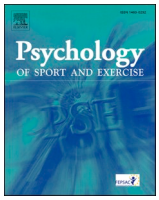
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The role of career adaptability resources in dual career pathways: A person-oriented longitudinal study across elite sports upper secondary school

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ABSTRACT

Objectives: Obtaining education is an important milestone in athletes' preparation for their professional career after sport. Literature indicates that combining school and sport is not an easy task for many aspiring youth athletes. It has been proposed that career adaptability, which refers to psychosocial resources enabling individuals to solve complex occupational transitions, present and anticipated vocational development tasks, and career related challenges could be a relevant concept for applied work with student-athletes. In this study, we examined whether there are distinct developmental profiles of career adaptability among adolescent athletes across the upper secondary school years. We also investigated the associations between career adaptability and sport withdrawal and academic achievement.

Design and methods: A total of 391 Finnish-speaking student-athletes completed the questionnaire on career adaptability (Career Adapt-Abilities Scale – Dual Career Form; Ryba & Aunola, 2015; Ryba et al., 2017) at the beginning and end of upper secondary school. The participants' background information about their sport participation and grade point average were collected upon completion of each grade of upper secondary school. The data were analysed using cluster analysis, cross-tabulation, and one-way analysis of variance.

Results: Four distinct adaptability profiles were identified: higher adaptability, lower adaptability, increasing adaptability, and decreasing adaptability. Higher and lower adaptability profiles showed stable levels of adaptability across time, whereas the adaptability level either increased or decreased in the other two profiles. Student-athletes with a lower career adaptability profile were overrepresented among those who withdrew from competitive sports, and they reported lower grade point averages than those with higher scores of career adaptability.

Conclusions: High scores of career adaptability were associated with high grades, whereas low scores of career adaptability were associated with low grades and a probability to withdraw from competitive sport. Therefore, it is recommended that career adaptability be considered as important self-regulation resources for sustaining dual career pathways over time.

Student-athletes face many challenging transitions simultaneously in different life domains that may pose threats to their psychosocial development and well-being (for a review, see Stambulova & Wylleman, 2019). According to the European Commission (2012), one of the key challenges is to safeguard vocational or post-sport career development of talented youth athletes. Therefore, a dual career—a combination of sport and education or work—has been recommended to prevent school dropout and to increase the percentage of student-athletes that graduate in higher education and obtain employment, while simultaneously keeping them in their respective sports. Although dual career has many benefits, it may also contribute to a lack of time, inadequate recovery, and postponement of vocational developmental tasks (e.g., crystalizing interests and forming a vocational identity, developing educational and occupational goals, and engaging in career planning; Savickas, 2013). Current literature provides ample examples of how youth athletes participating in dual career may compromise their vocational

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development (e.g., Harrison et al., 2020; Linner et al, 2019; Nikander, Aunola, et al., 2021; Ryba et al., 2017a). Moreover, Stambulova and Wylleman (2019) argue that certain skills and competencies are necessary for student-athletes to build a sustainable dual career. However, many athletes themselves report not having the tools required to successfully perform in both education and sport, which often leads to discontinuation of a dual career (Elliott et al., 2018; Rothwell et al., 2020; Ryba et al., 2021). For example, in the context of a project from which the current data were drawn, less than half of the participants sustained their participation in competitive sport as dual career athletes three years after the upper secondary (Joronen et al, 2023).

A number of necessary skills and competencies (e.g., social skills, time management, emotional regulation) have been identified as supporting student-athletes' success in dual career pathways (De Brandt et al., 2018; Linner et al, 2019); however, these competencies are focused on solving acute issues compared to emphasizing long-term career preparation. Yet the findings from the 2019 NCAA GOALS study (2020) indicate that around half of the student-athletes expressed an interest in learning more about preparing for their careers after college from their coaches and athletic administrators. Dual career pathways require athletes to balance two domains of sport and education, but also to manage psychosocial developmental tasks (i.e., committing to a career choice) and navigating transitions. Thus, to support student-athletes' dual career pathways, Ryba et al., 2016a, 2017a) proposed to adopt the concept of career adaptability (Savickas, 2005; Savickas & Porfeli, 2012) as a way to measure and to support student-athletes' abilities to integrate their athletic and academic career with vocational developmental tasks. Career adaptability resources may serve as a protective factor to manage career transitions and stressful situations effectively and, indeed, research has shown that high career adaptability increases one's sense of control and fosters well-being, and may assist in coping with professional transitions and demanding situations (Maggiori et al., 2015).

