

Linking sports-related and socio-economic resources of retiring Olympic athletes to their subsequent vocational career

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Abstract

The aim of this study was to examine patterns of sports-related and socio-economic resources at the time of athletic retirement and their relation to the subsequent vocational career. We surveyed 341 former Olympic athletes representing Switzerland about their athletic, educational, and vocational careers. In order to adequately depict the heterogeneous situations of athletes during and after their athletic career, we applied a person-oriented approach. This involves adopting a holistic perspective and using nonlinear methods of analysis to allow for interactions between different aspects of an athlete's career. Using cluster analytic techniques, we found different patterns of sports-related and socio-economic resources at the time of athletic retirement which were related with specific vocational career paths. In particular, clusters disposing of manifold resources had various opportunities in working life, whereas clusters with few resources fared less well. However, a lack of educational certificates could be compensated for by success in sports and popularity, provided that the vocational activity was pursued in sport. These findings may help career counsellors to better understand athletes' career development options and provide services of ever-improving quality.

Keywords

career transition, cluster analysis, elite athletes, employment, olympians, second career

Successful careers in high-performance sports require huge investments over many years by the athletes. However, being an elite athlete is not a lifetime job. Indeed, the average age of athletic retirement is soon after 30 (e.g., in Switzerland at around 31 years; see

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Kuettel et al., 2017; Schmid et al., 2021). As a result, a reorientation at a relatively young age is required. Various psychosocial challenges are associated with this transition (e.g., identity transformation, missing the company of people related to sport, changes in lifestyle and daily routines; Park et al., 2013). In addition, most athletes do not earn enough money during their sports career to achieve lifelong financial freedom after retirement. Thus, they must pursue a vocational activity after their athletic retirement (Aquilina, 2013). Our aim is therefore to investigate the relationship between the sports-related and socio-economic resources at the end of the athletic career on the one hand and the subsequent vocational career (post athletic retirement) on the other hand.

Several studies have investigated the vocational career of former high-performance athletes (e.g., Conzelmann and Nagel, 2003; López de Subijana et al., 2020; Nagel, 2002; Schmid et al., 2021; Vilanova and Puig, 2017). In general, it can be said that the majority is able to successfully launch a vocational career. When studied differentially, there are nevertheless differences between the former athletes. Specifically, Conzelmann and Nagel (2003) have examined vocational paths of former German Olympic athletes. Based on educational certificates, occupational prestige, vocational autonomy, and vocational field (within vs. outside of sports), they found eleven different career types. Looking at these different trajectories, approximately 54% of all athletes were able to follow a normal vocational career path after sports, which means that they hold a job position adequate to their educational level. About 41% of the athletes have found a more prestigious job than could have been expected given their education and have thus been able to launch a career of vocational upward mobility. In contrast, about 6% of athletes had a “problem career”, which means that they held lower vocational positions relative to their educational certificates (i.e., low-level employees graduated from secondary school).

Due to the ongoing professionalization and commercialization in sports as well as cultural differences, a similar study was recently conducted in Switzerland (Schmid et al., 2021). The results show that the majority of Swiss Olympians were also able to build a successful vocational career after retiring from sports. However, similar to Conzelmann and Nagel (2003), major differences were found between the various career types regarding their pathway: While some athletes pursue a normal academic career alongside sports, others focus exclusively on sports and choose to stay in sports after the end of their athletic career, for example, as a coach (Schmid et al., 2021). However, there are also athletes who have difficulties building a vocational career or are not satisfied with it. The question therefore arises how these different vocational careers originate. One explanation is that the vocational career of athletes is planned and prepared differently: While some elite athletes are conscious of the finite nature of a sports career and hence plan their second career, build necessary resources, or even pursue a dual career, other athletes focus almost exclusively on sports and disconnect themselves from other spheres (Vilanova and Puig, 2016). A second explanation could be the type of model used to pursue the sports career (Pallarés et al., 2011): There are athletes who choose a “linear model” (i.e., exclusive dedication to sports); other athletes pick a “convergent model” (i.e., prioritization of the athletic career while pursuing a second career); and still others decide on a “parallel model” (i.e., equal focus on the athletic and vocational careers). A similar systematization was also made within dual career

pathways in sports. Specifically, Cartigny et al. (2019) found a sporting pathway (i.e., prioritization of the athletic career), a parallel dual career pathway (i.e., equal focus on the athletic and vocational careers), and an educational/vocational pathway (i.e., prioritization of the vocational career). Regardless of which model or pathway is chosen, educational attainment at the end of an athlete's career is likely to play an important role: Previous research has shown that their then educational status at career termination has a significant impact on the occurrence of occupational difficulties, such as lack of professional knowledge, problems finding a job, or financial difficulties (Cecić Erpič et al., 2004).

