



The mediating role of mental endurance in the impact of leisure participation on life satisfaction

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ABSTRACT

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Participation in leisure activities is a multidimensional process shaped by individuals' positive attitudes, their belief in the meaningfulness of such activities, and their sustained involvement. Mental endurance refers to the ability to cope with challenges arising from the stressful and competitive nature of daily life and is generally stronger among individuals who are extroverted, social, self-confident, and experience low anxiety. Life satisfaction represents a general sense of well-being and contentment based on personal values and expectations. This study investigates how participation in leisure activities affects life satisfaction and examines the mediating role of mental endurance in this relationship. Focusing on skiing as a leisure activity, the research analyzes how participation influences emotional and cognitive well-being through mental endurance. Data were collected from 300 individuals participating in skiing at Palandöken Ski Resort using a convenience sampling method and were analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings revealed that mental endurance mediates the relationship between leisure participation and life satisfaction. To evaluate the model's explanatory power, R^2 values were examined. The R^2 for the life satisfaction construct was 0.389, indicating that the model explains 38.9% of the variance, representing a moderate level of explanatory strength. The mental endurance construct showed an R^2 value of 0.577, indicating a high explanatory level (57%). Overall, the results suggest that strengthening individuals' mental endurance enhances life satisfaction and positively contributes to psychological well-being and the ability to manage life challenges.

Contribution/Originality: This study contributes to the existing literature by empirically demonstrating the mediating role of mental endurance in the relationship between leisure participation and life satisfaction. It is one of the few studies focusing on skiing as a leisure activity and employs PLS-SEM to reveal the psychological mechanisms underlying well-being.

1. INTRODUCTION

Leisure participation can be defined as an individual's tendency to develop distinct and generally positive emotions toward an activity. Participation in leisure activities refers to the way individuals cultivate positive emotions related to specific activities. Furthermore, individuals' belief that leisure activities contribute positively to their lives enables them to develop an emotional attachment to these activities (Ragheb & Burlingame, 2002). Since the mid-1980s, the concept of leisure has consistently been associated with individual preferences and has been increasingly examined (Havitz & Mannell, 2005). In the literature, there is strong and frequent evidence suggesting that leisure activities support individuals' mental health and enhance their psychological well-being (Casey, Ripke, & Huston,

2005). More specifically, these activities are suggested to be directly related to the fulfillment of fundamental psychological needs such as competence, belongingness, and autonomy. The extent to which these needs are satisfied through leisure activities may vary depending on the level of participation (Leveresen, Danielsen, Birkeland, & Samdal, 2012). Various studies have demonstrated that the benefits gained from engaging in different leisure activities can positively influence both professional life and overall life satisfaction (Caldwell, 2005).

In this context, Havitz and Mannell (2005) define leisure participation as a non-visible state of motivation, interest, or arousal directed toward a recreational activity or its related products. Participation in leisure activities is considered one of the fundamental components of a healthy life and contributes to both mental and physical well-being (Kim & Lee, 2018). Kleiber, Hutchinson, and Williams (2002) emphasize that leisure activities strengthen individuals' relationships with their environment, enhance their self-perception, and foster positive changes. Furthermore, Kyle and Mowen (2005) argue that leisure participation should not be measured solely through singular factors such as interest, enjoyment, or self-expression, but rather through multidimensional scales.

The concept of mental endurance is a key element in explaining how individuals' participation in leisure activities relates to their psychological resilience. Although there is ongoing debate in the literature about whether mental endurance is a mindset-based trait or an innate personality characteristic, researchers generally agree on its multidimensional nature (Gucciardi, Gordon, & Dimmock, 2008). The concept of mental endurance is known to influence individuals psychologically in areas such as goal setting, self-efficacy, growth-oriented thinking, intrinsic motivation, and perseverance (grit) (Clough & Strycharczyk, 2012). Crust (2008) and Jones and Moorhouse (2008) state that mental endurance is a key determinant of individuals' resilient behaviors under pressure in performance-oriented environments. From this perspective, individuals with a high level of mental endurance are generally socially active, extroverted, self-confident, and have low levels of anxiety (Clough, Earle, & Sewell, 2002). These individuals are capable of maintaining their emotional balance in the face of challenges and effectively utilizing their focusing abilities. Thelwell, Weston, and Greenlees (2005) emphasized that mental endurance is not limited solely to athletic performance. Mental endurance also plays a crucial role in managing the processes and changes that occur in individuals' educational and personal lives. Another concept that should be considered alongside the structural characteristics of mental endurance is life satisfaction. Life satisfaction refers to the general level of well-being that individuals attain as a result of psychologically evaluating their lives according to certain standards and expectations they have set for themselves (Jebbouri, Zhang, Imran, Iqbal, & Bouchiba, 2022). Kim, Lee, and Ko (2016) point out that life satisfaction is an emotional and cognitive process that remains relatively stable over time. This concept not only reflects individuals' psychological states but is also associated with variables such as their social relationships, health status, and quality of life (Wang, Lai, & Liu, 2021).

Although winter tourism has gained increasing importance within the broader framework of leisure and sports tourism, empirical research exploring its psychological dimensions remains relatively scarce. In particular, while the concept of mental endurance has been extensively examined in the context of high-risk or physically demanding sports, its role within skiing as a leisure activity has not been sufficiently addressed. Previous studies have primarily focused on the physical, economic, or environmental aspects of skiing participation, often neglecting its potential effects on individuals' psychological well-being and life satisfaction. This gap in the literature highlights the need for a deeper understanding of how engaging in skiing contributes to tourists' life satisfaction and the extent to which mental endurance mediates this relationship. Accordingly, this study aims to fill this void by investigating the interplay among skiing participation, mental endurance, and life satisfaction within the context of the Palandöken Ski Resort, representing an emerging winter tourism destination.

2. THEORETICAL FRAMEWORK

Although winter sports share the general characteristics of outdoor activities, they also present distinct structural differences due to their inherently high-risk nature. These unique conditions can influence not only the athletes'

physical capacities but also their psychological resilience (Gavín-Chocano, Martín-Talavera, Sanz-Junoy, & Molero, 2023). Elements such as harsh weather conditions, the need for control, and the requirement for speed encountered in skiing are directly related to individuals' ability to cope with stress. Therefore, individuals who actively participate in winter sports must possess not only physical competence but also psychological readiness and adequacy.