To get a more holistic picture of the phenomena, in the current study, we adopted a longitudinal person-centred design to investigate the developmental trajectories of career adaptability among upper secondary school student-athletes. Associations between career adaptability profiles and athletes' withdrawal from sport and academic achievement were also explored. The person-oriented approach assumes heterogeneity concerning the changes of the phenomena and takes into consideration individual differences in the adaptability development (Hirschi & Valero, 2015; Mäkikangas & Kinnunen, 2016). Longitudinal studies support the understanding of how career adaptability progresses with student-athletes over time. Looking at individual student-athletes' career adaptability resources over time serves as a way to learn prior difficulties in adapting to tasks, transitions, and challenges that they may have faced integrating their academic, athletic, and vocational pursuits. Additionally, to understand the impact of dual career systems and inform decision makers of factors that contribute to successful dual career pathways, longitudinal knowledge of the phenomena is critical.

1. Career adaptability

Career adaptability is "the self-regulation strength or capacities that a person may draw upon to solve the unfamiliar, complex, and ill-defined problems presented by developmental vocational tasks, occupational transitions, and work traumas" (Savickas & Porfeli, 2012, p. 662). There are four general dimensions of career adaptability: concern, control, curiosity, and confidence. Savickas (2013) suggested that when faced with vocational tasks, occupational transitions, or career related difficulties, an adaptable individual is concerned about their future, takes control of preparing for their future, displays curiosity by the exploration of possible selves and potential forthcoming scenarios, and has the confidence to pursue their aspirations (Savickas & Porfeli, 2012). Research has shown that college athletes who do not have a plan for their lives after sport, have an elevated risk of psychological distress (Park et al, 2013). Furthermore, it has been found that youths who have high competencies to cope with and manage vocational tasks have demonstrated a higher commitment and adjustment in higher education, which has further been related to success in vocational career paths (Germeijs & Verschueren, 2007).

Thoughts about one's future on the career adaptability dimensions become evident early in secondary education (Timonen et al., 2016). Savickas (2005, 2013) emphasised the non-static nature of career adaptabilities that are acquired through education and life experiences. According to Savickas and Porfeli (2012), when adaptability skills increase, one's readiness to make occupational decisions increases as well. As an individual considers future transitions and developmental tasks, they experience more pressure to deal with goals relevant to those transitions and tasks (Salmela-Aro et al., 2007; Seiffge-Krenke et al., 2010). Hence, developing career adaptability can be seen as a crucial indicator of thriving in adolescence (Hirschi, 2009; Rudolph et al., 2018).

As the career adaptability construct is psychosocial in nature, influences of youth athletes' environments need to be taken into consideration. For example, young athletes may face contradictory expectations from parents and coaches whether to prioritise sport or education (Christensen & Sørensen, 2009; Nikander et al., 2022). Additionally, cultural narratives that present complete commitment to the athletic career as the only way to achieve success (Douglas & Carless, 2015) can create ambiguity among youth athletes regarding how to prepare for their future post-sport careers. It has been previously shown that high achieving adolescent athletes, especially in high revenue sports, experience psychological tensions when asked to project their future identities beyond professional sport (Christensen & Sørensen, 2009; Ryba et al., 2021). Consequently, they may struggle with motivation at school, such as to read for exams (e.g., Nikander et al., 2022). In external international evaluation of the Finnish elite sports system, Storm and Nielsen (2022) reported that professionalization at an early age in some sports partly compromised the National Olympic Committee's aim to support dual careers (see also Saarinen et al., 2020). Therefore, when facing unforeseen challenges or transitions, youth athletes' career adaptability resources may remain unexplored and stable over a period of time.

Nikander, Aunola, et al. (2021) showed that youth athletes, on the mean level, demonstrated stable career adaptabilities across upper secondary sport school. Subsequently, Nikander, Tolvanen, et al. (2021) found four stable adaptability profiles and one increasing profile among youth athletes; however, they investigated the development trajectories only across the first year of upper secondary school. As it has been found that individuals differ in their adaptability skills and career-related behaviours (Rudolph et al., 2017), it would be important to investigate individual differences in the adaptability development. Therefore, in this study we set to investigate the developmental trajectories across upper secondary school to get a broader picture of the development of career adaptabilities among youth athletes.

