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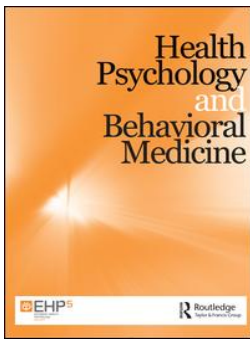
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Career Adapt-Abilities Scale – Dual Career Form (CAAS-DC): psychometric properties and initial validation in high-school student-athletes

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ABSTRACT

Talented adolescent athletes attempting to sustain academic and vocational training alongside the increasing demands of their athletic career often encounter difficulties, including lower vocational readiness and the challenge of adapting to life after elite sport. Therefore, it is necessary to better understand the specific competencies that youth athletes can draw upon to successfully combine sport and education into a dual career pathway. Building on the existing Career Adapt-Abilities Scale [Savickas & Porfeli, (2012). Career adapt-abilities scale: Construction, reliability, and measurement equivalence across 13 countries. *Journal of Vocational Behavior*, 80(3), 661–673], we developed a Dual Career Form of the Career Adapt-Abilities Scale (CAAS-DC) for use with adolescent student-athletes. A sample of 391 Finnish-speaking athletes completed the CAAS-DC at the beginning of their freshman year in sport high school. Adequate factorial validity of the CAAS-DC and internal consistency reliabilities of its five subscales were demonstrated in both exploratory structural equation modeling and confirmatory factor analysis. The concurrent validity of the CAAS-DC was demonstrated by positive and significant associations with self-esteem, sport task values, school task values, and career construction; and negative associations with school and sport burnout. Finally, partial strong measurement invariance was also observed across males and females. The evidence from this study suggests that the CAAS-DC is a promising self-report inventory that can be used by researchers and applied practitioners to assess young athletes' self-regulation capacities in dual career pursuits.

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In context of the recent dramatic changes in technology, human geography, and economy that not only destabilized the labor market, but also increased the required qualification minimum to obtain a job, the Europe 2020 growth strategy aims at reducing the rates of early school leaving and creating the conditions for a more competitive economy

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with higher employment. One target group of these initiatives is high-performance athletes, who often face multiple risks in attempting to sustain their academic and vocational training alongside their athletic career, which subsequently may hinder young people's employability and adaptation to life after elite sport (EU Guidelines on Dual Careers of Athletes, 2012). The term "dual careers" encapsulates the increasing societal expectations for athletes to successfully initiate, develop, and finalize their athletic careers in parallel to the pursuit of education and occupational trajectories, while simultaneously resolving other developmental tasks, such as identity formation and achieving financial independence. Though many studies with athletes have shown that a dual career pathway to adulthood benefits them, especially with respect to prioritizing and planning a balanced lifestyle, building a professional network, and decreased stress about the future (Aries, McCarthy, Salovey, & Banaji, 2004; Stambulova & Wylleman, 2014; Torregrosa, Ramis, Pallarés, Azócar, & Selva, 2015), junior student-athletes report a considerable role strain and overload in daily living, and overall find the dual career difficult (Christensen & Sørensen, 2009; O'Neill, Allen, & Calder, 2013; Van Rens, Borkoles, Farrow, Curran, & Polman, 2016). It is therefore critical to better understand the specific competencies that mobilize dual career design and management in the course of changing life tasks and contextual demands.

Recently, the concept of career adaptability has gained researchers' attention in vocational psychology. Defined by Savickas and Porfeli (2012) as "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" (p. 662), career adaptability centers on *how* individuals design and develop their career. Career adaptability is conceptualized as psychological resources that support self-regulation strategies along the four dimensions of concern, control, curiosity, and confidence (Savickas, 2005). *Concern* indicates future orientation and the extent to which one is aware of and prepares for a professional future. *Control* relates to beliefs about personal responsibility for shaping oneself and one's environment in vocational development and the perceived personal control over the preparatory process. *Curiosity* reflects the tendency and ability to explore the self and environment for options and possibilities. Finally, *confidence* suggests the perceived efficacy to pursue one's goals and aspirations (Savickas, 2011; Savickas & Porfeli, 2012).