Theories related to leisure help researchers understand the reasons why individuals engage in challenging outdoor activities such as winter sports. Understanding the experiences gained by individuals who participate in winter sports provides valuable insights into interpreting their developmental processes. At this point, the Developmental Theory of Leisure comes into play. This theory does not regard leisure merely as a period of rest; rather, it conceptualizes it as an active process through which individuals achieve self-actualization. The theory asserts that participation in leisure activities does not occur through spontaneous decisions but is instead shaped as a cumulative outcome of individuals' past experiences. Each activity in which a person engages allows for physical, social, emotional, and cognitive development compared to their previous state (Kelly, 1955). Accordingly, leisure activities contribute to individuals not only physically or socially but also by enhancing their sensory awareness, offering multidimensional benefits.

The developmental gains derived from leisure activities eventually integrate with psychological resilience. One of the theoretical foundations of mental endurance is Kelly (1955). Personal Construct Theory suggests that individuals construct their personality through environmental experiences (Jones, Hanton, & Connaughton, 2007). Within this structural framework, mental endurance is defined as the individual's ability to demonstrate persistence or resilience when faced with adversity, uncertainty, or failure. The literature in exercise and sport psychology reveals that individuals with high mental endurance tend to be intrinsically motivated, self-disciplined, confident, and goal-oriented in the face of challenges (Crust et al., 2014). Thus, success in high-risk sports such as winter sports is closely associated with an individual's capacity for mental endurance, in addition to physical competence.

The relationship between mental endurance and an individual's ability to maintain inner balance also directly reflects upon the concept of life satisfaction. In this regard, the Satisfaction With Life Scale (SWLS) views general life satisfaction as a fundamental dimension of subjective well-being (Diener, Emmons, Larsen, & Griffin, 1985). Life satisfaction is shaped by an individual's cognitive evaluation of the alignment between their expectations and current life conditions (Cho & Hong, 2013). Newman, Nielsen, Smyth, and Hirst (2018) emphasize that life satisfaction involves a deliberate and reflective evaluation of one's life based on personally defined criteria or standards. Similarly, Erdogan, Bauer, Truxillo, and Mansfield (2012) highlight the importance of understanding what individuals perceive as sources of happiness to fully grasp the concept of life satisfaction. Therefore, life satisfaction is not solely determined by environmental factors but is also influenced by internal resources, psychological resilience, and an individual's interpretation of life's meaning.

3. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Although academic interest in mental endurance has increased over the last decade, some conceptual and methodological concerns have limited its contribution to the development of the field. Specifically, the predominance of mental endurance research within the context of sports restricts the generalizability of the findings to other domains (Gucciardi et al., 2008). Furthermore, when mental endurance is studied in non-sport contexts, researchers often fail to provide sufficient substantive or empirical evidence to explain this concept.

Damodaran, Di Troia, Visaggio, Austin, and Stamp (2017) highlighted that mental endurance plays a vital role in enhancing life attitudes associated with mental health. Similarly, Gerber et al. (2015) noted that mental endurance contributes to reducing symptoms of burnout.

Nevertheless, the positive effects of sports participation on individuals have been widely documented in contemporary research, revealing that participation in physical activities affects not only psychological and physiological well-being but also the overall quality of life of individuals (Allender, Cowburn, & Foster, 2006; Bloom,

Grant, & Watt, 2005). In this context, considering the relationship between mental endurance and sports, there is a general consensus that mentally resilient athletes are individuals who can quickly recover from challenges, stay focused on their goals, are self-confident, and effectively manage their emotions and behaviors. Therefore, it is believed that mental endurance can contribute to individuals' coping capacity not only in the domain of sports but also in various areas of life.

The research model developed and utilized within the scope of this study was created by the authors for the first time and will be applied for the first time in this research.

The studies were reviewed, and the following hypotheses (H1, H2) were formulated.

H₁: Developmental activities positively affect mental endurance.

H₂: Developmental activities positively affect life satisfaction.

In the literature, no studies either domestic or international have examined the effect of excitement levels on mental toughness in individuals participating in leisure activities such as skiing. Therefore, it can be stated that this finding contributes to the literature as a precursor.

H₃: Exciting activities positively affect mental endurance.

H₄: Exciting activities positively affect life satisfaction.

H₅: Socializing activities positively affect mental endurance.

H₆: Socializing activities positively affect life satisfaction.

A review of the existing literature reveals that, although many studies have examined the associations among leisure participation, life satisfaction, and mental endurance, limited research has specifically focused on how leisure participation influences life satisfaction (Liao, Zhou, & He, 2022). This study addresses the gap by analyzing the mediating role of mental endurance in the relationship between leisure participation and life satisfaction among individuals engaged in skiing.

The findings are expected to contribute valuable insights for future research and to enhance understanding of how skiers can structure their leisure activities to improve their overall life satisfaction (Geng et al., 2023).

H₇: Mental endurance positively affects life satisfaction.

H₈: Mental endurance mediates the relationship between developmental activities and life satisfaction.

H₉: Mental endurance mediates the relationship between engaging activities and life satisfaction.

H₁₀: Mental endurance mediates the relationship between social activities and life satisfaction.

4. MATERIALS AND METHODS

4.1. Research Model and Hypotheses

In this research, the proposed hypotheses were tested using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. This method was chosen because it accommodates non-normal data distributions and enables the analysis of complex structural relationships. Therefore, PLS-SEM has been widely applied, particularly in studies within the domains of marketing and consumer behavior (Guenther, Guenther, Ringle, Zaefarian, & Cartwright, 2023).

Although certain methodological debates persist in the literature concerning the PLS-SEM approach, it remains a preferred method due to its robustness and suitability for practical applications (Hair & Alamer, 2022). Additionally, all analyses were conducted using the SmartPLS 4 software, and the conceptual framework, along with the corresponding hypotheses, is illustrated in Figure 1.