2. Sport withdrawal

Although there are no studies that explicitly examine the effects of dual career policies on youth athletes' career construction, several scholars have argued about the impact of gendering on dual careers in elite development environments, illuminating the ways in which gender expectations, as well as sports type, shape an adolescent athletes' future perspective on their vocational development (Ryba et al., 2021; Skrubbeltrang et al., 2018). In general, literature indicates that female athletes tend to invest more in their educational and vocational goals and identities than male athletes, as well as plan to pursue a dual career at a university (e.g., Ekengren et al., 2020; Harrison et al., 2020; Ryba et al., 2021; Skrubbeltrang et al., 2018). Previous research findings appear unanimous that student-athletes engage in limited self-exploration during their dual careers (Christensen & Sørensen, 2009; O'Neill et al.,

2013; Ronkainen & Ryba, 2018). Brown et al. (2000) found that student-athletes have lower skills in career decision-making than non-athlete counterparts. Ryba et al. (2017a) have also showed that adolescent athletes are more concerned about balancing their sport and school in everyday life than about their careers after sport. While Aunola et al. (2018) found that the youth athletes who reported high motivation toward a dual career were more likely planning to enter higher education, a study by Moazami-Goodarzi et al. (2020) showed that adolescents with high dual career identity were more likely to withdraw from sport than those with high athletic identity but low student identity.

Another contributing aspect to dual career sustainability is student-athletes' mental health which was pioneered in the Winning in the Long Run project (Ryba et al., 2016b). In her doctoral research, Sorkkila (2018) demonstrated that school and sport burnout symptoms increased and generalised over time in elite sports school upper secondary school. Moreover, a spill over effect from school-related exhaustion to burnout in sport was also shown. Research with high-performance adolescents suggests that experiencing burnout symptoms in school and/or sport due to high workload (Sorkkila et al., 2020), and inability by elite development environments to support athletes' dual careers, may lead to premature withdrawal from sport (Rothwell et al., 2020). In a Germany-based study, it was reported that almost one third of student-athletes in elite sport schools (i.e., upper secondary level) withdrew from sport prior to their transition to mastery level in athletic development (Baron-Thiene & Alfermann, 2015). For us, in agreement with Stambulova et al. (2015), a sustainable development of dual careers is about fluidity in engagement with athletic and educational/vocational goals, and includes attention to individual mental health, collective well-being, and the ability to participate in life opportunities.

Finally, a national system that provides young people with the opportunity to combine sport and education may influence student-athletes' decision on continuation of athletic careers. Of note, in Finland, there is no structural system to combine sport and education in higher education compared to upper secondary school level (Morris et al., 2021; Nikander, Saarinen, et al., 2021). Still to date, only a few studies have focused on school aged athletes' withdrawal from elite development pathways (e.g., Baron-Thiene & Alfermann, 2015; Rothwell et al., 2020) and different predictors or consequences of the withdrawal are not really known (Bergeron et al., 2015).

3. Academic achievements

It has been suggested that students who perform well academically (e.g., high GPA) may demonstrate higher educational aspirations and preparation for their future career and subsequently manage their career better compared to their peers (Negru-Subtirica & Pop, 2016; Tian & Fan, 2014). Furthermore, low academic results have been found to be associated with limited career possibilities and individuals may need to adjust their career plans if their initial educational goals are not realized (Negru-Subtirica & Pop, 2016). This is especially crucial in systems and countries where upper secondary grades are a prerequisite for tertiary education admission. Additionally, students with lower academic achievement seem to have difficulty with other life skills as well (Negru-Subtirica & Pop, 2016). Hence, low academic results may also limit adolescents' career preparation, which may lead to lower self-efficacy in career-related decision making and higher career insecurity (Negru-Subtirica and Pop, 2016). Cross-sectional studies (Ryba et al., 2017b; Timonen et al., 2016) with Finnish-speaking upper secondary school students (both athletes and non-athletes) has shown that career adaptability is positively related to academic achievement (measured by GPA). Gaining a better understanding of how unique patterns of dual career construction and adaptability resources relate to developmental outcomes would have a significant practical utility for applied work with student-athletes.

4. Purpose of the present study

Given the substantial impact of career adaptability resources on successful coping with transitions to higher education and overall life satisfaction, longitudinal research is necessary to obtain knowledge about how career adaptability develops during adolescence in an athlete population. Specifically, there is a need for a person-centred perspective to understand different patterns of the career adaptability development among student-athletes. Furthermore, to inform interventions supporting dual career pathways, there is an urgent need to understand the relationship between career adaptability resources and sport withdrawal and academic achievement. The study was guided by the following research questions: (1) Are there distinct career adaptability profiles among student-athletes? (2) To what extent is adolescents' career adaptability associated with dual career – that is, (2a) is there a relationship between career adaptability and sport withdrawal? And (2 b) is there a relationship between career adaptability and academic achievement?