The Career Adapt-Abilities Scale (CAAS, Savickas & Porfeli, 2012) has been validated and extensively used to assess career adaptability in diverse socio-cultural samples, including early and late adolescents (Ambiel, de Francisco Carvalho, Martins, & Tofoli, 2016; Di Maggio, Ginevra, Laura, Ferrari, & Soresi, 2015; Tien, Lin, Hsieh, & Jin, 2014), revealing that career adaptability resources are pivotal for activating the life designing process (Savickas, 2012). Studies with middle- and high-school students have shown that career adaptabilities are related to a sense of power over own life and perceived well-being (Hirschi, 2009), positive attitudes toward the future and life satisfaction (Di Maggio et al., 2015), and goals in school and occupational engagement (Hartung, Porfeli, & Vondracek, 2008). It has also been suggested that career adaptabilities might constitute a protective factor to effectively cope with career transitions and stressful situations (Maggiori, Rossier, & Savickas, 2015). Taking into consideration that elite sport and high school are characterized by increasing performance standards that may result in an elevated risk of burnout among youth athletes (Gustafsson, Hill,

Stenling, & Wagnsson, 2015; Sorkkila, Aunola, & Ryba, 2017), it is important to glean an understanding of whether career adaptabilities (Savickas, 2005) constitute a psychological resource for athletes in life transitions to support their health and well-being at all stages of their development.

Savickas (2005, 2012) emphasized that individual adapt-abilities are not static traits but relational and socially constructed competencies, derived from education and life experiences. Past studies with student-athletes have shown that they tend to prioritize their athletic career over education and vocational development (Christensen & Sørensen, 2009; Cosh & Tully, 2014; Stambulova, Engström, Franck, Linnér, & Lindahl, 2015), lack practical experience in occupational settings (Cabrita, Rosado, Leite, Serpa, & Sousa, 2014), and score lower on career maturity than non-athletes (Brown, Glastetter-Fender, & Shelton, 2000). Several studies also reported that athletes spend more time in school and higher education to complete their graduation requirements and tend to postpone obtaining a degree in order to train as an elite athlete (Aquilina & Henry, 2010; Ryba, Ronkainen, & Selänne, 2015).

However, despite the professional attitude and disciplined lifestyle required of athletes at the elite level, there are limited opportunities to advance to the professional ranks. In football (soccer), for instance, it has been estimated that less than 1% of players will successfully complete their junior-to-senior professional football transition in the English Premier League (Morris, Tod, & Oliver, 2015). In a Finnish survey of high-school graduates, it was found that only 5% athletes commit full time to their sport after graduating from school (Karvonen & Suomela, 1996). Although many athletes are fairly realistic about the professional opportunities in sport and realize the significance of pursuing academic endeavors (Christensen & Sørensen, 2009; Harrison & Lawrence, 2004; Ronkainen, Watkins, & Ryba, 2016), it seems likely that adolescent athletes' concern for vocational future after sport is less of a priority when compared to their immediate dual career concern, which requires balancing sport and school in daily life. Previous research findings of developmental changes in collegiate student-athletes provide some support of this reasoning by revealing that hours of weekly sport participation inversely related to career decision-making self-efficacy (Brown et al., 2000), as well as the gradual decrease in the level of commitment to sports and associations with the athlete role from freshmen to upper classmen (Adler & Adler, 1985; Chen, Snyder, & Magner, 2010). Consequently, we hypothesized that because talented young athletes face the unique demands of combining their athletic and academic pursuits, their concerns for the future might diverge from a six-item "concern" factor of the CAAS. We nevertheless emphasize that it is the combined levels of the career adaptability dimensions that appear to be the appropriate approach to conceptualize and measure a career adaptability construct in student-athletes embarking on a dual career path (see Hirschi, 2009).

The aim of this study was to develop and validate the Dual Career Form of the CAAS (CAAS-DC) to measure concern, dual career concern, control, curiosity, and confidence in student-athletes. Given the exploratory nature of the five-factor measurement model in which we included a new factor of dual career concern, exploratory structural equation modeling (ESEM; Asparouhov & Muthén, 2009) offers an alternative approach by extending the traditional factor analyses by integrating the strengths of both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) into a single structural equation modeling framework (Marsh et al., 2009). Unlike CFA, the ESEM allows all of

