ISSN 2148-7286 • EISSN 2149-1305

ADDICTA

The Turkish Journal on Addictions

Volume: 12 • Issue: 3 • September 2025

251 Türkiye's Medical Cannabis Law: Progress with Pitfalls

253 Emerging Threats on Video-on-Demand Platforms: A Content Analysis of Alcohol, Tobacco, and Drug Imagery in Turkish Films and Series

260 Tracking Public Interest in Psychoactive Substances: Insights from Google Trends Data

267 Smokers' Reactions to Anti-Smoking Advertisements: A Preliminary Neuromarketing Study

278 Change in Smoking Outcome Expectation Scale and Anti-Smoking Self-Efficacy Scale of the Students During University Education: Repeated Cross-Sectional Study

286 Alcohol Consumption among Shift and Night Workers: A Scoping Review

294 Prevalence of Alcohol Use and Alcohol Use Disorder and Risk Factors among University Students: A Cross-Sectional Study in Trabzon, Türkiye

302 Emergency Department Admissions of Alcohol and Substance Use Disorders: A Two-Year Comparison from a University Hospital in Türkiye

309 Causes of Drop Out in Substance Use Disorder Treatment: A Mixed-Method Study

320 Disulfiram Encephalopathy Presenting with Delirium, Epilepsy, and a Manic Episode: A Case Report

324 The Relationship of Smartphone Addiction with Sleep Quality, Eating Attitudes, and Obesity

331 Problematic Pornography Use, Psychopathology, and Body Connection: Associations and Sex Differences

339 The Mediating Role of Interpersonal Emotion Regulation in the Effect of Parasocial Relationships on Social Media Addiction and the Moderating Role of Death Anxiety: A Cross-Sectional Study

348 Examining Compulsive Online Shopping Behavior, Posttraumatic Cognitions, and Death Anxiety in Young Adults

355 Analysis of Cognitive Schemas and Work-Related Stress Dynamics in Addictive Behaviors: Case Study

YEŞİLAY

addicta.com.tr

ADDICTA

Editor-in-Chief

Hakan Coşkunol
Turkish Green Crescent Society, Türkiye
hakan.coskunol@ege.edu.tr
ORCID iD: 0000-0001-5925-4441

Section Editors

Addiction and Comorbidity
Cüneyt Evren
Liman Psychiatry and Psychotherapy Center, Türkiye
cuneytevren@yahoo.com
ORCID iD: 0000-0002-4431-3514

Addiction and Forensic Sciences
Safa Koçoğlu
İstanbul Medeniyet University, İstanbul, Türkiye
safa.kocoglu@medeniyet.edu.tr
ORCID iD: 0000-0003-2203-8424

Alcohol Use Disorders
Ebru Aldemir
İzmir Tınaztepe University, İzmir, Türkiye
ozturk.ebru2000@gmail.com
ORCID iD: 0000-0002-3808-1956

Communication and Addiction
Kübra Güran Yiğitbaşı
Turkish Ministry of Interior, Afyonkarahisar Governorate, Afyonkarahisar, Türkiye
gurankubra@gmail.com
ORCID iD : 0009-0009-3181-9426

Gambling Addiction
Marc N. Potenza
Yale University, New Haven, USA
marc.potenza@yale.edu
ORCID iD: 0000-0002-6323-1354

Public Health
Mehmet Sait Değer
İstanbul University-Cerrahpasa, İstanbul, Türkiye
mehmetsaitdeger@gmail.com
ORCID iD: 0000-0001-8862-1343

Research Methods in Addiction
Akif Avcu
Marmara University, İstanbul, Türkiye
avcuakif@gmail.com
ORCID iD: 0000-0003-1977-7592

Substance Use Disorders
Nabi Zorlu
Katip Çelebi University, İzmir, Türkiye
zorlunabi@gmail.com
ORCID iD: 0000-0002-2340-6156

Technology Addiction
Adem Başpınar
Kırklareli University, Kırklareli, Türkiye
abaspinar@klu.edu.tr
ORCID iD: 0000-0002-2125-1832

Tobacco/Nicotine Addiction
Volkan Kara
İstanbul University-Cerrahpaşa, İstanbul, Türkiye
volkan_kara@yahoo.com
ORCID iD: 0000-0001-7702-9731

Türkiye Yeşilay Cemiyeti adına sahibi / Owner on behalf of the Türkiye Yeşilay Cemiyeti (Turkish Green Crescent Society): Mehmet Dinç • Sorumlu Yazı İşleri Müdürü / Responsible Manager: Hakan Çetin • Yayın türü / Publication Type: Yerel süreli / Local Periodical • Basım yeri / Printed at: Maviform Matbaa Basım Yayın Grafik Tas. Rek. Ve Org. San. Tic. Ltd. Şti - Mimar Sinan Mh. Üsküdar Cad. Yedpa Tic.Mrkz. F Cad. No:1 D:87 Ataşehir / İstanbul • Basım tarihi / Printing Date: Eylül 2025 / September 2025

AVES

General Manager
İbrahim KARA

Publications Director
Deniz KAYA

Finance Coordinator
Gözde DOĞAN

Publications Coordinators
Nisanur ATICI
Şeref Mert GÜCÜN
Lütfiye ÇETİN
Tabita TOPARLAK
Şevval AKKAYA

Web Coordinator
Ayça Nur SEZEN

Web Assistant
Ozan ŞAHİN
Batuhan KARA

Contact
Address: Halaskargazi Mah. Halaskargazi Cad. No: 38-66E İç Kapı No: 215 Şişli, İstanbul, Türkiye
Phone: +90 212 217 17 00
E-mail: info@avespublishing.com

ADDICTA

Editorial Board

Zeynep Esra Abay Çelik
University of Health Sciences, Türkiye

Elias Aboujaoude
Stanford University, USA

Yusuf Adıgüzel
Sakarya University, Türkiye

Merih Altıntaş
University of Health Sciences, Türkiye

Osman Tolga Arıcak
Hasan Kalyoncu University, Türkiye

Hediyetullah Aydeniz
Marmara University, Türkiye

Mehmet Emin Babacan
Marmara University, Türkiye

Şaziye Senem Başgül
Hasan Kalyoncu University, Türkiye

Rabia Bilici
The Turkish Green Crescent Society, Türkiye

Natale Salvatore Bonfiglio
Scientific Institute for Research, Hospitalization and Healthcare, Italy

Henrietta Bowden-Jones
Imperial College London, UK

Kathleen Brady
Medical University of South Carolina, USA

Peyami Çelikcan
İstinye University, Türkiye

Paolo Deluca
King's College London, UK

Zsolt Demetrovics
University of Gibraltar, Gibraltar

Artuner Deveci
Celal Bayar University, Türkiye

Eren Murat Dinçer
Mimar Sinan Fine Arts University, Türkiye

Halil Ekşi
Marmara University, Türkiye

Toker Ergüder
University of Health Sciences, Türkiye

Kathleen A Garrison
Yale School of Medicine, USA

Yusuf Genç
Sakarya University, Türkiye

Jon E. Grant
The University of Chicago, USA

David Greenfield
University of Connecticut, USA

Mustafa Necmi İlhan
Gazi University, Türkiye

Ayşe Esra İşmen Gazioğlu
İstanbul University-Cerrahpaşa, Türkiye

Susana Jimenez-Murcia
University of Barcelona, Spain

Muhammed Tayyib Kadak
İstanbul University-Cerrahpaşa, Türkiye

Máté Kapitány-Fövény
Semmelweis University, Hungary

İlyas Kaya
İstanbul University, Türkiye

Çiğdem Karakükcü
Erciyes University, Türkiye

Orsolya Király
ELTE Eötvös Loránd University, Hungary

Shane W. Kraus
University of Nevada, USA

Anne-Marie Laslett
La Trobe University, Curtin University, Australia

Maria Lavdaniti
International Hellenic University, Greece

Alexander Logemann
ELTE Eötvös Loránd University, Hungary

Mustafa Otrar
Republic of Türkiye Ministry of National Education, Türkiye

Ahmet Özdinç
Istanbul University-Cerrahpasa, Türkiye

Hans-Juergen Rumpf
University of Lübeck, Germany

Recep Erol Sezer
Yeditepe University, Türkiye

Sherry Stewart
Dalhousie University, Canada

Daniel Tornaim Spritzer
Universidade Federal do Rio Grande do Sul, Brazil

Perihan Torun
University of Health Sciences, Türkiye

Abdullah Uçar
Sakarya University, Türkiye

Ömer Miraç Yaman
İstanbul University-Cerrahpaşa, Türkiye

Akaki Zoidze
Ilia State University, Georgia

Darin Weinberg
King's College Cambridge, UK

ADDICTA

CONTENTS

Editorial Commentary

251 **Türkiye's Medical Cannabis Law: Progress with Pitfalls**
Hakan Coşkunol

Original Articles

253 **Emerging Threats on Video-on-Demand Platforms: A Content Analysis of Alcohol, Tobacco, and Drug Imagery in Turkish Films and Series**
Okan Maden, Süheyla Kurum, Şefik Yurdakul, Egemen Ünal, Mehmet Enes Gökler

260 **Tracking Public Interest in Psychoactive Substances: Insights from Google Trends Data**
Gonca Aşut

267 **Smokers' Reactions to Anti-Smoking Advertisements: A Preliminary Neuromarketing Study**
Ahmet Uyar

278 **Change in Smoking Outcome Expectation Scale and Anti-Smoking Self-Efficacy Scale of the Students During University Education: Repeated Cross-Sectional Study**
Mehmet Ali Kurçer, Merve Bektaş, Ebru Katar

Review

286 **Alcohol Consumption among Shift and Night Workers: A Scoping Review**
Triki Amira, Amel Kchaou Fendri, Imen Ben Hnia, Ahmed Trigui, Nada Kotti, Mounira Hajjaji, Kaouthar Hammami Jmal

Original Articles

294 **Prevalence of Alcohol Use and Alcohol Use Disorder and Risk Factors among University Students: A Cross-Sectional Study in Trabzon, Türkiye**
Cansu Agrali Gundogmus, Sevil Turhan, Abdul Kadir Albayraktar, Yusuf Emre Bostan, Murat Topbas, Nazim Ercument Beyhun, Aykut Karahan, Samiye Cilem Bilginer, Nihan Kalkandeler Ozdin, Gizem Nur Sakar

302 **Emergency Department Admissions of Alcohol and Substance Use Disorders: A Two-Year Comparison from a University Hospital in Türkiye**
Ibrahim Sungur, Gulser Karakoc Tugrul, Damla Isman Haznedaroglu, Ozlem Kuman Tuncel

309 **Causes of Drop Out in Substance Use Disorder Treatment: A Mixed-Method Study**
Nurhalime Akkaya, Kübra Akın, İlker Aktürk, Ömer Miraç Yaman

Case Report

320 **Disulfiram Encephalopathy Presenting with Delirium, Epilepsy, and a Manic Episode: A Case Report**
Zehra Uçar Hasanlı, Mustafa Danışman, Gamze Zengin İspir, Kübra Sezer Katar

Original Articles

324 **The Relationship of Smartphone Addiction with Sleep Quality, Eating Attitudes, and Obesity**
Deniz Dolaş, Mustafa Nogay Coşkun, Ali Erdoğan

331 **Problematic Pornography Use, Psychopathology, and Body Connection: Associations and Sex Differences**
Robin Engelhardt, Jürgen Maes, Nicholas C. Borgogna, Timo von Oertzen, Marc N. Potenza, Shane W. Kraus

339 **The Mediating Role of Interpersonal Emotion Regulation in the Effect of Parasocial Relationships on Social Media Addiction and the Moderating Role of Death Anxiety: A Cross-Sectional Study**
Sevgi Koroglu, Metin Yıldız, Gulgun Durat

348 **Examining Compulsive Online Shopping Behavior, Posttraumatic Cognitions, and Death Anxiety in Young Adults**
Hikmet Beyza Yakıcı, Zeliha Traş

Case-Based Review

355 **Analysis of Cognitive Schemas and Work-Related Stress Dynamics in Addictive Behaviors: Case Study**
Laila Essfioui

ADDICTA

ABOUT

Addicta: The Turkish Journal on Addictions is a peer reviewed, open access journal published by the Turkish Green Crescent Society.

Addicta: The Turkish Journal on Addictions is a quarterly journal that is published in English in March, June, September and December.

Abstracting and Indexing

Addicta: The Turkish Journal on Addictions is covered in the following abstracting and indexing databases;

- Web of Science-Emerging Sources Citation Index
- DOAJ
- CNKI
- TUBITAK ULAKBIM TR Index
- EBSCO
- Turkish Psychiatry Index
- InfoBase
- Gale
- Scopus

All content published in the journal is permanently archived in Portico.

Aims, Scope, and Audience

Addicta: The Turkish Journal on Addictions aims to publish studies of the highest scientific and clinical value, and encourages the submission of high-quality research that advances the understanding and treatment of addictions.

Addicta: The Turkish Journal on Addictions covers a wide range of topics related to addiction and related disorders as well as forming a scientific forum by producing quality debate on various disciplines. The journal is interested in publishing original research that addresses important clinical questions and advances the understanding and treatment of these conditions. This may include studies on addictions to tobacco, alcohol, drugs, gambling and technology.

Addicta: The Turkish Journal on Addictions publishes research articles, reviews, case reports, case-based reviews, letters to the editors, and book reviews within its scope. Conference proceedings may also be considered for publication.

The target audience of the journal includes researchers in the area of addiction from health, social, educational, natural and applied sciences fields.

Editor in Chief: Hakan Coşkunol
Address: Turkish Green Crescent Society, Türkiye
E-mail: editor@addicta.com.tr

Publisher: AVES
Address: Halaskargazi Mah. Halaskargazi Cad. No: 38-66E İç Kapı No: 215 Şişli, İstanbul, Türkiye
Phone: +90 212 217 17 00
E-mail: info@avespublishing.com
Web page: avespublishing.com

ADDICTA

INSTRUCTIONS TO AUTHORS

It is strongly advised to review the journal's policies before submitting any manuscripts to ensure compliance with the journal's guidelines.

Manuscript Preparation
Manuscripts submitted for evaluation should be original and not previously presented or published in any electronic or print medium. If a manuscript was previously presented at a conference or meeting, authors should provide detailed information about the event, including the name, date, and location of the organization.

Manuscripts should be prepared in accordance with ICMJE-Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals (updated in May 2023).

Authors are required to prepare manuscripts in accordance with the relevant guideline listed below:

- Randomized research studies and clinical trials: CONSORT guidelines (for protocols, please see the SPIRIT guidance)
- Observational original research studies: STROBE guidelines
- Studies on diagnostic accuracy: STARD guidelines
- Systematic reviews and meta-analysis: PRISMA guidelines (for protocols, please see the PRISMA-P guidelines)
- Experimental animal studies: ARRIVE guidelines and Guide for the Care and Use of Laboratory Animals, 8th edition
- Nonrandomized evaluations of behavioral and public health interventions: TREND guidelines
- Case report: the CARE case report guidelines
- Genetic association studies: STREGA
- Qualitative research: SRQR guidelines
- To find the right guideline for your research, please complete the questionnaire by Equator Network here.

Addicta: The Turkish Journal on Addictions encourages authors to follow the 'Sex and Gender Equity in Research – SAGER – guidelines' when preparing their manuscripts to promote the inclusion of sex and gender considerations in research. Before submission, authors can consult EASE Guidelines for Authors and Translators to produce clear, concise and accurate manuscripts that are easy to understand and free of common errors and pitfalls.

The style of manuscripts should follow the Publication Manual of the American Psychological Association (APA), Seventh Edition (2020).

Manuscripts can only be submitted through the journal's online manuscript submission and evaluation system. Manuscripts submitted via any other medium and submissions by anyone other than one of the authors will not be evaluated.

In addition to the manuscript files, authors are required to submit the following during the initial submission:

- Copyright Agreement and Acknowledgement of Authorship Form, and
- ICMJE Disclosure Form (should be filled in by all contributing authors) These forms are available for download at https://www.addicta.com.tr/EN.

Preparation of the Manuscript
Title page: A separate title page should be submitted with all submissions and this page should include:

- The full title of the manuscript as well as a short title (running head) of no more than 50 characters,
- Name(s), affiliations, highest academic degree(s), and ORCID IDs of the author(s),
- Grant information and detailed information on the other sources of support,
- Name, address, telephone (including the mobile phone number), and email address of the corresponding author,

- Acknowledgment of the individuals who contributed to the preparation of the manuscript but who do not fulfill the authorship criteria.
- If the author(s) is a member of the journal's Editorial Board, this should be specified in the title page.

Abstract: An abstract should be submitted with all submissions except for Book Reviews and Letter to the Editors. The abstract of Research Articles should be unstructured. Please check Table 1 below for word count specifications.

Extended Abstract: As of 2020, Addicta: The Turkish Journal on Addictions publishes Turkish extended abstracts of the articles in the journal's webpage for educational purposes. Therefore, the Turkish authors are required to submit a 1000 word-long Turkish extended abstract of their article during initial submission. International authors, on the other hand, are expected to submit the extended abstract in English. The Turkish Green Crescent Society will translate English extended abstracts before publication. Extended abstracts should include Introduction, Methods, Results, and Discussion subheadings. Please do not include references.

Keywords: Each submission must be accompanied by a minimum of three to a maximum of six keywords for subject indexing at the end of the abstract. The keywords should be listed in full without abbreviations. The keywords should be selected from the National Library of Medicine, Medical Subject Headings database (https://www.nlm.nih.gov/mesh/MBrowser.html).

Main Points: All submissions except letters to the editor should be accompanied by 3 to 5 "main points." These main points should highlight the most important results of the study and emphasize the main message of the manuscript. The main points should be structured as a list and should be written in a clear and straightforward manner. Since the main points are intended for experts and specialists in the field, they should be written in plain language that is easy to understand. By including main points with the manuscript, authors can help ensure that the most important findings and messages of their study are conveyed clearly to the reader.

Manuscript Types

Original Articles: Original articles provide new information based on original research. The acceptance of original articles is typically based on the originality and importance of the research. The main text of an Original Article should be structured with subheadings, including Introduction, Material and Methods, Results, and Discussion.

Limitations, drawbacks, and the shortcomings of original articles should be mentioned in the Discussion section before the conclusion paragraph.

Please check Table 1 for the limitations for Original Articles.

Clinical Trials

Addicta: The Turkish Journal on Addictions adopts the ICMJE's clinical trial registration policy, which requires that clinical trials must be registered in a publicly accessible registry that is a primary register of the WHO International Trials Registry Platform (ICTRP) or in ClinicalTrials.gov. By registering clinical trials in a publicly accessible registry, authors can help to promote transparency and accountability in their research.

Instructions for the clinical trials are listed below.