5. Method

5.1. Participants and procedures

The current study is drawn from the dataset of the Winning in the Long Run project (Ryba & Aunola, 2022) that investigates risk and resilience factors of a dual career construction in upper secondary sport schools in Finland. Ethical permission for the study was obtained from the relevant university. The participants ($N = 391$, M_{age} at T1 $= 16$ years; $SD_{age} = 0.17$; 51% females, 49% males) were student-athletes from six upper secondary sport schools. Participants' background information about their sport participation and grade point average (GPA) was collected (a) at the beginning of upper secondary school (T1), (b) at the end of the first year (T2), (c) at the end of the second school year (T3), (d) at the beginning of the third school year (T4), and (e) at the end of the third school year (T5). In addition, student-athletes completed the dual career adaptability questionnaire two times: at the beginning of upper secondary school (T1) and at the end of the third year (T5). Of the participants, 50% participated in individual sports (e.g., swimming) and 50% in team sports (e.g., ice hockey) at various competition levels (i.e., regional, national, and international). The majority of the participants at the beginning of research expected to continue to tertiary education (68%) and to compete at the World Championships or Olympic Games (60%) (Ryba et al., 2016b).

The participating schools were contacted through the national Olympic Committee; the participants agreed to participate in an online survey by signing an informed consent form prior to data collection. In Finland, informed consent from the parents or guardians of young people over 15 is not required. Although the dataset on which this article is based has been used in other publications, the present study is original regarding its longitudinal design, variables, and research questions.

5.2. Instrument

Career adaptability was measured using the Career Adapt-Abilities Scale–Dual Career Form (CAAS-DC; Ryba & Aunola, 2015; Ryba et al., 2017b). The original CAAS (Savickas & Porfeli, 2012) measures four dimensions of career adaptability: *concern* (e.g., "Planning how to achieve my goals"), *control* (e.g., "Taking responsibility for my actions"), *curiosity* (e.g., "Investigating options before making a choice"), *and confidence* (e.g., "Working up to my ability"). The Dual Career Form was developed by adding a dual career concern subscale which consists of five questions (e.g., "Becoming aware of the sport choices that I must make; " "Concerned about my athletic career; " "Concerned about combining my sport and education") and was shown to demonstrate factorial and concurrent validity in a Finnish upper secondary school sample (see Ryba et al., 2017b). Participants rated each item on a

five-point Likert scale (1 = not my strongest ability to 5 = one of my strongest abilities). For each subscale, a mean score was computed from the items measuring competence in the given domain. The range of scores were 1.00–5.00 for all subscales (i.e., concern, dual career concern, control, curiosity, and confidence), including for the total score of the CAAS-DC. In the current study, Cronbach alphas were used for the scores of different subscales, the total score of all 27 items, and the scores of time points (T1 and T5). The Cronbach alpha reliabilities for the subscales, items, and time points varied between 0.81 and 0.91.

Withdrawal from competitive sports was measured with a question, "Do you still participate in competitive sports" that was asked at every measurement point from T2 onwards. At the beginning of this study all the participants participated in competitive sports, whereas at T5 a total of 24.5% withdrew from the elite development pathway.

Academic achievement was measured at each measurement point by using self-reports of most recently earned grade point averages (GPA). In Finland, the GPA varies from 4 (poorest) to 10 (highest). In previous Finland-based studies, self-reported GPA has been shown to correlate 0.96 with actual GPA (Holopainen & Savolainen, 2005).

5.3. Analysis strategy

The analyses were carried out according to the following steps. First, to explore whether different career adaptability profiles can be found among the participants (Research Question 1), K-means Cluster analysis was performed using standardized subscale scores at the first (T1) and the last (T5) measurement points as criteria variables. By selecting the first and the last measurement points, the focus was on the overall change in career adaptabilities during upper secondary school. Because there were no hypotheses about the number of different profiles based on the theory, different solutions from two to six clusters were investigated. In K-means clustering, the decision concerning number of profiles/clusters was based on the content criteria, on the one hand, and sample sizes of each cluster, on the other. Second, to address Research Question 2a, cross-tabulation was used to detect sport dropout distributions within different career adaptability profiles. To address Research Question 2 b, the association of distinct career adaptability profiles with student-athletes' school achievement (GPA) at different time points was examined with One-Way Analyses of Variance (*ANOVA*). All statistical analyses were conducted using IBM SPSS Statistics 24 program. The means (*M*) and standard deviations (*SD*) of the used CAAS-DC variables are presented in Table 1.

6. Results

6.1. Development of career adaptability profiles

The first research question of the present study was to find out if there were different developmental pathways of career adaptability among student-athletes. Results of K-means cluster analysis for T1 and T5 total career adaptability scores suggested that the solution of four clusters best described the data: solutions with less than four clusters showed only stable level differences between clusters, whereas solutions with more than four clusters did not further specify the phenomenon. Additionally, the solution of four clusters was the most informative, and the group sizes of this solution were big enough for subsequent group comparisons. The means and standard deviations of criteria variables at different groups are presented in Table 2. All four groups differed statistically significantly ($p < .001$) from each other according to criteria variables (i.e., total score of CAAS-DC at T1 and T5). Based on the mean scores, the four found subgroups of career adaptability development were named as higher, lower, increasing, and decreasing career adaptability groups.

