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Strategic thinking, entrepreneurial inclination, and career planning among sports science students

Pensamiento estratégico, vocación emprendedora y planificación profesional entre los estudiantes de ciencias del deporte

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Abstract

This study examines the multidimensional relationships between strategic thinking ability, entrepreneurial inclination, and career development among sports science students. A cross-

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sectional correlational design was used. The sample included 905 students enrolled in sports science programs. The study was conducted among sports science students in Türkiye. Data were collected with a 64-item, five-point Likert instrument covering six constructs. This 64-item assessment tool was originally developed by the authors as part of this study. Exploratory factor analysis and confirmatory factor analysis were conducted on separate subsamples. Structural equation modeling was used to assess direct and indirect associations. Indirect effects were tested with 5,000 bootstrap samples. Subscale means ranged from 3.07 to 3.24, and Cronbach's alpha coefficients ranged from .864 to .928. For the six-factor measurement model, the following values were obtained: $\chi^2/df = 1.117$, CFI = .982, TLI = .981, RMSEA = .016, and SRMR = .036. The proportions of variance explained by the model are 13.8% for OPSA, 18.8% for IBPCA, 27.4% for EI, 16.9% for CP, and 20.0% for SCDI. Strategic thinking ability was positively associated with opportunity perception and strategic awareness. It was also associated with innovative behavior and a proactive career attitude. The direct path to entrepreneurial inclination was not statistically significant. However, the indirect paths through the proposed mediators were significant. Strategic thinking ability had a direct association with career planning. It also showed direct and indirect associations with strategic career development intention in the sports industry. The findings suggest that strategic thinking does not translate automatically into entrepreneurial inclination. Its contribution becomes stronger when students recognize opportunities and adopt proactive, innovative career behaviors. Sports science programs should combine strategic thinking with opportunity analysis, applied entrepreneurship, career planning, and industry-based experience.

Keywords: strategic thinking; entrepreneurial inclination (EI); career planning; proactive career attitude; opportunity recognition

Resumen

Este estudio analiza las relaciones multidimensionales entre la capacidad de pensamiento estratégico, la inclinación emprendedora y el desarrollo profesional entre los estudiantes de ciencias del deporte. Se utilizó un diseño correlacional transversal. La muestra incluyó a 905 estudiantes matriculados en programas de ciencias del deporte en Turquía. Los datos se recopilaban mediante un instrumento —desarrollado por los autores para este estudio— de 64 ítems con una escala de Likert de cinco puntos que abarcaba seis constructos. Se realizaron análisis factoriales exploratorios y confirmatorios en submuestras independientes. Se utilizó el modelo de ecuaciones estructurales para evaluar las asociaciones directas e indirectas. Los efectos indirectos se comprobaron con 5.000 muestras de bootstrap. Las medias de las subescalas oscilaron entre 3,07 y 3,24, y los coeficientes alfa de Cronbach, entre 0,864 y 0,928. Para el modelo de medición de seis factores, se obtuvieron los siguientes valores: $\chi^2/df = 1,117$; CFI = 0,982; TLI = 0,981; RMSEA = 0,016; y SRMR = 0,036. Las proporciones de varianza explicadas por el modelo son del 13,8 % para la OPSA, del 18,8 % para la IBPCA, del 27,4 % para la EI, del 16,9 % para la CP y del 20,0 % para la SCDI. La capacidad de pensamiento estratégico se asoció positivamente con la percepción de oportunidades y la conciencia estratégica. También, con el comportamiento innovador y una actitud proactiva hacia la carrera profesional. La ruta directa hacia la inclinación emprendedora no fue estadísticamente

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significativa. Las rutas indirectas sí lo fueron. La capacidad de pensamiento estratégico se asoció directamente con la planificación profesional. Asimismo, mostró asociaciones directas e indirectas con la intención de desarrollo profesional estratégico en la industria del deporte. Ello sugiere que el pensamiento estratégico no se traduce automáticamente en inclinación emprendedora. Su contribución se refuerza al reconocer las oportunidades y adoptar comportamientos profesionales proactivos e innovadores. Los programas de ciencias del deporte deberían combinar el pensamiento estratégico con el análisis de oportunidades, el emprendimiento aplicado, la planificación profesional y la experiencia en el sector.

Palabras clave: pensamiento estratégico; inclinación emprendedora (IE); planificación de la carrera profesional; actitud profesional proactiva; reconocimiento de oportunidades

Introduction

Nowadays, sports science education is moving away from focusing solely on preparation for traditional professional roles such as teaching, coaching, or sports management. The rapid digitalization of sports services, the spread of performance analytics, and the growth of the wellness market are radically changing sectoral dynamics. These macro-level developments are transforming traditional revenue models while making graduates' ability to make decisions under uncertainty increasingly important (Lara-Bocanegra et al., 2022). The sports entrepreneurship literature emphasizes that processes of innovation, creativity, and opportunity exploitation play a fundamental role in managing this sectoral transformation (Hammerschmidt et al., 2024; Ratten, 2018). Parallel to this transformation, career development is no longer viewed as a linear occupational choice. Students need to dynamically monitor changing work conditions, rationally compare alternatives, analyze personal resources, and link long-term macro goals with short-term micro steps. Career self-management and career proactivity research shows that behaviors of planning, information seeking, networking, and continuous skill development during the transition from university to working life are decisive for transition success (Hirschi & Koen, 2021; Jiang et al., 2023).

In this context, strategic thinking is defined as the capacity to evaluate future options, anticipate potential consequences, and establish coherent links between current resources and ultimate goals. Strategic thinking is not limited to preparing a formal and static plan; it also involves making sense of changes in the environment, integrating heterogeneous information,

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and flexibly shifting directions when necessary (Dalal et al., 2023). The entrepreneurship literature reveals that cognitive adaptability and effectuation and causation decision logics are directly related to individuals' entrepreneurial intentions (Dheer & Castrogiovanni, 2023). Holistically addressing systems, futures, and values-focused thinking dimensions in educational practices enables students to approach complex problems multidimensionally (Dalal et al., 2023). For sports science students, this strategic skill is critically important for accurately evaluating the balances and interrelationships between sporting performance, service quality, and economic sustainability.

This study is based on three fundamental theoretical approaches. The first is the Theory of Planned Behavior, which explains entrepreneurial intention through attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991). The second is Social Cognitive Career Theory, which emphasizes the roles of self-efficacy, outcome expectations, goals, and contextual factors in career development (Lent et al., 1994). The third is Career Construction Theory, which emphasizes individuals' adaptation to changing conditions and the active construction of their career trajectories (Savickas, 2013). Within this theoretical framework, the relationship between strategic thinking ability (STA) and other variables is examined. In particular, the mediating roles of opportunity perception and strategic awareness (OPSA) and innovative behavior/proactive career attitude (IBPCA) are examined. The indirect relationships formed through these variables with entrepreneurial inclination (EI) and the intention to pursue strategic career development (SCDI) in the sports industry are theoretically evaluated.

The translation of strategic thinking into a concrete entrepreneurial inclination depends on students recognizing potential needs around them, converting these needs into actionable opportunities, and acting proactively during the solution generation process. Research conducted on university samples shows that "opportunity recognition" is a key mediating variable between entrepreneurship education and entrepreneurial intention (Hassan et al., 2020; Hou et al., 2022). Similarly, innovativeness, creative self-efficacy, and proactive personality traits stand out as psychological and behavioral elements directly supporting entrepreneurial intention (Tantawy et al., 2021). In the sports ecosystem, opportunity perception has a more complex dimension due to the multi-stakeholder structure of the sector. Sports clubs, fitness

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businesses, event organizations, and digital fan platforms must manage the simultaneous and sometimes conflicting expectations of different stakeholders. For example, during the pandemic period, sports businesses restructuring service deliveries through digital tools and developing new revenue models and communication channels illustrated the relevance of entrepreneurial inclination in minimizing uncertainty (González-Serrano et al., 2023). These practical applications demonstrate that opportunity awareness is not merely an abstract attitude, but a dynamic part of the process of transforming environmental change into strategic action.