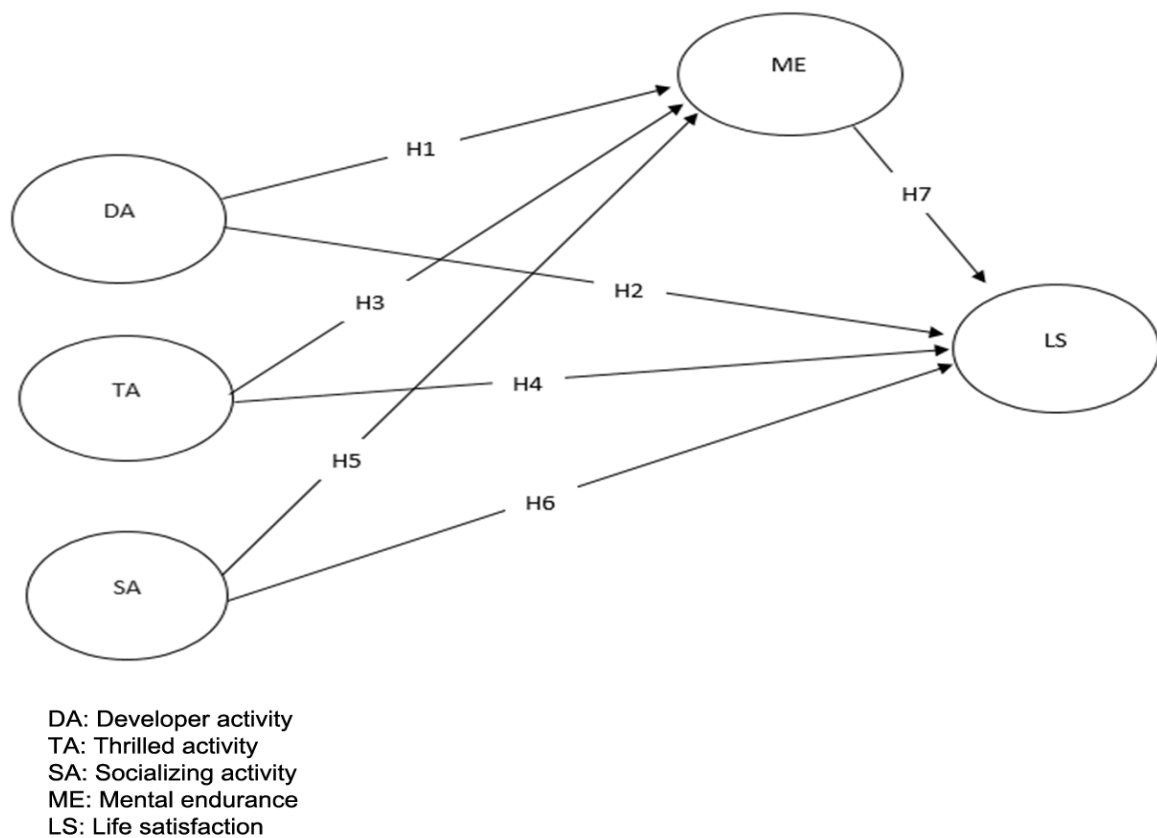


Figure 1. Research Model.

H₁: Development activities have a positive effect on mental endurance.

H₂: Development activities have a positive effect on life satisfaction.

H₃: Thrilled activities have a positive effect on mental endurance.

H₄: Thrilled activities have a positive effect on life satisfaction.

H₅: Socializing activities have a positive effect on mental endurance.

H₆: Socializing activities have a positive effect on life satisfaction.

H₇: Mental endurance has a positive effect on life satisfaction.

H₈: Mental endurance mediates the relationship between development activities and life satisfaction.

H₉: Mental endurance mediates between thrilling activities and life satisfaction.

H₁₀: Mental endurance mediates the relationship between social activities and life satisfaction.

4.2. Sampling and Data Collection

The data used in testing the research model were evaluated for compliance with ethical standards. The scales employed in the study were adapted from valid and reliable measurement tools previously used in other research. However, due to variability in the sample, revisions might be necessary, particularly regarding appropriate language use, to prevent issues during analysis. An objective assessment of this process was conducted by external field experts outside the research team. Consequently, the questionnaire developed for data collection was reviewed by three experts with experience in Tourism Management and Sports Sciences, who were familiar with the relevant literature. The development of the questionnaire was based on their recommendations. The participants' ability to comprehend the scale items was ensured through this review process. The questionnaire consisted of two sections: the first included descriptive expressions with six items, and the second comprised 29 scale items related to the variables in the research model. The study population consisted of all tourists who had experienced skiing at Palandöken Ski Center. The questionnaire was created using Google Forms and distributed to respondents through various channels,

including face-to-face QR code scanning, WhatsApp, email, and social media platforms. The research sample comprised tourists who were either staying at or visiting the Palandöken Ski Center for a day trip. The convenience sampling method was employed due to its low cost, rapid implementation, and practicality, making it a common choice in research studies (Bethlehem, 2010). According to the guidelines, for the PLS-SEM analysis to be conducted, a minimum of 10 participants is required for each parameter included in the research model (Bayraktar, 2024). Therefore, considering the 29 scale items in the study, data were collected from at least 290 participants for the PLS-SEM analysis. This number is considered sufficient to represent the population; however, additional participants were recruited to obtain more reliable results (Hair & Alamer, 2022). As a result, 300 tourists participated in the study, and a sufficient amount of data was obtained for the PLS-SEM analysis. Participants were properly informed, and voluntary participation was ensured throughout the data collection process.

4.3. Purification of Measures

The measurement scales for leisure participation, mental endurance, and life satisfaction were determined to be both valid and reliable. All constructs were specifically adapted to the context of skiing and snowboarding. The leisure satisfaction scale, originally developed by Churchill Jr (1979), initially included 34 items across eight dimensions; however, only three dimensions comprising 13 items were selected to suit the purpose of this study. The life satisfaction scale, created by Diener et al. (1985), is a unidimensional instrument containing five items. The Mental Resilience Scale, designed by Madrigal, Hamill, and Gill (2013), was also employed. All instruments used a 5-point Likert scale, through which participants rated their level of agreement or participation.

5. RESULTS

5.1. Descriptive Statistics

A total of 300 volunteer skiers took part in the research, and their demographic characteristics are summarized in Table 1.

Table 1. Demographic information.

