

Psychological Network Analysis of Academic Life Satisfaction and Attitudes Toward Graduate Education in Sports Sciences

Spor Bilimleri Alanında Akademik Yaşam Doyumu ve Lisansüstü Eğitime Yönelik Tutumların Psikolojik Ağ Analizi

Selmani ABIŞ*, Abdullah ARISOY

*Correspondence:

Selmani Abiş
selmani.abis@gumushane.edu.tr

¹Dr. Öğretim Üyesi., Gümüşhane University / Faculty of Sport Sciences, Gümüşhane/Türkiye - Email: selmani.abis@gumushane.edu.tr / ORCID: <https://orcid.org/0000-0002-0322-518X>

²Dr., Süleyman Demirel University / Faculty of Sport Sciences, Isparta/Türkiye Email:abdullaharisoy@gmail.com / ORCID: <https://orcid.org/0000-0002-2193-7519>



<https://doi.org/10.5281/zenodo.23704021>

Received / Gönderim: 10.08.2026

Accepted / Kabul: 09.10.2026

Published / Yayın: 25.10.2026

Volume 3, Issue 3, October, 2026

Cilt 3, Sayı 3, Ekim, 2026

How to Cite This Article

APA 7

Abiş, S. & Arısoy, A. (2026). Psychological Network Analysis of Academic Life Satisfaction and Attitudes Toward Graduate Education in Sports Sciences. *International Journal of Health, Exercise, and Sport Sciences*, 3(3), 1145-1167

Vancouver

Abiş S. & Arısoy A. Psychological Network Analysis of Academic Life Satisfaction and Attitudes Toward Graduate Education in Sports Sciences. *International Journal of Health, Exercise, and Sport Sciences*. 2026;3(3). 1145-1167

Abstract

Background: Academic life satisfaction and attitudes toward graduate education are critical components of students' educational experiences; however, their complex, item-level interactions remain insufficiently addressed by aggregate total scores. This study examined the psychological network structure, node centrality, and cross-domain bridge elements connecting academic life satisfaction and attitudes toward graduate education among sport sciences graduate students. Methods: A cross-sectional design was conducted with 220 graduate students in sport sciences. Academic life satisfaction was measured using a 5-item scale, and attitudes toward graduate education were measured using a 13-item scale. All statistical analyses and network estimations were performed using R (version 4.6.1). A regularised partial correlation network (18 nodes) was estimated via the EBICglasso algorithm (sparsity = 0.490). Node centrality (strength, expected influence) and bridge centrality were computed. Edge-weight accuracy and centrality stability were evaluated using 1,000 bootstrap resamples. Results: Out of 153 possible connections, 78 non-zero edges were retained. The strongest positive conditional associations were identified between ALS3 (future employment utility) and ALS5 (positive career impact) ($w = .425$), as well as between GE1 (decision-making confidence) and GE2 (critical thinking skills) ($w = .423$). Regarding centrality, GE11 (support mechanisms) showed the highest strength centrality ($z = 1.697$), indicating that GE11 was the most strongly connected item in absolute terms. Crucially, ALS5 emerged as the primary structural bridge connecting the two domains (bridge strength = 0.256, bridge betweenness = 22), followed by ALS3 and ALS1. Network edge weights ($CS(edge) = .673$) and strength centrality ($CS(strength) = .750$) demonstrated robust stability. Conclusions: The findings show conditional associations between academic life satisfaction and attitudes toward graduate education at the item level. ALS5 showed the largest observed bridge strength connecting the two domains, whereas GE11 showed the highest strength centrality. ALS5 and GE11 may be considered candidate domains for prospective evaluation; the present cross-sectional network does not establish intervention effects.

Keywords: Academic Life Satisfaction, Sport Sciences, Graduate Education, Psychological Network Analysis, Bridge Centrality.

Öz

Amaç: Akademik yaşam doyumu ve lisansüstü eğitime yönelik tutumlar, öğrencilerin eğitim deneyimlerinin kritik bileşenleridir; ancak bunların madde düzeyindeki karmaşık etkileşimleri genel toplam puanlarla yeterince ortaya konulamamaktadır. Bu çalışma, spor bilimleri lisansüstü öğrencilerinin akademik yaşam doyumları ile lisansüstü eğitime yönelik tutumlarını birbirine bağlayan psikolojik ağ yapısını, düğüm merkeziliklerini ve alanlar arası köprü unsurlarını incelemiştir. Yöntem: Spor bilimlerinde öğrenim gören 220 lisansüstü öğrenci ile kesitsel bir araştırma yürütülmüştür. Akademik yaşam doyumu 5 maddelik bir ölçekle, lisansüstü eğitime yönelik tutumlar ise 13 maddelik bir ölçekle değerlendirilmiştir. Tüm istatistiksel analizler ve ağ modelleri R (sürüm 4.6.1) yazılımı kullanılarak gerçekleştirilmiştir. Düzeltilmiş kısmi korelasyon ağı (18 düğüm) EBICglasso algoritması ile tahmin edilmiştir (seyreklik = 0.490). Düğüm merkeziliği ve köprü merkeziliği değerleri hesaplanmıştır. Ağ yapısının kararlılığı ve doğruluğu 1.000 bootstrap yinelenmesiyle test edilmiştir. Bulgular: Olası 153 bağlantıdan 78'i sıfırdan farklı ilişki göstererek ağıda yer almıştır. En güçlü pozitif ilişkiler ALS3 ("gelecekte işe yararlık") ile ALS5 ("kariyere olumlu etki") ($w = .425$) ve GE1 (karar verme özgüveni) ile GE2 (eleştirel düşünme) ($w = .423$) arasında bulunmuştur. Merkezilik açısından, GE11 (destek mekanizmaları) en yüksek güç merkeziliğine ($z = 1.697$) sahip olup mutlak bağlantı ağırlıkları bakımından en güçlü bağlantılara sahip madde olmuştur. En önemli bulgu olarak, eğitimin gelecekteki kariyere katkısını temsil eden ALS5, iki alanı birbirine bağlayan ana yapısal köprü olarak öne çıkmıştır (köprü gücü = 0.256, köprü ara-değerliği = 22). Ağın kararlılık katsayıları yüksek düzeydedir ($CS(edge) = .673$; $CS(strength) = .750$). Sonuç: Bulgular, akademik yaşam doyumu ile lisansüstü eğitime yönelik tutumlar arasında madde düzeyinde koşullu ilişkiler bulunduğunu göstermektedir. ALS5, iki alanı birbirine bağlayan en yüksek gözlenen köprü gücüne sahipken GE11 en yüksek güç merkeziliğine sahip olmuştur. ALS5 ve GE11, ileriye dönük değerlendirmeler için aday alanlar olarak ele alınabilir; mevcut kesitsel ağ analizi müdahale etkilerini ortaya koymamaktadır.

Anahtar Sözcükler: Akademik Yaşam Doyumu, Spor Bilimleri, Lisansüstü Eğitim, Psikolojik Ağ Analizi, Köprü Merkezilik.

<https://www.ijoss.org/Archive/v3-i3/ijoss-Volume3-issue3-14.pdf>

INTRODUCTION

Graduate education constitutes a critical component of higher education systems because it enables individuals to advance beyond undergraduate-level learning, develop specialised expertise, and actively participate in scientific inquiry and knowledge production. In the field of sport sciences, graduate education plays an important role in preparing professionals and researchers who can integrate scientific knowledge with the practical demands of sport. However, participation in graduate education is not determined solely by career aspirations, institutional opportunities, or external circumstances. Students' experiences within their academic environments and the attitudes they develop toward graduate education may also shape how they perceive and engage with the graduate education process. Accordingly, understanding the psychological and educational factors associated with students' academic experiences and attitudes toward graduate education is important for evaluating the quality and effectiveness of graduate programs.

One of the important constructs reflecting students' experiences within higher education is academic life satisfaction. Academic life satisfaction refers to the degree to which individuals are satisfied with their academic experiences and the educational environment in which they participate. Rather than representing a single, unidimensional evaluation, academic life satisfaction encompasses students' subjective evaluations of various aspects of their academic lives, including the quality of education, relationships with faculty members, academic environment, institutional belonging, and overall academic experiences. Previous research has demonstrated that students' academic experiences and satisfaction are associated with broader psychological and educational outcomes. Students' sense of belonging and perceived fit between the individual and the academic environment have been shown to be systematically associated with academic satisfaction (Duru & Balkis, 2015). Similarly, research has highlighted associations between students' procrastination tendencies, academic life satisfaction, and emotional well-being, suggesting that students' evaluations of their academic lives are embedded within a broader network of psychological and academic experiences (Balkis & Duru, 2016).

