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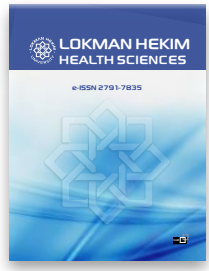

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ORIGINAL ARTICLE

The Relationship between Digital Addiction and Sensory Processing Patterns in University Students: An Occupational Therapy Perspective

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Abstract

Introduction: Digital addiction is an emerging concern among university students and may be influenced by individual sensory processing patterns. Understanding this relationship offers new avenues for occupational therapy interventions that promote balanced digital engagement. This study aimed to examine the relationship between digital addiction and sensory processing patterns in university students and to determine whether specific sensory processing traits predict digital addiction severity.

Methods: The study was conducted online through self-administered surveys. A total of 117 university students aged 18–25 years who regularly used digital devices for at least 1 year participated in the study. Digital addiction scale and adolescent/adult sensory profile were administered. Data were analyzed using correlation and multiple regression analyses.

Results: Sensory sensitivity was positively correlated with all subdimensions of digital addiction and significantly predicted total digital addiction scores. Other sensory processing patterns were not significant predictors.

Discussion and Conclusion: University students with heightened sensory sensitivity are more vulnerable to digital addiction. Occupational therapy practitioners should incorporate sensory-informed strategies to address problematic digital engagement in young adults.

Keywords: Digital addiction; Occupational therapy; Sensory processing; Sensory sensitivity; University students

The growing ubiquity of digital technologies in daily life has given rise to behavioral health concerns, including digital addiction. Among university students, digital devices are widely used for education, socialization, and leisure. However, excessive and compulsive engagement with digital media can interfere with academic performance, emotional regulation, and participation in meaningful daily activities, core domains within the scope of occupational therapy.[1,2]

Digital addiction, characterized by uncontrolled digital device use and associated functional impairments, has been linked to psychological outcomes such as anxiety, depression, and cognitive overload.[2–5] However, there is limited understanding of how digital addiction interacts

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with sensory processing patterns, a key area of focus in occupational therapy that influences how individuals interpret and respond to sensory input from their environment.[3,4] Prolonged digital exposure may disrupt sensory modulation by overloading specific channels (e.g., visual), leading to sensory sensitivity or avoidance behaviors.[6]

Emerging evidence suggests that individuals with heightened sensory sensitivity may be more vulnerable to digital overuse as they seek predictable, controllable environments.[7,8] This is particularly relevant in the university student population, who are navigating developmental transitions and often face academic stress, social adaptation challenges, and increased autonomy. These factors may compound the risk of maladaptive digital engagement and make this population particularly susceptible to its consequences.[9,10]

From an occupational therapy perspective, understanding the role of sensory processing in digital addiction can inform person-centered interventions aimed at improving digital habits, emotional regulation, and functional participation. However, there is a need for empirical research exploring these relationships among emerging adults.

The present study aims to examine the relationship between digital addiction and sensory processing patterns in university students, with a specific focus on whether sensory sensitivity predicts digital addiction levels.

Materials and Methods

Design

This study employed a cross-sectional, correlational design to examine the relationship between digital addiction and sensory processing patterns among university students. The research was guided by a quantitative framework consistent with occupational therapy's emphasis on person-environment interaction.

Participants

The G*Power (version 3.1) program was used to calculate the sample size to be included in the study. With an expected correlation coefficient of r=0.30, an alpha level of 0.05, and a statistical power of 0.90, the required sample size was calculated as at least 112 participants. A total of 117 university students (aged 18–25 years) were recruited through convenience sampling. Inclusion criteria were: (1) current enrollment in a university program, and (2) regular digital device use (e.g., smartphone, tablet, computer) for at least one year. Exclusion criteria included a self-reported diagnosis of neurological or psychiatric conditions and any physical disability that could interfere with participation in daily activities. Participants voluntarily completed the online survey after providing informed consent. This study was approved by the Institutional Review Board of Lokman Hekim University (Approval No: 2025/130, Date: May 30, 2025). The study was conducted in accordance with principles of the Declaration of Helsinki.