- Clinical trial registry is only required for the prospective research projects that study the relationship between a health-related intervention and an outcome by assigning people to different groups.
- To have their manuscript evaluated in the journal, authors should register their research to a public registry at or before the time of first patient enrollment.
- Based on most up to date ICMJE recommendations, Addicta: The Turkish Journal on Addictions accepts public registries that include minimum acceptable 24-item trial registration dataset.
- Authors are required to state a data sharing plan for the clinical trial registration. Please see details under the "Data Sharing" section.
- For further details, please check ICMJE Clinical Trial Policy and COPE Data and Reproducibility guidelines.

Reporting Statistical Analysis

Statistical analysis to support conclusions is usually necessary. Statistical analyses must be conducted in accordance with international statistical reporting standards (Altman DG, Gore SM, Gardner MJ, Pocock SJ. Statistical guidelines for contributors to medical journals. Br Med J 1983: 7; 1489-93). Information on statistical analyses should be provided with a separate subheading under the Materials and Methods section and the statistical software that was used during the process must be specified.

When reporting statistical data in a research paper, it is important to present the values in a clear and consistent manner. P values, confidence intervals (CIs), and other statistical measures should be rounded appropriately and expressed according to the guidelines provided. For example, P values should be expressed to two digits to the right of the decimal point unless the first two digits are zeros, in which case three digits should be provided (eg, instead of $P < .01$, report as $P = .002$). However, values close to .05 may be reported to three decimal places because .05 is an arbitrary cut-off point for statistical significance (eg, $P = .053$). P values less than .001 should be designated as $P < .001$ rather than providing the exact value (eg, $P = .000006$).

Units should be prepared in accordance with the International System of Units (SI).

Review Articles

Review articles that are written by authors with extensive knowledge and expertise in a particular field and a strong track record of publication are welcomed. These authors may even be invited to contribute a review article to the journal. Review articles should provide a comprehensive overview of the current state of knowledge in studies on addictions to tobacco, alcohol, drugs, gambling, and technology and should include discussions and evaluations of relevant research. The subheadings of the review articles can be planned by the authors. However, each review article should include an "Introduction" and a "Conclusion" section. Please check Table 1 for the limitations for Review Articles.

Case Reports

The journal has limited space for case reports, and prioritizes publishing reports on rare cases or challenging conditions that provide new insights into diagnosis and treatment, offer novel therapies, or reveal knowledge not yet included in the literature. Interesting and educational case reports are also welcomed for publication. The text of a case report should include Introduction, Case Presentation, and Discussion sections. An unstructured abstract should also be included. Please check Table 1 for the limitations for Case Reports.

Case-Based Reviews

Case-based reviews are reports on rare cases or conditions that constitute challenges in diagnosis and treatment. They should incorporate a short literature review of similar cases published in the literature, including a description of the search strategy and a summary table of the cases found. These manuscripts should provide insight into the diagnosis and treatment of these challenging cases and highlight the importance of considering rare conditions in clinical practice. Please check Table 1 for the limitations of Case-Based Reviews.

Letters to the Editor

A "Letter to the Editor" is a type of manuscript that discusses important or overlooked aspects of a previously published article. This type of manuscript may also present articles on subjects within the scope of the journal that are of interest to readers, particularly educational cases. Readers can also use the "Letter to the Editor" format to share their comments on published manuscripts. The text of a "Letter to the Editor" should be unstructured and should not include an abstract, keywords, tables, figures, images, or other media. The manuscript that is being commented on must be properly cited within the "Letter to the Editor."

Editorial Comments

Invited editorial comments on selected articles are published in the journal to provide expert insight and critical analysis of the research presented. These comments are written by authors who have demonstrated expertise or a high reputation in the topic of the research article. The journal carefully selects and invites these authors to contribute their comments. The editorial comments should not exceed 1000 words in length and should not include an abstract, keywords, tables, figures, images, or other media.

Book Reviews

The journal welcomes reviews of contemporary and noteworthy books within the journal's scope, provided that they have been reviewed by an external expert on the relevant topic. These reviews should provide a critical evaluation of the book, highlighting its strengths and weaknesses, as well as its relevance to the journal's readership. Please refer to Table 1 for the limitations of Book Reviews.

Table 1.
Limitations for each manuscript type

Type of manuscript	Word limit	Abstract word limit	Reference limit	Table limit	Figure limit
Original Research	4000	200	35	6	5 or total of 10 images
Review Article	5000	250	50	6	10 or total of 15 images
Case Report	1200	200	15	No tables	4 or total of 8 images
Letter to the Editor	400	No abstract	5	No tables	No media
Case-based Review	2500	250	40	2	2
Editorial Comments	2500	No abstract	5	No tables	No media

*Word limit should not include the abstract, references, tables, and figure legends.

Tables
Tables should be included in the main document, after the reference list, and they should be numbered consecutively in the order they are referred to within the text. Each table should have a descriptive title placed above it, and any abbreviations used in the table should be defined below the table by footnotes (even if they are defined in the main text). Tables should be created using the "insert table" command of the Word processing software, and they should be arranged clearly to make the data easy to read and understand. The data presented in the tables should not be a repetition of the data presented in the main text, but should support and enhance the main text.

Figures and Figure Legends
Figures should be submitted as separate files in TIFF or JPEG format, and they should not be embedded in the Word document or the main manuscript file. If a figure has subunits, each subunit should be submitted as a separate file, and the subunits should not be merged into a single image. The figures should not be labeled (a, b, c, etc.) to indicate subunits. Instead, the figure legend should be used to describe the different parts of the figure. Thick and thin arrows, arrowheads, stars, asterisks, and similar marks can be used on the images to support figure legends. Images should be anonymized to remove any information that may identify individuals or institutions. The minimum resolution of each figure should be 300 DPI, and the figures should be clear and easy to read. Figure legends should be listed at the end of the main document. Figures should be referred to within the main text, and they should be numbered consecutively in the order in which they are mentioned.

Abbreviations
All acronyms and abbreviations used in the manuscript should be defined at first use, both in the abstract and in the main text. The abbreviation should be provided in parentheses following the definition, and it should be used consistently throughout the paper.

Identifying products
When mentioning a drug, product, hardware, or software program in a manuscript, it is important to provide detailed information about the product in parentheses. This should include the name of the product, the producer of the product, and the city and country of the company. For example, if mentioning a Discovery St PET/CT scanner produced by General Electric in Milwaukee, Wisconsin, USA, the information should be presented in the following format: "Discovery St PET/CT scanner (General Electric, Milwaukee, WI, USA)." Providing this information helps to ensure that the product is properly identified and credited.

References
Both in-text citations and the references must be prepared according to the Publication Manual of the American Psychological Association (APA), Seventh Edition (2020).

When citing publications, preference should be given to the latest, most up-to-date sources. Citing the latest sources can help to ensure that the paper is relevant and timely, and that it reflects the latest developments in the field.

It is the responsibility of the authors to ensure the accuracy of the references in their article. All sources must be properly cited, and the citations must be formatted correctly.

To avoid plagiarism, it is necessary to acknowledge other sources in your paper through in-text citations. For every in-text citation, a corresponding reference list entry must be provided.

The APA in-text citation style includes the author's last name and the year of publication, such as (Field, 2005). If quoting directly from a source, the page number should also be added, such as (Field, 2005, p. 14).

If an ahead-of-print publication is cited, the DOI number should be provided in the reference list.

The reference styles for different types of publications are presented in the following examples.

Journal Article: Edwards, A. A., Steacy, L. M., Siegelman, N., Rigobon, V. M., Kearns, D. M., Rueckl, J. G., & Compton, D. L. (2022). Unpacking the unique relationship between set for variability and word reading development: Examining word- and child-level predictors of performance. Journal of Educational Psychology, 114(6), 1242 – 1256. https://doi.org/10.1037/edu0000696

Book Section: Zeleke, W. A., Hughes, T. L., & Drozda, N. (2020). Home – school collaboration to promote mindbody health. In C. Maykel & M. A. Bray (Eds.), Promoting mind – body health in schools: Interventions for mental health professionals (pp. 11 – 26). American Psychological Association. https://doi.org/10.1037/0000157-002

Books with a Single Author: Haslwanter, T. (2022). An introduction to statistics with Python. New York, NY: Springer International Publishing.

Editor(s) as Author: Rhodewalt, F. (Ed.). (2008). Personality and social behavior. Psychology Press.

Thesis: Valentin, E. R. (2019, Summer). Narcissism predicted by Snapchat selfie sharing, filter usage, and editing [Master's thesis, California State University Dominguez Hills]. CSU ScholarWorks. https://scholarworks.calstate.edu/concern/theses/3197xm925?locale=en

Websites: Chandler, N. (2020, April 9). What's the difference between Sasquatch and Bigfoot? howstuffworks. https://science.howstuffworks.com/science-vs-myth/strange-creatures/sasquatch-bigfootdifference.htm

Epub Ahead of Print Articles: Muldoon, K., Towse, J., Simms, V., Perra, O., & Menzies, V. (2012). A longitudinal analysis of estimation, counting skills, and mathematical ability across the first school year. Developmental Psychology. Epub ahead of print. doi:10.1037/a0028240.

In the seventh edition, up to 20 authors should now be included in a reference list entry. For sources with more than 20 authors, after the 19th listed author, any additional authors' names are replaced with an ellipsis (…) followed by the final listed author's name: Author, A. A., Author, B. B., Author, C. C., Author, D. D., Author, E. E., Author, F. F., Author, G. G., Author, H. H., Author, I. I., Author, J. J., Author, K. K., Author, L. L., Author, M. M., Author, N. N., Author, O. O., Author, P. P., Author, Q. Q., Author, R. R., Author, S. S., . . . Author, Z. Z.

Production

Once a manuscript has been accepted for publication, it goes through a copy-editing process by professional language editors to ensure that it is clear and well-written. This process may involve correcting grammar, punctuation, and formatting errors, as well as making changes to improve the overall clarity and readability of the manuscript.

After the copy-editing process is complete, the manuscript is published online as an "ahead-of-print" publication, which means that it is available to readers before it is included in a scheduled issue of the journal. This allows readers to access the latest research as soon as it becomes available.

ADDICTA

Before the manuscript is officially published, the corresponding author is sent a PDF proof of the accepted manuscript for review. The corresponding author is asked to review the proof and approve it for publication within a specified time period, typically 2 days. This is an important step in the publication process, as it allows the author to catch any errors or make any final changes before the manuscript is published.

DISCLAIMER

Statements or opinions expressed in the manuscripts published in Addicta: The Turkish Journal on Addictions reflect the views of the author(s) and not the opinions of the editors, the editorial board, or the publisher; the editors, the editorial board, and the publisher disclaim any responsibility or liability for such materials. The final responsibility regarding the published content rests with the authors.

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

EDITORIAL COMMENTARY

Türkiye's Medical Cannabis Law: Progress with Pitfalls

Hakan Coşkunol

Turkish Green Crescent Society, Türkiye

ORCID IDs of the author: H.C. 0000-0001-5925-4441.

A Decade-Long Vision

In 2013, Ege University submitted a proposal to the Turkish Ministry of Health titled Medical Cannabis Implementation Project. The Ministry's response confirmed the feasibility of the initiative, identifying Ege University's Faculty of Agriculture as a suitable institution for species identification and seed development. Although the proposal lacked a detailed implementation roadmap, it was endorsed as applicable by the General Directorate of Plant Production. Twelve years later, Türkiye has enacted legislation that echoes many of the principles proposed in that project. However, while this policy shift is encouraging, it presents substantial challenges requiring close scrutiny.

Legislative Developments: Clarifying the Scope

In Türkiye, permission for cannabis cultivation for the purpose of producing active pharmaceutical ingredients has been in effect under existing legislation. The regulation issued on September 13, 2024, strengthened this framework by introducing detailed control mechanisms. Subsequently, Law No. 7557, published in the Official Gazette on July 24, 2025, expanded the scope of cannabis cultivation to include the production of medical products, health products, personal care products, and supportive products. This amendment builds upon existing legal foundations and does not imply the legalization of recreational use. It is therefore essential to correct misleading headlines—particularly in international media—that suggest Türkiye has legalized cannabis in general.

Scientific Promise and Clinical Potential

For patients with treatment-resistant conditions, the law offers new therapeutic possibilities. Cannabidiol (CBD), a phytocannabinoid, one of the identified cannabinoids in Cannabis, has shown promise in managing seizures and chronic neuropathic pain. A recent review found moderate evidence for cannabinoids in epilepsy and spasticity, though broader therapeutic benefits remain limited (Hoch, 2024). Restricting sales to licensed pharmacies and monitoring products through the National Pharmaceutical Tracking System (ITS) reflects responsible policy design. Türkiye's existing hemp cultivation infrastructure could position the country as a regional center for cannabinoid-based pharmaceutical research—provided academic and industrial partnerships are cultivated with care.

Scientific Safeguards Before Implementation

The Green Crescent Scientific Committee recommends that regulatory changes be structured in a way that protects public health. This includes:

- Active involvement of interdisciplinary scientific committees in the drafting process
- Establishment of clear dosage protocols for distribution
- Development of evidence-based early warning systems to monitor psychiatric interactions and addiction risks
- Accurate public communication that clearly distinguishes medical use from recreational use

These integrated safeguards are essential to ensure responsible implementation and to prevent misuse or misinterpretation.

Scientific and Regulatory Gaps

Despite its promise, the legislation presents notable challenges:

Corresponding author:
Hakan Coşkunol

Publication Date:
September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Cite this article as: Coşkunol, H. (2025). Türkiye's medical cannabis law: progress with pitfalls. *Addicta: The Turkish Journal on Addictions*, 12(3), 251-252.

- **Scientific Uncertainty:** The Turkish Medical Association has raised concerns about the lack of randomized controlled trials supporting many cannabis-based therapies. International observational studies report improved quality of life but limited impact on pain outcomes (Arkell, 2023). Mental health and addiction-related applications remain under-researched (Wilson, 2025).
- **Public Misunderstanding:** Even low-THC products can pose risks—particularly to adolescents, individuals with psychiatric vulnerabilities, or those predisposed to substance use disorders. Clear differentiation between medical and recreational use is essential.
- **Regulatory Ambiguity:** Key implementation questions remain unresolved:
  - Which conditions qualify for treatment?
  - What are the standards for physician training and prescription?
  - How will adverse events and misuse be monitored?

Ethical Balance

As the medical cannabis sector expands, ethical concerns intensify. Commercial interests must not override patient-centered care, and punitive clauses must not disproportionately affect marginalized communities. Regulatory frameworks must uphold both accountability and compassion—ensuring vulnerable groups are not further stigmatized or exploited.

Conclusion: Compassion Must Not Eclipse Caution

Türkiye's medical cannabis law is a significant reform—but not a final destination. Its success depends on prioritizing scientific evidence, transparent regulation, and public education. The law's potential must not be overshadowed by premature implementation or unchecked commercial expansion. As someone who advocated for this reform over a decade ago, I welcome its arrival. But its future depends on ensuring that compassion does not eclipse caution—and that innovation is firmly grounded in integrity.

References

Arkell, T. R., McCartney, D., Kevin, R. C., et al (2023). Assessment of medical cannabis and health-related quality of life: A prospective observational study. *JAMA Network Open*, *6*(5), e2312996. [CrossRef]

Hoch, E., Niemann, D., Schneider, M., Friemel, C. M., & Preuss, U. W. (2024). Cannabis, cannabinoids and health: A review of evidence on risks and medical benefits. *European Archives of Psychiatry and Clinical Neuroscience*, *274*(5), 721 – 734. [CrossRef]

Wilson, J., Langcake, A., Bryant, Z., Freeman, T. P., Leung, J., Chan, G. C. K., Englund, A., Graham, M., & Stockings, E. (2025). The safety and efficacy of cannabinoids for the treatment of mental health and substance use disorders: Protocol for a systematic review and meta-analysis. *Systematic Reviews*, *14*(1), 23. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Emerging Threats on Video-on-Demand Platforms: A Content Analysis of Alcohol, Tobacco, and Drug Imagery in Turkish Films and Series

Okan Maden, Süheyla Kurum, Şefik Yurdakul, Egemen Ünal, Mehmet Enes Gökler

Department of Public Health, Ankara Yıldırım Beyazıt University Faculty of Medicine, Ankara, Türkiye

ORCID iDs of the authors: O.M. 0009-0002-4735-8993, S.K. 0000-0002-1498-7665, Ş.Y. 0000-0003-2700-5904, E.Ü. 0000-0002-9939-9191, M.E.G. 0000-0002-1524-8565

Main Points

- Alcohol and tobacco imagery appeared frequently across the Turkish films and series examined on digital platforms.
- Such portrayals may contribute to shaping attitudes and behaviors, especially among younger audiences.
- The study underlines the importance of ongoing attention to media content within the scope of public health and regulation.

Abstract

Digital platforms, through video-on-demand services, reach large audiences, with Turkish content gaining international popularity. Exposure to imagery of alcohol, tobacco, and drugs may pose an addiction risk. This study examined the frequency of these images in Turkish films and series. The popular tenfilms and ten series in Turkish, according to internet movie database, were analyzed. The content was divided into 5-minute intervals, and 304 intervals were evaluated for alcohol, tobacco, and drug imagery. Mann – Whitney U test and Kruskal-Wallis tests were used for analysis. 64.47% of the 304 intervalscontained at least one image of alcohol, tobacco, or drugs: Alcohol appeared in 50.33%, tobacco in 28.95%, and drug imagery in 0.99%. No differences were found across platforms, genres, or between films and series. This study was the first to analyze alcohol, tobacco, and drug imagery in Turkish content on digital platforms. Stricter regulation is recommended due to their potential contribution to addiction.

Keywords: Addiction, alcohol, drug, tobacco, video on demand

Corresponding Author:
Okan Maden,
E-mail:
drokanmaden@gmail.com

Received: February 24, 2025
Revision Requested: April 20, 2025
Last Revision Received: April 29, 2025
Accepted: June 12, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

The advancement of technology has significantly transformed the broadcasting industry, fostering diversity, and adaptation to innovations. The advent of digital broadcasting has facilitated the rise of over-the-top (OTT) platforms, which, powered by web infrastructure, have experienced significant growth, particularly over the past decade (Yıldıran Önk & Dabak Özdemir, 2022). Unlike traditional broadcasting, OTT platforms do not require cable or satellite connections, enabling users to access content anytime through various devices, including smartphones, tablets, computers, and televisions. Among OTT platforms, the segment generating the highest revenue is video streaming/subscription video on demand services, which offer unlimited access to video content via subscription. Leading organizations in this sector include Netflix, Amazon, and Disney+. According to Statista, the global number of video streaming platform users reached 1.3 billion in 2023 and is projected to grow by over 300 million in the next 4 years (Stoll, 2024). This transformation in the media environment has similarly impacted the Turkish market, where more than ten domestic and international digital platforms are currently operational. Additionally, Turkish-produced films and series have garnered

Cite this article as: Maden, O., Kurum, S., Yurdakul, Ş., Ünal, E., & Gökler, M. E. (2025). Emerging threats on video-on-demand platforms: A content analysis of alcohol, tobacco, and drug imagery in Turkish films and series. *Addicta: The Turkish Journal on Addictions*, 12(3), 253-259.

significant international popularity in recent years, being watched in numerous countries (Özarslan, 2020).