Besides these individual preparation strategies, pathways, and educational attainments, there is a number of other factors that influence the vocational career of former elite athletes. Specifically, Vilanova and Puig (2017) looked at agents that influence the transition to a second career (e.g., resources available at, or characteristics of the career end). They found four job market entry profiles in former Spanish elite athletes, which were described and labeled as follows: the non-strategists: it's a job (office workers, workers in the services sector and skilled laborers), lifetime athletes (coaches and middle managers in the sports sector), freelance strategists (small business owners), parallel life strategists (directors, skilled professionals, technicians and middle managers). It turns out that those subsequent vocational career profiles are strongly shaped by the type of athletic career ending as well as individual and social resources such as education, family support, degree of preparation of the second career, and financial situation. Especially athletes from families with an elevated economic and cultural capital begin early to plan for their post-sports career and by doing so increase the chances of being successful and satisfied in their career. These results are in line with a previous study of Vilanova and Puig (2016), which found that social reproduction has an influence on educational and vocational planning of elite athletes. Similar findings were reported by Moret and Ohl (2019) in Swiss ice hockey players: Players from parents with high cultural capital were more likely to pursue a dual career or to have a plan B when ending their athletic career. In addition to social reproduction and cultural capital, ice hockey players' career choices were also determined by context and parents' belief in the value of sports capital (i.e., sporting performance, measured by victories and rankings; Moret and Ohl, 2019). These studies draw on Pierre Bourdieu's theorizing. According to Bourdieu (1986), social positions occupied by agents and groups within fields depend on their possession of capitals. In particular, Bourdieu proposed three forms of capital: economic (i.e., material assets that are immediately and directly convertible into money), social (i.e., resources associated with the possession of a stable social network of more or less institutionalized relationships of mutual acquaintance and recognition), and cultural capital (i.e., embodied state: long-lasting dispositions of the mind and body; objectified state: possession of cultural goods; institutionalized state: educational qualifications). The different forms of capital are interrelated and can also be transformed into each other (Bourdieu, 1986).

Hence, it is important to note that various resources (or capitals using Bourdieu's terminology) have an influence on social positions. With regard to the vocational career of former elite athletes, educational level, parental socio-economic status, or work experience were identified as important resources in previous research (e.g., Cecić Erpič et al., 2004; Moret and Ohl, 2019; Vilanova and Puig, 2017). In addition to these

more general factors, however, sports-specific factors may also ease the start in a vocational career. For example, Haerle (1975) found some time ago that not only education, but also popularity and athletic success have an influence on an ex-athlete's first paid job. A positive influence of success in sports on vocational career has also been found in more recent studies (e.g., Cecić Erpić et al., 2004; López de Subijana et al., 2020). Moreover, there are indications that through sports success, a lack of educational certificates can be compensated (e.g., Nagel and Conzelmann, 2006). Several studies have demonstrated gender differences in this context. For example, women frequently earn less money during their sports career (Kuettel et al., 2017) and pursue slightly more often than men a problematic career path (Schmid et al., 2021). Similarly, in Spain retired female athletes were found to experience more difficulties when entering the labor market as well as earning less than retired male athletes (Barriopedro et al., 2018).

In conclusion, different vocational careers of former elite athletes can be observed. Research has found several sports-related and socio-economic resources that help explain these different trajectories. Nevertheless, the state of research is not entirely satisfactory, because a considerable amount of heterogeneity remains unexplained. This may well be related to the variable-oriented approach, which has up and until recently dominated quantitative research. Broadly spoken it considers the different factors in isolation and above all does not take potential interactions into account. We therefore chose the person-oriented approach which is more holistic in nature. In addition, this approach relaxes the assumption that the same influencing factors are equally relevant for all individuals and is thus open to the possibility that there are multiple distinct subgroups characterized by different constellations of influencing factors (Bergman et al., 2003). Therefore, the aim of our study was to provide a holistic and more individualized view on the vocational career development of elite athletes. Specifically, we aimed to identify various patterns of sports-related and socio-economic resources at the time of athletic retirement and their relation to the subsequent vocational career.

Theoretical framework

In order to investigate the interplay between an athlete's sports and vocational career and how they link to his or her subsequent vocational career, it is useful to apply the life course approach (Bernardi et al., 2019; Elder et al., 2003; Mayer, 2004). In this framework, the life course is a self-referential process, as the person acts or behaves on the basis of past experiences and resources (Mayer, 2004). When understanding life courses, interdependencies and multiple interactions between time (e.g., current life circumstances and future life course), life domains (e.g., work, education, leisure), and levels of analysis (i.e., inner-individual level such as psychological attributes; individual action level such as education or social status; and supra-individual level such as the legal, cultural or economic frame) need to be looked at (Bernardi et al., 2019). Ultimately, however, it is about explaining the transitions of individuals from one biographical state to the next. A person's "biographical state" describes the various domains of which his or her life is composed at a particular age. Applied to athletes, the different components of their biographical state at the end of an athletic career may interact and influence which direction the vocational career will take. Predicting such

career trajectories based on biographical states is a developmental issue. Developmental theories that consider the total *person-in-the-environment* over time are found within the holistic-interactionistic paradigm (Vondracek and Porfeli, 2002), which assumes that various factors in an individual's development interact in a complex, reciprocal manner and should therefore be studied simultaneously (Bergman et al., 2003). By adopting the person-oriented approach, we respond to this call. Within this approach, the individual is viewed as a functioning and developing totality that is best described by analyzing patterns of information rather than individual variables. Nevertheless, as mapping the comprehensive person-environment system is highly complex and therefore methodologically hardly feasible, the entire system is often subdivided into different subsystems (Bergman and El-Khoury, 2003). Moreover, an informed choice of subsystems has to be made. Accordingly, we restricted ourselves to the sports and the socio-economic subsystems and attempted to describe them at the time of athletic retirement as holistically as possible and to analyze their relation to the subsequent vocational career. Again, with a view to complexity, only a limited number of variables can be used to characterize a subsystem. Therefore, it is essential to choose variables (i.e., operating factors) that are as representative as possible for each subsystem (Bergman and El-Khoury, 2003). Furthermore, we reduced complexity by describing the (reduced) system at two points in time only and determining the transition probabilities between the two systems states. Specifically, we assessed the biographical state at the time of athletic retirement by aggregated sports-related and socio-economic resources, and five years thereafter by vocational status. In doing so, we have tried to cover the resources that are, from a sociological perspective, most relevant.