Academic life satisfaction may also be connected to students' perceptions of their future educational experiences. Students who evaluate their academic environment positively may develop more favourable perceptions of academic development, scientific engagement, and continued education. Conversely, dissatisfaction with the academic environment may coexist with less favourable evaluations of educational experiences and future academic engagement. However, these relationships may not be adequately represented by a simple linear association between overall academic satisfaction and attitudes toward further education. Academic life satisfaction itself consists of multiple interconnected experiences, while attitudes toward graduate education encompass different cognitive, affective, and behavioural components. Examining these constructs solely through total scores may therefore obscure the specific components through which they are connected.

The relationship between students' academic experiences and their educational attitudes can also be considered within the framework of Social Cognitive Career Theory. Lent and Brown (2008) emphasised that individuals' satisfaction with their academic and professional lives is related to self-efficacy beliefs, outcome expectations, goals, and environmental conditions. From this perspective, students' evaluations of their current academic environments may be connected to their expectations and attitudes regarding future educational and professional development. Nevertheless, the relationship between these constructs is unlikely to be adequately represented by a single aggregate association. Different aspects of academic life satisfaction may have different relationships with specific aspects of attitudes toward graduate education. Identifying these relationships requires an analytical approach capable of examining the interconnections among individual components of psychological and educational constructs.

Graduate education itself represents a structured process through which individuals acquire advanced knowledge, develop specialised competencies, and engage in scientific research. It includes educational, instructional, scientific, and practical activities designed to prepare individuals for advanced professional and academic roles (Varış, 1984; Sevinç, 2001). Yılmaz (2008) similarly defines graduate education as an educational process through which individuals acquire deeper knowledge and competencies in a particular field beyond undergraduate education. One of the fundamental purposes of graduate education is to prepare researchers and academics who can generate, critically evaluate, and apply knowledge, thereby contributing to the development of higher education and society (Karaman & Bakırcı, 2010; Ünal & İlter, 2010). Within this context, students' attitudes toward graduate education are particularly important because attitudes encompass cognitive, affective, and behavioural tendencies toward a given object or process. Classical theories of attitude and behaviour suggest that attitudes are closely related to behavioural intentions and subsequent engagement in a behaviour (Fishbein & Ajzen, 1975; Ajzen, 1991). Thus, understanding the specific components underlying students' attitudes toward graduate education may provide important information about their experiences and engagement within graduate programs.

Previous studies have examined academic satisfaction and attitudes toward graduate education largely as separate constructs. Academic satisfaction has been investigated in different student populations and educational contexts (Duffy et al., 2015; Balkis, 2013; Duru & Balkis, 2015; Fırıncı Kodaz, 2016; Pepe, 2021; Koçyiğit, 2023), whereas attitudes toward graduate education have been examined across different academic disciplines and student groups (Ünal & İlter, 2010; İlhan et al., 2012; İlter, 2020). Although these studies provide valuable evidence regarding the individual characteristics and correlates of the two constructs, the literature remains limited in terms of examining how the specific components of academic life satisfaction and attitudes toward graduate education are interconnected. This limitation is particularly apparent among graduate students in sport sciences, whose educational experiences combine academic learning, scientific research, professional preparation, and, in many cases, practical engagement with sport.

Psychological Network Analysis as a Systemic Approach

A conventional variable-centred approach generally evaluates the relationship between academic life satisfaction and attitudes toward graduate education through correlations, regression coefficients, or comparisons of aggregate scores. Although such approaches are useful for determining whether constructs are statistically associated, they may provide limited information about how the individual components of these multidimensional constructs are interconnected. Psychological network analysis offers a complementary systemic framework for addressing this limitation by conceptualising psychological and educational phenomena as systems of interacting components rather than as isolated variables or predefined linear pathways (Epskamp & Fried, 2018).

Within a network model, individual variables or questionnaire items are represented as nodes, whereas the statistical associations between nodes, conditional on the other elements of the network, are represented as edges. Consequently, the network provides an empirical representation of the interconnected structure of the phenomenon under investigation. Rather than asking only whether academic life satisfaction is associated with attitudes toward graduate education, a network perspective makes it possible to examine which specific aspects of academic life satisfaction are connected to which specific aspects of attitudes toward graduate education. This distinction is particularly relevant when studying complex educational experiences because different components of students' academic lives may not contribute equally to the overall pattern of relationships.

One of the principal advantages of psychological network analysis is its ability to visually and analytically represent complex patterns of interrelationships that may be obscured when constructs are reduced to total scores. Network visualisation provides an interpretable representation of the relationships among individual components and allows researchers to examine the organisation and density of connections within the system (Epskamp et al., 2018). In the present study, this approach enables the simultaneous examination of the individual components of academic life satisfaction and attitudes toward graduate education, thereby providing a more detailed representation of graduate students' academic experiences.

Centrality measures provide another important component of network analysis. Measures such as strength, closeness, betweenness, and expected influence can be used to identify nodes that occupy relatively prominent positions within a network (Hevey, 2018). Importantly, centrality should not be interpreted as evidence that a particular component causally influences other components, particularly when the network is estimated from cross-sectional data. Instead, centrality indices describe each node's relative structural position within the estimated network. Identifying highly connected components may therefore help clarify which aspects of academic life satisfaction or attitudes toward graduate education are most strongly embedded within the overall system.

An additional advantage of the network approach is its capacity to examine relationships between theoretically distinct domains. When multiple constructs are included in the same network, bridge-related measures can be used to identify nodes that connect different conceptual communities. In the present study, academic life

satisfaction and attitudes toward graduate education can be considered two related but conceptually distinguishable domains. Examining bridge connections may therefore provide insight into which specific components of academic life satisfaction are most closely connected to components of attitudes toward graduate education, and vice versa. Such information may be especially valuable for understanding how students' evaluations of their current academic experiences are interconnected with their attitudes toward graduate education.

Network analysis can thus provide information about the structural organisation of psychological and educational constructs that cannot be obtained from conventional regression models alone. Whereas regression analysis typically evaluates whether one variable statistically predicts another while controlling for specified variables, network analysis focuses on the pattern of conditional associations among multiple components simultaneously. Thus, the network perspective does not replace conventional statistical approaches but provides a complementary framework for investigating the internal organisation and interconnections of complex psychological and educational constructs (Epskamp & Fried, 2018).

This systemic perspective is particularly relevant to graduate education in sport sciences. Graduate students' academic experiences may emerge from the interaction of multiple factors, including perceptions of educational quality, relationships with faculty members, academic environment, institutional belonging, and expectations concerning future education and professional development. Similarly, attitudes toward graduate education may comprise several interconnected cognitive, affective, and behavioural components. Treating these components as an interconnected system may therefore provide a more comprehensive understanding of students' graduate education experiences than examining the constructs exclusively through their aggregate scores.

Despite the growing application of network-based approaches in psychological and behavioural research, research examining academic life satisfaction and attitudes toward graduate education through a network perspective appears to be limited. There is a lack of evidence regarding the structure of the relationships between individual components of academic life satisfaction and specific attitudes toward graduate education among graduate students in sport sciences. Addressing this gap may contribute to a more nuanced understanding of how students' academic experiences and educational attitudes are organised and interconnected.

Therefore, the present study aimed to examine the network structure of academic life satisfaction and attitudes toward graduate education among graduate students in sport sciences. Specifically, the study examined the conditional associations among the individual items of the two constructs, identified relatively central nodes within the network, and investigated the connections that bridge academic life satisfaction and attitudes toward graduate education. By adopting a systemic network perspective, the study moves beyond the question of whether academic life satisfaction and attitudes toward graduate education are associated and instead examines how their individual components are organised and interconnected within the same psychological network.

Research Questions

Based on the theoretical framework and the research gap identified in the literature, the present study addressed the following research questions:

RQ1. What is the network structure of academic life satisfaction and attitudes toward graduate education among graduate students in sport sciences?

RQ2. Which items of academic life satisfaction and attitudes toward graduate education occupy the most central positions within the estimated network?

RQ3. Which items function as the most prominent bridge nodes connecting the academic life satisfaction and attitudes toward graduate education communities?

RQ4. What are the strongest conditional associations among items related to academic life satisfaction and attitudes toward graduate education?

RQ5. To what extent are the estimated edge weights and centrality estimates stable and accurate?

These research questions were examined using a psychological network analysis framework. Because the study was based on cross-sectional data, network associations were interpreted as conditional statistical associations rather than evidence of causal relationships.

METHOD

Research Design

This study employed a quantitative, cross-sectional research design to examine the interconnected structure of academic life satisfaction and attitudes toward graduate education among graduate students in sport sciences. Rather than examining the two constructs solely through their total scores, the study adopted a psychological network analysis approach to investigate the relationships among their individual items.

