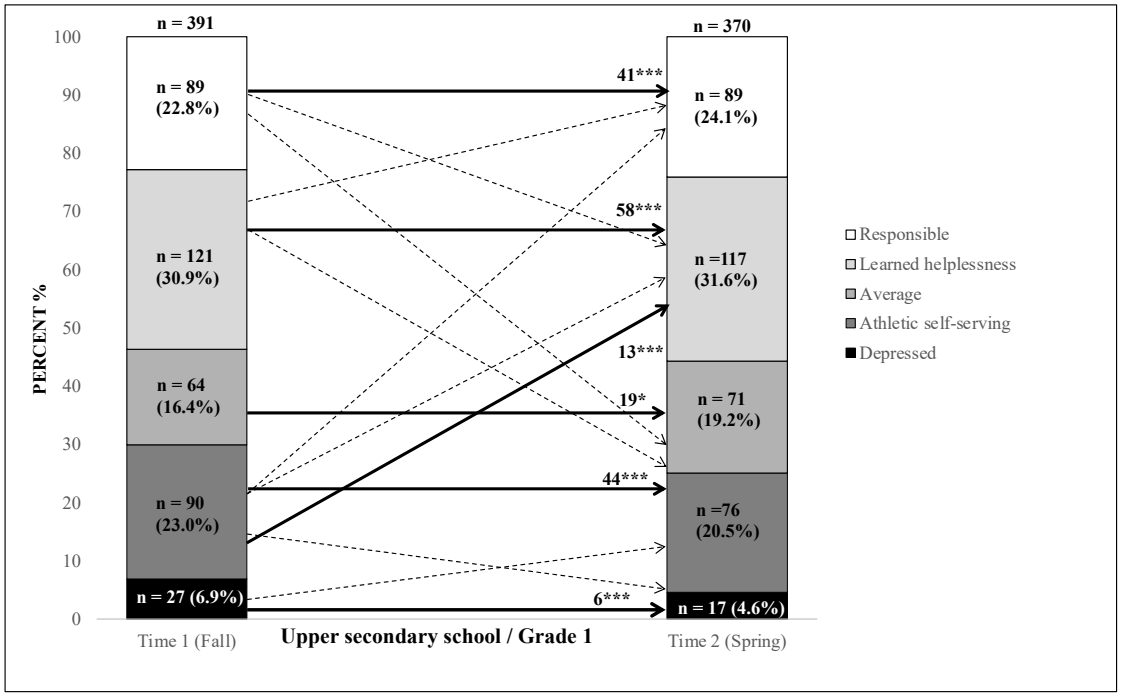


Note 1. N of I-states = 761.

Note 2. Sp = Sport; Sc = School.

Figure 2

Statistically Significant Stabilities and Changes in Attributional Profiles Across Two Measurement Points (Frequencies) when Tested with Log Linear Models.



Note 1. Straight line for changes that are more likely than expected by chance; dotted lines for changes that appear less likely than expected by chance ($p < .05$).

Note 2. $*p < .05$, $***p < 0.001$.

Table 1

Model Fit Indices and Class Frequencies for Latent Profile Analyses (with different numbers of latent profiles for student-athletes' causal attributions in sport and school (N of I-states = 761).

Number of Groups	BIC	aBIC	AIC	Entropy	p-Value of VLMR	p-Value of LMR
2 (288/473)	16,838.074	16,758.688	16,722.208	0.696	$p < .05$	$p < .05$
3 (292/217/252)	16,679.970	16,572.005	16,522.392	0.801	$p < .05$	$p < .05$
4 (29/279/214/ 239)	16,484.261	16,347.717	16,284.972	0.851	$p < .05$	$p < .05$
5 (44/166/135/ 238/178)	**15,607.897**	**15,442.775**	**15,366.896**	**0.929**	***p* < .05**	***p* < .05**
6 (44/135/20/23/ 189/135)	15,600.197	15,406.495	15,317.484	0.930	$p > .05$	$p > .05$

Note. The selected solution is in bold.

Table 2

Means of Standardized Variables, Standard Deviations (in Parentheses), and Differences between Attribution Profiles for Criterion Variables Tested with ANOVA (N of I-states = 761).

	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5
Criterion Variable	Depressive (n = 44)	Athletic self-serving (n = 166)	Average (n = 135)	Learned helplessness (n = 238)	Responsible (n = 178)
Success/ability					
Sport	-0.57 (1.18)[a]	0.41 (0.91)[b]	-0.19 (0.92)[a]	-0.19 (0.77)[a]	0.19 (1.09)[b]
School	-0.58 (0.90)[a]	0.01 (1.11)[bc]	0.03 (0.90)[bc]	0.07 (0.97)[c]	0.25 (0.93)[b]
Success/effort					
Sport	-2.32 (0.49)[a]	0.92 (0.00)[b]	0.01 (0.00)[c]	-0.89 (0.00)[d]	0.92 (0.00)[e]
School	-0.46 (0.71)[a]	0.11 (1.11)[b]	0.06 (0.89)[b]	-0.24 (0.86)[a]	0.33 (0.91)[b]
Failure/ability					
Sport	0.22(0.87)[acd]	-0.81 (0.75)[b]	0.02 (0.98)[c]	0.14 (0.87)[ac]	0.51 (0.96)[d]
School	0.21 (0.82)[ac]	-0.37 (1.11)[b]	-0.12 (0.94)[ab]	0.01 (0.93)[a]	0.36 (0.94)[c]
Failure/effort					
Sport	0.23 (0.60)[a]	-0.96 (0.73)[b]	0.02 (1.04)[a]	0.04 (0.83)[a]	0.76 (0.72)[c]
School	-0.00 (0.72)[ab]	-0.39 (1.17)[a]	-0.11 (0.96)[ab]	0.00 (0.85)[b]	0.45 (0.93)[c]

Note. Group means with different superscripts showed a statistically significant difference ($p < .05$). Post hoc tests were performed with Tamhane.

1