Method

Participants

Athletes were invited to this study if they participated in the Olympic Games for Switzerland between 1988 and 2012. This time span was chosen for two reasons: We wanted to ensure, first, that the sample was active in a somewhat similar economic context (abolition of the amateur status which excluded professional athletes from Olympic Games). And second, it was necessary that the sample has had time to complete any education or training after their athletic career and to establish themselves in the working world. This resulted in a population of 694 individuals (33.7% female, 66.3% male). We were able to obtain valid contact addresses for 638 (91.9%) of these athletes. The final sample consisted of 341 former Olympic athletes (32.8% female, 67.2% male) with an average age of 47.16 years ($SD = 7.72$) from 42 different sports (response rate of 53.5%). Overall, 15% of the sample ($n = 51$) won at least one Olympic medal and 32.0% ($n = 109$) received an Olympic diploma (rank 4 to 8). The average career duration in high-performance sports was 16.88 years ($SD = 6.06$). On average, the athletes ended their career at the age of 31.38 years ($SD = 5.83$).

To examine possible selection biases, the individuals who participated in the study ($n = 341$) were compared regarding demographic and sports-related characteristics with those who did not ($n = 353$). Specifically, a binary logistic regression was

performed on the probability of study participation to determine relative importance of gender, year of birth, sports type (i.e., summer/winter sports), success at the Olympic Games, and popularity. The full model containing five independent variables was not significant, $\chi^2 = 6.300$, $N = 694$, $df = 5$, $p = .278$; R^2 (Nagelkerke) = .012, indicating that based on the available information the sample is a good representation of the population.

Measures

The questionnaire by Conzelmann et al. (2001) was adapted in order to fit the Swiss context and consisted of three parts covering the athletic, educational, and vocational career. The most relevant aspects of each career were surveyed (e.g., major achievements in sports, age at the time of athletic retirement, duration of sports career; type of education, highest educational qualification and duration of education; job title and position; education and profession of parents). In more detail, success in sports was rated on a three-point scale (1 = *participation in the Olympic Games*, 2 = *top 8 at World Championships or Olympic Games*, 3 = *top 3 at World Championships or Olympic Games*). The popularity of the athletes during their athletic career was assessed by four sports experts on a three-point scale (1 = *low popularity among the Swiss population*, 2 = *medium*, 3 = *high*). To check the inter-rater reliability of the popularity rating, Krippendorff's α was calculated. Analyses revealed that the rating based on three specific experts ($\alpha = .54$) is preferable to that based on all four ($\alpha = .41$), which is why the ratings of the fourth expert were not taken into account. Incidentally, this rater stated that there was a number of older athletes she was unaware of and could not rate reliably. Income during the sports career was assessed using an 11-point scale from 1 = *under CHF 1000 per month* to 11 = *over CHF 10,000 per month*. In order to assess the educational resources, the highest educational qualification at career end in sports was recorded (0 = *none* to 5 = *university of applied sciences or university level*). Vocational experience was operationalized with the level of employment during the two last years of the athletic career (0 = *none*, 1 = *1–24%*, 2 = *25–49%*, 3 = *50–74%*, 4 = *75–100%*). The parental socio-economic status was assessed by transforming the coded job titles of the parents (i.e., ISCO-08) into the *International Socio-economic Index of Occupational Status* (ISEI; Ganzeboom et al., 1992; Ganzeboom and Treiman, 2003). The vocational status of the athletes five years after retirement from elite sports was determined by occupational prestige (SIOPS; Ganzeboom and Treiman, 2003; Treiman, 1977), job autonomy scores (1 = *low autonomy* to 5 = *high autonomy*; Hoffmeyer-Zlotnik, 2003), and the vocational field (0 = *within sports*, 1 = *outside of sports*).

Because 13.2% of the sample is French-speaking, the digital questionnaire (LimeSurvey, version 2.50) was translated into French and double-checked by two bilingual sports experts.

Procedures

We collected the data using a retrospective longitudinal research design. Each respondent listed all educational and vocational stages chronologically and provided information about their most important achievements in sports as well as their income during the

career in elite sports. For each respondent, the variables success in sports, popularity during the sports career, income during the sports career, highest educational qualification, average employment level during the two years before athletic retirement and parental socio-economic status (using ISEI) were compiled at the time of athletic retirement. Prestige, job autonomy and the vocational field were compiled five years after retirement from sport. As many athletes completed vocational training in the first two to three years after their retirement from elite sports, the time point of five years after the end of the athletic career was chosen in order to compare the vocational status. The authors' institutional research ethics committee approved the study. All respondents gave written informed consent to participate before beginning the survey.

Data analysis

Prior to actual data analysis, the data set was checked for incomplete or inconsistent values on the basis of survey data or publicly available information (e.g., results databases). If no information could be found, we singly imputed the missing data under the assumption of missing at random using the Expectation Maximization algorithm implemented in the MVA procedure (IBM SPSS Statistics, version 27.0). Information of the entire sample ($N = 341$) was used for imputation, namely (1) demographic characteristics (gender, age), (2) sports-related features (e.g., sports, athletic performance level, age at the time of athletic retirement, duration of the sports career, average time investment in sports, income during the sports career), (3) educational characteristics (e.g., educational level), and (4) vocational characteristics (e.g., occupational prestige, job autonomy, vocational field).