Psychological network analysis conceptualises psychological constructs as systems of interconnected components. Within this framework, individual questionnaire items are represented as nodes, whereas statistical associations between nodes, conditional on the remaining nodes in the network, are represented as edges (Epskamp & Fried, 2018). Accordingly, the present study aimed to identify the structural organisation of academic life satisfaction and attitudes toward graduate education, determine relatively central nodes, and examine the components connecting the two conceptual domains.

Because the study was based on cross-sectional data, network edges and centrality indices were interpreted as statistical and structural associations rather than causal relationships.

Participants and Sampling

Participants were recruited using a convenience sampling method. Although convenience sampling provides practical advantages in terms of time and resources, it may limit the generalizability of findings to the broader population (Tabachnick & Fidell, 2019).

The target population consisted of individuals enrolled in graduate programs in sport sciences. Participants were eligible if they were currently enrolled in a graduate program in sport sciences and agreed to participate voluntarily in the study.

Data were collected using an online questionnaire administered through Google Forms. The survey link was distributed through social media channels and university student groups with the permission and support of the relevant universities. The introductory text of the questionnaire informed participants about the research topic and the data collection instruments and stated that participation was voluntary.

A total of 234 individuals initially participated in the study. During data screening, 14 participants were excluded because of incomplete responses or failure to meet the inclusion criteria. Consequently, the final analytical sample consisted of 220 graduate students.

Sample Characteristics

As shown in Table 1, 69 participants (31.4%) were between 23 and 26 years of age, 76 (34.5%) were between 27 and 30 years, 35 (15.9%) were between 31 and 34 years, 22 (10.0%) were between 35 and 38 years, and 18 (8.2%) were aged 39 years or older.

Regarding gender, 140 participants (63.6%) were male, and 80 (36.4%) were female. Most participants were enrolled in master's programs ($n = 169$, 76.8%), whereas 51 participants (23.2%) were doctoral students.

With respect to graduate programs, 113 participants (51.4%) were enrolled in Physical Education and Sports Teaching, 56 (25.5%) in Coaching Education, and 51 (23.2%) in Sports Management.

Table 1. Demographic Characteristics of the Participants (N = 220)

Characteristic	Category	n	%
Age	23–26 years	69	31.4
	27–30 years	76	34.5
	31–34 years	35	15.9
	35–38 years	22	10.0
	≥39 years	18	8.2
Gender	Male	140	63.6
	Female	80	36.4
Program	Master's degree	169	76.8
	Doctorate	51	23.2
Graduate Program	Physical Education and Sports Teaching	113	51.4
	Coaching Education	56	25.5
	Sports Management	51	23.2

Measures

Academic Life Satisfaction Scale

Academic Life Satisfaction was assessed using the Academic Life Satisfaction Scale developed by Schmitt et al. (2008) and adapted into Turkish by Balkis (2013). The scale consists of five items rated on a five-point Likert-type scale ranging from 1 (strongly

disagree) to 5 (strongly agree). Higher scores indicate higher levels of academic life satisfaction.

The original scale demonstrated good internal consistency (Cronbach's $\alpha = .81$), whereas the Turkish adaptation study reported a Cronbach's α of .86 (Balkis, 2013).

For the present network analysis, we treated the five items as separate nodes rather than aggregating them into a single total score. This enabled the examination of the specific relationships among the components of academic life satisfaction and their connections with attitudes toward graduate education.

Attitudes Toward Graduate Education Scale

We assessed attitudes toward graduate education using the Turkish adaptation of the Attitudes Toward Graduate Education Scale, originally developed by Ng et al. (2014) and adapted into Turkish by İlter (2019).

The original scale consists of 15 items rated on a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Four items (Items 8, 10, 12, and 13) are negatively worded and require reverse scoring. The original scale demonstrated good internal consistency (Cronbach's $\alpha = .87$).

Following the Turkish adaptation, the instrument was restructured into a 13-item version comprising three dimensions: Facilitating Roles, Professional Recognition, and Barriers. The Turkish version demonstrated acceptable internal consistency, with a Cronbach's α of .84 (İlter, 2019).

For the present study, the 13 individual items were retained as separate nodes in the network. Reverse-coded items were recoded before network estimation so that the direction of the item responses was consistent with their intended interpretation. Specifically, GE8, GE10, GE12, and GE13 were the reverse-coded items in the final 13-item version. Descriptive statistics reported in Table 3 were calculated from the raw item responses before reverse scoring; the reverse-scored values were used for network estimation.

Internal Consistency

Internal consistency was examined for descriptive and measurement-reporting purposes. Cronbach's alpha coefficients were calculated for the total scores of both instruments in the current sample.

The Academic Life Satisfaction Scale demonstrated high internal consistency ($\alpha = .95$), whereas the Attitudes Toward Graduate Education Scale demonstrated acceptable internal consistency ($\alpha = .74$).

Table 2. Internal Consistency of the Measurement Instruments

Scale	Number of Items	Cronbach's α
Academic Life Satisfaction Scale	5	.95
Attitudes Toward Graduate Education Scale	13	.74

Importantly, because the present study employed an item-level network approach, internal consistency coefficients were not used as indicators of network structure. Rather, they were reported to provide information regarding the internal consistency of the scale scores in the current sample.

Data Collection Procedure

The data were collected through an online questionnaire administered using Google Forms. The questionnaire consisted of three sections: (a) the personal information form, (b) the Academic Life Satisfaction Scale, and (c) the Attitudes Toward Graduate Education Scale.

The personal information form included age, gender, graduate education level, and graduate program. Participants were informed that participation was voluntary and that their responses would be evaluated anonymously for scientific purposes.

Following data collection, the dataset was screened for incomplete responses, eligibility criteria, and potential data-entry errors. Fourteen cases were excluded during the data-cleaning process, resulting in a final sample of 220 participants.

Data Analysis

All statistical analyses were performed using R (4.6.1). Descriptive statistics and preliminary psychometric analyses were conducted in R using the *bootnet*, *qgraph*, and *networktools* packages. Package version numbers were not retained in the available analysis record.

Data Screening and Descriptive Analysis

Before estimating the network, the data were examined for missing values, response errors, and outliers. Descriptive statistics were calculated for the individual questionnaire items, including means, standard deviations, skewness, and kurtosis.

Because the instruments use five-point Likert-type response categories, the distributions and measurement characteristics of the individual items were examined before network estimation. Rather than relying exclusively on the Kolmogorov–Smirnov test, which is highly sensitive to sample size, the distributional characteristics of the individual items were evaluated using descriptive indices and graphical inspection.

The sociodemographic characteristics of the participants were summarised using frequencies and percentages.

Preliminary Analysis and Data Screening

Missing data were addressed using the listwise deletion method, and subsequent analyses were conducted exclusively on complete cases. Because the questionnaire items were measured using five-point Likert-type response categories, the items were retained in their ordinal response format for network estimation rather than being treated as continuous variables. To prevent artificial inflation of edge weights and to eliminate potential multicollinearity issues resulting from part-whole redundancies, the raw total scores of the scales (ALS_Total and GE_Total columns) were strictly excluded from the network estimation matrix. Consequently, the network model was estimated based only on the individual scale items (18 distinct columns).

Network Estimation

The psychological network structure representing the interactions between the Academic Satisfaction items (5 nodes for ALS) and Attitudes Toward Graduate

Education items (13 nodes for GE), totalling 18 nodes, was estimated using the Extended Bayesian Information Criterion with Regularised Graphical Least Absolute Shrinkage and Selection Operator (EBICglasso) algorithm (Foygel & Drton, 2010). The correlation matrix was estimated using the `qgraph::cor_auto()` procedure, which automatically identifies ordinal variables and computes polychoric correlations for ordinal–ordinal item pairs. Accordingly, the network was estimated from an ordinal correlation matrix rather than Pearson correlations. The EBICglasso procedure was applied with an EBIC tuning parameter of $\gamma = 0.50$. Small edge estimates were shrunk toward, and in some cases to, zero, yielding a sparse network; this regularization does not imply that retained edges are necessarily true or stable conditional dependencies. This estimation was performed utilizing the `bootnet` (Epskamp et al., 2018) and `qgraph` (Epskamp et al., 2012) packages in RStudio. The network topology was visualized using the "Spring" layout algorithm, a force-directed layout based on the Fruchterman-Reingold algorithm that places closely related nodes near each other.