Media content significantly influences individual behaviors. For instance, exposure to smoking imagery in films has been shown to encourage smoking initiation (Dalton et al., 2003), increase the likelihood of established smoking (Sargent et al., 2007), foster positive attitudes toward smoking, and trigger smoking addiction, particularly during adolescence (Sargent, 2005). Similar effects have been observed with imagery of alcohol consumption, which can lead to earlier initiation of use and problematic behaviors (Jackson et al., 2018; Waylen et al., 2015). Although research on exposure to drug use imagery in media is limited due to legal constraints, studies indicate that adolescents exposed to drug marketing on social media are more likely to engage in drug use (Whitehill et al., 2020). Furthermore, exposure to alcohol content may have crossover effects, increasing susceptibility to other substances (Corcoran et al., 2024).

The World Health Organization (WHO) highlights concerning trends, noting that the age of first experience of alcohol, tobacco, and drug is steadily decreasing (Charrier et al., 2024). Early initiation of substance use is strongly associated with a higher risk of addiction in adulthood (Adolescent and Young Adult Health, 2024). Given the widespread use of digital platforms among young people, this issue takes on greater urgency (RTÜK, 2022). Preventing substance use and addiction is critical, as treating addiction poses significant challenges (Reitsma et al., 2021).

Legal regulations regarding the depiction and promotion of addictive substances extend to the media sector. In Türkiye, there are comprehensive regulations governing the display, promotion, and advertising of alcohol, tobacco, and drugs. For example, the use of tobacco products is completely banned from television broadcasts, and their imagery for commercial or advertising purposes on the Internet is also prohibited (Tütün Ürünlerinin Zararlarının Önlenmesi ve Kontrolü Hakkında Kanun, 2018). Similarly, broadcasting content that encourages alcohol consumption is forbidden under the same regulations (Bazı Kanunlar Ile 375 Sayılı Kanun Hükmünde Kararnamede Değişiklik Yapılması Hakkında Kanun, 2013). Furthermore, all media service providers must comply with regulations stating that broadcasts must not encourage addictive behaviors, including the use of alcohol, tobacco, drugs, or gambling ((Radyo ve Televizyonların Kuruluş ve Yayın Hizmetleri Hakkında Kanun, 2011).

While international studies have explored the prevalence of alcohol, tobacco, and drug use imagery in digital platforms, which continue to expand their reach, no such studies have been conducted in Türkiye. This study aimed to examine the frequency of imagery of alcohol, tobacco, and drug use in the most popular Turkish-made films and series available on digital platforms in Türkiye.

Material and Methods

This study was a content analysis design with cross-sectional components. The review was conducted based on sort by popularity feature in the advanced title search on internet movie database (IMDb) as of August 26, 2024. The top ten films and ten series meeting the inclusion criteria were analyzed. The inclusion criteria were that the content be published on or after January 1, 2023, produced in Türkiye in the Turkish language, and accessible on digital platforms on the study date. The exclusion criteria were content that was not broadcast in Türkiye or in Turkish, content unavailable on digital platforms as of the study date, and episodes of series released before January 1, 2023.

The duration of each film and the total episode duration of each series were segmented into five-minute intervals. Any remaining duration of less than five minutes at the end of the content was treated as a separate interval. For instance, a 197-minute film was divided into 40 intervals, while a series with a total duration of 677 minutes was divided into 136 intervals. The study population consisted of 1,384 intervals in total. Based on literature data indicating an alcohol prevalence of 41.7%, the minimum sample size required was calculated as 295 intervals, with a 95% confidence level and a design effect of 1.0 (Alfayad et al., 2022). The sample size was then proportionally weighted according to content durations, with decimal results rounded up to the nearest whole number. Ultimately, a total of 304 intervals were selected as the study sample. The intervals to be analyzed for each content were determined using a simple random sampling method.

Each interval was assessed using a three-point scoring system to evaluate imagery of alcohol, tobacco, and drug use. Points were assigned as follows: three points for actual consumption/use (observable consumption behavior), two points for implied consumption/use (referance to consumption through dialogue, imagery, or actions), and one point for material presence (display of the object without evidence of consumption). Each interval could receive a minimum score of 0 and a maximum score of 9. For instance, the presence of an individual actively using a drug was scored three points in the drug use category, the depiction of a drunk person scored two points in the alcohol use category, and the presence of an ashtray scored one point in the tobacco use category. If multiple depictions occurred within the same category during an interval, only the highest score was recorded. Repetition of the same scene in a different interval was considered a new exposure, with each interval scored independently.

All the interval samples were reviewed by three individual researchers and accordingly scored. Discrepancies in scoring among the researchers were resolved by re-evaluating the intervals through joint discussion, with full consensus achieved among all researchers. Interrater agreement was assessed using Kendall's coefficient of concordance, indicating a very high level of agreement among all coder pairs ($W = 0.99$).

Data were recorded in a control chart created using Microsoft Excel, and statistical analyses were conducted using IBM SPSS Statistics version 27 (IBM SPSS Corp.; Armonk, NY, USA). Descriptive statistics were presented using frequencies, percentages, medians, and quartiles. Following an assessment of the data's normal distribution, the Mann – Whitney U-test was applied for comparisons of quantitative variables between two groups, while the Kruskal-Wallis test was used for comparisons involving more than two groups. A p value of $< .05$ was considered statistically significant.

Ethics committee approval was not obtained as the research was conducted through publicly available sources.

Table 1.
Descriptive Features of Films and Series

Film/Series	Title	Source	Genre	Runtime	Total Interval	Sample Size
Film	Film 1	Platform 1	Drama	197	40	9
	Film 2	Platform 1	Comedy	107	22	5
	Film 3	Platform 2	Drama	110	22	5
	Film 4	Platform 1	Romantic	105	21	5
	Film 5	Platform 1	Drama	100	20	5
	Film 6	Platform 1	Romantic	91	19	5
	Film 7	Platform 1	Drama	157	32	7
	Film 8	Platform 1	Action	99	20	5
	Film 9	Platform 2	Drama	113	23	5
	Film 10	Platform 1	Biography	125	25	6
Series	Series 1	Platform 1	Science Fiction	677	136	29
	Series 2	Platform 1	Drama	435	87	19
	Series 3	Platform 3	Comedy	1027	206	44
	Series 4	Platform 4	Drama	481	97	21
	Series 5	Platform 1	Comedy	348	70	15
	Series 6	Platform 5	Comedy	656	132	29
	Series 7	Platform 6	Comedy	39	8	2
	Series 8	Platform 1	Drama	903	181	39
	Series 9	Platform 1	Drama	774	155	34
	Series 10	Platform 4	Drama	340	68	15
Total				6884	1384	304

Results

The 20 analyzed contents were distributed across six different platforms. Among them, 65% ($n = 13$) were hosted on Platform 1, and 50% ($n = 10$) belonged to the drama genre. Detailed information about the platforms, genres, total intervals, and the number of intervals included in the sample is presented in Table 1.

When the distribution of alcohol, tobacco, and drug imagery across the contents was examined, tobacco imagery was observed in six out of ten films, drug imagery in one film, and alcohol imagery in all films. Similarly, tobacco imagery was found in eight out of ten series, drug imagery in two series, and alcohol imagery in all series. Detailed distributions for films and series are provided in Table 2.

Table 2.
Prevalence of Alcohol, Tobacco, and Drug Use in Films and Series

	Films ($n = 10$)	Series ($n = 10$)	Total ($n = 20$)
Presence of alcohol, *n* (%)	10 (100)	10 (100)	20 (100)
Presence of tobacco, *n* (%)	6 (30)	8 (40)	14 (70)
Presence of drug, *n* (%)	1 (5)	2 (10)	3 (15)

The analysis of all content revealed the presence of alcohol, tobacco, and drug imagery as follows: 60% ($n = 12$) of the contents included actual tobacco use, 5% implied tobacco use, and 8% the presence of tobacco-related materials. Regarding alcohol imagery, 75% ($n = 15$) of the contents showed actual alcohol consumption, 95% ($n = 19$) implied alcohol consumption, and five contents included alcohol-related materials. In the evaluation of drug imagery, actual drug use was identified in two items and implied drug use in one item; no drug-related materials were detected.

A total of 304 intervals were analyzed, whereas 57 were from films and 247 from series. At least one instance of alcohol, tobacco, or drug consumption/use imagery was detected in 64.47% ($n = 196$) of the intervals. Tobacco imagery was present in 28.95% ($n = 88$) of the intervals, alcohol imagery in 50.33% ($n = 153$), and drug imagery in 0.99% ($n = 3$). In 15% ($n = 3$) of the analyzed contents, at least one imagery of alcohol, tobacco, or drug imagery was present in all interval. No content was found to be completely free of such imagery across all evaluated intervals.

A detailed analysis of the tobacco imagery revealed that 57.96% ($n = 51$) of the total 88 tobacco-related instances involved actual use, 23.86% ($n = 21$) implied use, and 18.18% ($n = 16$)

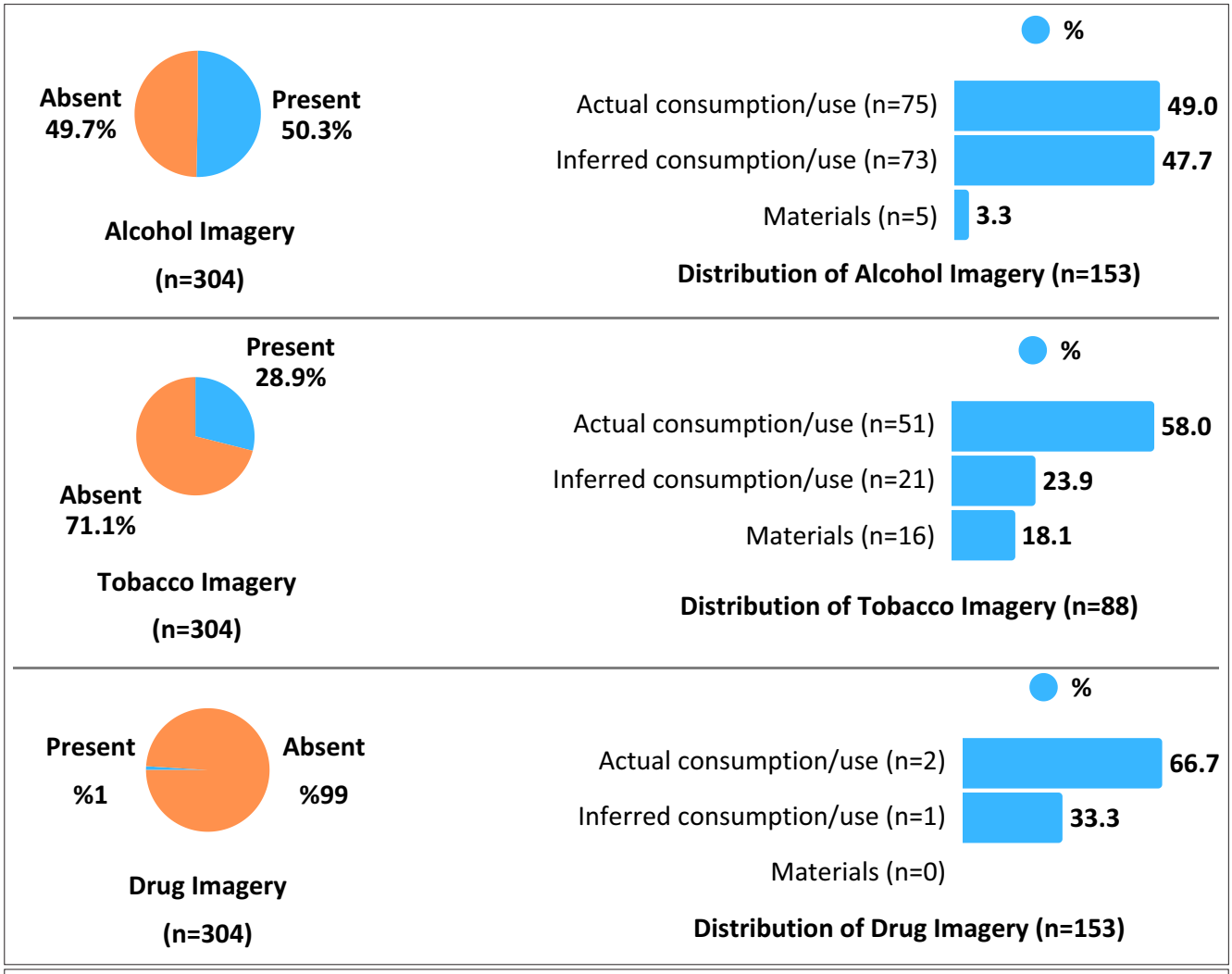


Figure 1. Presence and Distribution of Alcohol, Tobacco, and Drug Imagery

the presence of materials. For alcohol imagery, 49.02% (n = 75) of the 153 instances involved actual consumption, 47.71% (n = 73) implied consumption, and 3.27% (n = 5) the presence of materials. Regarding drug imagery, two of the three instances involved actual use, one implied use, and no drug-related materials were observed. Details of these findings are provided in Figure 1.

The distribution of actual consumption/use, inferred consumption/use, and materials presence was also analyzed according to the type of imagery (alcohol, tobacco, or drug). Among the 128 actual consumption/use instances, 39.84% (n = 51) involved tobacco, 58.60% (n = 75) alcohol, and 2 involved drugs. Of the 95 implied consumption/use instances, 22.11% (n = 21) involved tobacco, 76.84% (n = 73) alcohol, and 1 implied drug. Among the 21 instances involving materials, 76.19% (n = 16) were related to tobacco and 23.81% (n = 5) to alcohol, with no drug-related materials detected. Details of these distributions are provided in Figure 2.

No statistically differences were observed between films and series in terms of alcohol, tobacco, or drug consumption/use imagery (p = .481). Similarly, no differences were found regarding the type of content or the platforms on which they were broadcast (p = .567, p = .510, respectively). Details of these findings are provided in Table 3.

Discussion

Digital platforms are increasingly emerging as a significant global sector, extending their reach to broader audiences with each passing day. In Türkiye, there are currently over ten digital platforms offering a wide range of content. This study focuses on analyzing the most popular Turkish-made content available on these platforms.

In our study, at least one instance of alcohol, tobacco, or drug imagery was present in all 20 content items across six different platforms. Additionally, at least one of these images was detected in 64.47% (n = 196) of the analyzed intervals. Alcohol imagery was identified in all content analyzed.

A study examining Oscar-nominated films from 2008 to 2011 found that at least one instance of these images appeared in all films, with alcohol and tobacco use detected in approximately 40 – 50% of the films (Castaldelli-Maia et al., 2021). Similarly, a

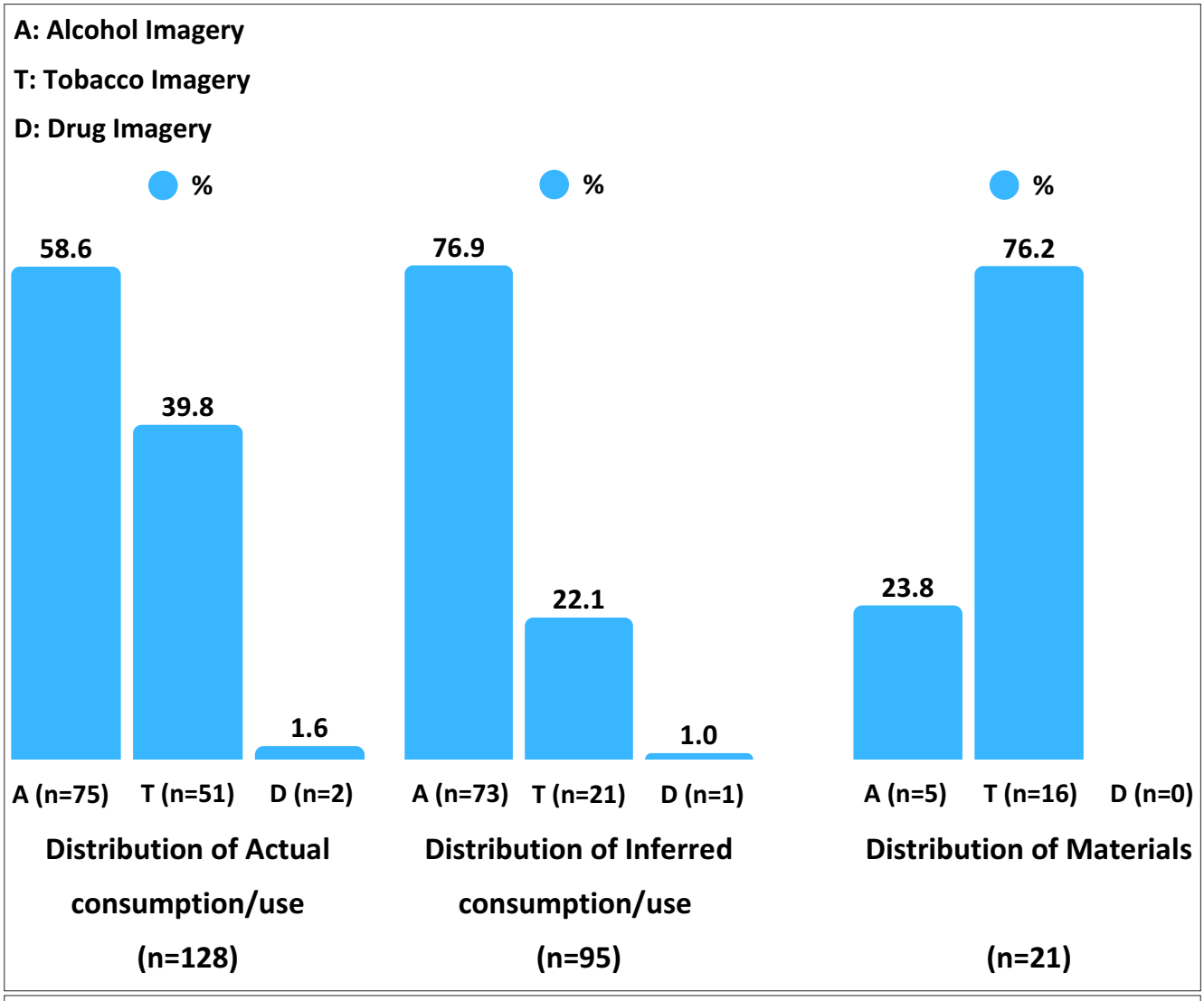


Figure 2. The Distribution of Actual Consumption/Use, Inferred Consumption/Use, and Materials

study by El-Feyyad et al. analyzed 11 films from two digital platforms, using 5-minute intervals similar to our methodology. They observed that 41.7% of intervals contained alcohol-related content, and 26.9% included tobacco imagery (Alfayad et al., 2022). Compared to this study, we found a higher prevalence of both tobacco and alcohol imagery. Specifically, active tobacco use was present in 16.4% of all intervals in El-Feyyad's study, while 16.7% of intervals in our study featured actual tobacco use. In terms of alcohol consumption, actual consumption was observed in 18.3% of intervals in the previous study mentioned before, compared to 24.6% in our study. Consistent with our study, no differences were found between the two digital platforms evaluated regarding harmful substance content.