Measures

Demographic Information Form

Participants provided information on age, gender, academic program, year of study, average daily screen time, primary reasons for digital device use (e.g., education, social media, entertainment), and medication use.

Digital Addiction Scale (DAS)

The DAS is a 19-item Likert-type self-report scale that evaluates five dimensions of digital addiction: excessive use, relapse, disruption of daily life, mood regulation, and inability to stop.[11] Higher scores indicate higher levels of digital addiction. The internal consistency for the original scale is reported as α=0.87.[11]

Adolescent/Adult Sensory Profile (AASP)

Based on Dunn's Sensory Processing Framework, the AASP (Brown and Dunn, 2002) is a 60-item self-report tool assessing individuals' sensory processing patterns across four quadrants: low registration, sensory seeking, sensory sensitivity, and sensation avoiding. Each item is rated on a 5-point Likert scale.[12] The Turkish adaptation was validated.[13]

Procedure

Data collection occurred between June 2025 and July 2025 using an online survey format hosted on Google Forms. The survey link, including an informed consent statement, was distributed through university-affiliated social media groups and email platforms. All survey items were marked as required to minimize missing data. Data were securely stored in password-protected files on the researchers' institutional accounts.

Data Analysis

Statistical analysis was performed using IBM Statistical Package for the Social Sciences Statistics version 29.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (means, standard deviations [SD], frequencies, and percentages) were calculated to summarize demographic variables and scale scores. The Kolmogorov–Smirnov test was used

Table 1. Demographic information of university students

Variables	Mean	SD
Age	21.7	1.78
Variables	**n**	**%**
Gender		
Female	90	77.0
Male	27	23.0
Year		
1	18	15.4
2	25	21.4
3	21	17.9
4	53	45.3
Screen time		
<2 h	6	5.1
2–5 h	43	36.8
More than 5 h	68	58.1
Purpose of digital device use		
Education	90	77.0
Social media	112	95.7
Gaming	48	41.0
Watching series/movies	90	77.0
Other	8	6.8

SD: Standard deviation.

to assess normality. Pearson or Spearman correlation coefficients were calculated to examine relationships between sensory processing patterns and digital addiction scores, depending on data distribution. Multiple linear regression analysis was conducted to identify whether sensory processing patterns predicted digital addiction levels. In the multiple regression analysis, demographic variables (age, gender, screen time) were not included as covariates. The model examined only the direct predictive relationships between the four sensory processing dimensions and total digital addiction scores. The level of statistical significance was set at $p<0.05$.

Results

A total of 117 university students participated in the study. The mean age of the participants was 21.7 years (SD=1.78), and the majority were female (77.0%). Most students (58.1%) reported using digital devices for more than 5 h/day, primarily for social media (95.7%), education (77.0%), and entertainment such as watching series or films (77.0%) (Table 1).

Sensory Processing Patterns

Analysis of the AASP revealed that most participants scored within the "similar to most people" range across all four quadrants: sensation avoiding (47.0%), sensation seeking (67.5%), low registration (51.3%), and sensory sensitivity (49.6%). However, a considerable portion of the sample exhibited elevated scores in sensory sensitivity (33.3%) and sensation avoiding (29.9%), suggesting heightened reactivity to sensory stimuli in a significant subset of students (Table 2).

Digital Addiction Levels

Participants' scores on the DAS indicated moderate levels of digital addiction, with the highest mean score in the "inability to stop" subdimension (M=3.72, SD=1.07), followed by excessive use (M=2.85, SD=0.83), relapse (M=2.60, SD=1.01), mood regulation (M=2.34, SD=0.74), and disruption of daily life (M=2.27, SD=0.87). The overall mean digital addiction score was 2.72 (SD=0.68), indicating moderate engagement with digital devices that may reflect problematic use (Table 3).