Theoretically, opportunity perception is the cognitive interpretation of a change in the environment or an unmet need as a "value-creation possibility." Strategic awareness, on the other hand, involves simulating this possibility along with industry conditions, existing resources, and potential macro-micro risks. Literature confirms that opportunity recognition is an independent and critical cognitive stage on the path to entrepreneurial intention (Hassan et al., 2020; Hou et al., 2022). In today's sports industry, opportunities increasingly emerge from technological change, service experience optimization, and new participation forms; digital fan experiences, smart stadium applications, and online integrated training services are the most concrete niche areas of this transformation (Yang & Cole, 2022; Yuksel et al., 2021). Although entrepreneurial inclination expresses an individual's general orientation and motivation toward the option of establishing a new business or enterprise, it is not synonymous with the direct act of founding an enterprise. Attitudes, perceived behavioral control, self-efficacy, and opportunity perception are key determinants of entrepreneurial intention (Sandoval-Álvarez, 2023). Practices integrating creativity and innovation management into the educational curriculum significantly strengthen students' entrepreneurial intentions (Tantawy et al., 2021); the positive relationship between innovativeness and intention reveals the importance of students' self-confidence in generating new ideas and commercializing/implementing them (Elnadi & Gheith, 2023).

Innovative behavior is a multi-stage structure encompassing processes of generating original ideas for a problem or need, supporting this idea at the organizational/sectoral level, and ultimately transforming it into an actionable output. In sports organizations, this behavioral structure manifests in various innovation types such as designing next-generation services,

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digital marketing strategies, and personalizing fan experience (Paek et al., 2022). A proactive career attitude encompasses self-initiated cognitive and behavioral efforts aimed at shaping one's professional future. This attitude includes behaviors such as career exploration, goal setting, strategic planning, and professional networking (Akkermans & Hirschi, 2023). Longitudinal studies show that strategic thinking capacity and proactive career behavior have a cycle that mutually feeds and reinforces each other over time (Xu, 2026).

Consequently, career planning relies on an individual systematically identifying their target professional position, the strategic resources needed to reach this position, and the action steps to follow. In contemporary career approaches, such as dynamic or boundaryless career models, planning is not a one-off static choice; it is a continuous "career self-management" process updated in light of new information obtained from dynamic market conditions (Hirschi & Koen, 2021). Particularly for student-athletes, career planning has a multi-layered structure that also requires managing dual-career transitions between athletic life and education/post-graduation working life. Future work self-salience is considered one of the strongest psychological antecedents of proactive career behavior (Lu, 2020). Strategic career development intention in the sports industry refers to students not merely being passive job seekers after graduation, but proactively monitoring sectoral macro-changes, identifying niche areas, and building long-term career projections on this dynamic field (González-Serrano et al., 2023).

The purpose of this study is to examine the relationships among strategic thinking ability, opportunity perception and strategic awareness, entrepreneurial inclination, innovative behavior and proactive career attitude, career planning, and intention to strategically develop a career in the sports industry among sports science students.

Previous studies have primarily examined entrepreneurial intention, career proactivity, or opportunity recognition among sports science students as separate relationships. In this study, however, strategic thinking, opportunity perception/strategic awareness, innovative-proactive career behavior, entrepreneurial inclination, career planning, and the intention to pursue strategic career development in the sports industry are examined together within the same structural model. In contrast to the studies by González-Serrano et al. (2021; 2023) in particular,

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this research examines not only the direct relationship between strategic thinking and entrepreneurial and career outcomes but also the indirect relationships mediated by OPSA and IBPCA within the same model. This integrated approach constitutes the theoretical and empirical contribution of this study.

Materials and methods

This quantitative study used a cross-sectional correlational survey design. While the main focus of the research is the relationships among strategic thinking ability, entrepreneurial inclination, and career planning, the intention to strategically develop a career in the sports industry was also included in the model as a complementary outcome variable regarding sectoral career orientation. Additionally, the mediating role of opportunity perception and strategic awareness, as well as innovative behavior and proactive career attitude, in these relationships was evaluated.

The study's accessible sampling frame consists of students on an online platform, comprising a total of 1,387 students enrolled in sports science programs. This frame should not be considered a national population representing all sports science students in Türkiye. For this accessible frame of 1,387 individuals, the minimum sample size based on a 95% confidence level and a 5% margin of error is approximately 302; however, 905 individuals were reported and analyzed as the final sample size included in the analysis, rather than the calculated minimum number.

The demographic and individual characteristics of the participants were structured across variables including gender, age, department, grade level, licensed athlete background, entrepreneurship/career planning education status, and post-graduation thought of establishing one's own business or sports enterprise. During data collection, confidentiality, adherence to ethical principles, and personal data protection regulations were meticulously observed; participation was entirely voluntary, and no personally identifying information was requested from participants.

The study's accessible population consists of an online social platform comprising individuals who are currently enrolled in from the schools of sports science at 38 different

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universities in Türkiye. During the period the study was conducted, there were a total of 1,387 active users on the platform. Participants were reached via the online platform, and participation in the study was entirely voluntary. Data were collected online between 6 and 14 July 2026. Of the 1,387 individuals on the platform, 905 were reached, and these individuals voluntarily participated in the study by fully completing the online survey.

Therefore, it is not claimed that the study sample statistically represents all sports science students in Türkiye; the study's findings are evaluated solely based on the participants reached through the online platform where the study was conducted. The fact that the participants came from 38 different universities allowed the sample to include participants from diverse institutional and educational settings.

An original 64-item, five-point Likert measurement instrument was developed by the authors for the present study. The final instrument comprises six subscales: Strategic Thinking Ability, Opportunity Perception and Strategic Awareness, Entrepreneurial Inclination, Innovative Behavior and Proactive Career Attitude, Career Planning, and Strategic Career Development Intention in the Sports Industry. No separate pilot study was conducted. Reliability estimates for the six subscales were therefore calculated using the analytical sample and are reported in the Results section.

The initial item pool was developed by the authors based on the conceptual definitions of the six constructs and the relevant literature on strategic thinking, opportunity perception and strategic awareness, entrepreneurial inclination, innovative behavior and proactive career attitude, career planning, and strategic career development in the sports industry. The initial items were reviewed by a total of nine field experts with expertise in sports science, business and technology management, education, educational measurement and evaluation, statistics, sociology, and psychology. The experts evaluated the items in terms of their relevance to the intended constructs, clarity, comprehensibility, and appropriateness for sports science students. The initial item pool consisted of 67 items. Based on the experts' evaluations, three items were removed because they were considered insufficiently appropriate in terms of construct relevance, clarity, comprehensibility, or suitability for sports science students. The wording and content of the remaining items were revised in accordance with the experts' feedback, resulting

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in the final 64-item measurement instrument. The expert review was conducted qualitatively; therefore, quantitative content-validity indices such as the Content Validity Index (CVI) or Content Validity Ratio (CVR) were not calculated.

The final measurement instrument consists of a total of 64 items. The items included in the scale are presented in Appendix 1 in the original language in which they were administered to participants and coded according to their subscales. The scale includes 12 items for Strategic Thinking Ability, 8 items for Opportunity Perception and Strategic Awareness, 12 items for Entrepreneurial Inclination, 10 items for Innovative Behavior and Proactive Career Attitude, 12 items for Career Planning, and 10 items for Intention to Pursue Strategic Career Development in the Sports Industry.

Although valid and reliable measurement tools exist in the literature for some of the constructs addressed in this study, the primary rationale for developing a new measurement instrument in this research is to evaluate these constructs together within an integrated model in the context of sports science students. Existing scales mostly address strategic thinking, entrepreneurial inclination, career planning, or proactive career behaviors as separate constructs; they do not holistically assess sports-sector-specific career opportunities, strategic awareness, and intentions for sector-specific career development within the same measurement framework. Therefore, this study aims to develop a multidimensional and context-specific measurement tool suitable for explaining the career and entrepreneurial inclinations of sports science students within the context of the sports industry. The decision to develop a new measurement tool rather than directly adapt existing scales stems from the unique contextual requirements of the research, which focuses on sports science education, sports entrepreneurship, and strategic career development in the sports industry.

In data analysis, descriptive statistics, reliability, normality, and Pearson correlation analyses were initially applied. To evaluate the factor structure and validity of the measurement instrument more robustly, the dataset was randomly split into two sub-samples. For the Exploratory Factor Analysis (EFA) conducted on the first sub-sample, Principal Axis Factoring was chosen as the extraction method, and Oblimin with Kaiser Normalization as the rotation method. Eigenvalues, scree plots, and parallel analysis results were jointly evaluated to

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determine the number of factors. During the Confirmatory Factor Analysis (CFA) performed on the second sub-sample, model fit indices, standardized factor loadings, Cronbach's Alpha, McDonald's Omega (ω), Composite Reliability (CR), Average Variance Extracted (AVE), Fornell-Larcker criteria, and Heterotrait-Monotrait Ratio (HTMT) values were examined. Robust Maximum Likelihood (MLR) estimation method was used in CFA and Structural Equation Modeling (SEM) stages; error covariances were not freed in the model tested in line with theoretical framework. In the structural equation modeling applied to examine direct and indirect relationships between variables, the significance of mediation relationships was tested over 95% confidence intervals (CI) obtained from 5,000 bootstrap samples. The exclusion of zero (0) in the confidence interval was taken as the primary criterion for the significance of indirect relationships. Since the study is based on a cross-sectional design, direct and indirect paths were interpreted within the scope of relationship and mediation findings, rather than a causal framework.