In a UK-based study, the five most popular TV series of 2018 were analyzed using IMDb data. This study found alcohol content in 94% of all episodes and tobacco content in 74%. The frequency of direct alcohol consumption in 1-minute intervals was 6%, and direct tobacco use was observed in 9% of the intervals (Barker et al., 2019). On the contrary, our study found actual use/consumption of both tobacco and alcohol to be approximately twice as frequent.

A study by Morgenstern et al. analyzed the top-rated TV series in Germany between 2017 and 2020, revealing smoking imagery in 71.4% of the TV series analyzed. No differences were found in smoking prevalence across the platforms evaluated (Morgenstern et al., 2024). Another study examined films released on digital platforms, with tobacco content detected by 48.1% (Hanewinkel et al., 2023). In our study, tobacco imagery was present in 70% of the 20 digital contents and 26.9% of the 304 intervals. No differences were found across digital platforms in terms of the presence of tobacco imagery.

These studies indicate a clear relationship between individuals' exposure to alcohol, tobacco, and drug use in broadcast content and the likelihood of such behaviors being adopted. The risk of initiation for these products increases in individuals who are exposed to media images of substance use, with frequency rising in those who already consume these substances. For instance, a study conducted in Bangladesh found that exposure to tobacco use in film scenes significantly increased tobacco consumption (Rahman et al., 2021). Another study examining the most popular television series in low- and middle-income countries found

Table 3.
Comparison of Films and Series by Genre and Platform

		n	Mean Interval Point ± SD[a] (Min[b]-Max[c])	*p*
Films/ Series	Film	10	2.01 ± 1.01 (0.74 – 2.47)	.481
	Series	10	1.69 ± 0.96 (0.60 – 3.40)	
Genre	Drama	10	2.08 ± 0.97 (0.74 – 2.47)	.567
	Comedy	5	2.08 ± 0.97 (0.74 – 3.47)	
	Romantic	2	1.71 ± 1.05(0.60 – 2.40)	
	Action	1	2.80	
	Biography	1	0.83	
	Science Fiction	1	1.03	
Platform	Platform 1	13	1.70 ± 0.96 (0.60 – 3.27)	.510
	Platform 2	2	2.30 ± 1.56 (1.20 – 3.40)	
	Platform 3	2	2.83 ± 0.90 (2.19 – 3.47)	
	Platform 4	1	2.16	
	Platform 5	1	1.52	
	Platform 6	1	1.00	

Note: [a]SD = Standard deviation; [b]min = minimum; [c]max = maximum.

that 72% of the 18 analyzed series included depictions related to tobacco use. This was identified as a driving factor contributing to the increase in tobacco use among young populations (Fitspatrick et al., 2019). In a study conducted by Kamath et al., it was demonstrated that watching films containing tobacco imagery increases smoking susceptibility among adolescents (Kamath et al., 2024).

Recent research has increasingly focused on adolescents, a group more susceptible to addiction. A study on popular films and early-onset alcohol consumption found that 92% of films depicted alcohol consumption, and adolescents were associated with early-onset alcohol consumption (Sargent et al., 2015). In a study involving six European countries, exposure to alcohol consumption in films led to excessive alcohol consumption among adolescents across all countries (Hanewinkel et al., 2012). A systematic review of seven cohort studies demonstrated that adolescent exposure to alcohol imagery in the media was linked to future alcohol consumption (Smith & Foxcroft, 2009). Likewise, it was shown that there was a relationship with alcohol consumption and being exposed to alcohol via films in adolescents in a study conducted in Latin American countries (Mejia et al., 2019). In our study, alcohol imagery was present in all content, which represents a higher rate of alcohol content than most studies in the literature and raises concerns about its potential role in contributing to addiction. These findings may complicate efforts to combat addiction in Türkiye.

Some perspectives argue that the issue should be framed as a matter of limiting personal freedoms. According to this view, since digital platforms are based on user preferences and often require membership or subscription fees, they cannot be considered equivalent to traditional broadcasting (Ergüney, 2020). However, our study's findings suggest that relevant regulations are not effectively implemented. Alcohol, tobacco, and drug use are categorized as harmful by WHO and other relevant health authorities, whose harmful effects are well-documented. It is crucial to address these substances at all levels from a public health perspective, ensuring that both health and social consequences are considered.

Alcohol consumption was identified in all of the popular content analyzed on digital platforms. Additionally, at least one instance of alcohol, tobacco, or drug use imagery was present in all the content examined. This study made a significant contribution to the literature as the first to examine the frequency of alcohol, tobacco, and drug imagery in Turkish films and series on digital platforms. Digital platforms, with their expanding audience base, may play a significant role in the propagation of addictive behaviors. Therefore, implementing stricter regulation and oversight of digital platforms could be beneficial in controlling and mitigating the spread of addictions.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethical approval was not required for this study.

Informed Consent: This study did not involve human participants.

Peer-review: Externally peer reviewed.

Author Contributions: Concept – O.M., S.K., Ş.Y., E.Ü., M.E.G.; Design – O.M., S.K., Ş.Y., E.Ü., M.E.G.; Supervision – E.Ü., M.E.G.; Resources – O.M., S.K., Ş.Y.; Materials – O.M., S.K., Ş.Y.; Data Collection and/or Processing – O.M., S.K., Ş.Y.; Analysis and/or Interpretation – O.M., S.K., Ş.Y.; Literature Search – O.M., S.K., Ş.Y.; Writing – O.M., S.K., Ş.Y., E.Ü., M.E.G.; Critical Review – E.Ü., M.E.G.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

References

Alfayad, K., Murray, R. L., Britton, J., & Barker, A. B. (2022). Content analysis of Netflix and Amazon prime instant video Original Films in the UK for alcohol, tobacco and junk food imagery. *Journal of Public Health*, *44*(2), 302 – 309. [CrossRef]

Barker, A. B., Smith, J., Hunter, A., Britton, J., & Murray, R. L. (2019). Quantifying tobacco and alcohol imagery in Netflix and Amazon Prime instant video original programming accessed from the UK: A content analysis. *BMJ Open*, *9*(2), e025807. [CrossRef]

Castaldelli-Maia, J. M., Gil, F., Ventriglio, A., Torales, J., Florio, L., Moura, H. F., de Andrade, A. G., Lotufo-Neto, F., & Bhugra, D. (2021). Substance use portrayal in oscar-nominated movies. *Current Drug Research Reviews*, *13*(3), 230 – 235. [CrossRef]

Corcoran, E., Janssen, T., Gabrielli, J., & Jackson, K. (2024). Cross-substance effects of adolescent exposure to alcohol content in popular movies on cannabis initiation. *Cannabis*, *7*(2), 38 – 50. [CrossRef]

Charrier L, van Dorsselaer S, Canale N, Baska T, Kilibarda B, Comoretto RI et al. A focus on adolescent substance use in Europe, central Asia and Canada. Health Behaviour in School-aged Children international report from the 2021/2022 survey. Volume *3*. Copenhagen: WHO Regional Office for Europe; 2024. Licence: CC BY-NC-SA 3.0 IGO.

Dalton, M. A., Sargent, J. D., Beach, M. L., Titus-Ernstoff, L., Gibson, J. J., Ahrens, M. B., Tickle, J. J., & Heatherton, T. F. (2003). Effect of viewing smoking in movies on adolescent smoking initiation: A cohort study. *Lancet*, *362*(9380), 281 – 285. [CrossRef]

Ergüney, M. (2020). RTÜK'ün internet Denetimi: İlgili mevzuat üzerine bir değerlendirme. *AJIT-E: Online Academic Journal of Information Technology*, *11*(41), 96 – 122. [CrossRef]

Fitzpatrick, I., Byrne, D., Gilmore, A. B., Hasan, F., & Cranwell, J. (2023). Quantifying and characterising tobacco content in the most in-demand streamed series in 10 low/middle-income countries in 2019. *Tobacco Control*, *33*(1), 45 – 51. [CrossRef]

Hanewinkel, R., Neumann, C., & Morgenstern, M. (2024). Rauchen in Netflix-Spielfilmen und Jugendschutz [Smoking in Netflix feature films and youth protection]. *Laryngo- Rhino- Otologie*, *103*(10), 723 – 727. [CrossRef]

Hanewinkel, R., Sargent, J. D., Poelen, E. A. P., Scholte, R., Florek, E., Sweeting, H., Hunt, K., Karlsdottir, S., Jonsson, S. H., Mathis, F., Faggiano, F., & Morgenstern, M. (2012). Alcohol consumption in movies and adolescent binge drinking in 6 European countries. *Pediatrics*, *129*(4), 709 – 720. [CrossRef]

Jackson, K. M., Janssen, T., Barnett, N. P., Rogers, M. L., Hayes, K. L., & Sargent, J. (2018). Exposure to alcohol content in movies and initiation of early drinking milestones. *Alcoholism, Clinical and Experimental Research*, *42*(1), 184 – 194. [CrossRef]

Kamath, V. G., Kulkarni, M. M., Kamath, A., Lewis, S., Bogdanovica, I., Bains, M., Cranwell, J., Fogarty, A., Arora, M., Bahl, D., Nazar, G. P., Naik, A. K., Ballal, K., Bhagawath, R., & Britton, J. (2024). Prospective study of exposure to smoking imagery in films and changes in susceptibility to smoking in a cohort of school students in Southern India. *Tobacco Induced Diseases*, *22*. [CrossRef]

Mejia, R., Perez, A., Morello, P., Santillan, E. A., Braun, S., Sargent, J. D., & Thrasher, J. F. (2019). Exposure to alcohol use in movies and problematic use of alcohol: A longitudinal study among Latin American adolescents. *Journal of Studies on Alcohol and Drugs*, *80*(1), 69 – 76. [CrossRef]

Morgenstern, M., Glantz, S. A., Neumann, C., & Hanewinkel, R. (2024). Smoking in popular streaming shows and youth protection in Germany. *Journal of Community Health*, *49*(1), 166 – 172. [CrossRef]

Özarslan, K. (2020). Ülke markalaması bağlamında uluslararası baasında Türk dizileri ve Türkiye imajı. *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *22*(1), 215 – 238. [CrossRef]

Rahman, M. A., Kundu, S., Ahinkorah, B. O., Okyere, J., Halder, H. R., Rahman, M. M., Yadav, U. N., Mistry, S. K., & Rahman, M. A. (2021). Was there any change in tobacco smoking among adults in Bangladesh during 2009 – 2017? Insights from two nationally representative cross-sectional surveys. *BMJ Open*, *11*(12), e057896. [CrossRef]

Rao, R., Panda, U., Gupta, S. K., Ambekar, A., Gupta, S., & Agrawal, A. (2020). Portrayal of alcohol in Bollywood movies: A mixed methods study. *Indian Journal of Psychiatry*, *62*(2), 159 – 166. [CrossRef]

Reitsma, M. B., Flor, L. S., Mullany, E. C., Gupta, V., Hay, S. I., & Gakidou, E. (2021). Spatial, temporal, and demographic patterns in prevalence of smoking tobacco use and initiation among young people in 204 countries and territories, 1990 – 2019. *Lancet Public Health*, *6*(7), e472 – e481. [CrossRef]

RTÜK, & Araştırmaları, R. K. (2022). https://www.rtuk.gov.tr/genclerin-medya-kullanimi-ve-dijital-okuryazarlik-arastirmasi-2022/4402

Sargent, J. D. (2005). Smoking in movies: Impact on adolescent smoking. *Adolescent Medicine Clinics*, *16*(2), 345 – 370. [CrossRef]

Sargent, J. D., Stoolmiller, M., Worth, K. A., Dal Cin, S., Wills, T. A., Gibbons, F. X., Gerrard, M., & Tanski, S. (2007). Exposure to smoking depictions in movies: Its association with established adolescent smoking. *Archives of Pediatrics and Adolescent Medicine*, *161*(9), 849 – 856. [CrossRef]

Sargent, J. D., Wills, T. A., Stoolmiller, M., Gibson, J., & Gibbons, F. X. (2006). Alcohol use in motion pictures and its relation with early-onset teen drinking. *Journal of Studies on Alcohol*, *67*(1), 54 – 65. [CrossRef]

Smith, L. A., & Foxcroft, D. R. (2009). The effect of alcohol advertising, marketing and portrayal on drinking behaviour in young people: Systematic review of prospective cohort studies. *BMC Public Health*, *9*(1), 1 – 11. [CrossRef]

Stoll, J. (2024). Video streaming worldwide - Statistics & facts. Statista. https://www.statista.com/topics/7527/video-streaming-worldwide/#topicOverview

Radyo ve televizyonların kuruluş ve yayın hizmetleri hakkında kanun (2011). *Türkiye Cumhuriyeti: T.C. Resmi Gazete*. https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6112&MevzuatTur=1&MevzuatTertip=5

Bazı kanunlar ile 375 sayılı kanun hükmünde kararnamede değişiklik yapılması hakkında kanun (2013). *Türkiye Cumhuriyeti: T.C. Resmi Gazete*. https://www.resmigazete.gov.tr/eskiler/2013/06/20130611-1.htm

Tütün ürünlerinin zararlarının önlenmesi ve kontrolü hakkında kanun (2018). *Türkiye Cumhuriyeti: T.C. Resmi Gazete*. https://www.mevzuat.gov.tr/mevzuatmetin/1.5.4207.pdf

Waylen, A., Leary, S., Ness, A., & Sargent, J. (2015). Alcohol use in films and adolescent alcohol use. *Pediatrics*, *135*(5), 851 – 858. [CrossRef]

Whitehill, J. M., Trangenstein, P. J., Jenkins, M. C., Jernigan, D. H., & Moreno, M. A. (2020). Exposure to cannabis marketing in social and traditional media and past-year use among adolescents in states with legal retail cannabis. *Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, *66*(2), 247 – 254. [CrossRef]

Adolescent and young adult health (2024). https://www.who.int/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions

Yıldıran Önk, Ü., & Dabak Özdemir, B. (2022). Gençler yerli dizileri nasıl izliyor? Türkiye'de yeni televizyon ekosistemi Çerçevesinde Eleştirel bir izleyici araştırması. *Intermedia International E-Journal*, *9*(17), 357 – 378. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Tracking Public Interest in Psychoactive Substances: Insights from Google Trends Data

Gonca Aşut

Department of Psychiatry, Başkent University Faculty of Medicine, Ankara, Türkiye

ORCID iDs of the authors: G.A. 0000-0002-7064-558X.

Main Points

- Cannabis had the highest relative search volume in Türkiye.
- Search interest in psychoactive substances peaked in spring and summer.
- Cocaine and amphetamine searches increased significantly between 2011 and 2025.
- Google Trends detected rising public interest in drug testing and detox.
- Google Trends may serve as an early warning tool for emerging drug trends in Türkiye.

Abstract

This study explores public interest in psychoactive substances in Türkiye using Google Trends, a digital epidemiology tool that tracks search behaviors. Search trends were analyzed for five commonly used substances—cannabis, heroin, cocaine, amphetamine, and ecstasy—across different provinces, time periods, and seasonal variations. Results indicate that cannabis had the highest relative search volume nationwide, with regional variations showing Hakkari leading for heroin, Antalya for cannabis, Istanbul for cocaine and ecstasy, and Samsun for amphetamine. Search interest peaked during spring and summer, possibly linked to tourism and festival seasons. Cannabis-related searches increased by approximately 30% over the study period. Frequently searched topics included drug detection, health risks, and substance use among celebrities. Google Trends is a valuable tool for monitoring real-time public interest; however, it has some limitations. These include the lack of absolute search numbers, potential algorithmic biases, and the inability to determine user intent. Despite these challenges, Google Trends offers a cost-effective tool for tracking emerging drug trends and informing public health policies. Future studies should integrate Google Trends data with epidemiological records to improve surveillance and prevention strategies for substance use in Türkiye.

Keywords: Infodemiology, internet, medical Informatics, psychoactive drugs

Corresponding author:
Gonca Aşut
E-mail:
goncaasut@hotmail.com
or gasut@baskent.edu.tr

Received: March 17, 2025
Revision Requested: April 30, 2025
Last Revision Received: May 26, 2025
Accepted: June 17, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

The use of psychoactive substances is a global public health problem. In 2018, the global prevalence of substance use disorders was reported by the United Nations to be 5.4%, and it is projected to increase to 11% by 2030 (United Nations, 2021). According to the Türkiye 2024 Drug Report, the five most common substances leading to treatment admissions are amphetamines, opioids, cannabis, cocaine, and ecstasy (Emniyet Genel Müdürlüğü Narkotik Suçlarla Mücadele Başkanlığı, 2024). The most recent data for Türkiye in the United Nations Office on Drugs and Crime (UNODC) country data pool is from 2018, and the most frequently used five substances are cannabis, ecstasy, cocaine, opioids, and amphetamines, respectively (United Nations Office on Drugs and Crime, 2024).

The internet is a digital network facilitating communication, interaction, and unlimited information transmission on any topic at any time. The internet plays a significant role in shaping substance use behaviors, not only as an information source but also as a platform for discussing and promoting drug-related content. Websites provide information on psychedelics, including their use, risks, and purchasing options; however, many lack scientific references, potentially contributing to misinformation (Al-Imam et al., 2022); (Parker et al., 2017). Online

Cite this article as: Aşut, G. (2025). Tracking public interest in psychoactive substances: Insights from Google Trends data. *Addicta: The Turkish Journal on Addictions*, 12(3), 260-266.

DOI: 10.5152/ADDICTA.2025.25379

forums, social media, and websites may facilitate the introduction of new psychoactive substances, share methods to evade detection in drug tests, and even serve as illicit marketplaces (Jena & Goldman, 2011; Qeadan et al., 2022). Experienced users, called "e-Psychonauts," actively share both positive and negative experiential knowledge about substances on drug forums under the anonymity the internet provides (Soussan & Kjellgren, 2014). Given these influences, public health strategies should consider internet-based interventions to counter misinformation and promote evidence-based harm reduction.