The higher career adaptability group ($n = 80$; 20.46% of the sample) scored almost one standard deviation above the mean both at T1 and T5, which means that their adaptability was higher both at the beginning and at the end of upper secondary school. The lower career adaptability group ($n = 78$; 19.95% of the sample) had their scores approximately one standard deviation below the mean at T1 and T5, and their adaptability skills stayed behind others across time. The increasing career adaptability group ($n = 131$; 33.50% of the sample) had their scores slightly below the mean at T1, that is, at the beginning of upper secondary school, but raised above the mean at the end of upper secondary school (T5), which means that this group increased their career adaptability resources from when they began upper secondary school to when they ended; the size of this group was larger than that of the other groups. The decreasing career adaptability group ($n = 102$; 26.09% of the sample) scored above the mean at the first measurement point T1 but below the mean at the end of study (T5), which demonstrated a decrease in career adaptability resources when they began and ended upper secondary school.

6.2. Developmental association between career adaptability and dual career

The second research question of the present study was to examine to what extent adolescents' career adaptability is associated with sustainability of their dual careers – that is, (2a) is there a relationship between career adaptability and sport withdrawal? And (2b) is there a relationship between career adaptability and academic achievement? The results of the association of the developmental profiles of career adaptabilities (a total score of CAAS-DC) and withdrawal from sport (see Table 3) showed first that there was a relationship between cluster profile and withdrawing sport at T5. Students in the lower career adaptability group were more likely to withdraw from sport than those in the other three groups.

Because there was a connection between career adaptability and withdrawal from sport, withdrawal at earlier measurement points were examined as well to gain more information about this relationship. The results of cross-tabulation (see Table 4) demonstrated even stronger association between career adaptability profiles and withdrawal at T4 (χ^2 (3, $N = 310$) = 11.76, $p = .008$) than what was found at T5. The lower career adaptability profile was again overrepresented in those who withdrew from sport and underrepresented in those who continued in competitive sport. Differing from T5, at T4 the increasing career adaptability group was underrepresented in those who withdrew from sport and overrepresented in those who were continuing competitive sport. Cross-tabulations were not possible at measurement points T2 and T3 because of the small frequencies of those who had withdrawn from sport at those times. At T2 only two participants had withdrawn from

Table 1
Means (M) and standard deviations (SD) for career adaptability evaluation ratings.

		Measurement point					
		CAAS-DC	Concern	Control	Curiosity	Confidence	Dual career concern
T1	*M*	3.23	2.86	3.43	3.04	3.47	3.37
	SD	0.62	0.80	0.74	0.73	0.70	0.75
T5	*M*	3.15	3.02	3.24	3.10	3.28	3.11
	SD	0.64	0.82	0.79	0.76	0.75	0.84

Note. CAAS-DC = Whole construct of career adaptability

Table 2
Means (M) and standard deviations (SD) of standardized adaptability at T1 and at T5 as a function of different group membership.

		Groups							
		Higher (n = 80)	Lower (n = 78)	Increasing (n = 131)	Decreasing (n = 102)	df1	df2	F	Partial eta squared
T1	*M*	1.34	−1.27	−0.32	0.33	3	387	391.25***	0.75
	SD	0.59	0.59	0.41	0.45				
T5	*M*	1.15	−1.11	0.47	−0.59	3	314	236.88***	0.69
	SD	0.67	0.56	0.52	0.50				

Note. ***$p < .001$ (for pairwise comparisons Bonferroni was used).

Table 3
Cross Tabulation for Examining Distributions of Sport Withdrawal within Different Career Adaptability Developmental Profiles at T5 (N = 331). Each Cell Presenting Counts (n of participants), Percentages within Columns, and Adjusted Residuals.

Profile	Competing	Dropout
Higher	53	14
	21.2% (0.8)	17.3% (−0.8)
Lower	44	23
	17.6% (−2.1 *)	28.4% (2.1 *)
Increasing	83	24
	33.2% (0.6)	29.6% (−0.6)
Decreasing	70	20
	28.0% (0.6)	24.7% (−0.6)
Total	250	81
	100.0%	100.0%

Note. For adjusted residuals * $p < .05$.

Table 4
Cross Tabulation for Examining Distributions of Sport Withdrawal within Different Career Adaptability Developmental Profiles at T4 (N = 310). Each Cell Presenting Counts (n of participants), Percentages within Columns, and Adjusted Residuals.