Before proceeding with data analysis, the dataset was examined for missing data, outliers, and patterns of careless responses. A check conducted at the scale item level revealed no missing data; the total number of missing data points was 0, and the missing data rate was 0%. Since the missing data rates at both the item and participant levels were also 0%, no missing data imputation methods were applied. Univariate outliers were assessed using standard z-scores, and no outliers were identified based on the criterion $|z| > 3.29$. Multivariate outliers were examined using Mahalanobis distance; the critical value based on the χ^2 criterion was calculated as 104.716, and no observations were found above this value. Additionally, to assess patterns of careless responding, checks were conducted for selecting the same response option on all items and for low response variance. No participant was found to have selected the same response option on all items; nor were any participants identified with a response standard deviation below .20. Since the dataset did not include a variable related to response time, the criterion for excessively fast responding could not be evaluated separately.

During the confirmatory factor analysis process, model fit indices, standardized factor loadings, Cronbach's Alpha, Omega/CR, AVE, the Fornell-Larcker criterion, and HTMT values were examined. The MLR estimation method was used in both confirmatory factor analysis and

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structural equation modeling. The measurement model was tested in accordance with the theoretical framework; the error covariances of the items were not freed, whereas correlations among the six latent factors were allowed to be estimated freely.

Confirmatory factor analysis and structural equation modeling were conducted using R 4.6.1 software via the lavaan 0.6-21 package. The haven 2.5.5 and dplyr 1.2.1 packages were used for data reading and editing; the psych 2.6.5 package was used for exploratory factor analysis and reliability analysis; and the semTools 0.5-8 package was used for omega/CR, AVE, and HTMT calculations. In CFA and SEM analyses, model fit indices and direct path coefficients were calculated using the MLR estimation method, which provides robust standard errors. To assess the significance of indirect effects, the same structural model was also run using the ML estimation method with 5,000 bootstrap resamples. Bootstrap confidence intervals were obtained using the percentile method; the significance of the indirect effect was assessed based on the criterion that the 95% confidence interval did not include zero. The dataset was randomly divided into two groups to evaluate the factor structure of the measurement instrument on independent subsamples. The random assignment was performed based on a random number variable generated using the `set.seed(123)` command in the R environment. Of the total 905 participants, 452 were assigned to the exploratory factor analysis (EFA) subsample, and 453 were assigned to the confirmatory factor analysis (CFA) and structural equation modeling (SEM) subsample. Accordingly, EFA analyses were conducted on $n = 452$ participants, CFA analyses on $n = 453$, and SEM analyses on $n = 453$ participants. The SEM model was estimated not on the entire dataset, but on the same second subsample used for CFA. Chi-square tests were applied to assess the similarity of the subsamples in terms of basic demographic variables. The results showed no significant differences between the two subsamples regarding the variables of age group, department, grade level, history of licensed athletic participation, whether they had received entrepreneurship/career planning education, and the intention to start their own business or sports venture after graduation. In contrast, a statistically significant difference was identified between the two subsamples regarding the gender variable: $\chi^2(2) = 8.933$, $p = .011$. Therefore, it was noted that the subsamples generally

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had a largely similar demographic distribution, but there was a limited difference in terms of gender distribution.

Ethical approval was obtained from the Istanbul Kent University Social and Human Sciences Research Ethics Committee. Approval was granted at the meeting held on July 3, 2026 (Meeting No. 2026/06, Decision Item XVI). Participation was voluntary. No identifying information was collected. Responses were analyzed in aggregate, and confidentiality and applicable data-protection requirements were observed.

Results

TABLE 1. Descriptive Characteristics of Participants

Variable	Category	n	%
Gender	Women	424	46.9
	Men	468	51.7
	Prefer not to say	13	1.4
Age	18–20 years	407	45.0
	21–23 years	341	37.7
	24–26 years	118	13.0
	27 years or older	39	4.3
Department	Sports Management	191	21.1
	Coaching Education	232	25.6
	Recreation	121	13.4
	Physical Education and Sports Teaching	193	21.3
	Exercise and Sport Sciences	141	15.6
	Other	27	3.0
Grade level	Freshman	209	23.1
	Sophomore	214	23.6
	Junior	198	21.9
	Senior	223	24.6
	MSc	46	5.1
	PhD	15	1.7
Licensed athlete background	Yes	614	67.8
	No	291	32.2
Entrepreneurship/career-planning education status	Received entrepreneurship education	162	17.9

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Variable	Category	n	%
	Received career-planning education	184	20.3
	Received education in both	144	15.9
	No prior education	415	45.9
Intention to establish a business/sports venture after graduation	Definitely not considering	79	8.7
	Not considering	150	16.6
	Undecided	259	28.6
	Considering	282	31.2
	Definitely considering	135	14.9

According to Table 1, the gender distribution of participants was balanced, with the 18–20 age group representing 45.0% of the sample. The highest participation came from Coaching Education (25.6%), followed by Physical Education and Sports Teaching (21.3%) and Sports Management (21.1%). The fact that 67.8% of participants possessed a background as a licensed athlete shows that the sample consists of individuals with direct experience in sports.

45.9% of participants had not previously received any career planning or entrepreneurship training. While the proportion of those considering establishing their own business or sports venture after graduation was 46.1%, 28.6% indicated they were undecided. These findings suggest that students' entrepreneurial inclinations present potential for growth if supported through academic and sectoral incentives.

TABLE 2. Comparison of Key Outcome Variables Based on a Licensed Athlete Background

Variable	Licensed Athlete Background	n	Mean	t	df	p	Cohen's d
EI	Yes	614	3.21	-1.429	558.60	.154	-0.102
EI	No	291	3.31				
CP	Yes	614	3.18	-0.600	548.69	.549	-0.043
CP	No	291	3.21				
SCDI	Yes	614	3.07	-0.989	577.86	.323	-0.070
SCDI	No	291	3.14				

NOTE. EI = Entrepreneurial Inclination; CP = Career Planning; SCDI = Strategic Career Development Intention in the Sports Industry. The Welch independent samples t-test was used. Cohen's d values indicate the effect size.

The results of the Welch independent-samples t-test, conducted based on a history of licensed athletic participation, indicate that there were no statistically significant differences in

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EI, CP, and SCDI scores between participants with and without a history of licensed athletic participation. When effect sizes were examined, Cohen's d values ranged from -0.043 to -0.102, indicating that these effects were negligible. This finding suggests that a history of licensed athletic participation does not result in a significant difference in the primary outcome variables.

Comparison of Key Outcome Variables by Training/Seminar Participation Status and History of Licensed Athletics

Key outcome variables were compared based on participation in entrepreneurship/career planning training and history of licensed athletics. One-way ANOVA results showed that, based on training/seminar participation status, entrepreneurial inclination, $F(3, 901) = 4.830, p = .002, \eta^2 = .016$, and scores for the intention to pursue strategic career development in the sports industry, $F(3, 901) = 2.639, p = .048, \eta^2 = .009$. No significant differences were found regarding career planning, $F(3, 901) = 1.879, p = .132, \eta^2 = .006$. According to Tukey's post-hoc analysis, the scores of participants who did not receive training were lower than those of participants who received entrepreneurship training. The results of the Welch t-test based on a licensed athlete background showed that for entrepreneurial inclination, $t(558.60) = -1.429, p = .154, d = -0.102$; for career planning, $t(548.69) = -0.600, p = .549, d = -0.043$, and the intention to pursue strategic career development in the sports industry, $t(577.86) = -0.989, p = .323, d = -0.070$, showed no statistically significant differences. Overall, the effect sizes were determined to be small or negligible.