On the other hand, internet search behavior may also reflect individuals' efforts to obtain information, avoid harm, or seek assistance. One study examining internet searches for medical symptoms prior to seeking information about 12-step addiction treatment programs found that ten medical symptoms were predictive of searches related to Alcoholics Anonymous, while nine symptoms predicted interest in Narcotics Anonymous (Nitzburg et al., 2019). In another study investigating the impact of awareness days on online health information – seeking behavior related to substance use disorders, significant increases in search activity were observed on the International Day Against Drug Abuse and Illicit Trafficking over the past 5 years (Singh & Balhara, 2024). These findings suggest that common medical symptoms and public awareness events can prompt help-seeking behavior and highlight the internet's role as a resource for accessing support and information related to substance use.

Infodemiology is defined as the science of studying information distribution and determinants via electronic media (like the internet), which aims to inform public health and policy (Mavragani & Ochoa, 2019; Rovetta, 2024). It utilizes non-clinical data, such as web searches, to assess users' interest in health issues, providing insights into behaviors and lifestyles that are difficult to measure through traditional surveys (Mavragani & Ochoa, 2019; Nuti et al., 2014). Internet-based tools, such as Google Trends (GT), offer a more efficient alternative by analyzing temporal and geographical trends in search behavior (Demir & Bandawe, 2024; Schuurman & Bont, 2022).

According to Statista's web browser market share in Türkiye as of August 2024, Google has dominated the search engine market with a share of around 76%. This market share is much higher than that of other leading search engines like Safari (12.26 %), Samsung Internet (3.84) and Yandex Browser (2.97 %) (Statista, 2025). This makes GT a particularly valuable tool for estimating public interest in health-related topics, including psychoactive substances.

Google Trends is a well-known digital epidemiology tool that tracks the search terms entered into Google's search engine. It provides real-time and archived data from 2004 onward. Google Trends data is freely accessible, anonymized, and normalized for population size, allowing comparisons across different regions. It measures the search volumes and tracks changes over time for specific terms. Relative search volume is a standardized metric ranging from 0 (no significant searches) to 100 (peak interest), with data standardized by dividing search volumes by total searches in a given area and time frame. This makes GT a cost-effective, valuable, accessible resource for analyzing public interest and behavior (Alibudbud, 2023; Nuti et al., 2014; Rovetta, 2024; Sindhoo et al., 2023).

Previous studies have demonstrated GT can effectively monitor drug-related trends (Jankowski & Hoffmann, 2016; Perdue et al., 2018). For instance, in the United States of America, the smoothed and regressed GT search patterns for "naloxone" closely mirrored the opioid overdose trends reported by the National Center for Health Statistics (Ghosh et al., 2022). Similarly, a comparative study of GT data and forum discussions on 48 novel psychoactive substances found that substances often appeared on GT before being officially reported by UNODC and other sources (Batistic et al., 2021).

While GT has been widely used for substance-related research globally, to the best of the authors' knowledge, no study has examined search trends for psychoactive substances in Türkiye. This study aims to address this gap by analyzing GT data on the five most commonly used illicit psychoactive substances.

Material and Methods

Searching Tool

Google Trends is a free, open-access tool that aggregates and categorizes Google search data, excluding infrequent searches and repeated queries from the same Internet Protocol (IP) address within a short period. It allows users to analyze search patterns across various platforms, including web, image, news, and YouTube searches (Alibudbud, 2023; Mavragani & Ochoa, 2019; Nuti et al., 2014).

Google Trends enables searches for specific terms or broader "topics," which group related keywords, including the exact term, misspellings, and acronyms. It is also language agnostic. A "category" filter can also be applied to refine searches and to avoid terms that are unrelated to researchers' search interests (Alibudbud, 2023; Mavragani & Ochoa, 2019; Nuti et al., 2014; Rovetta, 2024).

Google Trends provides real-time data from the past 7 days and archival data from January 2004 to the past 36 hours. Google Trends normalizes data by scaling search volumes from 0 to 100, where 100 represents the peak search interest for a given term or topic, and all other values are adjusted relative to this peak. This metric, known as relative search volume (RSV), quantifies user interest by comparing keyword-related queries to total web queries within a specified time and location and adjusts data for population size, enabling meaningful comparisons across regions. Researchers can export results in CSV format for further analysis (Alibudbud, 2023; Mavragani & Ochoa, 2019; Nuti et al., 2014; Rovetta, 2024).

Keyword Selection and Data Query

This study examined the five most commonly used illicit psychoactive substances according to Türkiye 2024 Drug Report and UNODC country data. Then, the corresponding RSVs were collected for each keyword.

Data collection was performed on February 19, 2025, using the public web facility GT, available from https://trends. google. com/trends/.

Google Trends was queried for the following keywords: Esrar (cannabis), eroin (heroin), kokain (cocaine), amfetamin (amphetamine) and ekstazi (ecstasy).

To ensure relevant search results, the following filters were applied: "Türkiye" as the search region, "Health" as the category,

and "Web Search" as the search type. The search was limited to the "Health" category to exclude irrelevant information and confounding results, which aligns with Mavragani et al.'s methodological framework (Mavragani & Ochoa, 2019).

The original plan was to examine the GT data from 2004 onwards, but as it was found that the GT had made methodological improvements at later dates, the analysis was refined into three periods:

(a) From 2004, the earliest available data,
(b) From January 1, 2011, when GT improved its geographical accuracy,
(c) From January 1, 2022, when GT implemented its latest data collection improvements.

Evaluations for these three periods are presented in the Results section.

Data Analysis

We have conducted a time trend and a geospatial trend search to monitor the month-wise and state-wise patterns, respectively. The index of measurement used was the RSV, a scale from 0 to 100, with higher values indicating higher popularity (Nuti et al., 2014). The data for this study were exported to Microsoft Excel and downloaded on February 19, 2025. The exact GT query URLs are provided in Supplementary File 1.

In addition to the figures provided by GT, a time series analysis was conducted in Microsoft Excel. Seasonal decomposition was performed using a centered moving average [CMA(4)] method to extract the trend (T_t) and seasonal (S_t) components, enabling the identification of recurring seasonal patterns and long-term changes in RSV.

All data used in this study were publicly accessible and anonymized, containing no personal health information. Therefore, an ethics review was not required. However, all procedures were conducted with scientific rigor to ensure the integrity of the research.

Results

Geospatial Trends

Between 2004 and 2025, cannabis had the highest RSV in nearly all provinces, except for Hakkari, where heroin had the highest RSV (Figure 1). However, after GT's methodological improvements, cannabis had the highest RSV nationwide (Figure 2). The provinces with the highest RSVs for each psychoactive substance are summarized in Table 1.

Time Trend Analysis

Time series analysis of GT data and visualizations provided by GT revealed seasonal variations in RSVs for the five psychoactive substances. Search interest generally peaked in spring and summer, and queries related to substance use disorders also showed an upward trend during these periods, except for heroin and ecstasy.

Figure 3 shows the time series analysis results as plots for each psychoactive substance, including the trend (Tt) and seasonal (St) components. In addition, Supplementary File 2 presents the results of the time trend analysis provided by GT.

As shown in Figure 4B, the beginning and end points for cannabis, heroin, cocaine, amphetamine, and ecstasy were 29, 10, 9, 3, 8 and 56, 8, 21, 8, 10, respectively (Supplementary File 2). Thus, it can can be said that there was a growth in search interest for cannabis-related information using the Google search engine increased by more than 90%, cocaine by 130%, and amphetamine by 160% between 2011 and 2025.

As shown in Figure 4C, the beginning and end points for cannabis, heroin, cocaine, amphetamine, and ecstasy were 56, 4, 21, 8, 12 and 65, 11, 26, 10, 12, respectively (Supplementary File 2). Thus, it can be said that there was a growth in search interest

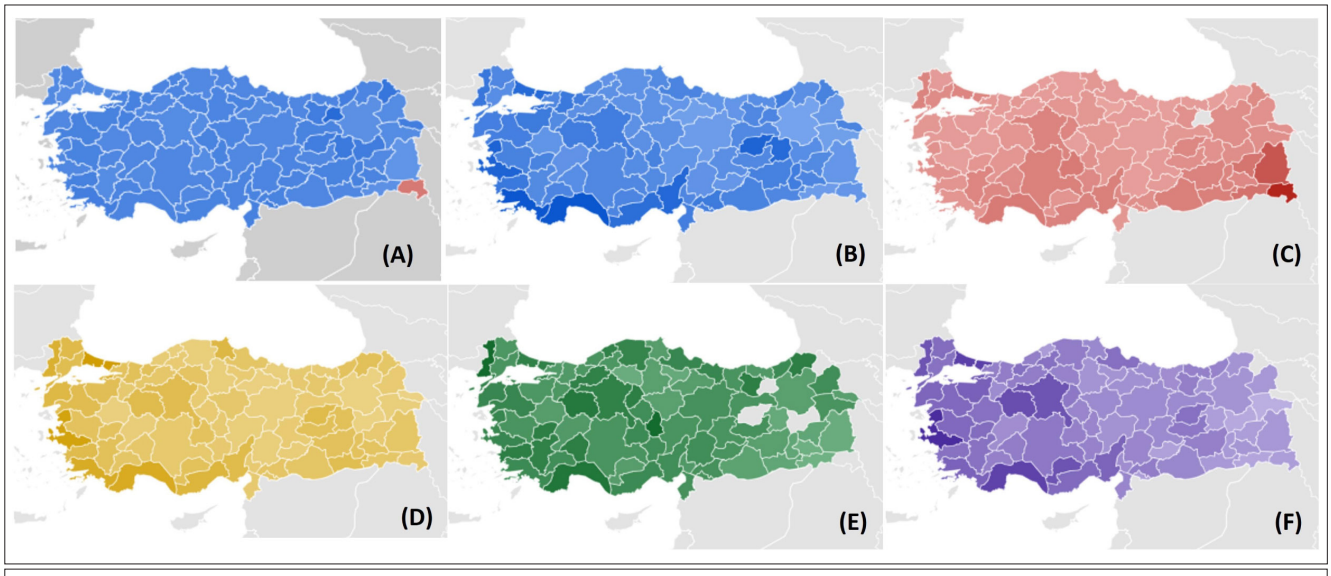


Figure 1. Geographic Distribution of Relative Search Volumes (RSVs) from 2004 to Date. (A) All Terms (Cannabis, Heroin, Cocaine, Amphetamine and Ecstasy); (B) Cannabis (blue); (C) Heroin (red); (D) Cocaine (yellow); (E) Amphetamine (green); (F) Ecstasy (purple). Greater Shading Indicate Higher RSVs. A Value of 0 (Unshaded Fields) Indicates that there is not Enough Data for this Term. (The Figure was Captured from Google Trends; Data Source: Google Trends (https://trends.google.com/trends/, accessed on 19 February 2025).

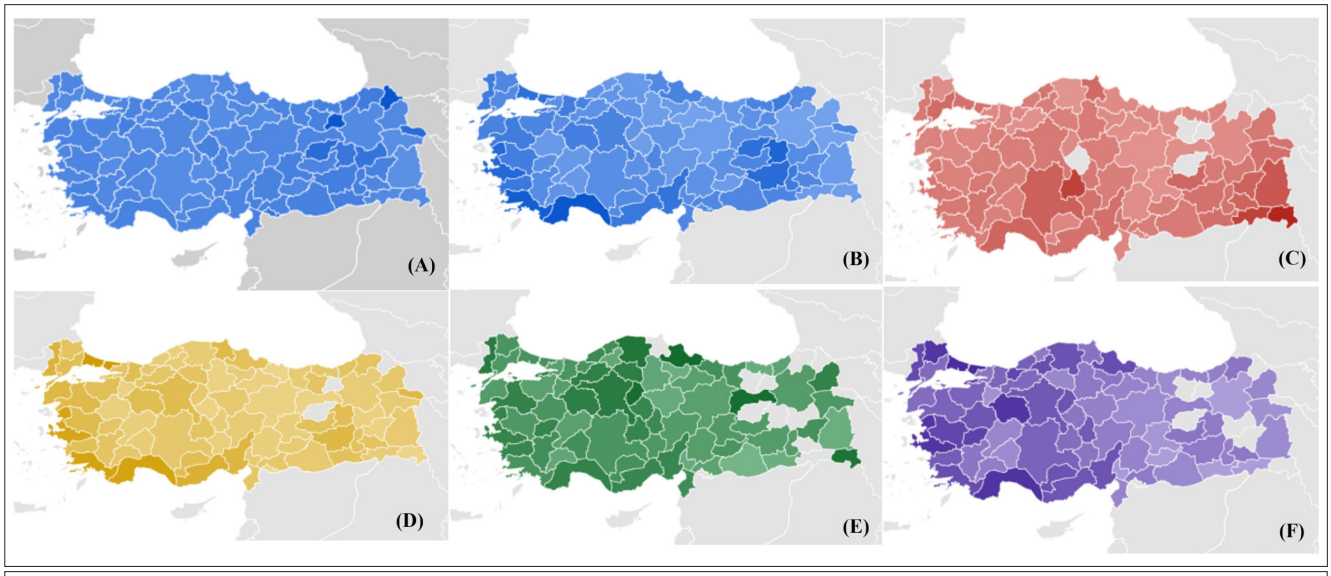


Figure 2. Geographic Distribution of Relative Search Volumes (RSVs) from 2022 to Date. (A) All Terms (Cannabis, Heroin, Cocaine, Amphetamine and Ecstasy); (B) Cannabis (blue); (C) Heroin (red); (D) Cocaine (yellow); (E) Amphetamine (green); (F) Ecstasy (purple). Greater Shading Indicate Higher RSVs. A Value of 0 (Unshaded Fields) Indicates that there is not Enough Data for this Term. (The Figure was Captured from Google Trends; Data Source: Google Trends (https://trends.google.com/trends/, accessed on 19 February 2025).

for cannabis-related information using the Google search engine increased by more than 15%, heroin by 175%, cocaine by 20%, and amphetamine by 25% between 2022 and 2025.

Questions related to search terms were also looked at ("users who searched for your term also searched for these queries"):

- Cannabis: "Is cannabis addictive?", "Changes in the body after quitting cannabis", "How many days does cannabis stay in urine?", "What to do to prevent cannabis in urine?", "Does cannabis appear in blood?", "When is cannabis cleared from the blood?", "Lyrica".
- Heroin: "Corex."
- Cocaine: "How to sleep after cocaine use?", "How to relieve nasal congestion after cocaine?", "Signs of cocaine use", "Cocaine prices 2023", "'*some celebrities' names* and cocaine."
- Amphetamine: "Adderall", "Ritalin."
- Ecstasy: "User experiences with ecstasy", "Is Xanax a drug?"

Discussion

This study utilized GT to evaluate public interest in the five most commonly used psychoactive substances in Türkiye. It analyzed geographic distribution, monthly and weekly trends, and related queries. To the authors' knowledge, this is the first study to apply GT for this purpose in Türkiye.

The findings revealed regional differences in search interest. Hakkari had the highest RSV for heroin, Antalya for cannabis, Istanbul for cocaine and ecstasy, and Samsun for amphetamine. These variations may reflect regional patterns in substance use, treatment-seeking behavior, or the media influences. However, direct conclusions about actual substance use should be drawn cautiously, as RSVs reflect population-level search behavior that can be influenced by media coverage and other external factors rather than actual prevalence or intent. Future studies should compare GT data with official epidemiological reports to validate its reliability as a surveillance tool.

In this study, search interest in psychoactive substances showed a fluctuating yet generally increasing trend over time. Peaks in interest often occurred during the spring and summer months. This seasonal variation may be associated with increased travel, festivals, and nightlife during these periods, which could drive greater curiosity or concern about substance-related topics. A study on the seasonal use of psychedelics and party drugs among festival attendees found that summer was a risk factor for the use of common psychedelics, especially among individuals attending electronic dance music events (Palamar et al., 2024). Similarly, research examining temporal and spatial patterns of methamphetamine and amphetamine in wastewater in Beijing reported significantly higher methamphetamine loads in urban areas and in summer compared to winter. The researchers suggested that increased entertainment activities and a higher socioeconomic status in urban regions may contribute to this seasonal trend (Li et al., 2014). Understanding these patterns is crucial for public health planning, as it highlights the importance of timing in prevention efforts.

Cannabis, cocaine, and amphetamine-related searches increased by approximately 30% over the study period. This rise may be attributed to growing media coverage, cultural references (e.g., songs), and shifts in public perception. These findings align with global trends showing an increase in online searches about mental health (Zhao et al., 2022) and substance use disorder (SUD)-related topics (Alibudbud, 2023). These findings may be interpreted as an increase in public interest and the need for accessible resources. However, it needs to be ensured that the public's expectations regarding information on substance use disorders are accurately met on online platforms. In addition, there is a need to reach the most affected population. The internet appears to be a viable option for delivering up-to-date prevention information.

Table 1.
Cities with the Highest Search Interest for Each Psychoactive Substance (i.e., with the Highest RSV) in the Specified Period (Geographical Distribution)

	2004 – To Date Top Five Provinces	RSV	2022 – To Date Top Five Provinces	RSV
Cannabis				
	Antalya	100	Antalya	100
	Muğla	96	Muğla	94
	İzmir	88	Bingöl	88
	Tunceli	88	İzmir	84
	Adana	84	Diyarbakır	80
Heroin				
	Hakkari	100	Hakkari	100
	Van	67	Şırnak	81
	Şırnak	48	Aksaray	81
	Bitlis	45	Van	66
	Antalya	42	Konya	60
Cocaine				
	İstanbul	100	İstanbul	100
	İzmir	91	Muğla	90
	Antalya	81	Antalya	90
	Muğla	79	İzmir	87
	Edirne	72	Mersin	72
Amphetamine				
	Edirne	100	Samsun	100
	Nevşehir	100	Erzincan	97
	Antalya	91	Kırıkkale	97
	Eskişehir	88	Hakkari	93
	Gümüşhane	83	Kastamonu	91
Ecstasy				
	İzmir	100	İstanbul	100
	İstanbul	88	Antalya	96
	Antalya	86	Eskişehir	95
	Eskişehir	79	Kırklareli	95
	Karaman	76	İzmir	95

Note: RSV = Relative search volume.