Correlation Analysis

Correlation analysis demonstrated that sensory sensitivity was significantly and positively correlated with all subdimensions of digital addiction, including excessive use ($r=0.346$, $p<0.001$), relapse ($r=0.277$, $p=0.002$), disruption of daily life ($r=0.325$, $p<0.001$), mood regulation ($r=0.203$, $p=0.028$), and inability to stop ($r=0.091$, $p=0.329$, not

Table 2. Distribution of adolescent Dunn sensory profile according to sensory processing subdimensions

	Sensation avoiding		Sensation seeking		Low registration		Sensory sensitivity	
	n	%	n	%	n	%	n	%
Much less than most people	0	0.0	0	0.0	5	4.3	3	2.6
Less than most people	9	7.7	31	26.5	33	28.2	2	1.7
Similar to most people	55	47.0	79	67.5	60	51.3	58	49.6
More than most people	35	29.9	6	5.1	18	15.4	39	33.3
Much more than most people	18	15.4	1	0.9	1	0.9	15	12.8

Table 3. Descriptive statistics for the subdimensions of the digital addiction scale

Subscales	n	Min	Max	Mean (SD)
Excessive use	117	1	5	2.85 (0.83)
Relapse	117	1	5	2.60 (1.01)
Disruption of daily life	117	1	5	2.27 (0.87)
Mood regulation	117	1	5	2.34 (0.74)
Inability to stop	117	1	5	3.72 (1.07)
Total	117	1	5	2.72 (0.68)

Min: Minimum; Max: Maximum; SD: Standard deviation.

significant). Sensation avoiding was also significantly associated with disruption of daily life (r=0.305, p<0.001) and mood regulation (r=0.335, p<0.001). Sensation seeking was only significantly correlated with the inability to stop (r=0.245, p=0.008). Low registration showed significant associations with disruption of daily life (r=0.308, p<0.001) and mood regulation (r=0.278, p=0.002) (Table 4).

Regression Analysis

A multiple linear regression analysis was conducted to determine whether sensory processing patterns predicted overall digital addiction scores. The model was statistically significant (F(4,112)=4.300, p=0.003), explaining 13.3% of the variance in digital addiction (R^2=0.133, Adjusted R^2=0.102). Among the four sensory processing dimensions, only sensory sensitivity was a significant predictor of digital addiction (β=0.292, p=0.028). Other variables (sensation avoiding, sensation seeking, and low registration) did not significantly predict digital addiction (Table 5).

Discussion

This study examined the relationship between digital addiction and sensory processing patterns in university students through an occupational therapy lens. The findings demonstrated that among the four sensory processing profiles, sensory sensitivity emerged as a significant predictor of digital addiction, while other profiles, such as sensation avoiding, low registration, and sensation seeking, were not statistically significant predictors in the regression model. These findings underscore the nuanced relationship between sensory modulation and problematic digital engagement in emerging adults.

This study uniquely establishes sensory sensitivity as a key predictor of digital addiction among university students within an occupational therapy context. This study is one of the first to objectively establish that sensory processing patterns, specifically heightened sensory sensitivity, significantly influence problematic digital involvement,

Table 4. Correlation between the digital addiction scale and the subdimensions of the adolescent Dunn sensory profile

Dunn/DAS	Sensation avoiding		Sensation seeking		Low registration		Sensory sensitivity	
	r	p	r	p	r	p	r	p
Excessive use	0.191*	0.039	0.162	0.080	0.132	0.154	0.346*	<0.001
Relapse	0.176	0.058	0.141	0.129	0.123	0.187	0.277*	0.002
Disruption of daily life	0.305*	<0.001	0.077	0.407	0.308*	<0.001	0.325*	<0.001
Mood regulation	0.335*	<0.001	0.177	0.057	0.278*	0.002	0.203*	0.028
Inability to stop	-0.051	0.588	0.245*	0.008	-0.136	0.143	0.091	0.329
Total	0.260*	0.005	0.219*	0.017	0.193*	0.038	0.356*	<0.001

*: p<0.05. DAS: Digital addiction scale.