TABLE 3. Descriptive Statistics for the Subscales

Subscale	N	$\bar{x} \pm sd$	Kolmogorov-Smirnov	Shapiro-Wilk	Skewness	Kurtosis
STA	905	3.07 $\pm$.84	.052*	.990*	-.02	-.67
OPSA	905	3.09 $\pm$.90	.058*	.983*	-.04	-.83
EI	905	3.24 $\pm$.98	.061*	.976*	-.21	-.85
IBPCA	905	3.13 $\pm$.91	.060*	.986*	-.09	-.72
CP	905	3.19 $\pm$.88	.044*	.988*	-.16	-.63
SCDI	905	3.10 $\pm$.93	.054*	.985*	-.10	-.77

NOTE. $p > .05$; STA = Strategic Thinking Ability; OPSA = Opportunity Perception and Strategic Awareness; EI = Entrepreneurial Inclination; IBPCA = Innovative Behavior and Proactive Career Attitude; CP = Career Planning;

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SCDI = Strategic Career Development Intention in the Sports Industry. Scores on every subscale covered the full response range from 1.00 to 5.00.

Examining Table 3 shows that participants' perceptions regarding relevant constructs and attitudes cluster slightly above medium level with limited deviations at extremes; sub-dimension scores being close to normal distribution indicates acceptability for parametric analyses.

TABLE 4. Reliability and Convergent Validity Results for the Subscales

Subscale	Number of Items	Cronbach Alpha	Omega / CR	AVE
STA	12	.899	.900	.427
OPSA	8	.864	.864	.443
EI	12	.928	.928	.520
IBPCA	10	.899	.898	.470
CP	12	.906	.906	.447
SCDI	10	.905	.905	.489

NOTE. Omega/CR = model-based reliability/composite reliability coefficient; AVE = average variance extracted. Reliability coefficients of .70 or higher were considered to indicate acceptable internal consistency. STA = Strategic Thinking Ability; OPSA = Opportunity Perception and Strategic Awareness; EI = Entrepreneurial Inclination; IBPCA = Innovative Behavior and Proactive Career Attitude; CP = Career Planning; SCDI = Strategic Career Development Intention in the Sports Industry.

Reliability coefficients exceeded .70 for all subscales, indicating acceptable internal consistency. Regarding convergent validity, EI met the AVE criterion of .50, whereas the remaining five constructs had AVE values below .50. Therefore, convergent validity was only partially supported.

TABLE 5. KMO and Bartlett's Test of Sphericity

Test	Kaiser-Meyer-Olkin measure of sampling adequacy	Bartlett's test of sphericity χ^2	df	p
Value	.93	13290.34	2016	<.001

NOTE. *p<.05

Prior to Exploratory Factor Analysis (EFA), KMO Sampling Adequacy and Bartlett's Test of Sphericity results were evaluated on the first sub-sample. The KMO value of .93

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indicates excellent sampling adequacy. The significant Bartlett test establishes that correlations between items are sufficient to execute factor analysis (Table 5).

TABLE 6. Total Variance Explained Results for Exploratory Factor Analysis

Factor	Code	Sum of Squared Factor Loadings	Variance Explained (%)	Cumulative Variance (%)
1	EI	6.165	9.63	9.63
2	CP	5.278	8.25	17.88
3	STA	4.971	7.77	25.65
4	IBPCA	4.767	7.45	33.09
5	SCDI	4.755	7.43	40.52
6	OPSA	3.704	5.79	46.31

NOTE. The sums of squared factor loadings indicate the explanatory contribution of each factor. Principal axis factoring was used for extraction, with Oblimin rotation. The number of factors was determined by jointly evaluating eigenvalues, the scree plot, and parallel-analysis results.

The 6-factor structure obtained in Table 6 explains 46.31% of total variance. Individual factor contributions range between 5.79% and 9.63%. These results support the theoretical multidimensional structure at the EFA level.

TABLE 7. Factor Structure Obtained from Exploratory Factor Analysis

Subscale / Factor	Number of Items	Item Range	Factor Loading Range
EI	12	EI01–EI12	.63–.76
CP	12	CP01–CP12	.57–.72
STA	12	STA01–STA12	.56–.69
IBPCA	10	IBPCA01–IBPCA10	.62–.76
SCDI	10	SCDI01–SCDI10	.61–.73
OPSA	8	OPSA01–OPSA08	.63–.69

NOTE. Results from the pattern matrix are reported. Loadings below .40 are not shown. Oblimin rotation was used because correlations among the factors were allowed.

Pattern Matrix results in Table 7 show items loaded onto respective factors cleanly. Loading ranges varied between .56 and .76, with all items surpassing the .50 threshold, demonstrating acceptable representation.

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Determination of the number of factors and the factor structure

The factor count was evaluated with eigenvalues, the scree plot, and parallel analysis. Six factors had eigenvalues above 1. Parallel analysis also supported six factors. The scree plot leveled off after the sixth factor, providing further support for this solution.

TABLE 8. Decision to Retain Factors Based on Parallel Analysis Results

Factor	Observed Factor Eigenvalue	Simulated/Random Eigenvalue	Decision
1	12.368	0.868	Retained
2	5.163	0.768	Retained
3	3.266	0.717	Retained
4	2.818	0.668	Retained
5	2.450	0.629	Retained
6	1.925	0.594	Retained
7	0.159	0.556	Not retained
8	0.156	0.526	Not retained
9	0.101	0.495	Not retained
10	0.060	0.465	Not retained

NOTE. The criterion used in the decision to retain a factor was that the observed factor eigenvalue must be higher than the simulated/random eigenvalue obtained from the parallel analysis. The parallel analysis was conducted using the Principal Axis Factoring approach with 100 iterations.

Upon examining the results of the parallel analysis, it is observed that the observed factor eigenvalues for the first six factors are higher than the simulated/random eigenvalues. However, starting with the seventh factor, the observed values fall below the simulated values. When evaluated in conjunction with the scree plot and the theoretical framework, this finding supports retaining the six-factor solution. The scree plot is shown in Figure 1.

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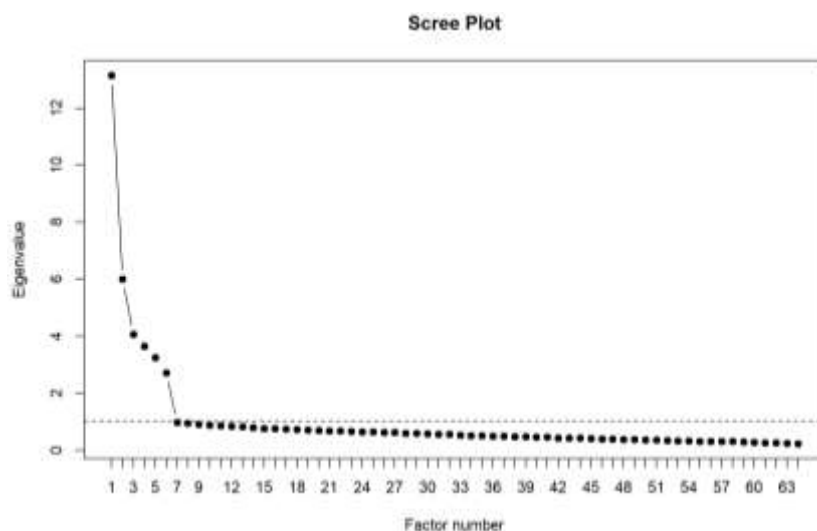


FIGURE 1. Scree Plot

Principal axis factoring with Oblimin rotation showed that the items clustered under the six expected dimensions. Factor loadings ranged from .56 to .76, and every item loaded above .50. Item communalities ranged from .369 to .594 and remained above .30. The exploratory results therefore supported the six-dimensional structure of the instrument.

TABLE 9. Fit Indices for Confirmatory Factor Analysis

Fit Index	χ^2	df	p	χ^2/df	CFI	TLI	RMSEA	RMSEA 90% CI	SRMR
Value	2164.341	1937	<.001	1.117	.982	.981	.016	.012–.020	.036

NOTE. $p < .05$; df=degrees of freedom; CI=confidence interval; CFI=comparative fit index; TLI=Tucker-Lewis index; RMSEA=root mean square error of approximation; SRMR=standardized root mean square residual.

CFA performed on the second subsample indicated that the six-factor measurement model showed good fit to the data (Table 9).

TABLE 10. Standardized Factor Loadings from the Confirmatory Factor Analysis

Subscale	Number of Items	Item Range	Standardized Factor Loading Range (λ)	p
STA	12	STA01–STA12	.585–.715	<.001
OPSA	8	OPSA01–OPSA08	.627–.703	<.001
EI	12	EI01–EI12	.676–.784	<.001

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IBPCA	10	IBPCA01–IBPCA10	.651–.720	<.001
CP	12	CP01–CP12	.608–.722	<.001
SCDI	10	SCDI01–SCDI10	.668–.746	<.001

NOTE. $p < .05$; STA=Strategic Thinking Ability; OPSA=Opportunity Perception and Strategic Awareness; EI=Entrepreneurial Inclination; IBPCA=Innovative Behavior and Proactive Career Attitude; CP=Career Planning; SCDI=Strategic Career Development Intention in the Sports Industry.