Trait	Variable	N	%
Gender	Female	133	44.2
	Male	168	55.8
Age	18-23 years	27	9.0
	24-29 years	80	26.6
	30-35 years	100	33.2
	36-41 years	69	22.9
	42-47 years	16	5.3
	48 years and over	9	3.0
Education status	Primary education	1	0.3
	Secondary education	3	1.0
	High school	38	12.6
	Associate's and Bachelor's Degrees	142	47.2
	Master's Degree	117	38.9
Profession	Housewife	4	1.3
	Laborer	41	13.6
	Officer	119	39.5
	Retired	4	1.3
	Student	74	24.6
	Self-employment	59	19.6
Monthly income	22.104-30.000 TL	64	21.3
	30.001-38.000 TL	36	12.0
	38.001-46.000 TL	38	12.6
	46.001.-54.000 TL	45	15.0
	54.001 TL and over	118	39.2
	Total	301	100

When examining the demographic variables of the participants, it was found that 55.8% were male, while 44.2% were female. Regarding age distribution, the majority of participants were young, adult, and middle-aged individuals. The highest participation was observed in the 30-35 age group, accounting for 33.2%, whereas only 8.3% of participants were aged 42 and over. In terms of educational status, the highest percentage (47.2%) held an Associate's or Bachelor's degree, representing 142 participants. Additionally, 117 participants (38.9%) held a Master's degree. These findings suggest that the educational level among the participants is relatively high, indicating a well-educated sample population.

Regarding their professions, it was observed that people from various occupational backgrounds participated in these activities. The lowest participation rates were among housewives (1.3%) and retirees (1.3%). The highest participation rates were among office workers (39.5%, 119 individuals) and students (24.6%, 74 individuals).

Finally, when examining the monthly income of participants interested in skiing, it was found that the lowest income group consisted of those earning between 30,001 TL and 38,000 TL (12.0%, 36 people), while the highest income group had monthly earnings of 54,000 TL and above (39.2%, 118 people). Given that the current minimum wage is 22,104 TL, it can be concluded that the economic status of the sample group is relatively high.

5.2. Other Model

This research focuses on exploring the interrelationships among individuals' participation in leisure activities, life satisfaction, and mental endurance. To this end, the proposed research model was analyzed using the PLS-SEM technique through SmartPLS 4 software. Consistent with the recommendations in the existing literature, the research model was conceptualized as reflective, and the results of the validity and reliability analyses are presented in Table 2.

Table 2. Results summary for the outer model.

Constructs and measurement items	Items	Outer loadings	VIF
Leisure activity participation			
Socializing activity	SA		
I met new people during the skiing activity.	SA1	0.881	3.275
Thanks to the skiing activity, I had the opportunity to socialize.	SA2	0.895	3.653
I enjoyed using my skills in the social environment of skiing activities.	SA3	0.861	2.432
I was with different people during the skiing activity.	SA4	0.868	2.686
The skiing activity provided me with the opportunity to participate in group activities.	SA5	0.806	2.041
Developmental activity	DA		
The skiing activity positively affected my physical condition.	DA1	0.842	2.746
The skiing activity helped me maintain my health.	DA2	0.793	2.393
The skiing activity positively affected my psychological condition.	DA3	0.823	2.250
I appreciated that the skiing activity enhanced my quality of life.	DA4	0.867	2.868
I felt that my skills improved thanks to the skiing activity.	DA5	0.856	2.416
Thrilled Activity	TA		
I had the opportunity to engage in various activities for entertainment during the skiing trip.	TA1	0.876	2.165
I encountered situations during the skiing activity that were unexpectedly enjoyable.	TA2	0.912	2.680
I was affected by the exciting aspect of the skiing activity.	TA3	0.895	2.394
Mental Endurance	ME		
I possess a strong self-confidence that convinces me I can achieve everything I set out to do.	ME1	0.776	2.556
I know when to enjoy the taste of success and when to stop and focus on the next goal.	ME2	0.818	3.592
When I know I can win, I have a strong intuition that can turn the situation in my favor.	ME3	0.786	2.829
I know what needs to be done to reach the required performance level for skiing.	ME4	0.776	2.180

Constructs and measurement items	Items	Outer loadings	VIF
I possess the discipline and patience necessary to focus my efforts on achieving my skiing goals.	ME5	0.849	3.261
Even if I'm tired, I keep working towards my goal.	ME6	0.818	2.832
I can utilize all aspects of a very challenging skiing process to turn them in my favor.	ME7	0.863	3.458
If necessary, I can increase my effort to ski.	ME8	0.857	3.340
When an obstacle comes my way, I find a way to overcome it.	ME9	0.816	2.720
I accept and embrace the elements of skiing that are considered painful.	ME10	0.727	2.192
While skiing, I remain fully committed to my performance goals until the last possibility of success is exhausted.	ME11	0.858	3.708
Life Satisfaction	LS		
I have a life close to my ideals.	LS1	0.815	1.937
My living conditions are perfect.	LS2	0.869	2.867
I am satisfied with my life.	LS3	0.873	2.808
So far, I have achieved the important things I wanted in life.	LS4	0.873	2.640
If I were born again, I wouldn't change almost anything in my life.	LS5	0.822	2.486

Factor analysis and variance inflation factor (VIF) calculations were conducted based on the item loadings presented in Table 3. The analysis revealed that all item loadings exceeded the acceptable threshold value of 0.50, and the results are presented in the relevant table.

In PLS-SEM analyses, excessively high correlations between indicators can lead to multicollinearity issues. Therefore, the Variance Inflation Factor (VIF) values of all items included in the model were examined, and it was found that these values remained below 5.0. This indicates that the research model is free from multicollinearity problems. The results of the reliability and validity analyses are presented in Table 3.

Table 3. Reliability and Validity.

Measurements	Items	Cronbach's alpha	CR (rho_a)	CR (rho_c)	AVE
Socializing activity	5	0.914	0.918	0.936	0.744
Developmental activity	5	0.893	0.899	0.921	0.700
Thrilled activity	3	0.875	0.876	0.923	0.800
Mental endurance	11	0.949	0.950	0.956	0.663
Life satisfaction	5	0.905	0.912	0.929	0.724

It can be seen in Table 3 that the Average Variance Extracted (AVE) values are above 0.50. The Composite Reliability (CR/rho_a – rho_c) coefficients exceeding 0.70 indicate strong structural reliability, while Cronbach's alpha values above 0.70 confirm internal consistency. In Table 4, discriminant validity is evaluated based on the results of the Heterotrait-Monotrait Ratio (HTMT) analysis.

Table 4. Discriminant validity—HTMT.

	DA	LS	ME	SA	TA
DA	1				
LS	0.418				
ME	0.746	0.659			
SA	0.745	0.459	0.708		
TA	0.869	0.458	0.777	0.837	1

The HTMT analysis is frequently recommended for use in PLS-SEM applications (Qin & Chen, 2022). The HTMT coefficient between variables should be below 0.90 (Hair, Hult, Ringle, & Sarstedt, 2019). As shown in Table 4, all HTMT coefficients fall within acceptable limits.