Bridge Centrality Analysis

To identify nodes that connect the Academic Satisfaction and Attitudes Toward Graduate Education communities, a Bridge Centrality Analysis was conducted using the `networktools` package (Jones et al., 2018). Within this framework, Bridge Strength coefficients were calculated for each node. Bridge strength represents the sum of the absolute weights of all direct edges connecting a specific node to all nodes belonging to the opposing community. Nodes with higher bridge strength were interpreted as structurally prominent bridge nodes reflecting greater cross-community connectivity.

Network Stability and Accuracy Analysis

To assess the precision of the estimated edge weights and the stability of edge-weight and strength-centrality estimates against sample variations, two distinct bootstrap simulation procedures were conducted (Epskamp et al., 2018):

Stability Test: A Case-Dropping Bootstrap analysis with 1,000 iterations was applied to compute the Correlation Stability Coefficient (CS-Coefficient). In psychometric network literature, a CS-coefficient above 0.25 is deemed acceptable, whereas a coefficient exceeding 0.50 indicates excellent network stability and reproducibility.

Accuracy Test: To assess the accuracy and stability of the estimated edge weights, a non-parametric percentile bootstrap procedure with $B = 1000$ resamples was conducted using the `bootnet` package (Epskamp et al., 2018). The 95% confidence intervals (95% CI) were determined using the 2.5 and 97.5 percentiles of the bootstrapped edge weight distribution as the lower and upper bounds, respectively.

FINDINGS

Table 3. Descriptive Statistics of Network Nodes

Variable	Category / Node	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
ALS1	All in all, I am satisfied with the education I can get in this school	4.00	0.99	-0.96	0.54
ALS2	I'm satisfied with the intelligence of my teachers here	4.13	0.98	-0.96	0.15
ALS3	I'm satisfied with the extent to which my education will be useful for getting future employment	3.98	1.07	-1.00	0.48
ALS4	I'm happy with the amount I learn in my classes	3.97	1.07	-0.89	-0.03
ALS5	I'm satisfied with the extent to which attending this school will have a positive effect on my future career	4.10	0.97	-1.07	0.74
GE1	Graduate education increases self-confidence in decision-making.	4.27	0.88	-1.44	2.35
GE2	Graduate education supports the development of critical thinking skills.	4.35	0.72	-1.22	1.58
GE3	Graduate education encourages behaviours that support and demonstrate academic autonomy.	4.22	0.88	-1.16	1.15
GE4	Graduate education provides experiences that enhance job satisfaction.	4.14	0.94	-1.17	1.35
GE5	Graduate education helps in acquiring professional knowledge and skills in a specific field.	4.31	0.78	-1.08	1.18
GE6	Graduate study in a field aids career development by increasing career awareness.	4.29	0.81	-1.31	2.20
GE7	For an individual pursuing graduate studies to be recognized as an expert in their field, they must possess graduate-level competencies specific to that field and exhibit behaviours consistent with those competencies.	4.34	0.82	-1.25	1.39
GE8	There is no difference in field-specific practices and experiences between an individual with graduate-level competencies in a field and one without such competencies.	2.25	1.38	-0.82	-0.57
GE9	An individual pursuing graduate studies must possess graduate-level competencies and experiences related to their field of work before obtaining the corresponding title.	4.18	0.87	-0.94	0.57
GE10	Balancing work, professional duties, and social life while pursuing graduate education is difficult.	3.92	1.12	-0.93	0.07
GE11	For graduate education to be successful, support must be provided to the individuals pursuing it (e.g., time, financial aid, advisor guidance, support from a spouse and/or employer, etc.).	4.40	0.76	-1.43	2.43
GE12	Pursuing graduate studies while working at an institution is stressful.	4.08	1.03	-1.15	0.91
GE13	Graduate education is costly.	3.65	1.16	-0.47	-0.65

$N = 220$. M = mean; SD = standard deviation; ALS = Academic Life Satisfaction; GE = Attitudes Toward Graduate Education. Item-level values are based on the five-point Likert response scale (1–5).

A psychological network analysis was conducted to examine the conditional associations among academic life satisfaction and attitudes toward graduate education at the item level. The estimated network consisted of 18 nodes, including five academic life satisfaction items (ALS1–ALS5) and 13 attitudes toward graduate education items (GE1–GE13). Of the 153 possible pairwise edges, 78 were non-zero, corresponding to a sparsity value of 0.490. Thus, approximately half of the possible conditional associations were retained in the regularised network. The resulting network structure is presented in Figure 1.

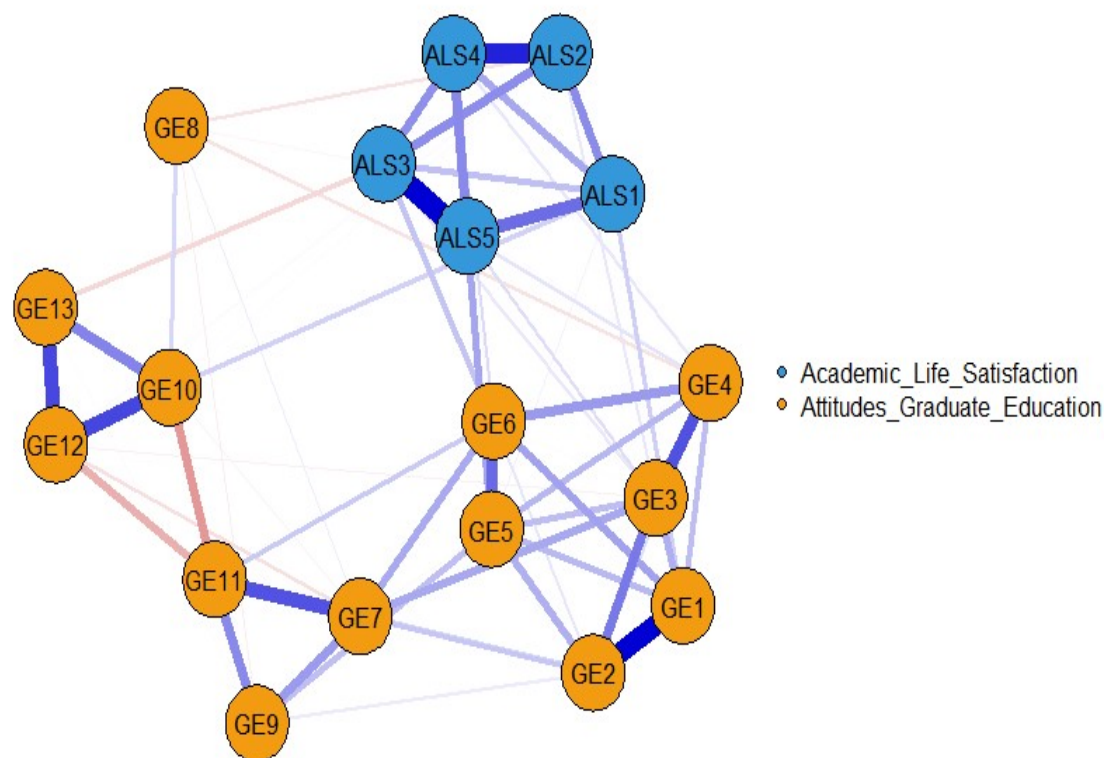


Figure 1. Psychological Network of Academic Life Satisfaction and Attitudes Toward Graduate Education

Network Structure and Edge Weights

The network contained several relatively strong positive associations within and across the two conceptual domains. The strongest estimated edge was observed between ALS3 and ALS5 ($w = .425$, 95% CI [.304, .546]), followed closely by the association between GE1 and GE2 ($w = .423$, 95% CI [.301, .545]). Other prominent edges included ALS2–ALS4 ($w = .368$, 95% CI [.216, .521]), GE10–GE12 ($w = .309$, 95% CI [.164, .454]), and GE12–GE13 ($w = .304$, 95% CI [.173, .435]). Additional relatively strong associations were observed for GE3–GE4 ($w = .288$, 95% CI [.126, .451]), GE7–GE11 ($w = .288$, 95% CI [.127, .449]), GE5–GE6 ($w = .248$, 95% CI [.084, .411]), and ALS1–ALS5 ($w = .243$, 95% CI [.127, .360]) (Table 4).

Table 4. Strongest Edges and Bootstrap Confidence Intervals in the Psychological Network

Rank	Edge	Edge weight (w)	95% CI
1	ALS3–ALS5	.425	[.304, .546]
2	GE1–GE2	.423	[.301, .545]
3	ALS2–ALS4	.368	[.216, .521]
4	GE10–GE12	.309	[.164, .454]
5	GE12–GE13	.304	[.173, .435]
6	GE3–GE4	.288	[.126, .451]
7	GE7–GE11	.288	[.127, .449]
8	GE5–GE6	.248	[.084, .411]
9	ALS1–ALS5	.243	[.127, .360]
10	GE2–GE3	.223	[.084, .362]

w = estimated edge weight; CI = 95% bootstrap confidence interval.