Profile	Competing	Dropout
Higher	52	10
	19.7% (−0.3)	21.7% (0.3)
Lower	44	17
	16.7% (−3.2 *)	37.0% (3.2 *)
Increasing	91	9
	34.4% (2.0 *)	19.6% (−2.0 *)
Decreasing	77	10
	29.2% (1.0)	21.7% (−1.0)
Total	264	46
	100.0%	100.0%

Note. For adjusted residuals * $p < .05$, $\chi 2$ (3, $N = 310$) = 11,75, $p = .01$.

sport (0.5%) and at T3 the number of participants who discontinued the athletic career was 22 (6.2%).

The association of developmental profiles of career adaptability resources with student-athletes' academic success was then examined. The results of One-Way Analysis of Variance (*ANOVA*) showed that the profiles differed significantly in GPA at measurement point T1 ($F(3, 387) = 3.13$, $p = .026$), T4 ($F(3, 301) = 3.02$, $p = .030$), and T5 ($F(3, 320) = 3.87$, $p = .010$). Post-hoc tests using Bonferroni (see Table 5) showed that at T1, the lower profile had significantly lower GPA scores than the increasing profile ($p = .035$, *95% CI* (0.01; 0.48). At T4 ($p = .046$, *95% CI* (0.01; 0.81) and at T5 ($p = .042$, *95% CI* (0.01; 0.80), the lower profile had significantly lower GPA scores than the higher profile. Overall, the results suggest that high scores of career adaptability are associated with high GPA, as well as lower scores of career adaptability resources are associated with a lower GPA.

7. Discussion

The current findings add to our understanding of the development of career adaptability profiles (a person-centred perspective) across upper secondary school, as well as developmental associations between career adaptability and sport withdrawal and academic achievement. First, the results showed that there were individual differences in the overall levels of the constructs across time, and four distinct profiles were identified. Second, the results showed a significant association of career adaptability profiles with sport withdrawal and academic achievement.

The first research question of the study was to find out if there were different developmental pathways of career adaptability among student-athletes. Results in this study showed that although on mean level career adaptability resources decreased during upper secondary school, this was not the case for all student-athletes. Four different career adaptability profiles were found in the present study (i.e., higher, lower, increasing, and decreasing). A total of 40% of student-athletes showing either higher and lower adaptability profiles demonstrated stable levels of career adaptability across time, whereas 60% of student-athletes showed changing levels of career adaptability across upper secondary school, either increasing or decreasing. These results support that career adaptability development happens at different rates, with the possibility of developmental rates decreasing, increasing, and remaining stable (Savickas, 2013). Additionally, these results suggest that there are individual differences in the developmental pathways of career adaptability, which is in line with Savickas' (2005, 2012) notion that individual adaptabilities are relational and socially constructed

Table 5
Means (M) and standard deviations (SD) of GPA in different CAAS profiles at different measurement points.

		CAAS profiles						
		Higher	Lower	Increasing	Decreasing	*df1*	*df2*	*F*
T1	*M*	8.92	8.68[a]	8.93[a]	8.80	3	384	3.13
	SD	0,60	0,65	0,63	0,58			
T2	*M*	8.32	8.10	8.34	8.16	3	354	1.59
	SD	0.85	0.93	0.87	0.80			
T3	*M*	8.25[b]	7.84[b]	8.08	8.02	3	349	2.46
	SD	0.90	1.02	0.98	0.77			
T4	*M*	8.28	7.88	8.17	7.93	3	298	3.02
	SD	0.84	1.07	0.91	0.79			
T5	*M*	8.25[c]	7.85[c]	8.16	7.90	3	317	3.87
	SD	0.92	0.93	0.85	0.78			

Note. Means within a row sharing the same superscripts are significantly different at the level of $p < .05$ (for pairwise comparisons Bonferroni was used).

competencies that are attained from one's education and life experience (see also, Hirschi & Valero, 2015).This finding is important for applied practitioners, as interruptions between the four career adaptability dimensions (concern, control, curiosity, and confidence) can result in student-athletes having difficulties with solidifying their career preferences and identifying occupational choices (Savickas, 2013). Student-athletes may demonstrate distinct adaptability resources and development patterns according to their career construction. For example, those youth athletes who approach sport and education in a harmonious manner by valuing sport and education as equally important (i.e., in a contrapuntal style, Ryba et al., 2017a), may have more resources to cope with the transitions and challenges in dual careers compared to those who experience the integration of athletic and academic pursuits as incompatible (e.g., Ronkainen et al., 2020; Rothwell et al., 2020).