In line with the person-oriented approach, a statistical procedure was chosen that is capable of handling nonlinear relationships and interactions (Bergman et al., 2003). More precisely, the LICUR (Linking of Clusters after removal of a Residue) method was used to identify different developmental trajectories. This procedure included three steps: First an outlier analysis was conducted, whereby the squared average Euclidean distance of 0.8 calculated on standardized variables was used as a criterion to detect possible outliers (Vargha et al., 2015). Second, cluster analyses were carried out to find characteristic patterns of sports-related and socio-economic resources at the time of athletic retirement on the one hand and characteristic patterns of vocational status on the other hand. We used the following six operating factors for the situation at the time of athletic retirement: success in sports, popularity during the sports career, income during the sports career, highest educational qualification, average employment level during the two years before athletic retirement, parental socio-economic status. In order to characterize the vocational status five years after the end of the athletic career in sports, we used prestige, job autonomy and the vocational field as operating factors. Third, transition probabilities (i.e., OR) between the two cluster solutions at the two different development points were estimated.

The preliminary cluster solutions were obtained using Ward's method (proximity measure: average squared Euclidean distance) and subsequently optimized with the help of cluster center analysis (k-means method). The final cluster solutions were determined based on content considerations and statistical criteria namely the elbow criterion, the percentage of the total error sum of squares explained by the cluster solution (EESS >

67%), the weighted mean of cluster homogeneity coefficient values ($HC_{\text{mean}} < 1.0$), and the silhouette coefficient ($SC > 0.5$) (Bergman et al., 2003). These analyses were conducted using ROPstat 2.0 (Vargha et al., 2015). In the third and last step of LICUR mentioned above, the cluster membership of the respondents at the two time points was linked by cross-tabulation. To check for significant deviations from the expected distribution in single cells, exact tests with two-tailed hypergeometric probabilities were used. The strength of association between two clusters was represented by the OR with a 95% confidence interval (CI) to estimate its precision; values greater than 1 denote more transitions, values smaller than 1 indicate fewer transitions than expected by chance.

Using IBM SPSS Statistics (version 27.0), a one-way MANOVA followed by one-way ANOVAs was conducted to detect differences between the clusters regarding the following variables: age at the time of athletic retirement (years), duration of the sports career (years), and average time investment in sports (hours per week). For one-way ANOVAs, the effect size was estimated using Eta squared (η^2 ; .01 = small, .06 = medium, .14 = large; Cohen, 1988). Exact tests with two-tailed hypergeometric probabilities were used to check the gender distribution across the clusters. The significance level was set at 5% for all statistical tests.

Results

Resource classification at the time of athletic retirement

Based on the outlier analysis, no cases had to be removed. The decision on the number of clusters was made step-by-step. First, the potential cluster solutions were assessed with respect to their substantive meaning. We concluded that the six-cluster-solution has the best level of detail for each cluster while maintaining meaningful differences between the clusters. In a second step, the statistical properties of the different cluster solutions were examined. The six-cluster solution ($HC_{\text{mean}} = 1.00$, $SC = 0.49$) fulfils two criteria, however, the third one was not satisfied, because the explained error sum of squares was 51.43% and thus slightly below the cut-off value of 66.6% (Bergman et al., 2003). Table 1 provides an overview of all clusters.

The first cluster (1-1) contained athletes who were slightly more successful and popular than average and earned a considerable sum of money during their career. Apart from sports, however, they had a below-average education level and professional experience. In addition, their family of origin had a below-average socio-economic status. In an attempt to highlight the specific characteristics, of this cluster, it was labeled as *athletically successful, popular high earners*. Athletes who were both very successful and popular and who, during their athletic career, had completed a high levels of education (i.e., university degree) were found in the second cluster (1-2). These athletes, labelled *athletically successful, popular academics*, did not have much personal work experience before the end of their sports career, but they originate from a family with high socio-economic status. The athletes in the third cluster (1-3) had slightly above-average success in sports, but were relatively unknown and had earned little during their career. They had an average level of education, slightly below average work experience at the end of their career and parents with a below average socio-economic status. Accordingly, they were named as *successful athletes with little income and an average educational level*. The

Table 1. Descriptive statistics as a function of clusters for the operating factors of the sports-related and socio-economic resources at the time of athletic retirement.

Cluster	Success in sports		Popularity during sports career		Income during sports career		Highest educational qualification at career end in sports		Average employment level prior to career end in sports		Parental socio-economic status (ISEI)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Overall (n = 305)	2.06	0.79	1.80	0.83	5.21	3.36	3.70	1.25	1.55	1.60	51.93	18.52
Cluster 1-1 (n = 52): <i>Athletically successful, popular high earners</i>	2.27	0.66	2.62	0.63	9.65	2.00	2.58	0.85	0.46	1.04	39.34	14.85
Cluster 1-2 (n = 47): <i>Athletically successful, popular academics</i>	2.72	0.50	2.75	0.44	7.79	2.93	4.62	0.64	1.34	1.49	63.16	14.47
Cluster 1-3 (n = 42): <i>Successful athletes with little income and an average educational level</i>	2.33	0.69	1.50	0.63	2.64	1.39	3.67	1.14	0.41	0.70	39.05	15.34
Cluster 1-4 (n = 65): <i>Less renowned athletes with excellent education and vocational experience</i>	1.80	0.78	1.31	0.50	4.40	2.02	4.71	0.49	3.31	0.85	59.11	16.39
Cluster 1-5 (n = 45): <i>Work-experienced athletes with little education and a low parental socio-economic status</i>	2.18	0.75	1.38	0.54	4.49	2.06	2.44	0.73	3.02	0.89	36.36	14.28
Cluster 1-6 (n = 54): <i>Less successful athletes with high parental socio-economic status</i>	1.30	0.50	1.35	0.62	2.24	1.65	3.85	1.27	0.35	0.71	68.61	12.83

Note. Response choice offered for the clustering variables: Success in sports: 1 = participation in the Olympic Games to 3 = medals at World Championships or Olympic Games; popularity during sports career: 1 = low to 3 = high; income during sports career: 1 = under CHF 1000 per month to 11 = over CHF 10,000 per month; highest educational qualification: 0 = none to 5 = university; average employment level: 0 = none to 4 = 75–100%; International Socio-economic Index of Occupational Status (ISEI): numerical value [16; 90].