Table 5. Multiple regression results related to the predictive level of the total digital addiction scale and subdimensions of the adolescent dunn sensory profile

Variables	B	SE	Beta	t	p	95% CI	Tolerance	VIF	Cohen's f^2
Constant	1.441	0.378	–	3.811	<0.001	(0.693, 2.189)	–	–	–
Sensation avoiding	0.067	0.098	0.084	0.686	0.494	(-0.127, 0.261)	0.520	1.924	0.004
Sensation Seeking	0.111	0.110	0.091	1.002	0.319	(-0.107, 0.329)	0.933	1.072	0.006
Low registration	-0.036	0.096	-0.041	-0.371	0.711	(-0.226, 0.154)	0.636	1.573	0.001
Sensory sensitivity	0.237	0.107	0.292	2.221	0.028	(0.026, 0.448)	0.449	2.229	0.044

SE: Standard error; CI: Confidence interval; VIF: Variance inflation factor. Model F(4,112)=4.300, p=0.003; R^2=0.133, Adjusted R^2=0.102.

despite prior research focusing on psychological and social aspects. This discovery enhances existing theoretical comprehension by proposing that individuals with sensory sensitivity may utilize digital gadgets for environmental control and sensory regulation, a viewpoint not before highlighted in the literature on digital addiction.

It is crucial to acknowledge that, although statistically significant, the correlation coefficients identified in this study were predominantly weak to moderate, indicating that sensory processing patterns account for only a limited fraction of the variance in digital addiction. The regression model accounted for 13.3% of the variance in digital addiction, suggesting that sensory processing patterns contribute a tiny yet significant percentage to the variability of digital addiction. This limited explanatory power highlights the multifaceted character of digital addiction. The residual 87% of variance is presumably ascribed to various factors, including personality traits (e.g., impulsivity, neuroticism), psychological conditions (e.g., depression, anxiety, loneliness), social influences (e.g., peer norms, social support), cognitive elements (e.g., self-regulation, executive function), and contextual variables (e.g., academic stress, living circumstances). The findings suggest that digital addiction is a multifaceted phenomenon shaped by various variables beyond sensory processing, highlighting the necessity for comprehensive, multidimensional strategies in study and rehabilitation.

Numerous studies indicate that sensory sensitivity is associated with challenges in emotional control and social functioning in university students. Studies indicate that individuals with increased sensory processing sensitivity exhibit more susceptibility to environmental stressors and may utilize digital technologies as coping strategies.[7,8,14,15] This pattern is especially evident in university environments where students encounter various stresses, such as academic pressures, social changes, and environmental uncertainties. The relationship between sensory sensitivity and digital addiction is characterized by a positive correlation, indicating that higher levels of sensory sensitivity are associated with greater total digital addiction scores across various dimensions.[7] This suggests that university students exhibiting greater sensory sensitivity may engage more extensively with digital platforms, potentially as a coping mechanism for their heightened sensitivity to environmental stimuli.[8]

Nevertheless, the literature recognizes the intricacy of these relationships. Research suggests that although a correlation exists between digital addiction and sensory sensitivity, this association may not be uniformly relevant across all circumstances or demographics. The correlation between sensory sensitivity and mental health disorders, such as sadness and anxiety, is intricate and exhibits considerable variability among individuals.[16] Elements beyond sensory sensitivity, including social support and flexibility to contextual changes, substantially influence the effect of digital involvement on mental well-being.[17] Evidence indicates that sensory sensitivity may provide advantages in specific settings, including heightened ambient awareness and increased depth of processing.[18,19] Moreover, other research indicates that sensory defensiveness and sensitivity may decrease with age, suggesting that various factors contribute to digital addiction and are not only reliant on sensory processing characteristics.[20] These nuanced findings underscore the necessity for person-centered methodologies that acknowledge individual differences in the manifestation and interaction of sensory processing features with digital engagement patterns.

The finding that university students report the highest average score for digital addiction in the "inability to stop" sub-dimension is supported by converging evidence highlighting the compulsive nature of digital engagement and loss of control associated with it. Studies indicate that students often recognize their inability to regulate their digital usage, significantly impacting their academic and personal lives. For instance, research has found that social networking addiction is linked to adverse academic performance, with excessive engagement disrupting educational commitments and demonstrating clear loss of control in students' interactions with digital technologies.[21] Similarly, patterns emerge where students with lower GPAs exhibit higher levels of digital addiction, reflecting compromised ability to manage digital consumption.[2]