the item indicators to be directly related to (loaded on) all the factors in the measurement model as in the EFA. And, unlike the EFA, it also provides the robust model-fit indices (e.g. goodness-of-fit indices, standardized factor loadings, and standardized errors) as in the CFA. Furthermore, the CFA was used to further confirm the measurement model of the CAAS-DC. To examine concurrent validity of the CAAS-DC, the measure's associations with various criteria variables were calculated. Based on previous findings supporting the links between career adaptability and positive youth development with respect to self-efficacy, well-being and life satisfaction (Di Maggio et al., 2015; Hirschi, 2009), and career maturity (Savickas & Porfeli, 2011) as well as a negative relationship to work stress and a positive one with orientations to happiness (Johnston, Luciano, Maggiori, Ruch, & Rossier, 2013), we expected positive associations between subscales of the CAAS-DC and self-esteem and career construction; and also negative associations with school and sport burnout. Given that no research exists on career adaptabilities in relation to subjective task values for school and sport, we set theoretically based predictions that these variables would relate positively to the CAAS-DC. The final objective was to examine the gender invariance of the measurement model. We hypothesized that the measurement model would remain invariant across males and females.

Methods

Participants

In total, 391 adolescent athletes (199 females and 192 males; $M_{\text{age}} = 16$ years, $SD_{\text{age}} = 0.17$) participated in this study. Fifty percent of the participants represented individual sports and 50% team sports, reporting that they had competed at least in the regional level for an average of 7 years ($SD = 2.41$). The athletes reported spending on average 25 hours ($SD = 8.99$) a week on their sport, and sixty percent expected to compete in the Olympic Games or World championships in the future. The participants were recruited from six sport high schools across Finland for Time 1 data collection of a longitudinal study of adolescent athletes' dual careers (Ryba et al., 2016).

Development of the CAAS-DC

The CAAS 2.0 of Savickas and Porfeli (2012) was translated into Finnish and back translated into English by two bilingual experts (Hambleton, 2001, 2005), and then finalized in collaboration with a Finnish-speaking doctoral student who studies counseling psychology in an American university. Furthermore, to measure dual career concern of adolescent athletes, three new items were added: "Becoming aware of the sport choices that I must make;" "Concerned about my athletic career;" and "Concerned about combining my sport and education." In addition, concern item # 6 of the CAAS ("Concerned about my career") was modified as "Concerned about my vocational career" to ensure a clear distinction between athletic career and vocational career. As such, a subscale *Dual Career Concern* was assumed to measure the extent to which an individual is aware of challenges to integrate athletic and academic pursuits and prepares for his or her dual career pathway.

Measures

Career Adapt-Abilities Scale–Dual Career Form (CAAS-DC)

The CAAS-DC contains 27 items and was developed to measure five dimensions, including: (a) Concern (4 items; e.g. “Thinking about what my future will be like”); (b) Dual career concern (5 items; e.g. “Concerned about combining my sport and education”); (c) Control (6 items; e.g. “Sticking up for my beliefs”); (d) Curiosity (6 items; e.g. “Becoming curious about new opportunities”); and (e) Confidence (6 items; e.g. “Performing tasks efficiently”). Participants responded on each item using a 5-point Likert scale (1 = *not a strength*; 5 = *greatest strength*). The reliabilities of the CAAS-DC subscales were, respectively, .85, .85, .85, .90, and .89; and reliability of the combined adaptability scale was .96.

Burnout

School burnout was measured with the School Burnout Inventory (Salmela-Aro, Kiuru, Leskinen, & Nurmi, 2009). The scale consisted of 10 items measuring three dimensions of burnout: (a) exhaustion at school (4 items; e.g. “I often sleep badly because of matters related to my school work”), (b) cynicism towards the meaning of school (3 items; e.g. “I feel lack of motivation in my schoolwork and often think of giving up”), and (c) feelings of inadequacy as a student (3 items; e.g. “I used to have higher expectations of my schoolwork than I do now”). The items were rated on a 5-point Likert scale (1 = *completely disagree*; 5 = *completely agree*). Reliability of the school burnout scale in this study was .88. Sport burnout was measured with the Sport Burnout Inventory for dual career (Sorkkila et al., 2017). The scale consisted of 10 items measuring three dimensions of burnout: (a) exhaustion at sport (4 items; e.g. “I feel overwhelmed by my sport”), (b) cynicism towards the meaning of sport (3 items; e.g. “I feel that I am losing interest in my sport”), and (c) feelings of inadequacy as an athlete (3 items; e.g. “I often have feelings that I am not doing well in my sport”). The items were rated on a 5-point Likert scale (1 = *completely disagree*; 5 = *completely agree*). Reliability of the sport burnout scale in this study was .85.

Self-esteem

Self-esteem was measured with five items (e.g. “On the whole, I feel satisfied with myself”) taken from Rosenberg’s Self-Esteem Scale (Rosenberg, 1965). The items were rated on a 5-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*). The Cronbach alpha reliability for the scale in this study was .77.