5.3. Inner Model

The structural model was tested using the bootstrap technique with 5,000 resamples. The results related to the fit indices are presented in Table 5.

Table 5. Model fit indices.

	SRMR	d_ULS	d_G	Chi-square	NFI
Saturated model	0.059	1.528	0.692	1167.054	0.845
Estimated model	0.059	1.523	0.690	1167.054	0.845

When examining the model fit indices, it was observed that the Standardized Root Mean Square Residual (SRMR) value, which is expected to be below 0.80, was 0.059. According to the fit criteria, the d_ULS and d_G values should be above 0.05, and the results indicated that the model met these conditions. The Normed Fit Index (NFI) value, which ranges between 0 and 1, suggests that values closer to 1 represent a better model fit. Based on these results, it was concluded that the model exhibited a good fit according to the NFI value (Hair et al., 2019). To evaluate the explanatory power of the model, R^2 , f^2 , and Q^2 values were calculated, and the results are presented in Table 6.

Table 6. Explanatory power of the structural model.

	F^2	P-values	R^2	Q^2
DA>LS	0.005	0.001	LS 0.389	LS 0.183
DA>ME	0.081	0.000	ME 0.577	ME 0.566
ME>LS	0.303	0.001		
SA>LS	0.004	0.256		
SA>ME	0.052	0.003		
TA>LS	0.001	0.039		
TA>ME	0.067	0.000		

The effect size f^2 indicates the explanatory power of a predictor by showing how much the R^2 decreases when the independent variable is removed from the model.

According to Cohen (1988), reference: “negligible effect: $f^2 < 0.02$, low effect: $0.02 \leq f^2 < 0.15$, average effect: $0.15 \leq f^2 < 0.35$, high effect: $f^2 \geq 0.35$ ”

When examining Table 6, it is observed that the smallest effects are TA-LS at 0.001 and SA-LS at 0.004, while the strongest explanatory path is ME-LS, with a value of 0.303. The R^2 metric is used to assess the explanatory power of the model. When analyzing the model, the R^2 value exceeds 0.10, indicating that the structural model has a satisfactory level of explanatory and predictive capability (Hair & Alamer, 2022). Additionally, a detailed analysis of the table reveals that an R^2 of 0.389 explains 38.9% of the variance for the LS variable, demonstrating a medium level of explanatory power, while an R^2 of 0.577 for the ME variable indicates a high explanatory power of 57%.

Q^2 indicates the predictive relevance of the model based on the cross-validation process. A positive value is sufficient, and higher values indicate stronger predictive power. According to (Hair & Alamer, 2022), the model demonstrates predictive power; however, if the value equals zero, it indicates no predictive ability, and if it is less than zero, it suggests that the model is inconsistent with the data. When examining the results for our study, it is observed that the LS Q^2 value of 0.183 indicates medium predictive power, while the ME Q^2 value of 0.566 demonstrates very strong predictive power.

5.4. Path Analysis

The PLS-SEM results of the model used in the study are presented in Figure 2.

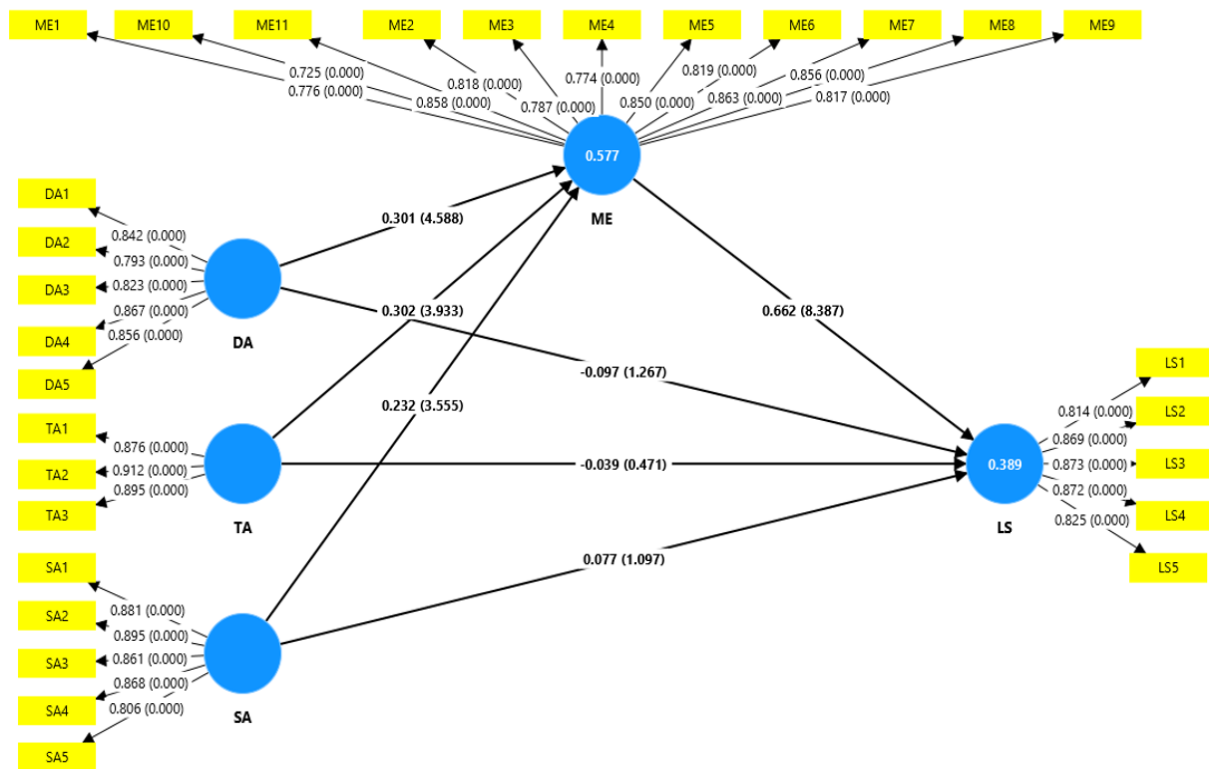


Figure 2. Path analysis results.