According to Table 10, all items loaded above .50 significantly ($p < .001$), supporting structural stability and parameter reliability.

TABLE 11. Discriminant Validity Results According to Fornell-Larcker Criterion

Variable	AVE	STA	OPSA	EI	IBPCA	CP	SCDI
STA	.427	.653					
OPSA	.443	.370	.666				
EI	.520	.346	.396	.721			
IBPCA	.470	.432	.193	.405	.686		
CP	.447	.410	.184	.101	.195	.669	
SCDI	.489	.412	.264	.464	.298	.326	.699

NOTE. Bold diagonal values are the square roots of AVE; off-diagonal values are correlations among the latent variables. AVE = average variance extracted.

In Table 11, the square roots of AVE exceeded inter-construct correlations in all cases, confirming discriminant validity via Fornell-Larcker criteria.

TABLE 12. Discriminant Validity Results According to HTMT Criterion

Variable	STA	OPSA	EI	IBPCA	CP	SCDI
STA	—					
OPSA	.360	—				
EI	.334	.385	—			
IBPCA	.428	.169	.395	—		
CP	.404	.147	.078	.161	—	
SCDI	.409	.240	.459	.288	.317	—

NOTE. HTMT=heterotrait-monotrait ratio. Values below .85 were considered acceptable evidence of discriminant validity.

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HTMT ratios provided a second assessment of discriminant validity. Table 12 shows that the values ranged from .078 to .459, and all were below the .85 threshold. The six constructs were therefore empirically distinguishable.

TABLE 13. Pearson Correlation Coefficients Among the Subscales

Variables	1	2	3	4	5	6
1. STA	—					
2. OPSA	.316**	—				
3. EI	.298**	.337**	—			
4. IBPCA	.380**	.187**	.357**	—		
5. CP	.336**	.160**	.073*	.167**	—	
6. SCDI	.379**	.236**	.410**	.278**	.306**	—

NOTE. * $p < .05$; ** $p < .01$; STA=Strategic Thinking Ability; OPSA=Opportunity Perception and Strategic Awareness; EI=Entrepreneurial Inclination; IBPCA=Innovative Behavior and Proactive Career Attitude; CP=Career Planning; SCDI=Strategic Career Development Intention in the Sports Industry.

Positive, significant, and low-to-moderate correlations in Table 13 demonstrate that constructs are interrelated yet empirically distinct. None of the coefficients approached a level that would indicate serious multicollinearity.

TABLE 14. Direct Effects in the Structural Model

Path	β	z	p	95% CI
STA → OPSA	.372	7.693	< .001	.277–.466
STA → IBPCA	.433	9.235	< .001	.341–.525
STA → EI	.104	1.904	.057	-.003–.212
OPSA → EI	.300	6.189	< .001	.205–.395
IBPCA → EI	.304	6.025	< .001	.205–.403
STA → CP	.387	7.072	< .001	.280–.494
OPSA → CP	.036	0.683	.494	-.068–.140
IBPCA → CP	.021	0.372	.710	-.089–.130
STA → SCDI	.305	5.508	< .001	.196–.413
OPSA → SCDI	.124	2.398	.017	.023–.225
IBPCA → SCDI	.143	2.573	.010	.034–.252

NOTE. β = standardized path coefficient; CI = confidence interval.

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The direct paths from STA to OPSA ($\beta = .372$) and IBPCA ($\beta = .433$) were positive and statistically significant. The direct path from STA to EI is not statistically significant ($\beta = .104$, $p = .057$, 95% CI $[-.003, .212]$); this result does not prove that the effect is zero. It merely indicates that the null hypothesis cannot be rejected in the current sample. The STA→CP path is significant ($\beta=.387$, $p<.001$); however, the direct paths from OPSA and IBPCA to CP are not significant. Due to the cross-sectional design, these paths should be interpreted as direct relationships within the proposed model rather than as causal “effects.”

TABLE 15. Bootstrap Analysis Results for Indirect and Total Effects

Effect Type	Path	β	SE	z	p	95% CI
Indirect effect	STA → OPSA → EI	.112	.028	4.000	< .001	.079–.191
Indirect effect	STA → IBPCA → EI	.132	.033	4.000	< .001	.093–.223
Indirect effect	STA → OPSA → CP	.013	.019	0.684	.494	-.026–.051
Indirect effect	STA → IBPCA → CP	.009	.023	0.391	.696	-.036–.053
Indirect effect	STA → OPSA → SCDI	.046	.022	2.091	.037	.007–.092
Indirect effect	STA → IBPCA → SCDI	.062	.026	2.385	.017	.013–.116
Total indirect effect	STA → EI	.243	.044	5.523	< .001	.201–.374
Total indirect effect	STA → CP	.022	.030	0.733	.463	-.039–.080
Total indirect effect	STA → SCDI	.108	.034	3.176	.001	.048–.179
Total effect	STA → EI	.348	.056	6.214	< .001	.290–.509
Total effect	STA → CP	.410	.052	7.885	< .001	.281–.483
Total effect	STA → SCDI	.413	.057	7.246	< .001	.317–.539

NOTE. CI = confidence interval. The significance of indirect effects was evaluated using 95% CI based on 5,000 bootstrap samples. An indirect effect was considered statistically significant when its CI did not include zero.

The bootstrap analysis identified significant indirect effects for Entrepreneurial Inclination and Strategic Career Development Intention. It did not identify a significant indirect effect for Career Planning. Opportunity Perception and Strategic Awareness, together with Innovative Behavior and Proactive Career Attitude, therefore accounted for part of the association with the first two outcomes. They did not account for the association between Strategic Thinking Ability and Career Planning.

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The two indirect paths from Strategic Thinking Ability to Entrepreneurial Inclination were significant. The effect through Opportunity Perception and Strategic Awareness was $\beta=.112$, while the effect through Innovative Behavior and Proactive Career Attitude was $\beta=.132$. Their combined indirect effect was $\beta=.243$. The corresponding confidence intervals excluded zero. The total effect on Entrepreneurial Inclination was $\beta=.348$. For Career Planning, both indirect paths and the total indirect effect were nonsignificant. The total effect remained significant at $\beta=.410$ because the direct path was strong. For Strategic Career Development Intention, both indirect paths were significant, and the total indirect effect was $\beta=.108$. The total effect was $\beta=.413$.

TABLE 16. Variance Explained in the Structural Model

Variable	R ²
OPSA	.138
IBPCA	.188
EI	.274
CP	.169
SCDI	.200

The R² values indicate that target dimensions are influenced by exogenous constructs within the model alongside unmodeled individual, educational, and external context variables. The explained variance was higher for Entrepreneurial Inclination and Strategic Career Development Intention. Even so, the model should be understood as a focused account rather than a complete explanation of student career behavior.

Discussion

The fact that indirect pathways for Career Planning (CP) are not significant indicates that, in the current model, the relationship between STA and CP is predominantly direct. This finding suggests that career planning may be more closely related to strategic assessment, goal setting, and future orientation; while opportunity perception and innovative/proactive behaviors may play more prominent roles in subsequent stages, such as the implementation of plans. This

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interpretation should be presented as a possible explanation due to the cross-sectional design and should not be stated as a causal mechanism.

The empirical contribution of this study lies in the development and testing via EFA/CFA of a six-dimensional measurement model (STA, OPSA, EI, IBPCA, CP, and SCDI) to examine the strategic career dynamics of sports science students. The low-to-moderate inter-construct correlations and HTMT results obtained from EFA and CFA analyses conducted on separate subsamples provide support for the distinguishability of the constructs. The fact that the α and ω values of the subscales are above .86 provides strong evidence of internal consistency. However, the AVE values for the five constructs other than EI are below the .50 threshold. High CR/ ω values may support this finding but do not invalidate the low AVE values. Therefore, the convergent validity of the measurement model should be interpreted as limited, and the psychometric strength of the findings should not be overgeneralized. The STA's significant relationships with OPSA and IBPCA indicate that strategic thinking changes in tandem with opportunity assessment and a proactive/innovative career orientation; the cross-sectional design does not allow for inferences regarding the direction or temporal causality of these relationships.