Task values

Adolescent athletes’ task values for sport and school were measured with scales based on Eccles et al. (1983). Scale of the sport domain consisted of 13 items, and that of school domain of 18 items, measuring three dimensions: (a) interest values (5 items; e.g. “How much do you like playing your sport?/How much do you like doing math?”), (b) attainment values (4 items; e.g. “How important is it to you that you do well in your sport?/How important is it to you to get good grades in math?”), and (c) utility values (4 items; e.g. “How useful is practicing your sport for what you want to do after you graduate or go to work?/How useful is learning math for what you want to do after you graduate or

go to work?”). All items were rated on a 5-point Likert scale (1 = *not very useful*; 5 = *very useful*). The Cronbach alpha reliabilities for the three sport-related subscales were .78, .81, and .80, respectively, and .72, .85, and .72, for the school-related subscales. Reliabilities of the total scale in this study were, respectively, .85 and .87 for sport and school.

Career construction

Career construction was measured with 14 items taken from the Student Career Construction Inventory (SCCI; Savickas & Porfeli, 2011). Three subscales of the SCCI were used to measure: (a) self-concept crystallization (5 items; e.g. “Recognizing my talents and abilities”), (b) occupational exploration (5 items; e.g. “Learning about different types of jobs”), and (c) career decision-making (4 items; e.g. “Selecting an occupation that will satisfy me”). The subscales reliabilities in this study were .78, .77, and .93, respectively. Reliability of the total scale in this study was .87.

Procedure

Ethical approval was received from the relevant university prior to data collection. To gain access to student-athletes, the purpose of the study was explained to the principals of the sport high schools. After obtaining the participants’ informed consent, the survey package was distributed to the student-athletes. In Finland, informed consent from the parents/guardians of young people over 15 is not required.

Data analysis

We conducted the ESEM and CFA using Mplus 7.3 (Muthén & Muthén, 1998–2012). Model-data fit was deemed as acceptable when comparative fit index (CFI) and Tucker-Lewis index (TLI) $\geq .90$, and the value of root mean square error of approximation (RMSEA) $\leq .08$ (Marsh, Hau, & Grayson, 2005). For each subscale, composite reliability (Rho (ρ); Raykov, 1997) was calculated to provide an index of internal reliability.

We adopted a sequential multi-group CFA approach to test whether the first-order five-factor measurement model of career adapt-abilities were invariant across male and female students (Dimitrov, 2010). Firstly, the measurement models of both the male and female student-athletes were examined individually. Secondly, the configural invariance was tested without forcing any constraints on the equality of model parameters (e.g. factor loadings and item intercepts) across males and females. Thirdly, metric invariance was tested by forcing the equality on the factor loadings across males and females. Fourthly, strong invariance was tested by forcing the equality on both factor loadings and item intercepts across males and females. Fifthly, strict invariance was tested by forcing the equality on the factor loadings, item intercepts, and residual value across males and females to be equal, while retaining the constraints of factor loadings and item intercepts. According to Cheung and Rensvold (2002), there is a lack of invariance if the change of CFI value (i.e. Δ CFI) between two nested models (e.g. configural invariant model and metric invariant model) was larger than .01 (absolute value).

The concurrent validity of the five dimensions of CAAS-DC on their criteria-related variables was examined by calculating their associations. We followed Cohen’s (1988)

guidelines to interpret the effect size of the correlation coefficients as small ($r = 0.1$), medium ($r = 0.3$), or large ($r = 0.5$).

Results

Preliminary analyses

We found no significant pattern of missing data in terms of the valid responses (missing rate = 1.67%). The skewness and kurtosis values of all items were less than 2 (absolute values), demonstrating the distribution is normal. However, the Missing Completely at Random (MCAR; Little, 1988) test indicated that data were not MCAR ($p < .001$). We therefore used the robust maximum likelihood estimator to handle the missing data through the estimator of full information maximum likelihood (Enders & Bandalos, 2001). The mean values, standard deviation values, skewness and kurtosis values for all items of the Factorial Validity of the CAAS-DC are detailed in Table 1.

Factorial validity of the CAAS-DC

Building on the model-fit indices, the ESEM demonstrated that the correlated five-factor model of the factorial validity of the CAAS-DC was acceptable, $\chi^2(226) = 500.17$, $p < .001$, CFI = .937, TLI = .903, RMSEA = .056 (90% CI = .049–.062). Similarly, the CFA revealed that the correlated five-factor model of the Factorial Validity of the CAAS-DC was

Table 1. Descriptive statistics for the career adapt-abilities–dual career form items ($n = 391$).