fourth cluster (1-4) included athletes who were less successful than average, were not very well known and had a low income during their sports career. However, at the time of athletic retirement, they had a very good education, were vocationally experienced and belong to a family with a high socio-economic status. They are named as *less renowned athletes with excellent education and vocational experience*. The fifth cluster (1-5) contained athletes who were slightly more successful, but somewhat less popular than average and had a below-average income. They tend to have achieved lower educational certificates and originate from a family with a below-average socio-economic status, but in the final years of their sports career, they have gained a lot of work experience. In other words, they are *work-experienced athletes with little education and a low parental socio-economic status*. Finally, the sixth cluster (1-6) contained *less successful athletes with high parental socio-economic status*. Much like cluster 1-5, these athletes had below-average popularity and a low income during their sports career, but clearly less work experience.

Additional analyses using further variables to describe the clusters (see Table 2) revealed that gender was unequally distributed across clusters, $\chi^2(5) = 13.01, p = .023, n = 305$, Cramer's $V = .21$. Moreover, there were marked differences in the three sports variables (age at the time of athletic retirement, duration, time involvement) between the clusters, $F(15, 820.288) = 9.13, p < .001$, Wilk's $\Lambda = 0.653, \eta_p^2 = .13$. The results of the one-way ANOVAs demonstrated that the clusters differ in age at the time of athletic retirement, $F(5, 299) = 17.23, p < .001, \eta^2 = .22$, duration of sports career, $F(5, 299) = 14.78, p < .001, \eta^2 = .20$, and average time investment in sports, $F(5, 299) = 5.71, p < .001, \eta^2 = .09$. When looking at the descriptive values in Table 2, it becomes apparent that the athletes in cluster 1-1 were the oldest when retiring, had the longest sports career and also invested the most time. In addition, there were significantly more men than women in this cluster. While athletes in cluster 1-6 were youngest when retiring and also had the shortest career, athletes in cluster 1-4 invested the least amount of time into sports. Proportionally, women were most frequently found in cluster *successful athletes with little income and an average educational level* (cluster 1-3).

Classification of the vocational status five years after the end of the athletic career

Again, an outlier analysis based on the vocational status variables revealed no extreme cases. Both statistical and content considerations pointed towards an optimal number of five clusters. In particular, we looked at the clusters in relation to the vocational field (within sports vs. outside of sports) and aimed for purely homogeneous groups for this variable. This was the case from the fifth cluster solution onward. In addition, the five cluster solution showed excellent statistical measures (EES = 76.03%, $HC_{\text{mean}} = 0.49, SC = 0.79$). A full overview of all clusters can be found in Table 3.

The first cluster (2-1) contained typical academic professions such as physicians, lawyers or high school teachers. These *liberal professions or executive-level jobs outside of sports* had both high prestige and high autonomy values. The second cluster (2-2) was composed of former athletes who had stayed in sports and found relatively prestigious jobs with a high degree of autonomy. Members of this cluster were

Table 2. Further characterization of the six-cluster solution.

Cluster	Gender		Age at the time of athletic retirement (years)		Duration of sports career (years)		Average time investment in sports (hours per week)	
	Female %	Male %	M	SD	M	SD	M	SD
	Overall (n = 305)	30.2	69.8	31.39	5.70	16.90	6.03	23.35
Cluster 1-1 (n = 52): <i>Athletically successful, popular high earners</i>	11.5	88.5	34.92	4.70	21.94	5.16	26.33	7.53
Cluster 1-2 (n = 47): <i>Athletically successful, popular academics</i>	25.5	74.5	32.98	5.07	17.74	5.62	25.73	7.02
Cluster 1-3 (n = 42): <i>Successful athletes with little income and an average educational level</i>	40.5	59.5	29.29	3.74	14.98	4.62	23.42	6.08
Cluster 1-4 (n = 65): <i>Less renowned athletes with excellent education and vocational experience</i>	33.8	66.2	31.58	4.74	16.68	5.82	20.86	6.06
Cluster 1-5 (n = 45): <i>Work-experienced athletes with little education and a low parental socio-economic status</i>	33.3	66.7	32.87	7.62	16.49	7.04	20.93	7.97
Cluster 1-6 (n = 54): <i>Less successful athletes with high parental socio-economic status</i>	37.0	63.0	26.76	3.89	13.39	3.91	23.36	7.30

therefore named *higher-level employees with high autonomy in sports*. The third cluster (2-3) included mid-level employees working outside sports with relatively high autonomy values. Many of these *mid-level employees with high autonomy outside of sports* were also self-employed. *Lower-level employees in sports* were found in the fourth cluster (2-4). They had below-average values for professional prestige and job autonomy. The fifth cluster (2-5) consisted of *skilled workers and lower grade white collar workers outside of sports*. These individuals had jobs with relatively low occupational prestige as well as job autonomy and did not work within sports.

A gender distribution difference was observed across clusters, $\chi^2(4) = 10.14$, $p = .038$, $n = 305$, Cramer's $V = .18$. In particular, it was found that there were slightly more women and fewer men than expected in clusters 2-4 and 2-5.