However, alternative perspectives suggest a more nuanced understanding of this phenomenon. Some research indicates that personal psychological factors such as loneliness and shyness serve as significant predictors of smartphone addiction, raising questions about whether the inability to stop stems solely from compulsive behavior or from deeper emotional needs prompting continual connectivity.[22] Evidence also points to lower internet addiction prevalence being correlated with positive psychological trajectories, suggesting that self-regulation, environmental factors, and individual differences play critical roles.[5] Furthermore, perceptions of digital addiction among students are subject to personal interpretation and cultural contexts, emphasizing that behaviors must be contextualized within individual motivations and life situations rather than through a singular lens of loss of

control.[23] Research also highlights various pathways leading to smartphone addiction, emphasizing impulsivity and impulsive decision-making as major contributors rather than strict inability to stop.[24]

Evidence supports the assertion that sensory avoidance and low registration profiles among university students correlate significantly with specific sub-dimensions of the DAS, namely interference with daily life and emotional state. Research demonstrates that atypical sensory processing can disrupt daily functions and emotional stability among students. Studies investigating associations between sensory processing profiles and adaptive functioning indicate that sensory avoidance and low registration profiles are associated with various adverse outcomes, including difficulties in daily functioning and emotional regulation.[25] This suggests that students with heightened sensory avoidance may experience disturbances in their emotional state, potentially amplifying feelings of distress when engaging with digital technologies.

Additional research reveals significant relationships between sensory processing patterns and occupational engagement, with individuals reporting high levels of sensory avoidance experiencing challenges that interfere with their ability to engage in everyday activities.[26] Studies exploring psychometric properties of sensory profiles have found that low registration and sensory avoidance significantly affect self-regulation and coping strategies, ultimately influencing students' emotional well-being and capacity for engagement with digital tasks.[27]

Nevertheless, some studies indicate that the relationship between sensory processing profiles and digital addiction may not be uniform across all university students. While sensory processing differences exist, the relationship with behavioral patterns might vary, suggesting that not all forms of sensory avoidance directly lead to digital addiction-related difficulties.[28] In addition, factors such as loneliness and social anxiety can predict smartphone addiction, and these psychosocial factors may overshadow the impact of sensory profiles on digital behaviors.[29] Some findings suggest that self-efficacy plays a critical role in mood management, indicating that interventions promoting self-efficacy could be essential in addressing emotional states linked to digital usage, potentially independent of sensory processing patterns.[30]

The finding that a significant proportion of university students scored "more than most people" in sensory sensitivity and sensory avoidance is supported by research exploring sensory processing sensitivity among university student populations. Studies investigating the relationship between sensory processing sensitivity and emotional difficulties have concluded that a substantial segment of university students demonstrated heightened sensory sensitivity, which correlated with emotional distress and challenges in daily functioning.[31] Reviews on the impact of sensory processing sensitivity on mental health emphasize that these traits are prevalent among students, with many reporting significant sensory sensitivity and avoidance behaviors that disrupt everyday functioning and emotional stability.[15] Research also indicates that sensory differences, particularly among female students, are significantly correlated with the need for support in managing emotional states and academic performance.[16]

However, contrasting evidence suggests variability in how sensory sensitivity manifests. Some research highlights that individuals with high sensory processing sensitivity might benefit from their heightened awareness, perceiving opportunities others might miss.[18] Systematic reviews reveal that sensory processing could correlate positively with aspects of well-being and quality of life, suggesting that some individuals with high sensory sensitivity may adapt by utilizing these sensitivities effectively.[19] These findings challenge the narrative that increased sensory sensitivity is uniformly problematic and instead suggest considerable variability in impact across individuals.

Occupational therapy interventions for university students with heightened sensory sensitivity may include: (1) Sensory diet implementation, involving the scheduling of regular sensory breaks throughout the day with activities such as deep pressure input (e.g., weighted blankets, compression clothing), proprioceptive activities (e.g., stretching, wall pushes), and calming vestibular input (e.g., gentle rocking, slow walking), which have been shown to support sensory regulation, attention, and behavioral outcomes;[32,33] (2) environmental modifications, including reducing visual clutter, using noise-canceling headphones, adjusting lighting, and creating designated low-stimulation zones to minimize sensory overload and enhance emotional regulation;[34,35] (3) Digital hygiene protocols, such as using blue light filters, enabling grayscale mode during evening hours, limiting vibrations and notifications, and practicing the 20–20–20 rule, which may help reduce sensory strain associated with prolonged digital engagement;[36] (4) Alternative engagement strategies, encouraging participation in non-digital occupations such as creative arts, crafts, gardening, and physical activities that provide meaningful sensory input while supporting emotional regulation and well-being;[37,38] and (5) mindfulness-based sensory awareness training, aimed at enhancing students'

awareness of sensory thresholds and teaching self-regulation strategies to prevent sensory overload, thereby supporting academic functioning and mental health.[34,35]

These interventions should be individualized based on comprehensive sensory assessment and should address the specific sensory profiles and digital use patterns of each student.