Construct	Item	Mean	SD	Skewness	Kurtosis
Concern	1. Thinking about what my future will be like	2.84	1.01	.19	-.48
	2. Realizing that today's choices shape my future	2.97	0.92	.12	-.34
	3. Preparing for the future	2.93	0.96	.04	-.37
	4. Becoming aware of the educational and vocational choices that I must make	2.68	0.99	.34	-.40
Dual career concern	1. Becoming aware of the sport choices that I must make	3.45	0.95	-.16	-.44
	2. Planning how to achieve my goals	3.30	0.97	-.09	-.43
	3. Concerned about my vocational career	3.13	1.00	.01	-.52
	4. Concerned about my athletic career	3.67	0.92	-.42	-.17
	5. Concerned about combining my sport and education	3.31	0.94	-.17	-.45
Control	1. Keeping upbeat	3.40	1.03	-.23	-.58
	2. Making decisions by myself	3.37	0.96	-.32	-.12
	3. Taking responsibility for my actions	3.53	0.90	-.19	-.38
	4. Sticking up for my beliefs	3.28	0.93	.04	-.37
	5. Counting on myself	3.32	1.01	-.17	-.47
	6. Doing what's right for me	3.60	0.96	-.43	-.18
Curiosity	1. Exploring my surroundings	3.05	0.94	-.09	-.29
	2. Looking for opportunities to grow as a person	3.09	0.91	.00	-.35
	3. Investigating options before making a choice	2.99	0.91	.09	-.32
	4. Observing different ways of doing things	2.91	0.88	-.08	-.15
	5. Probing deeply into questions I have	2.97	1.01	.02	-.51
	6. Becoming curious about new opportunities	3.40	0.90	-.03	-.24
Confidence	1. Performing tasks efficiently	3.39	0.89	.03	-.38
	2. Taking care to do things well	3.49	0.86	-.03	-.30
	3. Learning new skills	3.42	0.86	-.23	-.05
	4. Working up to my ability	3.38	0.79	-.02	.00
	5. Overcoming obstacles	3.50	0.85	-.05	-.22
	6. Solving problems	3.47	0.89	-.11	-.17

Abbreviation: SD, standard deviation.

Table 2. Standardized parameter estimates for the CFA and ESEM of career adapt-abilities–dual career form ($n = 391$).

	Factor 1 (concern)		Factor 2 (dual career concern)		Factor 3 (control)		Factor 4 (curiosity)		Factor 5 (confidence)		R^2 (ESEM)	R^2 (CFA)
	ESEM	CFA	ESEM	CFA	ESEM	CFA	ESEM	CFA	ESEM	CFA		
Conc1	.57**	.75**	.23		.07		.08		−.07		.56**	.57**
Conc2	.71**	.78**	.01		.21		−.02		.03		.64**	.61**
Conc3	.59**	.85**	.20		.12		.07		.02		.67**	.71**
Conc4	.61**	.68**	.16		−.06		.01		.07		.51**	.46**
Dual1	.04		.74**	.79**	.13		−.05		−.01		.66**	.63**
Dual2	.20		.62**	.79**	.14		−.10		.05		.62**	.63**
Dual3	.28		.53**	.67**	−.11		.10		−.01		.50**	.45**
Dual4	−.12		.80**	.80**	.03		.12		.03		.71**	.63**
Dual5	.08		.41**	.61**	−.10		.09		.26**		.40**	.38**
Cont1	−.00		.08		.50**	.65**	.16		.03		.44**	.42**
Cont2	.15		−.03		.67**	.67**	.00		.01		.51**	.45**
Cont3	.10		.03		.58**	.75**	.06		.13		.55**	.56**
Cont4	.19*		−.02		.49**	.74**	.12		.14		.52**	.54**
Cont5	.01		.05		.56**	.64**	.22		−.10		.45**	.41**
Cont6	−.15*		.14		.45**	.75**	.38*		.06		.62**	.56**
Curi1	.06		.09		.05		.76**	.79**	−.07		.68**	.62**
Curi2	.09		.02		.12		.71**	.78**	−.05		.64**	.61**
Curi3	.22		−.02		−.03		.56**	.75**	.10		.53**	.56**
Curi4	.23		.03		−.12		.63**	.76**	.07		.59**	.58**
Curi5	.17		−.07		.04		.51**	.70**	.16		.48**	.49**
Curi6	−.15		−.02		.21		.49**	.67**	.28*		.57**	.45**
Conf1	.11		−.01		.07		.11		.57**	.72**	.53**	.51**
Conf2	.11		−.02		−.03		.03		.72**	.72**	.58**	.52**
Conf3	−.07		.08		.02		.19		.57**	.71**	.51**	.49**
Conf4	−.01		.04		−.00		.20*		.66**	.79**	.64**	.63**
Conf5	−.02		.17*		.27**		−.08		.60**	.82**	.70**	.67**
Conf6	.11		.02		.25*		−.02		.57**	.78**	.62**	.61**