Developmental types and antitypes

Exact tests were used to examine whether the six resource clusters were equally distributed among the five vocational status clusters. Twelve significant deviations emerged (see

Table 3. Descriptive statistics for the operating factors of the vocational status five years after the retirement from elite sports as a function of cluster membership

Cluster	Occupational prestige (SIOPS; 5 years post sports)		Job autonomy (5 years post sports)		Vocational field (5 years post sports)	
	M	SD	M	SD	M	SD
Overall (n = 305)	52.51	9.63	3.66	0.96	0.64	0.48
Cluster 2-1 (n = 52): <i>Liberal professions or executive-level jobs outside of sports</i>	66.87	5.64	4.21	0.57	1.00	0.00
Cluster 2-2 (n = 78): <i>Higher-level employees with high autonomy in sports</i>	53.42	5.75	4.22	0.45	0.00	0.00
Cluster 2-3 (n = 70): <i>Mid-level employees with high autonomy outside of sports</i>	50.91	5.33	4.30	0.46	1.00	0.00
Cluster 2-4 (n = 31): <i>Lower-level employees in sports</i>	46.15	6.20	2.74	0.45	0.00	0.00
Cluster 2-5 (n = 74): <i>Skilled workers and lower grade white collar workers outside of sports</i>	45.65	8.44	2.46	0.58	1.00	0.00

Note. Response choice offered for the clustering variables: Occupational prestige (SIOPS): numerical value [12; 78]; job autonomy: 1 = low, 5 = high; vocational field: 0 = within sports, 1 = outside of sports.

Figure 1). In detail, five years after the end of their athletic career, *athletically successful, popular high earners* (cluster 1-1) had transitioned more often than could have been expected into the cluster *higher-level employees with high autonomy in sports* (cluster 2-2), OR = 4.28 [2.29; 7.99], and in the cluster with *lower-level employees in sports* (cluster 2-4), OR = 2.63 [1.16; 5.98]. Also, five years after career end these athletes were significantly less likely to be in *liberal professions or executive-level jobs outside of sports* (cluster 2-1), OR = 0.23 [0.11; 0.52], and *skilled workers and lower grade white collar workers outside of sports* (cluster 2-5), OR = 0.35 [0.14; 0.87]. Five years after their retirement from elite sports, *athletically successful, popular academics* (cluster 1-2) were significantly less likely to have vocations as *skilled workers and lower grade white collar workers outside of sports* (cluster 2-5), OR = 0.33 [0.12; 0.86], while no significant transitions were found for the cluster 1-3. *Less renowned athletes with excellent education and vocational experience* (cluster 1-4) were significantly more often working in *liberal professions or executive-level jobs outside of sports* (cluster 2-1), OR = 2.89 [1.52; 5.51], and were *mid-level employees with high autonomy outside of sports* (cluster 2-3), OR = 2.25 [1.23; 4.10]. However, they were significantly less often *higher-level employees with high autonomy in sports* (cluster 2-2), OR = 0.15 [0.05; 0.42]. *Work-experienced athletes with little education and low parental socio-economic status* (cluster 1-5) were frequently working as *skilled workers and lower grade white collar workers outside of sports* (cluster 2-5), OR = 6.04 [3.09; 11.80], and less often in *liberal professions or executive-level jobs outside of sports* (cluster 2-1), OR = 0.20 [0.05; 0.83], as well as working as *higher-level employees with high autonomy in sports* (cluster 2-2), OR = 0.32 [0.12; 0.84]. Finally, *less successful athletes*

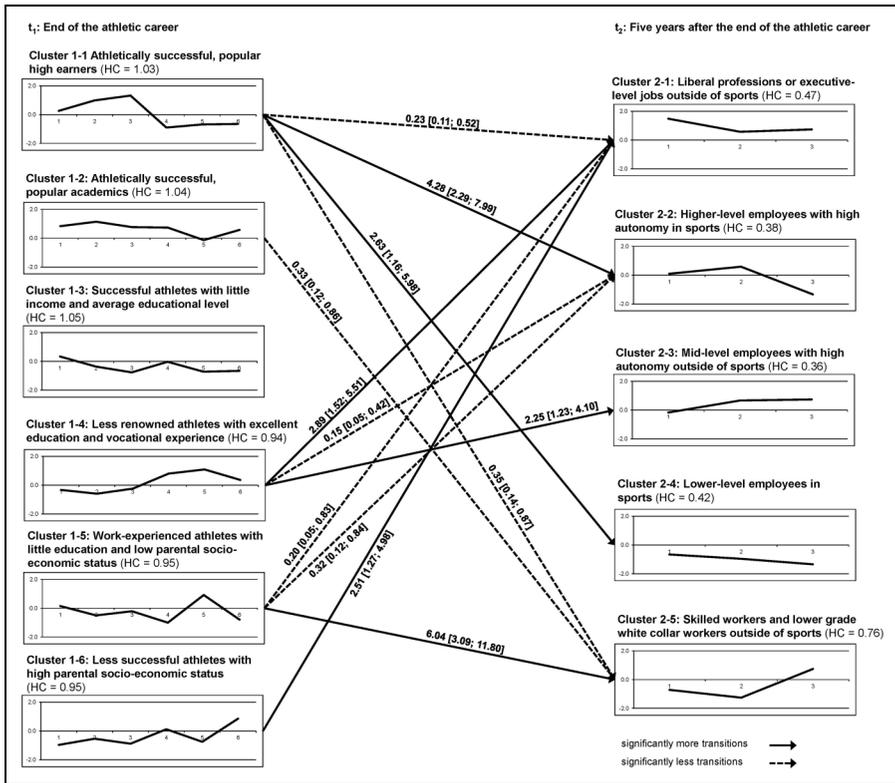


Figure 1. z-score profiles for the six resources patterns (at the time of athletic retirement) and five vocational status patterns (5 years after retirement from elite sports). HC = homogeneity coefficient per cluster. Operating factors t₁: 1 = success in sports, 2 = popularity during the sports career, 3 = income during the sports career, 4 = highest educational degree at sports career termination, 5 = average employment level two years prior to sports career termination, 6 = parental socio-economic status (ISEI). Operating factors t₂: 1 = occupational prestige (SIOPS), 2 = job autonomy, 3 = vocational field (within sports vs. outside of sports). Full and dashed arrows denote significantly more transitions and significantly less transitions, respectively. The numbers next to the arrows represent odds ratios (OR) and 95% confidence intervals (more transitions: OR > 1.0; less transitions: OR < 1.0).

with high parental socio-economic status (cluster 1-6) were significantly more often working in liberal professions or executive-level jobs outside of sports (cluster 2-1), OR = 2.51 [1.27; 4.98].