The model designed to test the hypotheses was calculated with a 5% confidence interval and 5,000 bootstrap resampling iterations (Streukens & Leroi-Werelds, 2016). When examining the path coefficients between the variables derived from the model, a significant and positive relationship was identified between DA and ME (path coefficient 0.301, t-value 4.588, $p < 0.01$). This suggests a strong contribution, where an increase in individuals' DA positively influences their ME. Additionally, a significant and positive relationship was observed between TA and ME (path coefficient 0.302, t-value 3.933, $p < 0.001$). Furthermore, ME has a highly significant and strong positive effect on LS (path coefficient 0.662, $p < 0.01$), indicating that ME is a key determinant with a substantial impact on LS.

On the other hand, the effects of DA (0.097, t: 1.267), TA (0.039, t: 0.471), and SA (0.077, t: 1.097) on LS were found to be insignificant, as their t-values were less than 1.96. However, it was determined that these variables influence LS indirectly through ME.

The results indicate that the hypotheses within the research model are supported. Supporting these hypotheses is a significant indicator that the model effectively addresses gaps in the existing literature. The findings aim to bridge the current knowledge gap by discussing both theoretical and practical aspects comprehensively. Based on these objectives and outcomes, the results provide a solid foundation for making informed recommendations to stakeholders.

6. DISCUSSION AND CONCLUSION

This study examined the impact of individuals' participation in sports activities during their leisure time on life satisfaction and investigated whether mental endurance plays a mediating role in this relationship. Conducted at Palandöken Ski Center in Erzurum, the study analyzed the effects of social, developmental, and thrilling leisure activities on mental endurance and life satisfaction using the PLS-SEM method.

The findings revealed that mental endurance develops through emotional and social experiences, aligning with previous literature. Specifically, developmental and thrilling activities have a significant and positive effect on mental endurance, indicating that experiences in which individuals push their physical limits, acquire new skills, and engage

in risk-involving activities enhance psychological resilience (Gucciardi et al., 2008). Extreme sports such as skiing and snowboarding also support this process by enhancing individuals' self-efficacy and strengthening their competitive traits (Shipway & Jones, 2007).

Results also demonstrated that mental endurance has a direct and significant impact on life satisfaction. Individuals with higher levels of mental toughness are better equipped to cope with stressful life events, thereby increasing their overall satisfaction with life (Clough & Strycharczyk, 2012). Considering that life satisfaction refers to the way individuals evaluate their lives overall (Diener et al., 1985), it can be stated that mental toughness plays a critical role in this evaluative process.

Moreover, mental endurance was found to mediate the relationship between social, developmental, and thrilling leisure activities and life satisfaction. This finding suggests that mental endurance is a key psychological mechanism through which the benefits of leisure participation are translated into higher life satisfaction. Similarly, Leversen et al. (2012) emphasized that leisure activities enhance individuals' quality of life by fulfilling their psychological needs. Therefore, mental endurance can be considered a fundamental element that reinforces the positive psychological effects of leisure experiences on individuals.

Another notable finding is that the effect of mental endurance on life satisfaction is particularly shaped by developmental and thrilling activities. This implies that mental endurance is not merely a stable personal trait but a dynamic process influenced by the nature and intensity of one's leisure experiences.

In this context, the study contributes to the limited body of research examining the influence of high-risk, physically demanding winter sports such as skiing and snowboarding on mental endurance and life satisfaction. Given the scarcity of studies addressing these sports from the perspective of mental endurance, the present research offers valuable theoretical and practical insights for both sports psychology and tourism literature.

In conclusion, this study demonstrates that participation in leisure activities extends beyond mere recreation, serving as an important factor in enhancing psychological resilience and life satisfaction. The findings highlight that, for winter tourism destinations and service providers, tourist experiences should be evaluated not only from a physical standpoint but also through their emotional and cognitive dimensions.

6.1. Theoretical Implications

This research makes an original contribution to the existing body of literature by analyzing the interconnections between individuals' leisure participation, mental resilience, and life satisfaction within an integrated model framework. In this context, mental toughness is evaluated as an intervening variable in the relationship between leisure activities and life satisfaction, thereby offering a conceptual expansion to both sport psychology and leisure literature. The theoretical contributions of the study can be discussed under three main themes: (1) the integration of the concept of mental toughness into leisure literature, (2) increasing conceptual depth through the differentiation of types of leisure participation, and (3) integrating the theory of mental toughness with life satisfaction.

In the existing literature, the concept of mental endurance has predominantly been studied within the context of sports psychology, particularly in relation to the performance of competitive athletes (Clough & Strycharczyk, 2012; Crust, 2008). This study, however, offers a new perspective by examining the concept within a recreational context, specifically focusing on touristic and hedonic leisure activities. The findings suggest that mental endurance is not merely a stable personality trait effective only in competitive environments but also a dynamic psychological construct that can develop through non-goal-oriented leisure experiences and support individual well-being (Gucciardi et al., 2008; Shipway & Jones, 2007).

In this study, individuals' participation in leisure activities was examined across three main dimensions: social, developmental, and thrilling activities. Previous studies have tended to approach this process as a one-dimensional structure. This research departs from the existing framework and provides a deeper conceptual understanding of all types of participation (Havitz & Mannell, 2005; Iwasaki & Havitz, 2004; Kyle & Mowen, 2005). Studies emphasize

that exciting and adrenaline-filled activities have a positive effect on individuals' mental endurance. There is a direct relationship between the frequency of engaging in such activities and individuals' psychological strengthening. This study attempts to explain how different types of participation influence individuals' psychological states, either positively or negatively (Gucciardi et al., 2008; Hutchinson, Loy, Kleiber, & Dattilo, 2003; Leversen et al., 2012).

Diener et al. (1985) define life satisfaction as individuals' evaluation of the emotional and psychological effects they experience in their daily lives, based on their own criteria. The findings of this study support these results and show similarities with previous research by Newman et al. (2018) and Cho and Hong (2013). Their research focused on the relationships between psychological characteristics and life satisfaction. In our study, it was determined that mental endurance is not merely a factor in coping with stress. Furthermore, the findings reveal that mental endurance serves as a psychological resource in individuals' processes of making sense of and evaluating their lives.