Abbreviations: CFA, confirmatory factor analysis; ESEM, exploratory structural equation modeling; Conc, concern; Dual, dual career concern; Cont, control; Curi, curiosity; Conf, confidence

* $p < .05$.

** $p < .01$.

acceptable, $\chi^2(314) = 684.29$, $p < .001$, CFI = .915, TLI = .906, RMSEA = .055 (90% CI = .049–.061). A summary of the standardized factor loadings of all the CAAS-DC items of the five-factor model using both ESEM and CFA are presented in Table 2. Based on the standardized factor loading patterns, it is obvious that the new added factor (dual career concern) can be integrated into the new five-factor measurement model of career adapt-abilities. To demonstrate that the five-factor model captures the data more accurately, we further examined a four-factor model using both ESEM and CFA with the factor of concern and dual career concern combined. The model fit of the four-factor CAAS-DC using ESEM is: $\chi^2(249) = 645.34$, $p < .001$, CFI = .910, TLI = .872, RMSEA = .064 (90% CI = .058–.070) and model fit of the four-factor CAAS-DC using CFA is: $\chi^2(318) = 831.63$, $p < .001$, CFI = .883, TLI = .871, RMSEA = .064 (90% CI = .059–.070). The factor means, standard deviations, latent factor correlations, and composite reliability estimates for the CFA and ESEM of the five-factor CAAS-DC are detailed in Table 3. Significant medium to large and positive latent factor correlations were observed and all five subscales evidenced adequate internal consistency reliabilities ($\rho > .70$).

We tested the measurement invariance of five-factor model of career adapt-abilities across males and females. The measurement model of both the male (item Curiosity 3 was fixed to correlate with item Curiosity 4) and female student-athletes (item Control 1 was fixed to correlate with item Control 5, and item Confidence 3 was fixed to correlate with item Confidence 4) were firstly established with minor modifications. Given that the change of CFI (Δ CFI) was less than .01 including configural invariance, metric invariance, partial strong invariance (the item intercepts invariance constraints of item Dual Career Concern 5 and item Confidence 2 were set to free), and strict invariance, gender invariance was demonstrated. A summary of invariance analysis results is presented in Table 4.

Concurrent validity of the CAAS-DC

The concurrent validity of the CAAS-DC was preliminarily established (Table 5). Specifically, significant and medium negative correlations were revealed between the five factors of the CAAS-DC and school and sport burnout. Significant and medium positive correlations were revealed between the five factors of the CAAS-DC and self-esteem, career construction, as well as school and sport task values. Initial evidence on the additional contribution of dual career concern factor resulted in a lower correlation between concern and sport burnout ($r = -.17$) than concern and school burnout ($r = -.27$) as well as a lower correlation between concern and sport task values ($r = .18$) than concern and school task values ($r = .30$). Although the factor of dual career concern is significantly related to both sport burnout ($r = -.27$) and school burnout ($r = -.25$), as well as sport task values ($r = .24$) and school task values ($r = .39$), higher effect sizes were revealed between dual career concern and sport-related variables (i.e. sport burnout and sport task values).

Discussion

The present study introduced the CAAS-DC that was developed based on the CAAS 2.0 (Savickas & Porfeli, 2012). Psychometric properties of the five-factor measurement model of the CAAS-DC were tested with a group of Finnish-speaking adolescent student-

Table 3. Factor means, standard deviations, latent factor correlations, and composite reliability estimates for the CFA and ESEM of the career adapt-abilities–dual career form ($n = 391$).