GT also highlights the types of questions people commonly seek answers online. The analysis found that cannabis-related searches frequently involved inquiries about detection in urine and blood, while searches for cocaine included concerns about nasal congestion and substance prices. These insights may help public health officials customize online education and harm-reduction strategies to address common concerns more effectively. Furthermore, news related to substance use among celebrities frequently appears in search trends, highlighting the impact of media on public perception and behavior. Studies suggest that celebrity drug use reports may contribute to normalization or increased interest in substances, particularly among younger populations (Shaw et al., 2010).

Although this study could not compare its findings with national data, beyond monitoring the existing situaition, it highlights the potential of GT to detect emerging trends in new psychoactive substances as shown in the studies from other countries (Al-Imam et al., 2022; Livingston et al., 2022). In Türkiye, GT could serve as a complementary early warning system, helping policymakers respond proactively to emerging drug trends.

Several limitations should be considered in this study. Despite its advantages, GT has several limitations that stem from itself. First, due to GT providing RSV rather than absolute search numbers, actual numbers of searches cannot be accessed, and neither can the popularity of terms be measured. This may cause misinterpretation of the results. Second, the specific terms or idioms grouped under topic keywords are not transparent due to GT's algorithmic limitations (Nuti et al., 2014), and the street names of drugs may be different and not be included in topic-based searches. Third, the context behind search terms, such as user intent or motivation, remains unknown; searches may be driven by curiosity, news events, or prevention efforts rather than actual drug use. Additionally, GT-based studies exclude data from non-Google platforms and individuals who lack internet access. This may lead to an underrepresentation of certain populations, such as the elderly or those in socioeconomically deprived or rural areas. This digital divide and unknown sociodemographic characteristics of users, may skew the study results. Further limitations include the inability to account for governmental controls on search engines and language barriers, which may affect the representativeness of data. Google Trends also does not capture searches from users who utilize IP masking, virtual private networks, or anonymous browsers like Tor and DuckDuckGo, nor can it identify repeated searches from the same IP address (Bergeron et al., 2022). This may limit the generalizability of the findings. Another limitation of this study is that correlation analyses could not be performed due to the lack of up-to-date official data for the provinces. Finally, the decision to restrict searches to the "health" category to exclude unrelated queries, such as song lyrics, may have inadvertently filtered out some relevant searches.

Despite all these limitations the strength of GT data lies in its standardized measurement across time and regions. Additionally, bias in reporting related to the stigma against psychoactive substances may be less of a concern, as individuals might feel more comfortable searching anonymously from their private homes. Future research should incorporate data from multiple search engines and cross-reference GT data with national health records or survey-based substance use prevalence studies. Additionally, studies that could investigate how sociodemographic and cultural factors influence online search behavior would further improve the interpretability of GT data.

In conclusion, this study provides the first GT-based analysis of psychoactive substance-related searches in Türkiye. It offers insights into regional and seasonal variations in public interest concerning these substances. The findings revealed that different provinces had the highest search volumes for all five substances. It should be kept in mind that online interest does not necessarily reflect actual intentions or behaviors. While GT data cannot

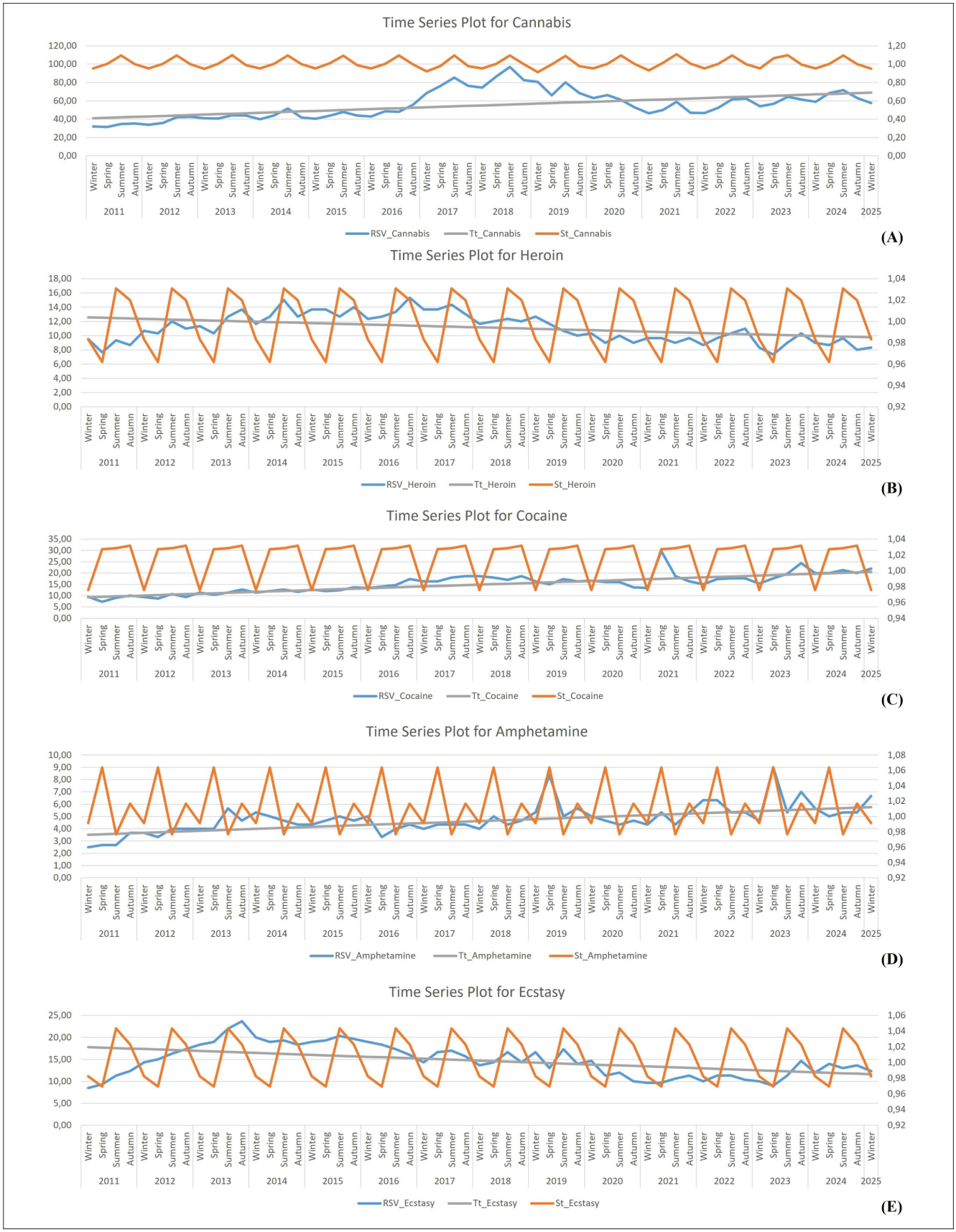


Figure 3. Time Series Analysis Results

replace traditional epidemiological methods, it offers a cost-effective and real-time tool for monitoring trends, identifying emerging substances, and informing public health strategies. By analyzing online search patterns, policymakers can develop targeted prevention campaigns, improve harm-reduction initiatives, and address public concerns more effectively. In the future, more comprehensive health service records and nationwide statistical data could help better determine the relationships between search volumes and real-world trends.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: All data used in this study were publicly accessible and anonymized, containing no personal health information. Therefore, an ethics review was not required. However, all procedures were conducted with scientific rigor to ensure the integrity of the research.

Informed Consent: All data used in this study were publicly accessible and anonymized, containing no personal health information. Therefore, an informed consent was not required. However, all procedures were conducted with scientific rigor to ensure the integrity of the research.

Peer-review: Externally peer-reviewed.

Declaration of Interests: The author has no conflict of interest to declare.

Funding: The author declared that this study has received no financial support.

References

Alibudbud, R. (2023). Google Trends for health research: Its advantages, application, methodological considerations, and limitations in psychiatric and mental health infodemiology. *Frontiers in Big Data*, *6*, 1132764. [CrossRef]

Al-Imam, A., Motyka, M. A., Witulska, Z., Younus, M., & Michalak, M. (2022). Spatiotemporal mapping of online interest in cannabis and popular psychedelics before and during the COVID-19 pandemic in Poland. *International Journal of Environmental Research and Public Health*, *19*(11), 6619. [CrossRef]

Batistic, F.-K., Rhumorbarbe, D., Lefrancois, E., Tettey, J., Raithelhuber, M., Rossy, Q., & Morelato, M. (2021). Analysis of Google Trends to monitor new psychoactive substance. Is there an added value? *Forensic Science International*, *326*, 110918. [CrossRef]

Bergeron, A., Décary-Hétu, D., Giommoni, L., & Villeneuve-Dubuc, M.-P. (2022). The success rate of online illicit drug transactions during a global pandemic. *International Journal on Drug Policy*, *99*, 103452. [CrossRef]

Demir, G., & Bandawe, C. (2024). The interest in betting, smoking, alcohol, and drugs in Malawi: Changing trends between 2012 – 2022. *Malawi Medical Journal*, *36*(1), 30 – 37. [CrossRef]

Ghosh, A., Bisaga, A., Kaur, S., & Mahintamani, T. (2022). Google Trends data: A potential new tool for monitoring the opioid crisis. *European Addiction Research*, *28*(1), 33 – 40. [CrossRef]

Jankowski, W., & Hoffmann, M. (2016). Can Google searches predict the popularity and harm of psychoactive agents? *Journal of Medical Internet Research*, *18*(2), e38. [CrossRef]

Jena, A. B., & Goldman, D. P. (2011). Growing Internet use may help explain the rise in prescription drug abuse in the United States. *Health Affairs*, *30*(6), 1192 – 1199. [CrossRef]

Li, J., Hou, L., Du, P., Yang, J., Li, K., Xu, Z., Wang, C., Zhang, H., & Li, X. (2014). Estimation of amphetamine and methamphetamine uses in Beijing through sewage-based analysis. *Science of the Total Environment*, *490*, 724 – 732. [CrossRef]

Livingston, M. D., Walker, A., Cannell, M. B., & Rossheim, M. E. (2022). Popularity of delta-8 THC on the internet across US states, 2021. *American Journal of Public Health*, *112*(2), 296 – 299. [CrossRef]

Mavragani, A., & Ochoa, G. (2019). Google Trends in infodemiology and infoveillance: Methodology framework. *JMIR Public Health and Surveillance*, *5*(2), e13439. [CrossRef]

Emniyet Genel Müdürlüğü Narkotik Suçlarla Mücadele Başkanlığı. (2024). *Türkiye uyuşturucu raporu*. chrome-extension://[CrossRef]/. https://www.narkotik.pol.tr/kurumlar/icisleri.gov.tr/duyurular(1)/2024_uyus_raporu.pdf

Nitzburg, G., Weber, I., & Yom-Tov, E. (2019). Internet searches for medical symptoms before seeking information on 12-step addiction treatment programs: A web-search log analysis. *Journal of Medical Internet Research*, *21*(5), e10946. [CrossRef]

Nuti, S. V., Wayda, B., Ranasinghe, I., Wang, S., Dreyer, R. P., Chen, S. I., & Murugiah, K. (2014). The use of google trends in health care research: A systematic review. *PLoS One*, *9*(10), e109583. [CrossRef]

Palamar, J. J., Rutherford, C., Le, A., & Keyes, K. M. (2024). Seasonal variation of use of common psychedelics and party drugs among nightclub/festival attendees in New York City. *Journal of Psychoactive Drugs*, *56*(4), 467 – 474. [CrossRef]

Parker, J., Cuthbertson, C., Loveridge, S., Skidmore, M., & Dyar, W. (2017). Forecasting state-level premature deaths from alcohol, drugs, and suicides using Google Trends data. *Journal of Affective Disorders*, *213*, 9 – 15. [CrossRef]

Perdue, R. T., Hawdon, J., & Thames, K. M. (2018). Can big data predict the rise of novel drug abuse? *Journal of Drug Issues*, *48*(4), 508 – 518. [CrossRef]

Qeadan, F., Egbert, J., & English, K. (2022). Associations between problematic internet use and substance misuse among US college students. *Computers in Human Behavior*, *134*, 107327. [CrossRef]

Rovetta, A. (2024). Google trends in infodemiology: Methodological steps to avoid irreproducible results and invalid conclusions. *International Journal of Medical Informatics*, *190*, 105563. [CrossRef]

Schuurman, G. S., & Bont, L. (2022). Social listening and google trends as tools for estimating public awareness of respiratory syncytial virus. *Pediatric Infectious Disease Journal*, *41*(7), e292 – e295. [CrossRef]

Shaw, R. L., Whitehead, C., & Giles, D. C. (2010). 'Crack down on the celebrity junkies': Does media coverage of celebrity drug use pose a risk to young people?? *Health, Risk and Society*, *12*(6), 575 – 589. [CrossRef]

Sindhoo, Z., Sindhoo, S., Ghosh, A., Kaur, S., Soyiri, I., & Ahmadi, K. (2023). Online interest for electronic cigarettes using Google Trends in the UK: A correlation analysis. *Substance Use and Misuse*, *58*(14), 1791 – 1797. [CrossRef]

Singh, S., & Balhara, Y. P. S. (2024). Impact of global public health days on online health-information-seeking behavior related to substance use: An analysis of five-year data. *Indian Journal of Psychiatry*, *66*(1), 111 – 115. [CrossRef]

Soussan, C., & Kjellgren, A. (2014). Harm reduction and knowledge exchange—A qualitative analysis of drug-related Internet discussion forums. *Harm Reduction Journal*, *11*, 25. [CrossRef]

Statista (2025). *Web browser market share in Türkiye*. https://www.statista.com/statistics/421633/web-browser-market-share-in-turkey/.

United Nations (2021). *World drug report - 2021*. https://www.unodc.org/res/wdr20 21/field/ WDR21_Bookl et_2.pdf.

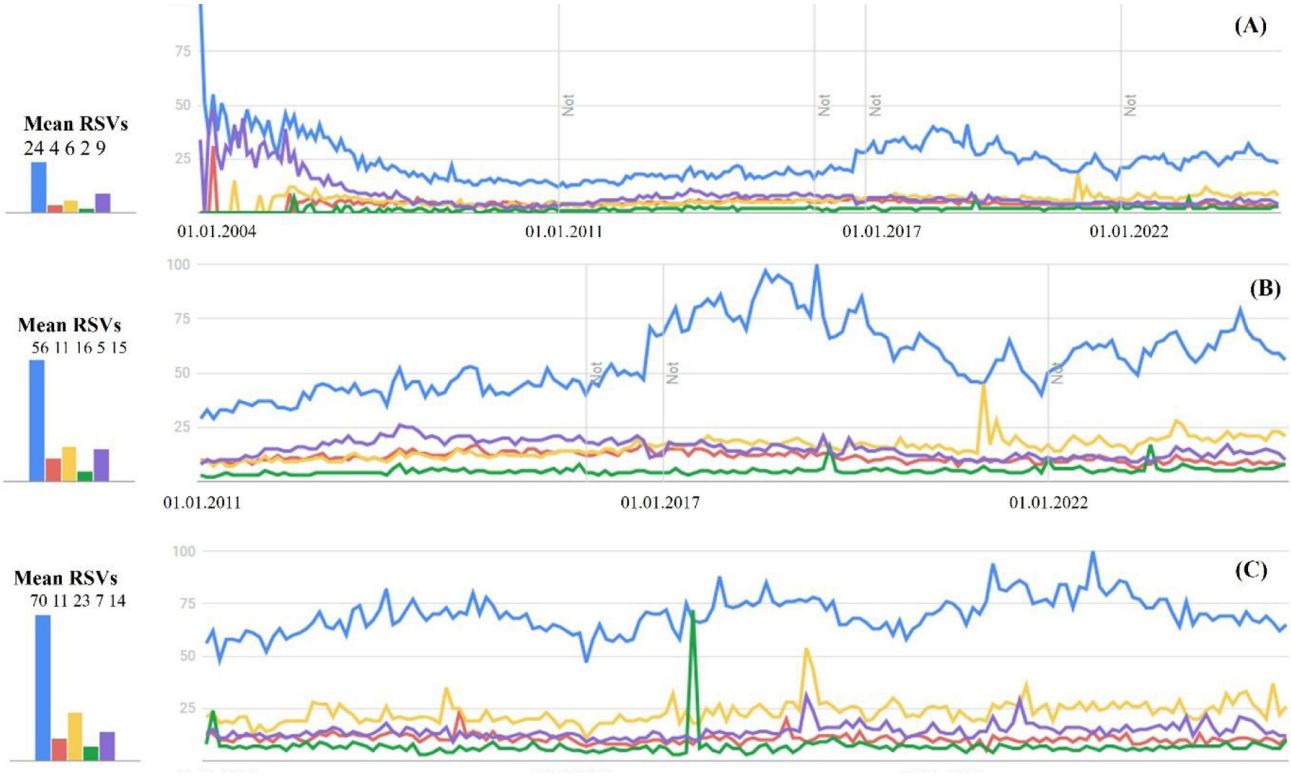
United Nations Office on Drugs and Crime (2024). *dataUNODC country profiles*. https://dataunodc.un.org/content/country-list.

Zhao, X., Coxe, S. J., Timmons, A. C., & Frazier, S. L. (2022). Mental health information seeking online: A Google Trends analysis of ADHD. *Administration and Policy in Mental Health*, *49*(3), 357 – 373. [CrossRef]

Supplementary File 1. The link of the Google Trends search

<scripttype="text/javascript"src="https://ssl.gstatic.com/trends_nrtr/4004_RC01/embed_loader.js"></script><scripttype="text/javascript"> trends.embed.renderExploreWidget("GEO_MAP", {"comparisonItem":[{"keyword":"/m/054yc0","geo":"TR","time":"2004-01-01 2025-02-19"},{"keyword":"/m/03n5b","geo":"TR","time":"2004-01-01 2025-02-19"},{"keyword":"/m/0256b","geo":"TR","time":"2004-01-01 2025-02-19"},{"keyword":"/m/0_0j","geo":"TR","time":"2004-01-01 2025-02-19"},{"keyword":"/m/02qpq","geo":"TR","time":"2004-01-01 2025-02-19"}],"category":45,"property":""}, {"exploreQuery":"cat=45&date=all&geo=TR&q=%2Fm%2F054yc0,%2Fm%2F03n5b,%2Fm%2F0256b,%2Fm%2F0_0j,%2Fm%2F02qpq&hl=tr","guestPath":"https://trends.google.com:443/trends/embed/"}); </script>

Supplementary File 2. The figure of the time trend analysis provided by Google Trends



THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Smokers' Reactions to Anti-Smoking Advertisements: A Preliminary Neuromarketing Study

Ahmet Uyar

Department of Banking and Insurance, Afyon Kocatepe University Bolvadin Faculty of Applied Sciences, Afyon, Türkiye

ORCID iDs of the author: A.U. 0000-0002-7481-4045.