6.2. Practical Implications

The findings of this study indicate that participation in winter sports, such as skiing and snowboarding, not only enhances physical health but also positively influences mental endurance and life satisfaction. Therefore, destination managers and tourism businesses should consider individuals' psychological needs when designing tourism activities, as this can enhance visitor well-being and enrich the overall destination experience. Winter tourism programs targeting young adults, middle-aged individuals, or professionals in high-stress occupations should go beyond recreational purposes and incorporate elements that support psychological health. Such practices are crucial for increasing customer satisfaction and strengthening destination loyalty (Hung, Dey, Vaculikova, & Anh, 2021; Jebbouri et al., 2022). Leisure activities tailored to tourists' psychological needs and individual differences can also contribute to destination differentiation and provide a competitive advantage. Moreover, integrating winter tourism into public policy strategies that promote healthy lifestyles may enhance societal well-being.

Given the influence of mental endurance on performance and life satisfaction, educational institutions are encouraged to incorporate this concept into their curricula. For professionals in high-stress environments, priority should be given to training programs that include nature-based and physical activities, as these initiatives can strengthen psychological resilience, improve personal satisfaction, and indirectly enhance workplace productivity (Crust et al., 2014).

In conclusion, this study demonstrates that leisure activities involving winter sports significantly affect life satisfaction through the mediating role of mental endurance. By providing interdisciplinary insights into tourism and positive psychology, the research highlights that experiences supporting psychological well-being are an effective means of enhancing overall quality of life.

6.3. Research Limitations and Future Directions

Although this study offers meaningful results within the context of an innovative model, it also involves several methodological constraints. First, the sample group is limited to individuals engaged in winter sports at the Palandöken Ski Resort in Erzurum, which limits the extent to which the findings can be generalized. Therefore, it is recommended that future research include multiple ski resorts from different geographical regions, as this would enhance the validity and generalizability of the findings.

The scales used in this study were adapted to the context of skiing. Future research could apply instruments developed for different sports, such as hiking, rafting, and mountaineering, as well as various leisure activities, to explore the relationship between mental toughness and life satisfaction across diverse settings. Employing experimental or longitudinal designs would enable researchers to track the development of mental endurance and leisure participation over time and to comparatively assess the psychological effects of different types of leisure activities.

Lastly, the current research model was tested exclusively within the context of skiing. Future studies could restructure and test the model in the context of other nature-based extreme sports, such as rafting, climbing, and camping, as well as different types of tourism activities. Doing so would not only expand the model's validity and scope but also provide multidimensional contributions to both the tourism and sport psychology literature.

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Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

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REFERENCES

- Allender, S., Cowburn, G., & Foster, C. (2006). Understanding participation in sport and physical activity among children and adults: A review of qualitative studies. *Health Education Research*, 21(6), 826-835. <https://doi.org/10.1093/her/cyl063>
- Bayraktar, Y. (2024). Sustainability in street food: Elaboration likelihood model (ELM) and image theory perspective. *International Journal of Gastronomy and Food Science*, 38, 101029. <https://doi.org/10.1016/j.ijgfs.2024.101029>
- Bethlehem, J. (2010). Selection bias in web surveys. *International Statistical Review*, 78(2), 161-188. <https://doi.org/10.1111/j.1751-5823.2010.00112.x>
- Bloom, M. R., Grant, M. W., & Watt, D. (2005). *Strengthening Canada: The socio-economic benefits of sport participation in Canada*. Paper presented at the Conference Board of Canada, Publication No. 35/6. Conference Board of Canada.
- Caldwell, L. L. (2005). Leisure and health: Why is leisure therapeutic? *British Journal of Guidance & Counselling*, 33(1), 7-26. <https://doi.org/10.1080/03069880412331335939>
- Casey, D. M., Ripke, M. N., & Huston, A. C. (2005). Activity participation and the well-being of children and adolescents in the context of welfare reform. In J. L. Mahoney, R. W. Larson, & J. S. Eccles (Eds.), *Organized activities as contexts of development: Extracurricular activities, after-school, and community programs* (pp. 65-84). Mahwah, NJ: Lawrence Erlbaum Associates / Psychology Press.
- Cho, K. S., & Hong, E. J. (2013). A path analysis of the variables related to the quality of life of mothers with disabled children in Korea. *Stress and Health*, 29(3), 229-239. <https://doi.org/10.1002/smi.2457>
- Churchill Jr., G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 16(1), 64-73. <https://doi.org/10.1177/002224377901600110>
- Clough, P., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. In I. M. Cockerill (Ed.), *Solutions in sport psychology*. In (pp. 32-45). London: Thomson Learning.
- Clough, P., & Strycharczyk, D. (2012). *Developing mental toughness: Improving performance, wellbeing and positive behaviour in others*. London: Kogan Page.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Crust, L. (2008). A review and conceptual re-examination of mental toughness: Implications for future researchers. *Personality and Individual Differences*, 45(7), 576-583. <https://doi.org/10.1016/j.paid.2008.07.005>
- Crust, L., Earle, K., Perry, J., Earle, F., Clough, A., & Clough, P. J. (2014). Mental toughness in higher education: Relationships with achievement and progression in first-year university sports students. *Personality and Individual Differences*, 69, 87-91. <https://doi.org/10.1016/j.paid.2014.05.016>