	Mean	SD	ESEM					CFA				
			Factor 1 (concern)	Factor 2 (dual career concern)	Factor 3 (control)	Factor 4 (curiosity)	Factor 5 (confidence)	Factor 1 (concern)	Factor 2 (dual career concern)	Factor 3 (control)	Factor 4 (curiosity)	Factor 5 (confidence)
Factor 1	2.85	0.80	(.71)									
Factor 2	3.37	0.46	.45*	(.76)								
Factor 3	3.41	0.73	.28*	.54**	(.72)							
Factor 4	3.07	0.77	.47**	.48**	.47**	(.78)						
Factor 5	3.43	0.69	.38**	.55**	.52**	.51**	(.79)					
							(.85)					
							.74**	(.85)				
							.64**	.73**	(.85)			
							.71**	.64**	.74**	(.88)		
							.63****	.73**	.79**	.69**	(.89)	

Abbreviations: CFA, confirmatory factor analysis; ESEM, exploratory structural equation modeling; SD, standard deviation

Note: Composite reliability estimates are enclosed in parentheses.

* $p < .05$.

** $p < .01$.

Table 4. Measurement invariance and overall fit indexes for the career adapt-abilities–dual career form measurement model among male ($n = 192$) and female students ($n = 199$).

Model	χ^2_R	df	χ^2_R/df	CFI	ΔCFI	RMSEA	RMSEA 90%CI
Females	536.13	317	1.69	.914		.059	.050–.067
Males	549.50	318	1.73	.896		.062	.053–.070
M1: Configural invariance	1052.15	625	1.68	.910		.059	.053–.065
M2: Metric invariance	1082.06	647	1.67	.908	-.002	.059	.052–.065
M3: Strong invariance	1187.15	674	1.76	.892	-.016	.062	.057–.068
M3P: Partial strong invariance	1151.84	672	1.71	.899	-.009	.060	.054–.066
M4: Strict invariance	1198.50	698	1.72	.894	-.005	.061	.055–.066

Abbreviations: χ^2_R , Robust chi-square; df, degrees of freedom; CFI, comparative fit index; RMSEA, root mean square error of approximation; CI, confidence interval; M3P, partially invariant residual variances (free item intercepts invariance constraints of items Dual Career Concern 5 and item Confidence 2).

Table 5. Means (M), standard dDeviations (SD) and Cronbach's α coefficients of the measures of all other variables, and Pearson's correlations between the factors of the career adapt-abilities–dual career form and other variables.

Variables	Mean	SD	Cronbach's α	Factors of the career adapt-abilities–dual career form				
				Concern	Dual career concern	Control	Curiosity	Confidence
Sport burnout	1.82	0.57	.85	-.17**	-.27**	-.31**	-.24**	-.16**
School burnout	2.49	0.67	.88	-.27**	-.25**	-.28**	-.24**	-.29**
Self-esteem	3.76	0.62	.77	.29**	.31**	.51**	.34**	.34**
Sport task values	4.64	0.33	.85	.18**	.39**	.25**	.25**	.32**
School task values	3.77	0.47	.87	.30**	.24**	.12*	.29**	.33**
Career construction	3.10	0.77	.87	.49**	.37**	.26**	.34**	.28**

* $p < .05$.

** $p < .01$.

athletes. The results showed that (a) the model comprising correlated but separate constructs of concern, dual career concern, control, curiosity, and confidence accurately reflected the data and (b) the CAAS-DC demonstrated adequate factorial validity and excellent internal consistency reliabilities of its five subscales.

In line with the CAAS 2.0 (Savickas & Porfeli, 2012), the data from high-school student-athletes fit the theoretically derived measurement of the CAAS on the dimensions of control, curiosity, and confidence with no modification. However, the original concern subscale was reduced to four items: "Thinking about what my future will be like," "Realizing that today's choices shape my future," "Preparing for the future," and "Becoming aware of the educational and vocational choices that I must make." In addition, a construct coined dual career concern was formed with five items: "Becoming aware of the sport choices that I must make," "Planning how to achieve my goals," "Concerned about my vocational career," "Concerned about my athletic career," and "Concerned about combining my sport and education." This new construct was designed to measure the extent to which an athlete is aware of the challenges in combining athletic and academic pursuits, and prepares for his or her dual career development.