Main Points

- The ad with positive messages about quitting smoking is more persuasive to smokers, more memorable, and watched more attentively by participants.
- Advertising with negative messages leads to avoidance behavior, especially among individuals with high smoking dependency. Therefore, frightening content should be presented in a realistic and empathetic manner, without being overly exaggerated.
- Smokers' primary motivation for smoking is to "feel better when sad," "cope with depression," and "escape negative emotions." Advertising can emphasize that these perceived benefits are not based on reality. Additionally, smokers believe that smoking makes them appear unattractive. This negative perception can also be leveraged in advertising to influence smokers.
- To enhance the effectiveness of anti-smoking advertising, attention and emotional responses to ads should be measured using technologies such as eye tracking, electroencephalography, and face coding. This feedback can guide the design process of the advertisements.

Abstract

There is a substantial body of research on how anti-smoking advertisements are perceived by smokers and which types of messages are most effective. However, these studies have not reached a consensus, producing diverse and sometimes contradictory findings. This study aims to explore how different types of messages in anti-smoking advertisements influence smokers and whether these advertisements prompt behavioral changes toward quitting smoking. To achieve this, a study was conducted with 40 smokers using neuromarketing methods, including eye tracking, face coding, andelectroencephalography. Participants were exposed to two advertisements: one with a positive message frame emphasizing the benefits of quitting smoking and another with a negative message frame highlighting the consequences of not quitting. The findings reveal that advertisements with positive messaging attract greater attention, are more memorable, and are more effective in encouraging smoking cessation. Additionally, it was observed that individuals with higher levels of smoking addiction tend to retain positive messages more effectively and are more likely to avoid negative messages. Therefore, the study concludes that anti-smoking advertisements should emphasize positive messaging to achieve greater effectiveness.

Keywords: Addictions to tobacco, anti-smoking advertisements, neuromarketing

Corresponding author:
Ahmet Uyar
E-mail:
ahmetuyar@aku.edu.tr

Received: February 2, 2025
Revision Requested: March 16, 2025
Last Revision Received: April 3, 2025
Accepted: April 20, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

Public authorities and organizations disseminate various anti-smoking advertisements to protect individuals from tobacco use. The effectiveness of these advertisements varies depending on factors such as the type of message, audience segmentation, and message perception. Research indicates that both empathy-based and fear-based messages can be effective, but their impact depends on the target audience and context. For instance, empathy-driven messages resonate more with regular smokers and women, promoting behavioral change. Conversely, fear-based messages are generally more effective among individuals with lower levels of nicotine addiction (Shen, 2015).

Cite this article as: Uyar, A. (2025). Smokers' reactions to anti-smoking advertisements: A preliminary neuromarketing study. *Addicta: The Turkish Journal on Addictions*, 12(3), 267-277.

Anti-smoking advertisements, particularly those with strong emotional content, graphic imagery, and personal narratives, have been shown to significantly enhance individuals' motivation and efforts to quit smoking. These types of messages tend to elicit heightened emotional responses, which not only increase recall but also facilitate behavioral change (Leas et al., 2015). Personal testimonies that emphasize the suffering caused by smoking foster empathy and reinforce the intention to quit, while graphic depictions of the health consequences of tobacco use serve as powerful deterrents (Farrelly et al., 2012). Neurophysiological evidence further supports these effects, indicating that exposure to such advertisements increases introspection and psychological stress, which in turn enhances cessation motivation (Gupta et al., 2018). Among younger populations, visual warnings—such as pictorial health warnings on cigarette packaging—have proven particularly effective in stimulating the desire to quit smoking (Faisal & Suryati, 2023). Moreover, broad media exposure to anti-smoking messages has been associated with higher population-level cessation rates (Hyland et al., 2006). These advertisements also contribute to increased interpersonal pressure from social circles, which indirectly reinforces the decision to quit (Dunlop et al., 2014). Collectively, these findings underscore the effectiveness of emotionally compelling and visually impactful anti-smoking campaigns in promoting smoking cessation by enhancing personal awareness and leveraging social influence.

The impact of anti-smoking advertisements on smokers can be summarized as follows (Nogueira et al., 2018):

Creating Awareness: Advertisements raise awareness of the health risks of smoking, such as lung cancer, heart disease, and other severe illnesses.

Motivating Quit Attempts: Some smokers experience increased motivation to quit after viewing advertisements that evoke strong emotional or cognitive reactions.

Reducing Social Acceptance: Public service announcements challenge the social norms surrounding smoking, making it less socially acceptable.

Strengthening Quit Efforts: Advertisements can reinforce the efforts of those already attempting to quit smoking.

Numerous studies have investigated the effectiveness of public service announcements on smoking cessation, using neuromarketing methods alongside surveys and interviews. For example, a study by Wang et al. (2013) utilizing fMRI revealed that strong messages in public service announcements activate specific brain regions, increasing smokers' motivation to quit. Similarly, Harris et al. (2019) demonstrated, using electroencephalography (EEG), that advertisements with intense emotional content capture greater attention and have a higher potential to drive behavioral change.

In contrast, Schmälzle et al. (2020) found that anti-smoking posters evoking negative emotions were associated with lower click-through rates, suggesting that while negative emotional reactions might seem persuasive, they do not necessarily lead to action. Yang (2018), using NeuroSky's MindWave device, emphasized that the framing of advertising messages significantly impacts their effectiveness. Advertisements that align with viewers' emotional and cognitive responses are more likely to succeed in encouraging smoking cessation. Cahill (2006) demonstrated that women exhibit stronger emotional responses to positively framed content and show higher emotional engagement, particularly in the context of health communication.

Cartocci et al. (2018) found that fear-inducing messages were more effective in eliciting cognitive activity compared to ironic or purely informative approaches. However, the effects varied by gender. Similarly, Lindstrom (2012) demonstrated that health warnings on cigarette packaging, despite being designed to deter smoking, sometimes increased smokers' desire to smoke. Lindstrom's findings highlighted the disparity between what participants claimed to feel and their actual behavior.

A study by Park and Lee (2021) reported that social norm messages were particularly effective in changing smokers' attitudes, whereas fear-based messages were less impactful. Conversely, it was Wakefield et al. (2013) observed that television advertisements visually illustrating the harms of smoking were highly effective among smokers in low- and middle-income countries.

This study aims to investigate the effectiveness of anti-smoking advertisements framed with positive and negative messages on smokers by employing neuromarketing methods such as EEG, eye tracking, and face coding. The main objectives are to determine which type of message elicits greater attention, emotional engagement, and memory retention, and to explore how these effects vary based on the level of nicotine addiction and gender. Based on prior literature and framing theory, the study hypothesizes that (H1) advertisements with positive messages will attract more attention and be more memorable than those with negative messages; (H2) individuals with higher addiction levels will exhibit avoidance behavior toward negatively framed advertisements; and (H3) female participants will show greater engagement with positive message advertisements compared to male participants.

Material and Methods

The target population for this study comprised cigarette smokers. In neuromarketing research utilizing methods such as eye tracking and EEG, a sample size of 34 participants is considered sufficient to measure advertisement effectiveness with 90% accuracy (Koşar & Tor Kadiroğlu, 2020: 205). In this study, a total of 40 participants were included. Participants were selected using a simple random sampling method among individuals who were known to be smokers and accessible during the research period (October 1 – 20, 2024). Potential participants were approached through public spaces (e.g., university campus, social gathering areas, and cafés) and invited to participate voluntarily. Individuals who met the inclusion criteria (18 years or older, regular cigarette use) were randomly chosen from among those who agreed to participate. No participants were excluded from the study.

Participants were required to meet the following inclusion criteria: (1) being 18 years of age or older, and (2) being a regular cigarette smoker (at least one cigarette per day for the past 6 months). Exclusion criteria included individuals with known neurological or psychiatric disorders that could interfere with

neuromarketing measurements, such as epilepsy, Parkinson's disease, or perceptual impairments. To assess these conditions, a brief pre-screening questionnaire was administered prior to participation. Participants were asked to self-report any such conditions, and those who did not meet the criteria were excluded from the study. These precautions were taken to ensure the reliability and accuracy of EEG, eye tracking, and face coding results.

This study combines traditional research methods, such as surveys, with neuromarketing techniques. Initially, participants were administered the "Psychological Dependence on Smoking Assessment Scale," developed by Bardakçı et al. (2021) to assess their levels of smoking addiction. This 3-point Likert scale enables differentiation among varying degrees of dependence. Since the number of participants exceeded 30, and the skewness and kurtosis values were within the acceptable range of ± 1.5, the assumption of normality was considered to be met. Therefore, the data obtained through the survey were analyzed using parametric tests (Can, 2014).

Various neuromarketing methods were employed in this study. Neuromarketing is an interdisciplinary research approach that brings together neuroscience, psychology, and marketing to better understand consumer behavior. Traditional marketing methods often rely on subjective measures such as surveys or interviews, which can be limited by participants' self-awareness and ability to articulate their thoughts (Ariely & Berns, 2010). In contrast, neuromarketing techniques allow for the objective evaluation of consumers' emotional and cognitive responses through the use of physiological and neurobiological tools such as electroencephalography (EEG), eye tracking, and facial coding (Morin, 2011). These tools offer valuable insights into unconscious processes such as attention, emotional arousal, memory encoding, and decision-making (Plassmann et al., 2012). In the context of advertising, neuromarketing helps identify which elements of a message are most effective in capturing attention and evoking emotional engagement, particularly in public health campaigns like anti-smoking advertisements. By integrating marketing insights with neuroscientific data, neuromarketing enables a more comprehensive analysis of how persuasive messages influence human behavior.

Neuromarketing techniques, including eye tracking, Face Coding, and EEG, were then applied:

Eye tracking: This technique identifies which elements attract consumers' attention, making it vital for analyzing advertising content (Wedel & Pieters, 2006). The study evaluated participants' attention levels using eye tracking metrics, such as the K-Coefficient, and generated heat maps to visualize the areas of advertisements that received the most attention (Špakov & Miniotas, 2007).

Face coding: This method measures emotional changes by analyzing facial expressions during advertisement viewing. It helps determine positive or negative emotional reactions to marketing content (McDuff & El Kaliouby, 2016).

The eye tracking and face coding measurements were conducted using RealEye, an AI-supported application capable of detecting 60 gaze points per second via webcam (Fazio et al., 2020).

Electroencephalography: Electroencephalography was used to assess participants' emotional states and evaluate the effectiveness of marketing messages. Measurements were conducted with the Muse 2 headband, which uses dry electrodes and tracks brainwave activity at a sampling rate of 256 Hz. EEG data were analyzed using metrics such as Frontal Alpha Asymmetry (FAA), Frontal Theta Asymmetry (FTA), and Frontal Theta scores (Morán-Mirabal, et al. 2024).

Data Analysis

EEG data were processed using the Julius.ai platform (https://julius.ai/). Preprocessing steps included artifact removal via Independent Component Analysis, bandpass filtering, and segmentation. Key EEG metrics analyzed included:

Frontal Alpha Asymmetry (FAA): A measure of emotional processing and motivation, with higher scores indicating positive emotional responses and approach behaviors (Chai et al., 2014).

Frontal Theta Asymmetry (FTA): A measure linked to emotional states and decision-making behaviors (Zhao et al., 2018).

Frontal Theta Scores: Associated with memory retention, recall, and preference for advertisements (Fischer et al., 2018).

EEG findings were further interpreted in consultation with a neurology expert.

Data Collection Process

To ensure reliable data collection, participants were evaluated in a quiet and controlled environment, free from external noise and emotional distractions. Each participant was individually admitted into a designated room and seated at a standardized distance of 65 cm from the laptop screen, in accordance with established scientific guidelines. Prior to viewing the advertisement, participants were asked to complete a questionnaire designed to assess their general level of psychological dependence on smoking, ensuring that responses were not influenced by the emotional content of the videos. Afterward, participants watched two anti-smoking advertisements presented in a randomized order to eliminate order bias. Eye tracking and face coding analyses were conducted online through the RealEye platform, which uses webcam-based artificial intelligence technology to monitor real-time eye movements and facial expressions. Since these analyses were conducted directly via the RealEye system, no additional time was required for setup or calibration. The entire data collection process, including questionnaire completion and neuromarketing measurements, took approximately 15 to 20 minutes per participant. All neuromarketing procedures—including eye tracking, face coding, and EEG measurements—were administered by trained researchers with expertise in neuromarketing tools and protocols. The research team received prior training in the operation of RealEye and Muse 2 systems, ensuring reliable and standardized data collection. Before the study began, each participant was informed about the purpose, methods, and confidentiality of the research and signed a voluntary informed consent form. They also completed a brief pre-screening form to confirm that they did not have any neurological or perceptual disorders. Ethics committee approval and legal permissions for the study were obtained from Afyon Kocatepe University (Date: January

12, 2024; Meeting number: 2024-01). This structured and individualized data collection process was designed to maximize objectivity, data accuracy, and participant comfort.

Participants were informed about the safety of the devices used, the confidentiality of the data collected, and the voluntary nature of their participation. Detailed explanations were provided, and informed consent forms were signed prior to their participation.

Two advertisements produced by the Turkish Green Crescent Society were shown to participants. The first advertisement conveyed positive messages, emphasizing the health benefits of quitting smoking (e.g., Quit Smoking, Do not Quit Life 3). The second advertisement focused on negative messages, highlighting themes such as the health risks of smoking, death, emotional separations, and social disconnections (e.g., Quit Smoking, Do not Quit Life 2).

The selection of these advertisements was based on message framing theory, which examines consumer responses to different communication frames. This theory posits that varying presentations of the same topic—such as gain-loss, concrete-abstract, or emotional-rational contrasts—can yield different consumer behaviors (Florence et al., 2022). Specifically, the study incorporated both positive and negative advertisements based on Tversky and Kahneman's (1981) hypothesis that individuals are more sensitive to losses than to gains. This theoretical foundation underpins the positive and negative framing strategies frequently employed in marketing.

Data Analysis

Demographic Characteristics and Addiction Levels of Participants

The study included 40 cigarette smokers, equally divided between males (n = 20) and females (n = 20), aged between 19 and 46 years. Participants smoked an average of 16.58 cigarettes per day. "Based on the levels of addiction, the severity of addiction was low in 17.5% of participants, moderate in 57.5%, and high in 25%."

Reliability Analysis

To assess the internal consistency and reliability of the survey, a Cronbach's Alpha analysis was conducted. Cronbach's Alpha

Table 1.
Psychological Dependency on Smoking Assessment Scale

Statement	*N*	X	Standard Deviation
I believe I am accepted by others when I smoke.	40	1.63	.740
Smoking helps me relax.	40	2.58	.549
I can only have a good time if I smoke.	40	1.78	.620
I can concentrate better when I smoke.	40	2.05	.749
I feel confident when I smoke.	40	1.38	.586
Smoking provides me with the energy I need.	40	2.03	.768
Smoking is my best friend/companion.	40	1.60	.632
Smoking allows me to adopt the character I want to embody.	40	1.15	.427
Smoking makes me appear attractive.	40	1.08	.267
I think more clearly when I smoke.	40	1.98	.698
Smoking creates an irresistible craving and desire in me.	40	2.28	.784
Smoking at parties and social gatherings makes the atmosphere more enjoyable.	40	2.42	.636
I enjoy smoking more when I drink alcohol.	40	2.17	.874
When I feel sad or depressed, smoking helps me feel better.	40	2.63	.540
Smoking helps me manage my stress.	40	2.55	.552
Smoking helps me control my anger.	40	2.38	.740
Smoking brings me great pleasure.	40	2.28	.679
Smoking helps me manage my anxiety.	40	2.13	.648
Smoking helps me calm down.	40	2.42	.594
Smoking gives me a sense of satisfaction.	40	2.45	.639
Smoking is an addiction associated with illness, cancer, and death. Yet, I have decided to continue smoking.	40	2.38	.705
Smoking is harmful, and nicotine is a drug. Yet, I have decided to continue smoking.	40	2.42	.712
I spend money on cigarettes that I could use for other things, but I think it is worth it.	40	2.03	.768
Smoking around my family affects their health. Yet, I will continue to smoke.	40	1.53	.679
Smoking at my workplace affects and disturbs my colleagues. However, I will continue to smoke.	40	1.88	.791

is a widely used statistical measure to evaluate the homogeneity of survey items (Yıldız & Uzunsakal, 2018). In this study, the Cronbach's Alpha value was calculated as 0.864, indicating a high level of reliability for the survey instrument.

Participants' Attitudes Toward Smoking Addiction

Table 1 presents the responses of participants to questions assessing smoking addiction. The survey used a 3-point Likert scale, where (3) indicates "very often," (2) indicates "sometimes," and (1) indicates "never." According to the results, participants most agreed with the statement, "Smoking when I feel sad or depressed helps me feel better," while they least agreed with the statement, "Smoking makes me look more attractive."

Eye Tracking and Electroencephalography Data of Participants

According to the data obtained in the study, participants paid closer attention to the advertisement containing positive messages (34.60 > 31.48). The FAA score was also higher for the advertisement with positive messages (0.23 > 0.01). The higher average FAA score for the advertisement with positive messages indicates that participants watched this advertisement with higher motivation and demonstrated an approach behavior toward it. Attention data obtained from eye tracking further supports this interpretation. Additionally, the high Frontal Theta Wave activity in the advertisement with positive messages (0.36) indicates that the advertisement was more memorable. However, the FTA score of −0.050 suggests the presence of anxiety or concern, potentially indicating resistance to change.

For the negative-themed advertisement, the data suggest it may have a lasting impression on viewers' long-term memory (0.144). However, this value is lower compared to the advertisement with positive messages (0.36 > 0.144). The FTA score (−0.096) reflects the presence of anxiety or concern among viewers.

Figure 1 presents the heatmap of the scene in the positive message advertisement that participants watched with the highest level of attention. In this scene, the attention score was calculated as 1.00. The attention score in the Realeye system ranges between −1 and +1 (Lewandowska & Wisiecka, 2022). A value of 1.00 indicates that the scene was viewed with the maximum level of attention. The scene depicts an elderly individual engaging in outdoor exercise after quitting smoking. A significant portion of participants focused on the face of the exercising individual.

Table 2.
Eye Tracking and Electroencephalography Data of Participants

Positive Message Advertisement	*N*	Mean
Eye tracking attention score	40	34.60
Frontal alpha asymmetry mean	40	0.23
Frontal theta asymmetry mean	40	−0.050
Frontal theta score mean	40	0.3624
Negative Message Advertisement		
Eye tracking attention score	40	31.48
Frontal alpha asymmetry mean	40	0.01
Frontal theta asymmetry mean	40	−0.096
Frontal theta score mean	40	0.144

Figure 2 shows the heatmap of the scene in the negative message advertisement that participants watched with the highest level of attention. In this scene, the attention score was calculated as 0.86. While this score is high, it is slightly lower compared to the positive message advertisement. The scene depicts a young individual in a hospital, reliant on medical equipment. Participants predominantly focused on the actor's face in this scene.