- Damodaran, A., Di Troia, F., Visaggio, C. A., Austin, T., & Stamp, M. (2017). A comparison of static, dynamic, and hybrid analysis for malware detection. *Journal of Computer Virology and Hacking Techniques*, 13(1), 1–12. <https://doi.org/10.1007/s11416-015-0261-z>
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71-75. https://doi.org/10.1207/s15327752jpa4901_13
- Erdogan, B., Bauer, T. N., Truxillo, D. M., & Mansfield, L. R. (2012). Whistle while you work: A review of the life satisfaction literature. *Journal of Management*, 38(4), 1038-1083. <https://doi.org/10.1177/0149206311429379>
- Gavín-Chocano, Ó., Martín-Talavera, L., Sanz-Junoy, G., & Molero, D. (2023). Emotional intelligence and resilience: Predictors of life satisfaction among mountain trainers. *Sustainability*, 15(6), 4991. <https://doi.org/10.3390/su15064991>
- Geng, W., Wan, Q., Wang, H., Dai, Y., Weng, L., Zhao, M., ... Duan, Y. (2023). Leisure involvement, leisure benefits, and subjective well-being of bicycle riders in an urban forest park: The moderation of age. *Forests*, 14(8), 1676. <https://doi.org/10.3390/f14081676>
- Gerber, Y., Weston, S. A., Redfield, M. M., Chamberlain, A. M., Manemann, S. M., Jiang, R., . . . Roger, V. L. (2015). A contemporary appraisal of the heart failure epidemic in Olmsted County, Minnesota, 2000 to 2010. *JAMA Internal Medicine*, 175(6), 996-1004. <https://doi.org/10.1001/jamainternmed.2015.0924>
- Gucciardi, D. F., Gordon, S., & Dimmock, J. A. (2008). Towards an understanding of mental toughness in Australian football. *Journal of Applied Sport Psychology*, 20(3), 261-281. <https://doi.org/10.1080/10413200801998556>
- Guenther, P., Guenther, M., Ringle, C. M., Zaefarian, G., & Cartwright, S. (2023). Improving PLS-SEM use for business marketing research. *Industrial Marketing Management*, 111, 127-142. <https://doi.org/10.1016/j.indmarman.2023.03.010>
- Hair, J., & Alamer, A. (2022). Partial least squares structural equation modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics*, 1(3), 100027. <https://doi.org/10.1016/j.rmal.2022.100027>
- Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2019). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Havitz, M. E., & Mannell, R. C. (2005). Enduring involvement, situational involvement, and flow in leisure and non-leisure activities. *Journal of Leisure Research*, 37(2), 152-177. <https://doi.org/10.1080/00222216.2005.11950048>
- Hung, V. V., Dey, S. K., Vaculcikova, Z., & Anh, L. T. H. (2021). The influence of tourists' experience on destination loyalty: A case study of Hue City, Vietnam. *Sustainability*, 13(16), 8889. <https://doi.org/10.3390/su13168889>
- Hutchinson, S. L., Loy, D. P., Kleiber, D. A., & Dattilo, J. (2003). Leisure as a coping resource: Variations in coping with traumatic injury and illness. *Leisure Sciences*, 25(2-3), 143-161. <https://doi.org/10.1080/01490400306566>
- Iwasaki, Y., & Havitz, M. E. (2004). Examining relationships between leisure involvement, psychological commitment, and loyalty to a recreation agency. *Journal of Leisure Research*, 36(1), 45-72. <https://doi.org/10.1080/00222216.2004.11950010>
- Jebbouri, A., Zhang, H., Imran, Z., Iqbal, J., & Bouchiba, N. (2022). Impact of destination image formation on tourist trust: Mediating role of tourist satisfaction. *Frontiers in Psychology*, 13, 845538. <https://doi.org/10.3389/fpsyg.2022.845538>
- Jones, G., Hanton, S., & Connaughton, D. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist*, 21(2), 243-264. <https://doi.org/10.1123/tsp.21.2.243>
- Jones, J. G., & Moorhouse, A. (2008). *Developing mental toughness: Gold medal strategies for transforming your business performance*. London: Spring Hill.
- Kelly, G. (1955). *The psychology of personal constructs* (Vol. 2). New York: Norton.
- Kim, B.-G., & Lee, S.-K. (2018). Psychological and physiological stress variations through casual and serious leisure. *Tourism Review*, 73(3), 297-313. <https://doi.org/10.1108/TR-08-2017-0129>
- Kim, H. J., Lee, T. J., & Ko, T. G. (2016). Satisfaction and subjective well-being of health tourists: The case of Japanese and Korean tourists. *Journal of Travel & Tourism Marketing*, 33(5), 742-756. <https://doi.org/10.1080/10548408.2016.1167392>

- Kleiber, D. A., Hutchinson, S. L., & Williams, R. (2002). Leisure as a resource in transcending negative life events: Self-protection, self-restoration, and personal transformation. *Leisure Sciences*, 24(2), 219-235. <https://doi.org/10.1080/01490400252900167>
- Kyle, G. T., & Mowen, A. J. (2005). An examination of the leisure involvement—agency commitment relationship. *Journal of Leisure Research*, 37(3), 342-363. <https://doi.org/10.1080/00222216.2005.11950057>
- Leveresen, I., Danielsen, A. G., Birkeland, M. S., & Samdal, O. (2012). Basic psychological need satisfaction in leisure activities and adolescents' life satisfaction. *Journal of Youth and Adolescence*, 41(12), 1588-1599. <https://doi.org/10.1007/s10964-012-9776-5>
- Liao, Z., Zhou, H., & He, Z. (2022). The mediating role of psychological resilience between social participation and life satisfaction among older adults in China. *BMC Geriatrics*, 22(1), 948. <https://doi.org/10.1186/s12877-022-03635-x>
- Madrigal, L., Hamill, S., & Gill, D. L. (2013). Mind over matter: The development of the mental toughness scale (MTS). *The Sport Psychologist*, 27(1), 62-77. <https://doi.org/10.1123/tsp.27.1.62>
- Newman, A., Nielsen, I., Smyth, R., & Hirst, G. (2018). Mediating role of psychological capital in the relationship between social support and wellbeing of refugees. *International Migration*, 56(2), 117-132. <https://doi.org/10.1111/imig.12415>
- Qin, Z., & Chen, P.-K. (2022). Enhancing the resilience of sustainable supplier management through the combination of win-win lean practices and auditing mechanisms — An analysis from the resource-based view. *Frontiers in Environmental Science*, 10, 962008. <https://doi.org/10.3389/fenvs.2022.962008>
- Ragheb, M. G., & Burlingame, J. (2002). *Assessment of leisure and recreation involvement*. Champaign, IL: Idyll Arbor.
- Shipway, R., & Jones, I. (2007). Running away from home: Understanding visitor experiences and behaviour at sport tourism events. *International Journal of Tourism Research*, 9(5), 373-383. <https://doi.org/10.1002/jtr.641>
- Streukens, S., & Leroi-Werelds, S. (2016). Bootstrapping and PLS-SEM: A step-by-step guide to get more out of your bootstrap results. *European Management Journal*, 34(6), 618-632. <https://doi.org/10.1016/j.emj.2016.06.003>
- Thelwell, R., Weston, N., & Greenlees, I. (2005). Defining and understanding mental toughness within soccer. *Journal of Applied Sport Psychology*, 17(4), 326-332. <https://doi.org/10.1080/10413200500313636>
- Wang, X., Lai, I. K. W., & Liu, X. (2021). The effect of place attachment on overseas students' tourism ambassador behavior: A mediation role of life satisfaction. *Frontiers in Psychology*, 12, 766997. <https://doi.org/10.3389/fpsyg.2021.766997>