The complete network, including positive and negative conditional associations, is illustrated in Figure 1.

Centrality of Individual Nodes

Node centrality indices were examined using strength, expected influence, betweenness, and closeness. The centrality profiles are displayed in Figure 2, with standardised centrality estimates presented in Table 5.

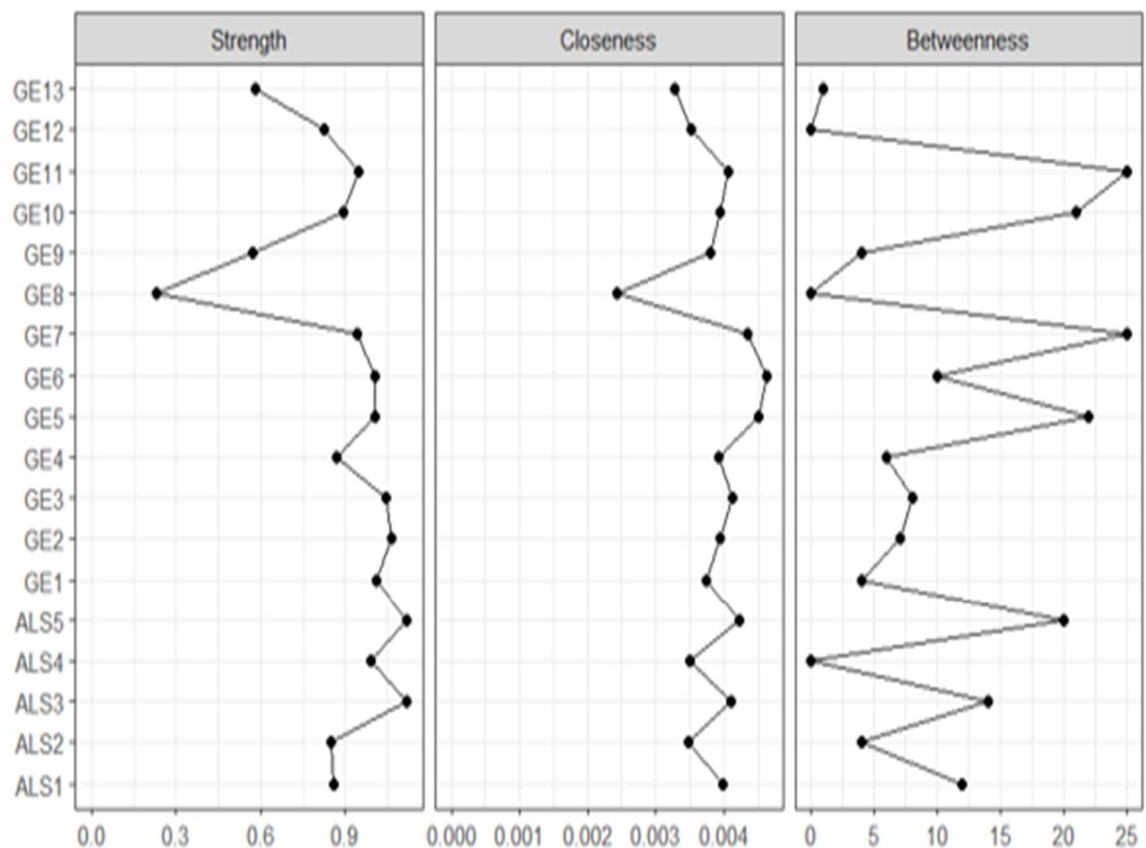


Figure 2. Centrality of Individual Nodes

Table 5. Centrality Indices of the Network Nodes

Node	Betweenness	Closeness	Strength	Expected Influence (z)
ALS1	-1.120	-0.859	-0.665	0.278
ALS2	-0.830	-1.713	-0.417	-0.045
ALS3	0.766	0.004	1.146	0.349
ALS4	-1.265	-1.949	-0.500	0.575
ALS5	1.926	0.387	0.976	1.369
GE1	-0.395	-0.551	0.691	1.216
GE10	-0.830	0.474	0.411	-0.895
GE11	1.346	0.846	1.697	-1.348
GE12	0.185	0.101	0.578	-0.906
GE13	-0.105	-0.606	-1.668	-0.920
GE2	-0.105	-0.359	0.501	1.114
GE3	0.185	0.307	0.321	0.458
GE4	-0.395	0.374	-0.331	-0.202
GE5	1.926	1.619	0.452	0.831
GE6	0.185	1.618	0.065	0.879
GE7	0.476	0.955	0.176	0.489
GE8	-0.540	0.395	-1.152	-2.058
GE9	-1.411	-1.043	-2.280	-1.184

Note. Expected influence values are standardised z scores. Negative z scores indicate values below the network mean and do not necessarily indicate negative raw expected influence.

In terms of strength, GE11 showed the highest standardised value ($z = 1.697$), followed by ALS3 ($z = 1.146$) and ALS5 ($z = 0.976$). These findings indicate that GE11 was the most strongly connected item in absolute terms, followed by ALS3 and ALS5. However, strength does not take the direction of associations into account.

Expected influence provided a complementary interpretation by incorporating the signs of the connections. ALS5 showed the highest expected influence ($z = 1.369$), followed by GE1 ($z = 1.216$), GE2 ($z = 1.114$), GE6 ($z = 0.879$), and GE5 ($z = 0.831$). In contrast, GE8 ($z = -2.058$), GE11 ($z = -1.348$), GE9 ($z = -1.184$), GE13 ($z = -0.920$), GE12 ($z = -0.906$), and GE10 ($z = -0.895$) showed comparatively lower expected influence values. The reported expected influence values are standardised z scores. Negative z scores indicate values below the network mean and do not necessarily indicate negative raw expected influence. Accordingly, these values describe relative expected influence and do not establish the sign of the sum of a node's connections.

For betweenness, ALS5 and GE5 had the highest standardised values ($z = 1.926$ for both), followed by GE11 ($z = 1.346$) and ALS3 ($z = 0.766$). Regarding closeness, GE5 ($z = 1.619$) and GE6 ($z = 1.618$) showed the highest standardized values, followed by GE7 ($z = 0.955$) and GE11 ($z = 0.846$). Given that betweenness and closeness can be sensitive to network characteristics, these indices were interpreted as complementary indicators rather than as standalone evidence of node importance.

Bridge Centrality

Bridge centrality was examined to identify nodes that may connect the academic life satisfaction and attitudes toward graduate education communities. Bridge strength values indicated that ALS5 had the largest numerical bridge strength (0.256), followed by ALS3 (0.210), ALS1 (0.172), GE5 (0.168), GE6 (0.163), and GE3 (0.128). The bridge centrality profile is presented in Figure 3.