Career proactivity paradigms posit that future-oriented rational evaluations must translate into concrete career self-management behaviors, such as skill development, industry-specific information searching, and professional networking (Jiang et al., 2023). This longitudinal interaction between career wisdom and proactive action (Xu, 2026) necessitates the concurrent development of thought and behavior. Considering that autonomy, idea support, and experimental practices trigger contextual creativity within sports organizations (Paek et al., 2022), integrating practices such as design thinking problem-solving, case studies, and interactive field internships into sports science curricula is projected to facilitate the transformation of strategic thought into proactive career behavior (Joachim et al., 2020).

The direct path from STA to EI is not statistically significant ($\beta = .104$, $p = .057$, 95% CI [-.003, .212]). This result does not prove that the direct relationship is “zero” or nonexistent; it merely indicates that the null hypothesis cannot be rejected based on the available data. In contrast, the indirect paths STA→OPSA→EI and STA→IBPCA→EI are significant.

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Accordingly, the findings indicate significant indirect associations rather than evidence of full mediation. Possible explanations for the nonsignificant direct path remain hypotheses that should be examined in future longitudinal or experimental studies.

This indirect mechanism carries critical significance within the context of sports science students. Although an athletic background imparts implicit skills such as teamwork, discipline, and coping with performance pressure, these gains do not automatically evolve into rational entrepreneurial intentions. Indeed, it is well established that the simultaneous presence of creativity, psychological resilience, and proactivity predicts entrepreneurial intention in elite athletes (Vidal-Vilaplana et al., 2025), and that individual-cultural dynamics must be weighed jointly when evaluating entrepreneurial tendencies (González-Serrano et al., 2021). The nearly equal magnitude of effect sizes for the OPSA and IBPCA pathways in our model suggests that entrepreneurial inclination may be associated with both cognitive opportunity evaluation and behavioral readiness. Therefore, rather than relying on traditional, abstract educational models focused solely on business plans and financing, these findings support considering modern pedagogical approaches (Malathi et al., 2025) in which students analyze real-world sports industry crises, develop user-centered prototypes, and engage in experiential, empirical processes.

The fact that the indirect relationships observed via OPSA and IBPCA are of similar magnitude suggests that EI may be associated with both cognitive opportunity evaluation and a proactive/innovative career attitude. Based on these findings, project-based learning, real-world industry problems, prototyping, and field experiences can be considered as potential educational interventions; however, this cross-sectional study does not directly demonstrate that these interventions will enhance entrepreneurial outcomes.

While indirect paths from OPSA and IBPCA to CP were not significant, the direct path from STA to CP was significant ($\beta=.387$, $p<.001$). This pattern reveals that, within the scope of the current model and sample, career planning is more strongly associated with strategic thinking; whereas opportunity perception and innovative/proactive career attitudes do not show an additional direct relationship with CP. This finding can be interpreted to suggest that career planning may be related to processes such as goal setting, information gathering, and systematic

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evaluation of the future; however, due to the cross-sectional design, it should not be concluded that STA directly “shapes” CP or that other mechanisms are unnecessary.

Longitudinal studies demonstrating that career orientations first trigger planning practices and subsequently drive professional networking behaviors (Bazine et al., 2025) reinforce the theoretical legitimacy of this direct path between STA and CP. The fact that explained variance (R^2) for the CP dimension remained at 16.9% indicates that while strategic thinking is a key internal resource, it is not exhaustive on its own. Career planning is also fed by multi-layered external variables omitted from the model, such as socio-economic conditions, familial expectations, role models, internship experiences, and occupational self-efficacy (Galvão et al., 2025). Particularly given that student-athletes navigate a dual-career (athletic vs. academic/professional) planning paradox, clarifying one's "future work self" perception fosters proactive career behaviors (Lu, 2020), while early career preparation and social capital remain decisive factors in professional athletes' post-retirement entrepreneurial success (Ramos et al., 2022).

Significant direct relationships were observed between Strategic Career Development Intentions (SCDI) in the sports industry and STA, OPSA, and IBPCA; in addition, significant indirect relationships from STA to SCDI via OPSA and IBPCA were found. This pattern suggests that sector-specific career intentions change in conjunction with both forward-looking strategic assessments and the opportunity and proactive behavior dimensions. However, because the measurements were conducted simultaneously and using the same self-report instrument, the temporal sequence or causal direction of these relationships cannot be determined in this study.

Indeed, the technology-driven transformations undertaken by sports organizations to survive global crises and pandemic periods necessitate that prospective graduates continuously update their innovative competencies (González-Serrano et al., 2023). Empirical evidence showing that opportunity perception and innovative attitudes play pivotal roles in sports science students' intrapreneurship intentions (González-Serrano et al., 2023; Lara-Bocanegra et al., 2025) strongly supports our findings. While entrepreneurial inclination entails a specific psychological commitment directed toward founding a new enterprise, sectoral career intention

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represents a broader spectrum comprising intrapreneurship within established entities, project management, executive leadership, and sectoral commitment (Winand et al., 2023).

TABLE 17. f^2 Effect Sizes for Direct Paths in the Structural Model

Path	Target Variable	R ² Full Model	R ² Path Removed	f^2	Effect Size
STA → OPSA	OPSA	.138	.000	.160	Moderate
STA → IBPCA	IBPCA	.188	.000	.231	Moderate
STA → EI	EI	.274	.271	.004	Negligible
OPSA → EI	EI	.274	.204	.095	Small
IBPCA → EI	EI	.274	.209	.089	Small
STA → CP	CP	.169	.070	.120	Small
OPSA → CP	CP	.169	.169	.000	Negligible
IBPCA → CP	CP	.169	.170	.000	Negligible
STA → SCDI	SCDI	.200	.143	.072	Small
OPSA → SCDI	SCDI	.200	.191	.012	Negligible
IBPCA → SCDI	SCDI	.200	.189	.014	Negligible

NOTE: f^2 effect sizes were calculated based on changes in R^2 in reduced models from which the relevant path was removed. Cohen's approximate thresholds were used in the assessment: $f^2 \approx .02$ for small, $f^2 \approx .15$ for moderate, and $f^2 \approx .35$ for large effects. Values below .02 were interpreted as negligible. R^2 = proportion of explained variance.

f^2 effect sizes were calculated for the direct paths in the structural model. The findings indicate that the STA → OPSA and STA → IBPCA paths have moderate effect sizes. It was determined that the OPSA and IBPCA paths contributed at a small level to EI; in contrast, the STA → EI path remained at a negligible level. In terms of CP, the STA path was found to have a small effect size, while the OPSA and IBPCA paths contributed at a negligible level. For SCDI, the STA pathway exhibits a small effect size, while the f^2 values for the OPSA and IBPCA pathways are negligible. These results indicate that, within the model, STA's explanatory contribution to OPSA, IBPCA, and CP is particularly pronounced, whereas the relationships with EI and SCDI are supported by more limited effect sizes.

The relatively moderate explained variance (R^2) values for certain endogenous dependent variables in the model (e.g., 13.8% for OPSA and 16.9% for CP) align with the multi-dimensional and open-system nature of career development models. Entrepreneurial and career intentions are influenced by numerous external variance sources omitted from this model,

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including institutional university support, formal entrepreneurship curricula, self-efficacy beliefs, subjective norms, personality traits, social support networks, and macro-economic climates (Fang et al., 2024; Sandoval-Álvarez, 2023). Therefore, these reasonable effect sizes do not compromise the model's empirical validity; rather, they preserve structural integrity by pointing toward complementary parameters that explain the broader phenomenon.

The subgroup analyses showed small differences in Entrepreneurial Inclination and Strategic Career Development Intention according to prior entrepreneurship/career-planning education, whereas Career Planning did not differ significantly across education groups. Participants with and without a licensed-athlete background also did not differ significantly in the three focal outcomes. Given the small effect sizes and the observational design, these subgroup findings should be interpreted cautiously and should not be taken as evidence that prior training causes higher entrepreneurial or career-development intentions.