Discussion

At the time of their retirement from elite sports, the situation of elite athletes varies as much as their biography differs. This study contributes to the discussion on career transitions out of high-performance sports (for an overview, see Park et al., 2013). Specifically,

we examined patterns of sports-related and socio-economic resources at the time of athletic retirement and their relation to the subsequent vocational career. While the existing literature often focuses on the influence of dual careers on the transition process (e.g., Torregrosa et al., 2015), we have shown that the subsequent career is also influenced by resources other than education and work experience, such as popularity or parental socio-economic status. Moreover, with the person-oriented approach, we have chosen a less commonly used but promising approach in this research field to investigate this topic. This approach has a holistic orientation and focuses on the development of an individual (e.g., Bergman et al., 2003). By using cluster analyses we allowed for the possibility of nonlinear interactions between different resources of a person. At the time of athletic retirement, we identified six resources clusters, all of which were characterized by different sports-related and socio-economic resources, and five vocational status clusters five years after the end of the athletic career. Specifically, it has been shown that individuals who had acquired many resources in one domain (e.g., popularity through sports) but had tended to neglect other areas (i.e., education, profession) were mostly full-time professional athletes. Those individuals also tended more frequently to stay in the vocational field of sports after retiring from elite sports (i.e., cluster 1-1: *athletically successful, popular high earners*). According to the systematization of Pallarés et al. (2011), these athletes mostly chose a “linear sports career model”. This means that they tended to focus entirely on sports and typically stopped their involvement in education or gave up employment outside of sports. This decision may be related to the fact that it was not possible to pursue education or vocational training in addition to sports because of limited time resources. Due to the high income from sports, there was certainly no financial need to work alongside sports during the career. Moreover, these former athletes came from families with a lower than average socio-economic status. Not striving for higher education could therefore be a strategy to realize athletic potential as quickly as possible with the aim to advance socially and economically (see Moret and Ohl, 2019). The question is whether these athletes stayed voluntarily in sports after the end of the athletic career or involuntarily, because, for example, all other options were closed to them due to a lack of educational or vocational certificates (see Vilanova and Puig, 2017). Remaining within sports is not only a personal choice. It also depends on the skills and abilities that an individual is equipped with. For example, specific competencies, such as personal management, financing, or marketing, are required to be successful as a sports manager (see Horch and Schütte, 2003). It would therefore be interesting to find out which skills or abilities could be predictive of remaining in sports. Athletes who had many resources in education, work, or family, but few in sports (i.e., cluster 1-4, 1-5, and 1-6) were more likely than other athletes to be employed in jobs outside of sports five years after their retirement from elite sports. It is also noteworthy – although expected – that the *work-experienced athletes with little education and low parental socio-economic status* (clusters 1-5) were clearly overrepresented (OR = 6.04) among the *skilled workers and lower grade white collar workers outside of sports* (clusters 2-5). Here, similar to cluster 1-1, a relatively low level of education was apparent, however, it does not coincide with many resources from sports (success, popularity, and income). Instead, this cluster showed a relatively high level of work experience. These athletes had thus pursued a dual career with sports and vocation.

Potentially, many of these individuals used their job income to finance their sports career and have remained in the same job after their sports career ended. In regard to cluster 1-6, the *less successful athletes with high parental socio-economic status*, it is striking that they quite often pursued a career in the *liberal professions or executive-level jobs outside of sports* (cluster 2-1) after athletic retirement, despite their fairly average educational attainment. However, due to the low average retirement age of the cluster (26.76 years), it must be assumed that these athletes had not yet reached their highest level of education at the end of their athletic career. Moreover, because the parents of the athletes in this cluster had the highest socio-economic status, we can assume that they are well supported in their education by their parents. This result is in line with previous research (Moret and Ohl, 2019; Vilanova and Puig, 2017), in which athletes from families with high economic and cultural capital (sensu Bourdieu, 1986) were found to plan their second career further in advance and to achieve more vocational success. As a result of the substantial resources they had been able to build during their athletic career, plenty of opportunities exist for the *athletically successful, popular academics* (i.e., cluster 1-2). Expectedly, they followed the pathway of *skilled workers and lower grade white collar workers outside of sports* less often than simply by chance. Athletes who had an average amount of resources at the time of their athletic retirement (i.e., cluster 1-3: *successful athletes with little income and an average educational level*) had no associated transition probabilities. In light of career construction theory (Savickas, 2013), the question arises as to what factors were critical in determining the career path of these athletes (cluster 1-2 and 1-3). For example, personal preferences and other resources (e.g., psychological or social) might have been decisive for career choice and development here. However, we have not yet been able to explore this hypothesis.