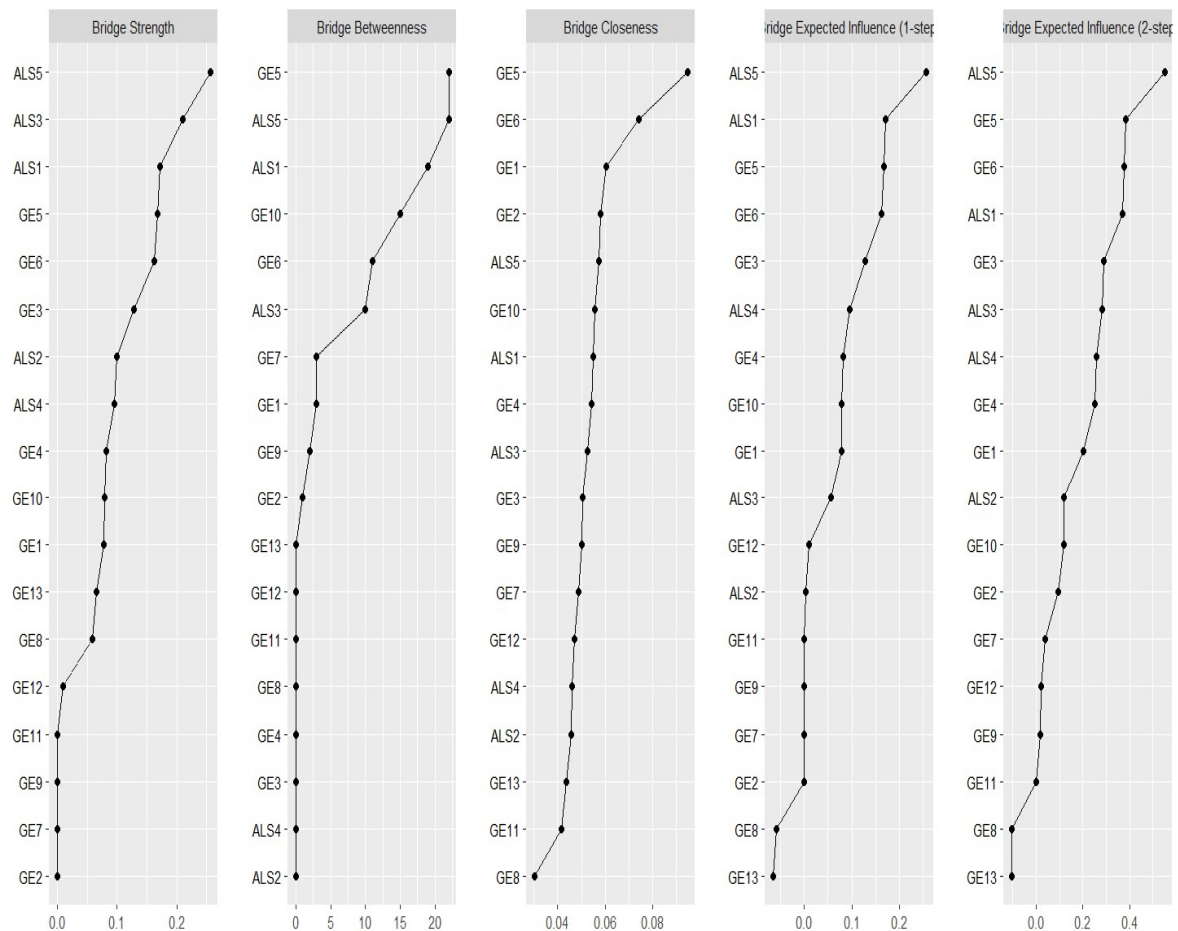


Figure 3. Bridge Centrality Profiles Across Academic Life Satisfaction and Attitudes Toward Graduate Education Communities

Bridge expected influence showed a similar pattern, with ALS5 having the highest one-step bridge expected influence (0.256), followed by ALS1 (0.172), GE5 (0.168), GE6 (0.163), and GE3 (0.128). Notably, ALS3 had a relatively high bridge strength (0.210) but a lower bridge expected influence (0.057), suggesting that the cross-community connections of this node included associations with different signs. Therefore, bridge strength and bridge expected influence provided somewhat different substantive information.

For bridge betweenness, ALS5 and GE5 had the highest values (22 each), followed by ALS1 (19), GE10 (15), GE6 (11), and ALS3 (10). In terms of bridge closeness, GE5 showed the highest value (0.095), followed by GE6 (0.074), GE1 (0.061), GE2 (0.058), and ALS5 (0.057). The complete bridge centrality estimates are reported in Table 6.

Table 6. Bridge Centrality Indices of the Network Nodes

Node	Bridge Strength	Bridge Betweenness	Bridge Closeness	1-Bridge Expected Influence	2-Bridge Expected Influence
ALS1	.172	19	.055	.172	.369
ALS2	.099	0	.046	.004	.120
ALS3	.210	10	.053	.057	.283
ALS4	.096	0	.046	.096	.258
ALS5	.256	22	.057	.256	.552
GE1	.078	3	.061	.078	.202
GE2	0	1	.058	0	.095
GE3	.128	0	.051	.128	.288
GE4	.083	0	.054	.083	.251
GE5	.168	22	.095	.168	.383
GE6	.163	11	.074	.163	.378
GE7	0	3	.049	0	.039
GE8	.059	0	.030	-.059	-.104
GE9	0	2	.050	0	.017
GE10	.079	15	.056	.079	.119
GE11	0	0	.042	0	-.001
GE12	.010	0	.047	.010	.019
GE13	.065	0	.044	-.065	-.106

Accuracy and Stability of the Network

The accuracy of the estimated edge weights was assessed using nonparametric bootstrapping. The strongest edges showed relatively narrow confidence intervals, supporting the precision of their estimated weights. For example, the ALS3–ALS5 edge had an estimated weight of .425 with a 95% confidence interval ranging from .304 to .546, whereas the GE1–GE2 edge had an estimated weight of .423 with a 95% confidence interval ranging from .301 to .545.

The robustness of the network was further examined using case-dropping bootstrap analysis. The bootnet case-dropping bootstrap produced a CS coefficient of 0.673 for edge weights (CS(edge)), indicating the stability of the estimated edge-weight structure under substantial case dropping. In the same analysis, the CS coefficient for strength centrality was 0.750 (CS(strength)), indicating that the strength-centrality estimates remained highly stable across the tested case-dropping range. Because the CS(strength) coefficient reached the maximum case-dropping proportion tested, a wider case-dropping range would be required to obtain a more precise upper-bound estimate.

DISCUSSION

This study examined the structural interrelations between academic life satisfaction and attitudes toward graduate education among graduate students in sport sciences. Moving beyond conventional variable-centred approaches that evaluate these constructs

through aggregate total scores or linear pathways, the present study employed a psychological network analysis framework. This approach enabled a fine-grained, item-level investigation of conditional statistical associations, node centrality, and cross-domain bridge connections. Overall, the network structure revealed a dense network of positive within-domain edges alongside specific, structural bridge connections between students' academic evaluations and their attitudes toward graduate education.

The estimated regularised network demonstrated that academic life satisfaction and attitudes toward graduate education are interconnected not as monolithic, singular constructs, but as a system of distinct yet interacting psychological components. Rather than viewing satisfaction merely as an overall antecedent predicting general attitude, the network topology highlights that specific dimensions of academic satisfaction share strong conditional dependencies with attitudinal components. Within the academic satisfaction community, the edge between ALS3 and ALS5 represented the strongest connection ($w = .425$), linking perceived usefulness of education for future employment with satisfaction regarding the extent to which attending the current school is expected to have a positive effect on future career. Similarly, within the attitude community, a strong positive association was observed between GE1 and GE2 ($w = .423$), concerning decision-making self-confidence and the development of critical thinking skills.

These findings align with and extend prior empirical research highlighting the interplay between students' academic evaluations and their educational or professional orientations. Previous studies employing conventional regression frameworks reported positive relationships between academic satisfaction and professional attitudes (Koçyiğit, 2023), as well as future outlooks toward the teaching profession (Pepe, 2021). While these studies established that general satisfaction broadly relates to positive future-oriented attitudes, the present network approach clarifies *how* these domains interact at the micro-level. Rather than assuming a uniform global effect, the network model illustrates that specific academic life satisfaction items share conditional associations with items assessing attitudes toward graduate education.

The broader educational and social environment in sport sciences also provides relevant context for interpreting these attitudinal networks. Research within sport science faculties indicates that perceived social support is associated with attitudes toward graduate study (Caz & Bardakçı, 2019) and that broader satisfaction metrics are related to positive domain-specific attitudes (Karakuş, 2020). In the present network, these contextual findings can be considered alongside the observed node-to-node conditional associations, but they do not establish that environmental or relational factors cause the observed network connections. Furthermore, literature addressing the dual nature of graduate education emphasises that while post-graduate studies yield substantial professional and academic benefits (Baş, 2013), they simultaneously present psychological challenges regarding stress, financial burdens, and work-life balance (İlter, 2020). The negative edges observed around reverse-coded barrier items (e.g., GE8, GE10, GE12, GE13) indicate conditional associations involving these items; given the wording of the items, these associations should be interpreted cautiously and may partly reflect item-wording or coding effects.

International findings further reinforce this conceptual pattern across diverse educational contexts. Studies among doctoral students in Russia demonstrated that program satisfaction directly connects to program completion intentions (Marchuk & Gordeeva, 2024), while research in the United States highlighted overall experience satisfaction as a key protective factor against academic withdrawal (Hardré et al., 2019). Similarly, research in the Philippines identified strong ties between cognitive-affective attitudes toward scientific research and actual research involvement (Abun, 2021). These international findings provide context for the conditional associations observed in the present network; they do not establish that high-centrality satisfaction nodes maintain attitudes or behavioural intentions.

Theoretical frameworks such as Social Cognitive Career Theory (Lent & Brown, 2008) and Self-Determination Theory (Deci & Ryan, 1985) may provide useful conceptual perspectives for interpreting the network structure observed in this study. SCCT emphasises relationships among academic/professional satisfaction, self-efficacy, and goal pursuit. Consistent with this perspective and empirical work on career adaptability and academic satisfaction (Duffy et al., 2015), ALS5 showed a relatively high expected influence ($z = 1.369$) and the largest observed bridge strength (0.256). These values indicate that ALS5 had comparatively prominent signed associations within the network and relatively strong cross-community connectivity, respectively; they should not be interpreted as evidence that ALS5 actively reinforces or transmits outcomes. From the perspective of SDT, the role of autonomy, competence, and relatedness provides a possible theoretical lens for understanding academic experiences, but the present cross-sectional network does not test the causal mechanisms proposed by the theory.