Policy and Practical Implications

These findings provide preliminary evidence for evaluating educational practices that could support strategic thinking, opportunity analysis, entrepreneurship, and career proactivity in higher education programs in sports science; however, the cross-sectional observational design conducted in a single country does not prove that the curriculum needs to be “radically restructured” or that specific reforms will directly lead to better outcomes. The fact that nearly half of the participants (45.9%) had received no prior formal training in entrepreneurship or career planning underscores an urgent empirical need for strategic support mechanisms to enhance sectoral awareness and employability within faculties of sports science. Accordingly, strategic thinking, opportunity analysis, and career proactivity could be integrated rather than delivered as isolated, fragmented courses; for example, they could be incorporated into project-based learning activities conducted collaboratively with industry stakeholders (e.g., sports clubs, federations, local municipalities, fitness chains, and sports tech startups). Educational curricula may move away from static frameworks that merely prepare students for traditional public or private sector roles, transitioning toward fostering cognitive flexibility to help them analyze emerging digital business models, performance analytics trends, recreational health

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ventures, and innovative service gaps in the sports industry. Career counseling services could move beyond a narrow focus on immediate post-graduation job placement. Instead, they could equip students with skills to effectively leverage professional digital networks (e.g., LinkedIn), build digital portfolios, access online proactive career resources, and simulate multi-scenario career paths. Ultimately, higher education policies could incentivize university-industry partnerships through formal financial and legal frameworks; by providing incubation centers, internship funds, and mentorship networks, institutions may convert the substantial proportion of undecided students (28.6%) into active entrepreneurial value creators. Graduates could enter the ecosystem not merely as job seekers, but as innovative actors who generate added value and employment across the sports industry.

Possible practical applications of the findings include: project-based sports entrepreneurship courses that address real-world challenges in the sports industry; university-based sports entrepreneurship and innovation incubator programs; field projects and internships conducted in partnership with sports federations, clubs, and sports technology companies; and structured mentorship programs that pair students with alumni and industry professionals. These recommendations are not interventions directly demonstrated by the current study but could be presented as practical options consistent with the findings that could be experimentally tested in the future.

Limitations and Future Research Directions

Given that the study sample comprised sports science students, the findings should be evaluated specifically within the context of sports science education, sports career planning, sports entrepreneurship, and sectoral career development. Alongside its empirical contributions, this study entails several methodological limitations that should be addressed in future research. First, because the research utilized a cross-sectional design, the mediated pathways tested in the SEM model cannot be interpreted as definitive temporal or causal relationships. Because variables were measured at a single point in time, the possibility of reverse causality—such as proactive career behaviors opening new empirical horizons that enhance an individual's strategic thinking capacity over time—cannot be ruled out. Indeed, cyclical and reciprocal

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relationships between career wisdom and proactivity have been established through longitudinal research (Xu, 2026). To establish temporal causality among variables, future studies should employ longitudinal designs incorporating at least three measurement waves or experimental intervention protocols. Second, reliance on self-report data introduces potential risks of common method bias and social desirability. The division of the data set into independent subsamples for EFA and CFA should not be regarded as a procedure that reduces common-method bias; this approach tests the replicability of the factor structure but does not eliminate common-method variance arising from data collected from the same participant using the same measurement form at the same time. Future research incorporating multi-source data—such as mentor evaluations, concrete project outputs, internship performance indexes, and objective behavioral opportunity-recognition tasks—will enhance empirical robustness. Furthermore, testing the measurement invariance of the six-factor structure across demographic subgroups (e.g., university type, grade level, and licensed athletic background) represents an empirical necessity. Finally, this study was limited to a sample of sports science students in Türkiye. The institutional maturity of the sports industry, state-level entrepreneurial incentives, and graduate employment policies vary substantially across nations. Given the decisive influence of national culture and macro-economic dynamics in shaping entrepreneurial intentions (González-Serrano et al., 2021, 2023), re-testing this structural model across different socio-cultural and geographical ecosystems via cross-cultural designs will contribute significantly to the literature. Despite these limitations, utilizing a large and qualified sample of 905 participants alongside rigorous methodological validation steps renders the study's findings a robust reference point for sports science literature.

Due to the online sampling framework, there is a potential for nonresponse bias. The fact that all variables were measured via self-report increases the risk of social desirability and common method variance. The fact that the sample is limited to members of an online platform restricts the generalizability of the results to all sports science students in Türkiye. Furthermore, since entrepreneurial and career orientations may be influenced by cultural and institutional contexts, the findings must be retested in different countries and types of institutions. Future

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studies should also examine measurement invariance across key subgroups, including gender and licensed-athlete status.

Conclusion

The findings of the structural equation model indicate positive and significant relationships between strategic thinking ability (STA) and opportunity perception and strategic awareness (OPSA), as well as innovative behavior/proactive career attitude (IBPCA). The direct path between STA and entrepreneurial inclination (EI) is not significant; however, significant indirect relationships via OPSA and IBPCA were observed. While a significant direct relationship was found between STA and career planning (CP), the indirect paths leading to CP are not significant. For SCDI, both direct and some indirect relationships are significant. Due to the cross-sectional design, these results should not be interpreted as evidence of causal mediation or temporal mechanisms; they should be evaluated as direct and indirect statistical relationships within the proposed model.

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Appendix 1. Final Scale Items

Item Code	Item Text	Reverse-Coded
STA01	Spor sektöründeki gelişmeleri gelecekteki mesleki hedeflerim açısından değerlendirebilirim.	No
STA02	Bir hedefe ulaşmak için birden fazla alternatif yol planlayabilirim.	No
STA03	Karar verirken yalnızca bugünü değil, gelecekteki sonuçları da dikkate alırım.	No
STA04	Spor alanındaki fırsatları, tehditleri ve riskleri birlikte değerlendirmeye çalışırım.	No
STA05	Bir sorunla karşılaştığımda önce durumu analiz eder, sonra çözüm yolu belirlerim.	No
STA06	Spor organizasyonlarında kaynakların planlı kullanılması gerektiğini düşünürüm.	No
STA07	Gelecekte başarılı olmak için stratejik düşünme becerisinin gerekli olduğuna inanıyorum.	No
STA08	Değişen koşullara göre planlarımı yeniden düzenleyebilirim.	No
STA09	Uzun vadeli plan yapmanın öğrencilik döneminde gerekli olmadığını düşünüyorum.	Yes
STA10	Spor alanındaki gelişmeleri takip etmek kariyerim açısından önemli değildir.	Yes
STA11	Hedeflerime ulaşmak için sistemli düşünmek yerine çoğu zaman anlık kararlar alırım.	Yes
STA12	Stratejik düşünme becerisinin spor bilimleri öğrencileri için mesleki avantaj sağlayacağını düşünüyorum.	No
OPSA01	Spor sektöründeki yeni iş alanlarını ve mesleki fırsatları fark etmeye çalışırım.	No
OPSA02	Spor teknolojileri, sağlıklı yaşam, rekreasyon ve performans alanlarının yeni kariyer fırsatları oluşturduğunu düşünüyorum.	No
OPSA03	Çevremdeki ihtiyaçları spor alanında yeni bir hizmet veya iş fikrine dönüştürebileceğimi düşünürüm.	No
OPSA04	Spor sektöründeki ekonomik, sosyal ve teknolojik değişimleri takip etmenin önemli olduğuna inanıyorum.	No
OPSA05	Bir fırsatı değerlendirirken olası riskleri de dikkate almaya çalışırım.	No
OPSA06	Spor alanında başarılı olmak için yalnızca diploma yeterli değildir; fırsatları okuyabilmek gerekir.	No
OPSA07	Spor sektöründe yeni fırsatlar aramak yerine mevcut seçeneklerle yetinmek daha doğrudur.	Yes
OPSA08	Gelecekteki kariyer fırsatlarını analiz etmek için özel bir çaba göstermem.	Yes
EI01	Gelecekte spor alanında kendi işimi veya girişimimi kurma fikri beni motive eder.	No
EI02	Spor sektöründe yenilikçi bir hizmet, organizasyon veya işletme modeli geliştirebileceğimi düşünüyorum.	No
EI03	Riskleri hesaplayarak yeni bir iş fikrini hayata geçirmeye istekli olurum.	No