Looking at the gender distribution across the clusters, it is evident that relatively few women appear in the high-income clusters (clusters 1-1 and 1-2) and, conversely, relatively many women in low-income clusters (clusters 1-3 and 1-6). This is most likely related to the circumstance that women, at least in the observed period (1988–2012), had fewer earning opportunities in and outside of high-performance sports than men. This is in line with Kuettel et al. (2017), who found a higher total income and greater amount of sports income for male than female athletes. A German study also reported a pay gap between male and female elite athletes in semi-professional sports (Wicker et al., 2021). It was found that this gender gap was largely driven by work-related earnings. This was explained by male athletes' preferences for paid work, while female athletes prefer to invest their time in studies and training (Wicker et al., 2021). This explanation could also apply to Switzerland, although we did not find any gender differences in terms of highest educational attainment. However, we do not know how much time was invested or what graduation grades were achieved. Therefore, it may well be that the female athletes achieved qualitatively better degrees, something that could pay off later on in their career.

Overall, the findings suggest that the post-sports career is a phenomenon constructed from the resources or, to use Bourdieu's term, "capitals" available in a particular context. Thus, there was a significant relationship between the resources of athletes and their subsequent vocational career. By applying the person-oriented approach (see Bergman et al., 2003) and combining sports-related and socio-economic resources, we get a much more

comprehensive picture of the life courses of former athletes. In the context of sports, too, a reproduction of social class is evident, as athletes from families with a high socio-economic status complete a better education and tend to have more prestigious jobs later on (see Moret and Ohl, 2019).

Limitations and future research

There are limitations to this study. First, due to retrospective data collection, which is often accompanied by methodological problems (e.g., recall bias), we restricted ourselves to easily accessible information for the athletes (e.g., educational certificates) and, wherever possible, checked all data for plausibility. Second, the athletes surveyed terminated their athletic career on average about 15 years ago. The educational and sports system has evolved in the meantime, which is why the results can only be applied with caution to today's athletes. For example, the professionalization of sports is advancing and thus offers new opportunities for athletes in that there are more jobs in the field of sports. However, there are also challenges, including the continued increase of time investment in sport (Conzelmann et al., 2001; see also Kuettel et al., 2018b; Schmid et al., 2021). As a counteraction opportunities for dual careers have been markedly expanded not only in the EU (European Commission, 2012), but also in Switzerland (Kempf et al., 2021), where 15 years ago little institutionalized support was available to combine elite sports and higher education (Kuettel et al., 2018a). As a result, the numerical ratios are likely to change, and more individuals are likely to be found in cluster 1-1 (*athletically successful, popular high earners*). To make these changes visible, the topic should be further investigated in the future. Third, owing to the complexity of the topic and the retrospective design, we had to confine ourselves to the individual action level (sensu Bernardi et al., 2019) and considered a limited selection of resources at the time of athletic retirement. To be more consistent with integrative and holistic models in developmental science (e.g., Bergman et al., 2003), life course research (e.g., Bernardi et al., 2019), career research in sports (e.g., Stambulova et al., 2021), and vocational career development (e.g., Hirschi, 2012), future studies should also include psychological aspects (e.g., identity, self-efficacy, resilience), social resources (e.g., social support), and the socio-cultural environment (e.g., societal and economic importance of elite sports). In other words, inner-individual and supra-individual levels (sensu Bernardi et al., 2019) or further subsystems of the whole person-environment system (sensu Bergman et al., 2003) should also be examined using prospective longitudinal designs. In this regard, qualitative studies might provide important insights into how these different levels interact and shape career paths of former elite athletes (e.g., Ryba et al., 2015). For example, future research could explore the extent to which the career path of the *skilled workers and lower grade white collar workers outside of sports* (cluster 2-5) has been planned and corresponds to the skills as well as aspirations of these former athletes. Fourth, we considered only two time points in our study and therefore only two slices of the athletes' entire life course. As a result of this simplification, we may have overlooked certain developments (see Ployhart and Vandenberg, 2010). Thus, at the first measurement point, we looked at the aggregated resources (e.g., highest educational attainment) neglecting temporal aspects. At the second measurement time point, we looked at

vocational status in the fifth year after the end of the athletic career, without considering the trajectory leading up to that point. Additional time points and different analytical strategies (e.g., sequence analyses) would enable greater insight into different career trajectories. Fifth, we surveyed Swiss athletes who have participated at least once in the Olympic Games. Therefore, the results cannot be generalized to athletes who were active in non-Olympic sports or have not achieved this milestone. However, there is evidence that less successful athletes tend to focus more on their education and terminate their athletic career relatively early, which is why their vocational career is less affected (Nagel and Conzelmann, 2006). More research is needed on the situation of athletes without Olympic participation from professional leagues (e.g., soccer, ice hockey) and athletes from non-Olympic sports (e.g., orienteering, motorsports). Additionally, it would be interesting to know more about typical career patterns in other countries, because there is empirical evidence that Swiss athletes tend to have less difficulties transitioning out of high-performance sports compared to other countries, although there was hardly any organized support for athletes pursuing higher education (Kuettel et al., 2017). Especially in countries, which have a markedly different sports and employment system, completely different patterns are likely to emerge. In addition, specific vocational types are likely to be found in western countries that provide athletes with employment in government-related organizations (e.g., Italy, France).

Conclusion

We have shown that different patterns of sports-related and socio-economic resources at the time of athletic retirement influence the likelihood of certain vocational career paths (e.g., stay in sports or work outside of sports). More specifically, clusters characterized by a combination of various resources have several opportunities in working life. In contrast, clusters with limited resources fare less well. In line with previous studies, clusters with above-average educational qualifications have more opportunities for a successful career. However, if the vocational activity is pursued in sports, a lack of educational certificates can be compensated for by success in sports and popularity. The results of this study can help in practice to view the situation of current athletes more holistically and to consult accordingly. To assist athletes' career transition out of sport and subsequent vocational career, sports federations and institutions should encourage and support athletes to consciously build both sports-related and socio-economic resources (e.g., by facilitating dual careers).

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