A critical contribution of this study is the identification of bridge nodes connecting the two conceptual communities. ALS5 showed the largest observed bridge strength (0.256) and a bridge betweenness value of 22, indicating comparatively prominent cross-community connectivity in the estimated network. Importantly, ALS5 assesses satisfaction with the extent to which attending the current school is expected to have a positive effect on future career. Additionally, GE5 and GE6 showed relatively prominent bridge-strength values within the attitude community. These findings identify specific items with comparatively strong cross-community associations without implying a directional pathway or causal leverage point.

CONCLUSION AND SUGGESTIONS

Based on the network structure and central bridge nodes identified in this study, several areas may be considered as candidate domains for institutional support and prospective evaluation:

Leveraging Bridge Elements in Academic Support: ALS5 showed the largest observed bridge strength and may therefore be considered a candidate area for further evaluation. Institutions may consider examining aspects related to students' perceptions of the future-career value of their current education, including advisor-student communication, mentorship opportunities, and academic belonging, while recognising that the present network does not establish intervention effects.

Developing Quality Assurance Systems Focused on Node Interconnections: Institutes offering graduate education may consider periodic feedback mechanisms that evaluate specific components of student satisfaction rather than relying only on global satisfaction metrics. Assessing research facilities, ethical climates, course structures, and faculty communication may provide candidate areas for support and prospective evaluation, but the present network does not establish that changes in any specific node would alter the broader network.

Tailoring Frameworks to the Applied Nature of Sport Sciences: Graduate students in sport sciences frequently balance academic demands with practical roles such as coaching, physical education teaching, or sports administration. Flexible and inclusive curricula that integrate field applications with scientific research may be considered as potential areas for future evaluation, particularly in relation to perceived barriers such as work-life balance and stress. The present findings should not be interpreted as demonstrating that such changes would causally reduce barrier-related associations or increase academic life satisfaction.

Future Research Recommendations

To build upon the systemic insights provided by this study, future research should consider the following directions:

Expanding Network Architectures with Multivariate Constructs: While the current 18-node network effectively captures core conditional associations, future studies should incorporate additional psychological and environmental variables. Integrating constructs such as academic self-efficacy, advisor support, academic burnout, perceived social support, and career adaptability into larger networks will clarify the broader psychological ecosystem surrounding graduate education.

Sample Expansion and Group-Level Network Comparisons: Future research should utilise larger, probability-based samples collected across diverse geographical regions and university types (public vs. private). Furthermore, applying Network Comparison Tests (NCT) to evaluate structural invariance across master's vs. doctoral students or across subdisciplines (e.g., Physical Education Teaching, Coaching Education, Sports Management) would reveal whether network topologies differ across academic sub-populations.

Longitudinal and Temporal Network Designs: Given the cross-sectional nature of the present network, future studies should employ longitudinal network designs (e.g., panel networks or temporal Vector Autoregression models). Tracking students across multiple semesters would allow researchers to examine temporal dynamics and directional lead-lag associations between satisfaction nodes and graduate attitudes over time.

Limitations

Several methodological and conceptual limitations must be noted when interpreting the findings of this study:

Cross-Sectional Network Design: The study utilised a cross-sectional design. Consequently, network edges represent conditional statistical associations rather than

directed, temporal, or causal relationships. High centrality or bridge strength should be interpreted strictly as structural prominence within an undirected network rather than evidence of causal influence.

Sampling Limitations and Generalizability: Data were collected via convenience sampling from a specific population of sport science graduate students in Turkey. While an analytical sample of $N = 220$ provided adequate stability for strength centrality (CS-coefficient = 0.750), larger samples ($N > 300$) are recommended to enhance the precision of smaller edge weights and edge-difference tests. Furthermore, voluntary participation may introduce self-selection bias toward students with relatively higher academic engagement.

Measurement Bias and Methodological Artefacts: Data relied entirely on self-report questionnaires administered via online platforms. This introduces potential common-method bias and social desirability bias. Additionally, the presence of negative edges among reverse-coded items (e.g., GE8, GE10, GE12, GE13) may partly reflect methodological artefacts associated with item wording rather than purely substantive psychological distances.

Model Boundaries: The network was restricted to 18 specific items representing academic life satisfaction and attitudes toward graduate education. Unobserved external variables, such as advisor relationship quality, financial status, or personal burnout, were not included in the network and could account for unmodeled conditional dependencies.

Discipline-Specific Scope: The sample was drawn exclusively from the field of sport sciences. Because sport science graduate programs uniquely combine theoretical research, laboratory work, and applied field practices (coaching, physical education, athletic training), the specific network topology and bridge connections observed here may not directly generalise to other academic disciplines in the humanities, social sciences, or natural sciences.

Kısaltmalar / Abbreviations

SD — Standard Deviation (Standart Sapma)

$\bar{X}$ — Mean (Ortalama)

n — Sample size (Örneklem büyüklüğü)

N — Total number of participants (Toplam katılımcı sayısı)

Min — Minimum value (Minimum değer)

Max — Maximum value (Maksimum değer)

% — Percentage (Yüzde)

ALS — Academic Life Satisfaction Scale

GE — Attitudes Toward Graduate Education

w — Estimated edge weight

Beyanlar / Declarations

Etik Onay ve Katılım Onayı / Ethics approval and consent to participate

Bu çalışmanın hazırlanma ve yazım sürecinde "Yükseköğretim Kurumları Bilimsel Araştırma ve Yayın Etiği Yönergesi" kapsamında bilimsel, etik ve alıntı kurallarına uyulmuştur. Toplanan veriler üzerinde herhangi bir tahrifat yapılmamış ve bu çalışma başka bir akademik yayın ortamına değerlendirilmek üzere gönderilmemiştir. Araştırmada kullanılan veri toplama araçları, Gümüşhane Üniversitesi Etik Kurulu tarafından incelenmiş ve etik açıdan uygun bulunmuştur.

(Karar tarihi: 03.06.2026, Sayı: 2026/5). Makale ile ilgili doğabilecek her türlü etik ihlal durumunda sorumluluk yazarlara aittir.

During the preparation and writing of this study, scientific, ethical, and citation rules were followed in accordance with the "Higher Education Institutions Scientific Research and Publication Ethics Guidelines." No alterations were made to the collected data, and this study has not been submitted to any other academic publication platform for evaluation. The data collection instruments used in this study were reviewed and approved by the Ethics Committee of Gümüşhane University (Decision date: 03 June 2026, Reference number: 2026/5). The authors accept full responsibility for any potential ethical violations related to this manuscript.

Veri Ve Materyal Erişilebilirliği / Availability of data and material

Bu çalışmanın bulgularını destekleyen veriler, makul talepler üzerine sorumlu yazardan temin edilebilir. Veri seti yalnızca akademik amaçlar için erişilebilir olacak ve verilerin herhangi bir kullanımı, orijinal çalışmaya referans gösterecek ve katılımcıların gizliliğini koruyacaktır.

The data that support the findings of this study are available from the corresponding author upon reasonable request. The dataset will be accessible only for academic purposes, and any use of the data will recognise the original study and maintain the confidentiality of the participants.

Çıkar Çatışması / Competing interests

Yazarlar, bu makalede sunulan çalışmayı etkileyebilecek herhangi bir çıkar çatışması veya kişisel ilişkiye sahip olmadıklarını beyan etmektedirler.

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Yazar Katkıları / Authors' Contribution Statement

Çalışmanın tasarımı ve planlanması, veri toplama, analizi ve yorumlanması, makalenin yazımı, veri düzenleme, yöntem belirleme, yazım – özgün taslak ile yazım – gözden geçirme ve düzenleme süreçlerine S.A. ve A.A. eşit katkı sağlamıştır. Tüm yazarlar makalenin önemli noktalarını eleştirel bir şekilde gözden geçirmiş ve makalenin son hâlini onaylamıştır.

S.A. and A.A. contributed equally to the design and planning of the study, data collection, analysis and interpretation, manuscript preparation, data organization, methodology development, writing of the original draft, and review and editing of the manuscript. All authors critically reviewed the manuscript and approved the final version of the article.

Fon Desteği / Funding

None.

Teşekkür / Acknowledgements

None.