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Item Code	Item Text	Reverse-Coded
EI04	Spor girişimciliğinin mezuniyet sonrası önemli bir kariyer alternatifi olduğunu düşünüyorum.	No
EI05	Yeni fikirler üretmek ve bunları uygulamaya dönüştürmek beni heyecanlandırır.	No
EI06	Başarısızlık ihtimali olsa bile iyi planlanmış bir girişimi denemeye açık olurum.	No
EI07	Spor alanında iş kurmak için sektör bilgisi, stratejik planlama ve ağ kurma becerisinin önemli olduğunu düşünüyorum.	No
EI08	Girişimcilik becerilerimi geliştirmek için eğitim, mentorluk veya proje çalışmalarına katılmak isterim.	No
EI09	Kendi işimi kurmak bana fazla riskli ve gereksiz görünmektedir.	Yes
EI10	Girişimcilik benim kişilik özelliklerime uygun değildir.	Yes
EI11	Spor sektöründe yeni iş fikirlerinin uygulanabilir olmadığını düşünüyorum.	Yes
EI12	Girişimcilik yerine yalnızca mevcut iş ilanlarına yönelmenin daha doğru olduğunu düşünüyorum.	Yes
IBPCA01	Spor alanındaki yenilikleri öğrenmek ve uygulamak için istekliyim.	No
IBPCA02	Mesleki gelişimim için yeni beceriler kazanmaya çalışırım.	No
IBPCA03	Kariyerimde karşılaşılabileceğim sorunlara önceden hazırlık yapmaya önem veririm.	No
IBPCA04	Fırsatlar ortaya çıkmadan önce kendimi geliştirmek gerektiğini düşünürüm.	No
IBPCA05	Spor sektöründeki değişimlere uyum sağlamak için aktif çaba gösteririm.	No
IBPCA06	Yeni projelerde sorumluluk almaktan çekinmem.	No
IBPCA07	Dijitalleşme, girişimcilik ve stratejik yönetim konularının spor kariyerim için önemli olduğunu düşünüyorum.	No
IBPCA08	Kariyerimde fark yaratmak için yalnızca ders başarısının yeterli olmayacağını düşünüyorum.	No
IBPCA09	Yeni beceriler öğrenmek için ekstra çaba göstermeyi gerekli bulmuyorum.	Yes
IBPCA10	Kariyerimle ilgili gelişmeleri takip etmek yerine mezuniyetten sonra düşünmeyi tercih ederim.	Yes
CP01	Mezuniyet sonrası hangi alanda çalışmak istediğime ilişkin hedefler oluşturmaya çalışırım.	No
CP02	Kariyer hedeflerime ulaşmak için hangi becerilere ihtiyaç duyduğumu değerlendirebilirim.	No
CP03	Spor sektöründe çalışmak istediğim alanlara yönelik bilgi toplamaya çalışırım.	No
CP04	Kariyer planı yapmanın öğrencilik döneminde önemli olduğunu düşünüyorum.	No
CP05	Mesleki hedeflerime ulaşmak için kısa, orta ve uzun vadeli planlar yapmaya çalışırım.	No
CP06	Staj, gönüllülük, proje ve saha deneyimlerinin kariyer gelişimime katkı sağlayacağını düşünüyorum.	No
CP07	Kariyerim için güçlü ve zayıf yönlerimi değerlendirmeye çalışırım.	No

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Item Code	Item Text	Reverse-Coded
CP08	Kariyer hedeflerimi belirlerken spor sektöründeki değişimleri dikkate alırım.	No
CP09	Kariyer planı yapmak bana gereksiz gelmektedir.	Yes
CP10	Mezuniyet sonrası ne yapacağımı şimdiden planlamanın önemli olmadığını düşünüyorum.	Yes
CP11	Kariyer hedeflerim konusunda çoğu zaman belirsizlik yaşamaktayım.	Yes
CP12	Spor Bilimleri alanında aldığım eğitimin kariyerime nasıl katkı sağlayacağını değerlendirmeye çalışırım.	No
SCDI01	Kariyerimi spor sektöründeki değişimlere uyum sağlayacak biçimde geliştirmek isterim.	No
SCDI02	Stratejik düşünme becerilerimi kariyer gelişimimde aktif olarak kullanmayı hedefliyorum.	No
SCDI03	Spor alanında girişimci veya yenilikçi projelerde yer almak isterim.	No
SCDI04	Mesleki hedeflerime ulaşmak için planlı ve sistemli hareket etmeye çalışırım.	No
SCDI05	Gelecekte spor sektöründe fark yaratacak bir kariyer oluşturmak isterim.	No
SCDI06	Spor girişimciliği, spor yönetimi veya spor teknolojileri alanlarında uzmanlaşmayı düşünebilirim.	No
SCDI07	Kariyer gelişimim için eğitimlere, sertifika programlarına ve uygulamalı projelere katılmak isterim.	No
SCDI08	Mezuniyet sonrası yalnızca rastlantısal iş fırsatlarına bağlı kalmak istemem.	No
SCDI09	Kariyerimi stratejik biçimde geliştirmeye ihtiyaç duymadığımı düşünüyorum.	Yes
SCDI10	Spor sektöründe uzun vadeli kariyer hedefi oluşturmanın gerekli olmadığını düşünüyorum.	Yes

NOTE. STA = Strategic Thinking Ability; OPSA = Opportunity Perception and Strategic Awareness; EI = Entrepreneurial Inclination; IBPCA = Innovative Behavior and Proactive Career Attitude; CP = Career Planning; SCDI = Strategic Career Development Intention in the Sports Industry

Appendix 2. Item-Level Standardized Factor Loadings for Confirmatory Factor Analysis

Subscale	Item	λ	SE	95% CI
STA	STA01	.715	.027	.662–.767
STA	STA02	.622	.033	.557–.687
STA	STA03	.700	.026	.649–.751
STA	STA04	.673	.028	.618–.727
STA	STA05	.673	.027	.620–.727
STA	STA06	.683	.028	.628–.738
STA	STA07	.664	.030	.605–.723
STA	STA08	.665	.028	.610–.719
STA	STA09	.585	.036	.515–.655
STA	STA10	.586	.034	.521–.652



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Subscale	Item	λ	SE	95% CI
STA	STA11	.646	.030	.586–.705
STA	STA12	.630	.031	.569–.691
OPSA	OPSA01	.652	.031	.592–.712
OPSA	OPSA02	.703	.028	.648–.758
OPSA	OPSA03	.655	.032	.592–.719
OPSA	OPSA04	.657	.032	.594–.720
OPSA	OPSA05	.699	.027	.646–.752
OPSA	OPSA06	.689	.030	.630–.747
OPSA	OPSA07	.627	.032	.564–.690
OPSA	OPSA08	.640	.032	.577–.703
EI	EI01	.784	.019	.748–.821
EI	EI02	.718	.024	.672–.765
EI	EI03	.753	.023	.709–.798
EI	EI04	.710	.025	.661–.758
EI	EI05	.754	.021	.712–.796
EI	EI06	.723	.026	.671–.775
EI	EI07	.728	.024	.681–.775
EI	EI08	.718	.027	.666–.770
EI	EI09	.689	.026	.639–.739
EI	EI10	.676	.029	.619–.733
EI	EI11	.690	.026	.639–.741
EI	EI12	.702	.026	.651–.753
IBPCA	IBPCA01	.720	.024	.673–.768
IBPCA	IBPCA02	.665	.028	.609–.720
IBPCA	IBPCA03	.689	.028	.634–.744
IBPCA	IBPCA04	.710	.027	.658–.762
IBPCA	IBPCA05	.692	.027	.639–.744
IBPCA	IBPCA06	.701	.026	.650–.752
IBPCA	IBPCA07	.672	.029	.615–.729
IBPCA	IBPCA08	.692	.028	.637–.748
IBPCA	IBPCA09	.664	.028	.609–.718
IBPCA	IBPCA10	.651	.031	.590–.711
CP	CP01	.662	.031	.601–.723
CP	CP02	.640	.031	.580–.700
CP	CP03	.675	.027	.623–.727
CP	CP04	.689	.028	.635–.743
CP	CP05	.722	.025	.673–.771



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Subscale	Item	λ	SE	95% CI
CP	CP06	.670	.028	.614–.725
CP	CP07	.692	.026	.640–.743
CP	CP08	.660	.030	.602–.718
CP	CP09	.608	.033	.544–.672
CP	CP10	.651	.032	.588–.713
CP	CP11	.632	.032	.570–.694
CP	CP12	.719	.026	.668–.769
SCDI	SCDI01	.707	.028	.651–.762
SCDI	SCDI02	.707	.026	.657–.757
SCDI	SCDI03	.702	.028	.647–.757
SCDI	SCDI04	.674	.029	.617–.731
SCDI	SCDI05	.697	.028	.643–.751
SCDI	SCDI06	.746	.023	.701–.790
SCDI	SCDI07	.694	.027	.640–.748
SCDI	SCDI08	.697	.028	.643–.752
SCDI	SCDI09	.668	.028	.613–.723
SCDI	SCDI10	.693	.027	.640–.746

NOTE. λ = standardized factor loading; SE = standard error; CI = confidence interval; STA = Strategic Thinking Ability; OPSA = Opportunity Perception and Strategic Awareness; EI = Entrepreneurial Inclination; IBPCA = Innovative Behavior and Proactive Career Attitude; CP = Career Planning; SCDI = Strategic Career Development Intention in the Sports Industry.