As we found two groups with changing adaptabilities, the practical gain of this study highlights the importance of understanding the non-static nature of career adaptability development while working with student-athletes. Compared to Nikander, Tolvanen et al.'s (2021) study across the first year of upper secondary school, in which four stable profiles and one increasing profile were found, it appears that student-athletes face more career related tasks toward the end of upper secondary school. Therefore, attention should be given to first-year student-athletes because a separation in the developmental profiles of adaptability skills is seen after the first year of upper secondary school. Student-athletes could benefit from supportive interventions that would help them breach out beyond their sporting career to other life domains, which is in line with extant youth athlete research (Bergeron et al., 2015). For that, discursive interventions circulating versatile role models and career stories may assist adolescent athletes with building resources to project into their multiple future possibilities and explore individual career paths (Carless & Douglas, 2013; Ronkainen & Ryba, 2018; Ryba et al., 2017a). Furthermore, adolescent student-athletes' parents could demonstrate belief in their child's abilities to succeed in education, which has shown to predict higher career adaptabilities (Nikander, Tolvanen, et al., 2021). Finally, planning for the future should also be considered when working with young athletes because only a fraction of them will eventually be able to achieve a professional career in sport, which suggests that most of them need to build some other professional plans (Baron-Thiene & Alfermann, 2015). In the United States, findings from the 2019 NCAA GOALS (2020) found that student-athletes desire support in preparing for their professional careers, as around half of the participants expressed an interest in learning more about preparing for their careers after college from their coaches and athletic administrators.

The second research question of the study was to examine to what extent adolescents' career adaptability is associated with dual career sustainability – that is sport withdrawal and academic achievement. The results of this study showed a relationship between career adaptability and both sport withdrawal and academic achievement, finding that lower career adaptability resources were related to sport withdrawal, as well as higher career adaptability scores were related to high academic achievement. The results examining academic success reflect earlier studies conducted with different population samples, where polarization in academic skills were found (Demulier et al., 2013; Negru-Subtirica & Pop, 2016). As expected based on previous research, in this study students with profiles of higher adaptability resources displayed greater adapting attitudes and behaviors (continuation of dual career and stronger academic achievement) than those with lower adaptability profiles (Hirschi et al., 2015; Hirschi & Valero, 2015). Therefore, to support sport continuation and academic success, adolescent athletes with lower career adaptability resources could benefit from achievement and commitment-based interventions early in their high school career, as the interventions focus on promoting cognitive and emotional functioning in career planning (Kiuru et al., 2021).

Evidence has shown that generally a positive relationship has been found with career adaptability dimensions and indicators of successful adaptation (Rudolph et al., 2017). Thus, our findings contribute to this literature by suggesting that this may also be found with student-athletes as well. Earlier reports have found that many adolescents quit their competitive sporting career when they face the transition from junior to senior sport (Bergeron et al., 2015), or if they face challenges balancing academic and athletic demands (Sorkkila et al., 2020). Because developmental tasks push adolescents to develop in many life domains (Nurmi, 1991), they might not have enough time, motivation, or resources to continue on their dual career paths (Baron-Thiene & Alfermann, 2015; Ryba et al., 2021). In Finland, a higher education degree has high value, both in the work market as well as in the attitudes of student-athletes and parents (Ryba et al., 2016a). Additionally, transition to higher education means an end of the structured and integrated dual career system compared to secondary school stage (Nikander, Saarinen, et al., 2021), which can cause athletes to opt-out from sport due to the lack of support. This is further highlighted by the high equality in Finnish society (Storm & Nielsen, 2022), meaning that student-athletes in tertiary education do not have special flexible solutions, and thus, individual competencies and skills to combine sport and education are critical.

This study suggests that the CAAS-DC measure can be used to identify student-athletes that may struggle with combining sport and education early in their dual career. Special focus should be paid on the group of student-athletes who show a lower level of adaptability, as well as those who seem to decline in their abilities. Identifying these student-athletes early is crucial in order to help student-athletes develop skills and resources to better manage their dual career, while also potentially increasing both student-athlete academic achievement and sport retention. Earlier research has shown the importance on timing of adolescent career development (Hirschi, 2009), and that students with lower academic achievement seem to also have difficulty with other life skills as well, affecting future choices and decisions that they may make (Negru-Subtirica & Pop, 2016).

Because career adaptabilities are psychosocial resources (Savickas, 2013) and environmental experiences affect career adaptability (Savickas, 2005, 2013), the dual career development of student-athletes can be impacted by environmental influences (e.g., parental support and athletes' social networks; European Commission, 2012; Knight et al., 2018; Nikander, Tolvanen, et al., 2021). Therefore, the development of career adaptability resources should not solely be placed on the student-athlete, but should also be facilitated by key stakeholders (e.g., parents, coaches, etc.) supporting the student-athletes' dual career. Thus, consideration should be given to how student-athletes' environments are contributing to the development or hindrance of student-athletes' career adaptabilities. For example, coaches' attitudes toward and skills assisting in career planning outside of sports (Saarinen et al., 2020; Ronkainen et al., 2018)), parents' attitudes toward dual career (Guidotti et al., 2015), and the organizational culture of the athletic talent development environment (Nikander et al., 2022) have been shown to influence youth athletes career development. The reasons and processes (individual and environmental) behind lower and decreasing career adaptability resources with student-athletes should be studied and understood in order to support student-athletes in their development and dual career. This could be done by conducting mixed method investigations that implement intensive qualitative designs to account for processes related to cognitive or emotional functioning in career construction (Hoare et al., 2012; Ryba et al., 2022).