References / Kaynaklar

- Abun, D. (2021). *The attitude of graduate students toward research and their intention to conduct research in the future*[Working paper]. SSRN. <https://doi.org/10.2139/ssrn.3807893>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Balkis, M. (2013). Academic procrastination, academic life satisfaction and academic achievement: The mediation role of rational beliefs about studying. *Journal of Cognitive & Behavioral Psychotherapies*, 13(1), 57–74.
- Balkis, M., & Duru, E. (2016). Procrastination, self-regulation failure, academic life satisfaction, and affective well-being: Underregulation or misregulation form. *European Journal of Psychology of Education*, 31(3), 439–459. <https://doi.org/10.1007/s10212-015-0266-5>
- Baş, G. (2013). Öğretmenlerin lisansüstü eğitimden beklentileri: Nitel bir araştırma (Niğde ili örneği). *Yükseköğretim Dergisi*, 3(2), 61–69. <https://doi.org/10.2399/yod.13.009>
- Caz, Ç., & Bardakçı, S. (2019). Spor bilimleri fakültesi öğrencilerinin algılamış oldukları sosyal desteğin lisansüstü eğitime yönelik tutumu yordama gücü: Marmara Üniversitesi örneği. *Akdeniz Eğitim Araştırmaları Dergisi*, 13(28), 186–197. <https://doi.org/10.29329/mjer.2019.202.11>

- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum Press. <https://doi.org/10.1007/978-1-4899-2271-7>
- Duffy, R. D., Douglass, R. P., & Autin, K. L. (2015). Career adaptability and academic satisfaction: Examining work volition and self-efficacy as mediators. *Journal of Vocational Behavior*, 90, 46–54. <https://doi.org/10.1016/j.jvb.2015.07.007>
- Duru, E., & Balkis, M. (2015). Birey-çevre uyumu, aidiyet duygusu, akademik doyum ve akademik başarı arasındaki ilişkilerin analizi. *Ege Eğitim Dergisi*, 16(1), 122–141. <https://doi.org/10.12984/eed.42566>
- Epskamp, S., Borsboom, D., & Fried, E. I. (2018). Estimating psychological networks and their accuracy: A tutorial paper. *Behavior Research Methods*, 50(1), 195–212. <https://doi.org/10.3758/s13428-017-0862-1>
- Epskamp, S., Cramer, A. O. J., Waldorp, L. J., Schmittmann, V. D., & Borsboom, D. (2012). qgraph: Network visualizations of relationships in psychometric data. *Journal of Statistical Software*, 48(4), 1–18. <https://doi.org/10.18637/jss.v048.i04>
- Epskamp, S., & Fried, E. I. (2018). A tutorial on regularized partial correlation networks. *Psychological Methods*, 23(4), 617–634. <https://doi.org/10.1037/met0000167>
- Fırıncı Kodaz, A. (2016). *İyimserlik, geleceğe yönelik tutum, akademik içsel motivasyon ve akademik doyum arasındaki ilişkilerin yapısal eşitlik modellemesi ile incelenmesi* [Yüksek lisans tezi, Uludağ Üniversitesi]. Uludağ Üniversitesi Açık Erişim Sistemi. <https://acikerisim.uludag.edu.tr/server/api/core/bitstreams/b54c1492-b71c-4c50-b81b-b672077cd317/content>
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Addison-Wesley.
- Foygel, R., & Drton, M. (2010). Extended Bayesian information criteria for Gaussian graphical models. In J. D. Lafferty, C. K. I. Williams, J. Shawe-Taylor, R. S. Zemel, & A. Culotta (Eds.), *Advances in neural information processing systems* (Vol. 23, pp. 604–612). Curran Associates. https://proceedings.neurips.cc/paper_files/paper/2010/hash/072b030ba126b2f4b2374f342be9ed44-Abstract.html
- Hardré, P. L., Liao, L., Dorri, Y., & Beeson Stoesz, M. (2019). Modeling American graduate students' perceptions predicting dropout intentions. *International Journal of Doctoral Studies*, 14, 105–132. <https://doi.org/10.28945/4161>
- Hevey, D. (2018). Network analysis: A brief overview and tutorial. *Health Psychology and Behavioral Medicine*, 6(1), 301–328. <https://doi.org/10.1080/21642850.2018.1521283>
- İlhan, M., Öner Sünkür, M., & Yılmaz, F. (2012). İlköğretim öğretmen adaylarının lisansüstü eğitime yönelik tutumlarının incelenmesi (Dicle Üniversitesi örneği). *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi*, (23), 22–42.
- İlter, İ. (2019). Lisansüstü Eğitime Yönelik Tutum Ölçeği'nin Türk kültürüne uyarlanması ve psikometrik özelliklerinin incelenmesi. *İlköğretim Online*, 18(1), 263–284. <https://doi.org/10.17051/ilkonline.2019.527218>
- İlter, İ. (2020). Lisansüstü öğrenim gören öğretmenlerin lisansüstü eğitime yönelik tutumlarının değerlendirilmesi. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 49, 263–292. <https://doi.org/10.9779/pauefd.488580>
- Jones, P. J., Mair, P., & McNally, R. J. (2018). Visualizing psychological networks: A tutorial in R. *Frontiers in Psychology*, 9, Article 1742. <https://doi.org/10.3389/fpsyg.2018.01742>
- Karakuş, M. (2020). Spor bilimleri fakültesi öğrencilerinin yaşam tatmini ve boş zaman tutumları arasındaki ilişkinin incelenmesi. Z. F. Dinç (Ed.), *Sporda psiko-sosyal alanlar* içinde (ss. 153–160). Akademisyen Kitabevi.
- Karaman, S., & Bakırcı, F. (2010). Türkiye'de lisansüstü eğitim: Sorunlar ve çözüm önerileri. *Sosyal Bilimler Araştırmaları Dergisi*, 5(2), 94–114.
- Koçyiğit, B. (2023). Akademik doyum mesleğe yönelik tutumu etkiler: Beden eğitimi ve spor öğretmeni adayları üzerine bir çalışma. *Journal of ROL Sport Sciences*, 4(1), 37–50. <https://doi.org/10.5281/zenodo.7755821>
- Lent, R. W., & Brown, S. D. (2008). Social cognitive career theory and subjective well-being in the context of work. *Journal of Career Assessment*, 16(1), 6–21. <https://doi.org/10.1177/1069072707305769>
- Marchuk, L. A., & Gordeeva, T. O. (2024). What determines satisfaction with graduate school and intentions to complete it among modern PhD students? *Psychological Science and Education*, 29(4), 5–15. <https://doi.org/10.17759/pse.2024290401>
- Ng, L. C., Tuckett, A. G., Fox-Young, S. K., & Kain, V. J. (2014). Exploring registered nurses' attitudes towards post graduate education in Australia-instrument development. *Journal of Nursing Education and Practice*, 4(3), 20–29. <https://doi.org/10.5430/jnep.v4n3p20>
- Pepe, O. (2021). The effect of academic satisfaction on attitudes to the future and the teaching profession: Physical education and sports teacher candidates. *Revista EDaPECI*, 21(3), 79–87. <https://doi.org/10.29276/redapeci.2021.21.316186.79-87>

- Schmitt, N., Oswald, F. L., Friede, A., Imus, A., & Merritt, S. (2008). Perceived fit with an academic environment: Attitudinal and behavioral outcomes. *Journal of Vocational Behavior*, 72(3), 317–335. <https://doi.org/10.1016/j.jvb.2007.10.007>
- Sevinç, B. (2001). Türkiye’de lisansüstü eğitim uygulamaları, sorunlar ve öneriler. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 34(1), 125–137. https://doi.org/10.1501/Egifak_00000000052
- Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.
- Ünal, Ç., & İlter, İ. (2010). Sınıf öğretmeni adaylarının lisansüstü eğitime olan tutumları (Fırat, Erzincan ve İnönü Üniversitesi sınıf öğretmenliği ABD örneği). *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 14(2), 147–164.
- Varış, F. (1984). Lisansüstü düzeyde eğitim elemanı yetiştirme. C. Kavcar (Ed.), *Eğitim bilimleri sempozyumu* içinde (ss. 49–54). Ankara Üniversitesi Eğitim Bilimleri Fakültesi Yayınları.
- Yılmaz, R. (2008). *Türkiye’de lisansüstü öğrenim için öğrenci seçimi: Kara Harp Okulu Savunma Bilimleri Enstitüsü’nde bir uygulama* [Yayımlanmamış yüksek lisans tezi]. Kara Harp Okulu.

Disclaimer / Publisher’s Note

The statements, opinions, and data contained in all publications are solely those of the individual author(s) and contributor(s) and do not necessarily reflect the views of **IJOSS** and/or the editor(s). **IJOSS** and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions, or products referred to in the content. **IJOSS** remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.