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design prevents the establishment of causal relationships between sensory processing patterns and digital addiction. Longitudinal research is needed to explore the directionality of this association over time. Second, the study relied on self-reported measures, which may introduce biases such as social desirability or inaccurate self-assessment. Third, the use of convenience sampling and online recruitment may limit the representativeness of the sample. Participants were not stratified by academic discipline (e.g., engineering, social sciences, health sciences), which may introduce selection bias as students from different fields may have varying patterns of digital device use and sensory processing characteristics. Future studies should employ stratified sampling methods to ensure broader generalizability across academic disciplines. Fourth, the sample comprised predominantly female participants (77.0%), which may introduce gender bias in the findings. Research suggests that sensory processing patterns and digital device use behaviors may differ between genders, with some studies indicating that females report higher sensory sensitivity and different patterns of social media engagement compared to males. Therefore, the observed relationships between sensory sensitivity and digital addiction may not generalize equally to male university students, and future research should ensure more balanced gender representation to examine potential gender-specific effects. Fifth, the regression model did not control for potentially relevant demographic covariates such as age, gender, and screen time, or for psychological variables such as stress levels, anxiety, impulsivity, or emotional regulation. These unmeasured variables may act as confounders or moderators in the relationship between sensory processing and digital addiction. Individual differences in these psychological traits may have a substantial influence on both digital behavior and sensory processing responses. Future research should employ hierarchical regression or structural equation modeling to account for these variables and better isolate the unique contribution of sensory processing patterns. Finally, although the AASP is a widely accepted tool, future studies may benefit from using neurophysiological or observational methods to further validate sensory processing characteristics in relation to digital technology use.

Conclusion

The findings of this study suggest that sensory sensitivity plays a significant role in predicting digital addiction among university students. Students who exhibit heightened sensory reactivity appear to be more vulnerable to the overstimulating and immersive nature of digital technologies. In addition, sensory avoidance and low registration patterns were associated with disruptions in daily functioning and emotional regulation, further underscoring the relevance of sensory processing in understanding problematic digital behavior. From an occupational therapy perspective, these findings highlight the importance of assessing sensory profiles when addressing digital overuse, particularly in young adult populations. Occupational therapists can develop individualized intervention strategies that support sensory modulation, including sensory diets, structured routines, and alternative engagement strategies that reduce reliance on digital devices. Incorporating sensory-informed practices into digital health interventions may enhance students' participation, academic performance, and emotional well-being.

Based on these findings, we recommend that university counseling centers and student health services incorporate sensory screening as part of digital wellness assessments. Specific interventions may include: (1) sensory diet planning to provide alternative sensory regulation strategies; (2) environmental modifications in study spaces to reduce sensory overload; (3) structured digital breaks incorporating sensory-based activities (e.g., mindfulness, progressive muscle relaxation, outdoor walks); (4) psychoeducation programs helping students recognize their sensory triggers and develop healthier coping mechanisms; and (5) collaboration between occupational therapists and counselors to develop individualized digital wellness plans. Youth counseling centers could implement group-based sensory modulation workshops combined with cognitive-behavioral strategies for digital habit formation.

Future occupational therapy research and practice should explore multimodal intervention models that integrate cognitive, sensory, and psychosocial elements to address digital addiction holistically. By recognizing the interplay between sensory processing and digital engagement, occupational therapists are uniquely positioned to promote balanced technology use and foster healthier occupational participation in the digital era.

Ethics Committee Approval: The Lokman Hekim University Ethics Committee granted approval for this study (date: 30.05.2025, number: 2025/130).

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