7.1. Evaluation of the study

This study has several strengths. First, we extended the current dual career literature to new knowledge about individual differences in career adaptability among adolescent student-athletes. Second, the results of our study provide new insights into the role of career adaptability resources in the continuation of adolescent athletes' athletic

career and academic achievements. Third, career adaptabilities were assessed longitudinally across upper secondary school, making it possible to identify possible different trajectories of career adaptability resources across time. Fourth, our findings render important knowledge for decision makers and dual career support providers about specific psychosocial resources (i.e., concern, dual career concern, control, curiosity, and confidence) that may contribute to sustainable dual careers, as well as emphasize the importance of early career interventions, especially for student-athletes with low career adaptability levels, that assess and build career adaptability resources. Furthermore, this study holds the potential to assist Finnish dual career systems, as it provides a novel perspective on how career adaptability resources (i.e., concern, dual career concern, control, curiosity, and confidence) may support dual career pathways by increasing sport continuation and academic success with student-athletes in elite sports upper secondary schools. This perspective also highlights the importance of integrating career interventions within dual career systems when student-athletes enter into upper secondary schools, not only as student-athletes' transition out of sport.

The present study has some limitations that should be considered before generalising the results. While a limitation in this study is its focus on student-athlete career adaptabilities, making the results limited in application to other populations, adolescents developing dual careers in other life domains, such as music or dance, may be able to draw upon this research for insight into their own career adaptability development. Another limitation concerns the CAAS-DC measure, which is relatively new and therefore limited in its applicability to other athletic populations. Thus, the factor structure of the CAAS-DC needs to continue to be examined in other athletic populations (Ryba et al., 2017b). The present study examined the associations of career adaptability profiles and sport withdrawal; however, other factors may play a role in student-athletes opting to withdraw from sport. In addition, the development of career adaptability may be influenced by multiple factors across upper secondary school. Finally, in the present study four career adaptability profiles with distinct content in terms of level and development of career adaptabilities were found. However, it is possible that the profile solution is dependent on the sample. Larger samples, for example, could end up with a more than four profiles. Therefore, further studies are needed to replicate the profile solution of the present study before generalizing the results. In the future, person-focused longitudinal studies could give additional information and explanations for the changes that were noticed in this study (Johnston, 2018).

8. Conclusion

To conclude, the findings of the present study suggest that the profiles of career adaptability identified differ both in the level of adaptability resources and in the pattern of change across upper secondary sport school. This suggests that the student-athletes' self-regulation abilities in their dual career pursuits over time can be improved. Additionally, these findings emphasize the need for support and targeted interventions with student-athletes' that demonstrate lower and decreased career adaptability resources. The CAAS-DC instrument could be used to not only identify student-athletes with lower career adaptability resources, but to track student-athlete resource development throughout their high school career. Continued assessment should not only be done with student-athletes that initially show lower career adaptability resources, as this study has demonstrated that student-athlete resources are vulnerable to changing over time. Additionally, continual assessment of student-athletes' career adaptabilities will allow dual career support providers, teachers, and coaches to assist with the positive development of career adaptability resources, thus, supporting athletes' construction of a sustainable dual career. Comparing the development of student-athletes' career adaptability resources over time will help applied practitioners better understand previous difficulties student-athletes have had in adapting to tasks, transitions, and challenges specific to dual career pursuits (Savickas, 2013).

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Declaration of interest

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Author contribution

Juulia Ojala: Conceptualisation, Formal analysis, Interpretation of results, Writing - Original Draft, Data visualisation. **Aku Nikander**: Formal analysis, Interpretation of results, Writing - Original Draft, Data visualisation, Writing - Review & Editing. **Kaisa Aunola**: Data Curation, Methodology, Formal analysis, Interpretation of results, Data visualisation, Writing - Review & Editing, Supervision. **Jessica De Palo**: Interpretation of results, Writing - Review & Editing. **Tatiana Ryba**: Conceptualisation, Funding acquisition, Project administration, Investigation, Data Curation, Interpretation of results, Writing - Original Draft, Writing - Review & Editing, Supervision.

Data availability

Data will be made available on reasonable request.

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