The results appear to confirm our hypothesis that in a specialized population of talented high-school athletes, concern for the future may be distinguished as two constructs: (1) the ability to project into one's vocational development taking into consideration one's current inclinations and future aspirations and (2) the awareness of specific dual career demands to meet these challenges and secure one's vocational future. As the level of the athletes' adapt-abilities on concern and dual career concern subscales in this

study indicates (Table 1), the dimension of dual career concern is more relevant to student-athletes at this developmental stage, which aligns with Savickas and Porfeli's (2012) assertion that "psychosocial constructs, such as adaptability, are highly sensitive to context and age" (p. 666). The present study's result also supports previous findings that athletes tend to prioritize their athletic development and are likely to postpone their vocational engagement (Brown et al., 2000; Cabrita et al., 2014; Christensen & Sørensen, 2009; Stambulova et al., 2015). Overall, the CAAS-DC was found to show good construct validity, suggesting that, in addition to the 4 Cs adaptability patterns – concern, control, curiosity, and confidence – it is reasonable to include the fifth, dual career concern subscale when examining or assessing career development of student-athletes.

The CAAS-DC was also found to have good concurrent validity. The results showed that student-athletes' task values in both athletic and academic settings were significantly associated with all five factors of the CAAS-DC; thus, supporting previous findings that athletes' motivation in respective domains correspondingly predicts their academic and athletic development (Gaston-Gayles, 2004; Vink, Raudsepp, & Kais, 2015). Moreover, self-esteem and school burnout symptoms were positively and negatively associated with the CAAS-DC. This finding is consistent with the increasing number of studies reporting that career adaptability is related to reduced work stress (Johnston et al., 2013), increased job search self-efficacy (Guan et al., 2013), and overall is positively associated with life satisfaction and well-being (Di Maggio et al., 2015; Hirschi, 2009). The negative association found between school burnout and dual career adaptability is particularly promising given Sorkkila et al. (2017) findings that high athletic expectations increase the risk of school burnout in adolescent athletes. Therefore, individual competencies conceptualized as the dual career adaptability seem to protect youth athletes from burning out in the context of elite junior sport, which is also consistent with Maggiori et al.'s (2015) assertion that career adaptabilities constitute a resilience factor to effectively cope with career transitions and stressful situations. Finally, the student career construction (SCCI; Savickas & Porfeli, 2011) was associated with all factors of the CAAS-DC, suggesting that the concern for the dual career dimension is compatible with the theoretical tenets of career construction (Savickas, 2005).

Despite the psychometric strength demonstrated by the CAAS-DC, the current study's limitations should be disclosed to inform future research. Firstly, the sample of participants for the present study consisted only of 391 Finnish-speaking youth athletes who are at the beginning of their freshman year in sport high school. The results are therefore limited in their applicability to other athletic populations (e.g. athletes at senior years in high school or university student-athletes) and athletes from other countries. Thus, it is necessary to examine the factor structure of the CAAS-DC in a wider athletic population. Secondly, we were unable to examine the test-retest reliability and predictive validity of the CAAS-DC given the cross-sectional nature of the data. Due to the importance of career adapt-abilities in the long-term success of athletes, it will be interesting to further examine the test–retest reliability and predictive validity of the CAAS-DC by adopting a longitudinal investigation and/or intervention in the future. Thirdly, it is recommended for future studies to diversify data sources to minimize method bias.

In terms of practical implications, the Dual Career Form might potentially have a wide range of applications in career counseling with athletes. As student-athletes face unique

developmental challenges, the CAAS-DC could be used to assist them in recognizing their strengths and to generate possibilities for designing their life projects (Savickas, 2012). Moreover, employability is a central concern to career development, not only of youth athletes but also of mature performers, especially at the time of retirement from sport (Cecić Erpič, Wylleman, & Zupančič, 2004; Torregrosa et al., 2015). Hence, the CAAS-DC might highlight the psychological resources and accumulated competencies of athletes when tailoring intervention programs to support their rebuilding of expertise during the transition into work life (see also Luke, McIlveen, & Perera, 2016).

To conclude, the CAAS-DC showed high structural, scale, and item reliabilities and appears to be coherent with the career adaptability conceptual framework (Savickas, 2005; Savickas & Porfeli, 2012). As noted by proponents of the holistic career development and service provision for athletes, developmental and contextual needs of this population should become visible through research and be specifically addressed within dual career assistance programs (Henriksen, Larsen, Storm, & Ryom, 2014; Ryba, Stambulova, Ronkainen, Bundgaard, & Selänne, 2015; Stambulova & Wylleman, 2014; Wylleman, Reints, & De Knop, 2013). The CAAS-DC measure could inspire novel research on dual career development in various life domains, such as sport, music, and arts.

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