Facial Coding Analysis of Participants

Figure 3 illustrates the graph of participants' facial expressions while watching the positive message advertisement. According to the figure, participants exhibited limited expressions of surprise



Figure 1. Heatmap of the Scene with the Highest Attention Score in the Positive Message Advertisement.



Figure 2. Heatmap of the Scene with the Highest Attention Score in the Negative Message Advertisement.

and demonstrated a moderate degree of happiness (approximately Max = 0.18).

Facial Coding Analysis of Participants

Figure 4 presents the graph of participants' facial expressions while watching the negative message advertisement. According to the figure, participants exhibited almost no expressions of surprise and showed very minimal happiness (approximately Max = 0.1). When comparing the two advertisements, it can be concluded that participants experienced more happiness while watching the positive message advertisement.

Relationship Between Smoking Addiction and Neuromarketing Results

Tables 3 and 4 show the relationship between participants' smoking addiction levels and their responses to advertisements. In the correlation analysis conducted within the study, participants' responses to the addiction-related survey were compared with EEG and eye tracking data. According to the results obtained from the correlation analysis, there is a weak positive linear relationship between the Frontal Teta score and the addiction variable (0.04 < 0.05). This suggests that as participants' addiction levels increase, the Teta score, which indicates the recall rate of the advertisement, also rises. Individuals with higher levels of smoking addiction tend to retain the anti-smoking advertisement with positive messages for a longer period in their memory.

Furthermore, a negative relationship was found between the FAA score and the FTA score (0.03 < 0.05). This suggests that the advertisement may have triggered emotional and cognitive conflict in participants. In individuals with smoking addiction, while the advertisement elicited emotional responses, attention and cognitive evaluation processes were hindered.

Table 4 shows the relationship between the EEG and eye tracking data from negative message advertisements and the participants' addiction levels. According to the obtained data, there is a moderate negative correlation between the participants' addiction levels and FAA scores (0.42, $p < .05$). This means that as the addiction levels of smokers increase, their willingness to avoid advertisements highlighting the negative aspects of smoking addiction also increases. Furthermore, this suggests a negative change in the participants' emotional or motivational states. The "moderate" negative correlation between smoking addiction and frontal asymmetry indicates a significant relationship between these two variables.

Additionally, a moderate negative correlation was found between the FTA scores and FAA scores. This negative relationship between FTA and FAA indicates that anti-smoking

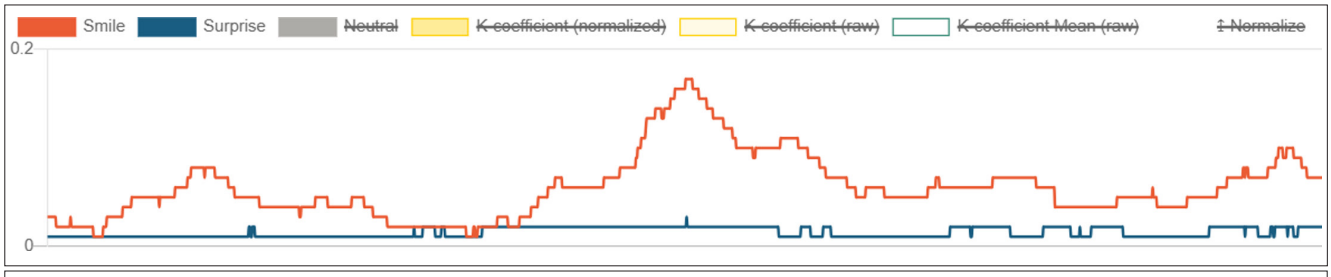


Figure 3. Facial Coding Graph for the Positive Message Advertisement.

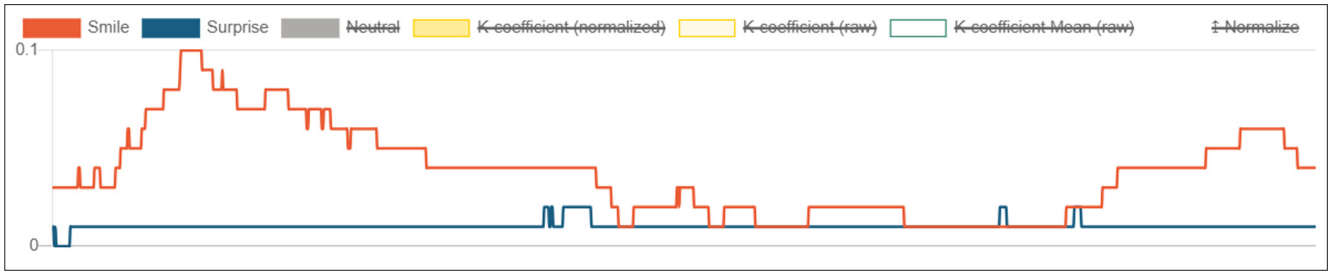


Figure 4. Facial Coding Graph for the Negative Message Advertisement.

advertisements may cause emotional discomfort for viewers, while also capturing their attention at a high level.

Comparison of Eye Tracking Data by Gender

The results of the t-test conducted to determine whether the attention shown by participants to the positive message advertisement differs by gender are presented in Table 5. The attention value shows a significant difference by gender. Specifically, women paid more attention to the positive message advertisement than men.

Discussion

Numerous studies have yielded varying, and sometimes contradictory, results regarding the effects of anti-smoking advertisements on smokers. The primary objective of such research is to identify the types of messages that are most effective in encouraging smoking cessation. This study investigated the effects of advertisements containing positive and negative messages on smokers, utilizing methods such as EEG, eye tracking, face coding, and surveys.

According to the findings from the survey section of the study, the statement, "When I am sad or depressed, smoking helps me feel better," was the most agreed upon by participants, whereas the statement, "Smoking makes me look attractive," received the least agreement. These results suggest that participants often rationalize their smoking behavior by citing emotional states such as sadness or depression. Similar findings in the literature have also demonstrated a link between depression and smoking addiction (Kiviruusu et al., 2024). Conversely, participants expressed skepticism regarding the perception of smoking as a factor that enhances physical attractiveness.

The study identified distinct differences in the effectiveness of positive versus negative message advertisements. Neuromarketing

Table 3.
Relationship between Positive Message Advertisement and Attention and Asymmetry Values

		Addiction	Eye Tracking Attention Value	Frontal Alpha Asymmetry Score	Frontal Theta Asymmetry Score	Frontal Theta Score
Addiction	Pearson correlation	1	−.120	−.209	.075	.391
	Sig. (2-tailed)		.461	.305	.722	**.048**
	N	40	40	40	40	40
Eye tracking attention value	Pearson correlation	−.120	1	−.020	−.032	.080
	Sig. (2-tailed)	.461		.923	.897	.697
	N	40	40	40	40	40
Frontal alpha asymmetry score	Pearson correlation	−.209	−.020	1	−.440	−.086
	Sig. (2-tailed)	.305	.923		**.031**	.683
	N	40	40	40	40	40
Frontal theta asymmetry score	Pearson correlation	.075	−.032	−.440	1	−.320
	Sig. (2-tailed)	.722	.897	.031		.119
	N	40	40	40	40	40
Frontal theta score	Pearson correlation	.391	.080	−.086	−.320	1
	Sig. (2-tailed)	.048	.697	.683	.119	
	N	40	40	40	40	

Table 4.
Relationship between Negative Message Advertisement and Attention and Asymmetry Values

		Addiction	Eye Tracking Attention Value	Fronthal Alpha Asymmetry Score	Frontal Theta Asymmetry Score	Frontal Theta Score
Addiction	Pearson correlation	1	.068	−.337*	.241	.209
	Sig. (2-tailed)		.676	.042	.157	.221
	N	40	40	40	40	40
Eye tracking attention value	Pearson correlation	.068	1	−.266	.010	.032
	Sig. (2-tailed)	.676		.111	.953	.855
	N	40	40	40	40	40
Frontal alpha asymmetry score	Pearson correlation	−.337*	-.266	1	−.556	.046
	Sig. (2-tailed)	.042	.111		.001	.791
	N	40	40	40	40	40
Frontal theta asymmetry score	Pearson correlation	.241	.010	−.556	1	−.131
	Sig. (2-tailed)	.157	.953	.001		.453
	N	40	40	40	40	40
Frontal theta score	Pearson correlation	.209	.032	.046	−.131	1
	Sig. (2-tailed)	.221	.855	.791	.453	
	N	40	40	40	40	40

*Correlation is significant at the 0.05 level (2-tailed).

data indicated that participants paid more attention to and were more motivated by the advertisements with positive messages. Metrics such as the FAA score, frontal theta score, and eye tracking attention score were higher for the positive message advertisements. This suggests that advertisements with positive messaging were more persuasive, left stronger impressions in memory, and were viewed with greater attention.

Interestingly, the FTA scores for both advertisements were negative, indicating that both ads caused some level of emotional disturbance among participants. However, the proximity of these scores to zero suggests that neither advertisement elicited a particularly strong emotional impact. Similarly, Face Coding analysis showed that participants displayed more expressions of happiness while watching the positive message advertisements compared to the negative ones.

Eye tracking data revealed that participants focused primarily on human faces during the advertisements, suggesting that they established an emotional connection with the individuals portrayed in the ads. There is also evidence in the literature suggesting that emotional connection influences smoking behavior among users (Leas et al., 2015)

Another key focus of this study was the relationship between smoking addiction levels and reactions to different messages. Correlation analysis revealed that as participants' addiction levels increased, so did their tendency to avoid advertisements that conveyed the negative aspects of smoking. A moderate relationship was identified between addiction levels and the avoidance of negative advertisements. Additionally, participants with higher addiction levels demonstrated greater recall rates for advertisements with positive messages. In other words, smokers with higher levels of addiction were more likely to retain information from positive advertisements while avoiding those with negative messages.

Gender differences in responses to the advertisements were also examined. According to the results of the T-test, women viewed the positive message advertisements with more attention compared to men. This gender-based difference may stem from a combination of emotional, psychological, and sociocultural factors. Previous studies have found that women are more likely to respond empathetically to emotionally positive content and display higher affective engagement in health communication contexts. Additionally, societal norms often associate caregiving and self-care behaviors more strongly with women, potentially

Table 5.
t-test Comparing Participants' Attention Values by Gender

Dimensions	Gender	*n*	X	**p*
Positive message	Women	20	38.05	.016
	Man	20	31.15	

$p < 0.05$.
X: arithmetic mean.

enhancing their receptiveness to positive, health-promoting messages. While this study did not directly examine these variables, future research should explore the interplay between gender, emotional reactivity, and addiction severity in greater depth.

The findings of this study contradict certain results in the literature. For instance, Lindstrom (2012) found that images of cancerous lungs or decayed teeth on cigarette packaging increased smokers' cravings to smoke. In contrast, this study revealed that participants tended to avoid negative message advertisements and approached them with negative motivation. Similarly, Cartocci et al. (2018) argued that fear-inducing advertisements are more effective in triggering cognitive activity; however, this study found lower FAA and FTA scores in response to fear-inducing advertisements.

On the other hand, the results align with some studies. Schmälzle et al. (2020) found that advertisements evoking negative emotions resulted in lower engagement, as smokers tended to avoid these messages even if they were affected by them. Similarly, Park and Lee (2021) reported that fear-based messages are less effective for smokers. Additionally, Shen (2015) found that fear-based messages are more effective for individuals with lower addiction levels. In line with these findings, this study showed that participants with higher addiction levels were more likely to avoid fear-inducing advertisements while responding more favorably to positive messaging. The results indicate that when the appropriate messages are delivered, such advertisements can be effective for participants and may contribute positively to smoking cessation efforts. This finding is generally supported by the existing literature (Gupta et al., 2018).

The effectiveness of positive message advertisements in this study supports Tversky and Kahneman's (1981) hypothesis that "people are more sensitive to gains than to losses."

Based on the findings, the following recommendations can be made for organizations creating anti-smoking advertisements:

Emphasize Positive Messaging: Advertisements that highlight a healthy, happy lifestyle and evoke positive emotions should be prioritized. Such content is likely to attract greater attention, enhance recall, and improve the likelihood of smoking cessation.

Balance Negative Messaging: Negative message advertisements can trigger avoidance behaviors, especially among individuals with high levels of addiction. Therefore, fear-based content should be presented in a balanced and empathetic manner to prevent excessive aversion. Negative messaging may be more effective for less addicted individuals but should still be used with caution.

Address Emotional Triggers: Since smokers often cite sadness and depression as motivations for smoking, advertisements can emphasize alternatives to smoking for coping with these emotions. Additionally, the perception that smoking does not enhance physical attractiveness can serve as a motivational factor in advertising campaigns.

Increase Emotional Impact: This study found that anti-smoking advertisements did not elicit a strong emotional impact. To strengthen the emotional connection with smokers, advertisements should incorporate more emotionally engaging elements.

Segment Audiences According to Emotional Reactions: Move beyond demographic targeting and consider segmenting audiences based on their neurocognitive and emotional responses to messages. This strategy enhances the relevance and impact of public health communications.

Develop Emotionally Intelligent, Personalized Health Messages: Public health campaigns should leverage real-time neurophysiological data (e.g., EEG, eye tracking) to tailor anti-smoking messages to individuals' emotional and attentional profiles. Personalized, positively framed messages are particularly effective for highly nicotine-dependent individuals and can enhance cessation outcomes.

Implement Emotional Segmentation in Health Communication: Instead of relying solely on demographic variables, public health strategies should classify target audiences based on their emotional responses to health messages. This approach fosters more nuanced and effective behavioral interventions.

Design Digital Content Specifically for Health Campaigns: Based on attention and memory data, public health agencies should produce short, emotionally engaging videos optimized for social media platforms. These formats increase accessibility and engagement, especially among younger demographics.

This study makes several contributions to the literature. It is the first study to combine multiple analysis methods—EEG, eye tracking, face coding, and surveys—allowing for a more comprehensive examination of anti-smoking advertisement effectiveness. The findings demonstrate that advertisements with positive messages are more effective in motivating smoking cessation, creating stronger impressions, and enhancing recall, particularly among individuals with higher addiction levels. Additionally, the study highlights gender-based differences, with women showing greater attention to positive advertisements. Lastly, the study challenges the notion that fear-based messaging is universally effective, particularly for highly addicted individuals.

Limitations and Future Directions

As with any research, this study has limitations. First, the sample size was relatively small. Future studies could involve larger and more diverse samples. Additionally, this study did not differentiate participants by age groups or generations; future research could explore generational differences. The study was conducted exclusively in a specific region, and results may vary in other geographical, cultural, and demographic contexts. Gender and other demographic factors were not extensively tested in this study. Future research could enhance the depth of analysis by incorporating these variables.

While this study employed EEG, eye tracking, face coding, and surveys, future research could incorporate other methods such as fMRI or Galvanic Skin Response to deepen the analysis. Longitudinal studies could also be conducted to assess the long-term effects of different types of advertisements. Future research could further investigate the interaction between gender, emotional response level, and dependency level. Finally, future studies

could explore additional message framing strategies, such as focusing on economic impacts, environmental harm, or emotional well-being, to determine their effectiveness in encouraging smoking cessation.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethical committee approval was received from Afyon Kocatepe University (Date: January 12, 2024; Meeting Number: 2024-01).

Informed Consent: Written informed consent was obtained from the participants who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Acknowledgements: The author would like to thank the participants who took part in the study.

Declaration of Interests: The author has no conflict of interest to declare.

Funding: The author declared that this study has received no financial support.

References

Ariely, D., & Berns, G. S. (2010). Neuromarketing: The hope and hype of neuroimaging in business. *Nature Reviews. Neuroscience*, *11*(4), 284 – 292. [CrossRef]

Bardakçı, M., Oztora, S., & Dagdeviren, H. N. (2021). The reliability and validity analysis of the Turkish version of the test to assess the psychological dependence on smoking. *Eurasian Journal of Family Medicine*, *10*(2), 100 – 106. [CrossRef]

Cahill, L. (2006). Why sex matters for neuroscience. *Nature Reviews. Neuroscience*, *7*(6), 477 – 484. [CrossRef]

Can, A. (2014). *SPSS ile bilimsel araştırma sürecinde veri analizi*. Pegem Akademi.

Cartocci, G., Modica, E., Rossi, D., Cherubino, P., Maglione, A. G., Colosimo, A., Trettel, A., Mancini, M., & Babiloni, F. (2018). Neurophysiological measures of the perception of antismoking public service announcements among young populations. *Frontiers in Human Neuroscience*, *12*, 231. [CrossRef]

Chai, J., Ge, Y., Liu, Y., Li, W., Zhou, L., Yao, L., & Sun, X. (2014). Application of frontal EEG asymmetry to user experience research. In *Engineering psychology and cognitive ergonomics*: 11th International Conference, EPCE 2014, Held as Part of HCI International 2014, Heraklion, Crete, Greece, June 22 – 27, 2014 (pp. 234 – 243). Springer International Publishing.

Costa-Feito, A., González-Fernández, A. M., Rodríguez-Santos, C., & Cervantes-Blanco, M. (2023). Electroencephalography in consumer behaviour and marketing: A science mapping approach. *Humanities and Social Sciences Communications*, *10*(1), 1 – 13. [CrossRef]

Dunlop, S. M., Cotter, T., & Perez, D. (2014). When your smoking is not just about you: Antismoking advertising, interpersonal pressure, and quitting outcomes. *Journal of Health Communication*, *19*(1), 41 – 56. [CrossRef]

Faisal, D. R., & Suryati, T. (2023). Do anti-smoking advertisements influence students to quit smoking? *Jurnal Administrasi Kesehatan Indonesia*, *11*(2), 264 – 275. [CrossRef]

Farnsworth, B. (2023, 9 Aralık). 10 most used eye tracking metrics and terms. iMotions. https://imotions.com/blog/learning/10- terms-metrics-eye-tracking/.

Farrelly, M. C., Duke, J. C., Davis, K. C., Nonnemaker, J. M., Kamyab, K., Willett, J. G., & Juster, H. R. (2012). Promotion of smoking cessation with emotional and/or graphic antismoking advertising. *American Journal of Preventive Medicine*, *43*(5), 475 – 482. [CrossRef]

Fazio, M., Reitano, A., & Loizzo, M. R. (2020). Consumer preferences for new products: Eye tracking experiment on labels and packaging for olive oil-based dressing. Proceedings, MDPI.

Fischer, N. L., Peres, R., & Fiorani, M. (2018). Frontal alpha asymmetry and theta oscillations associated with information-sharing intention. *Frontiers in Behavioral Neuroscience*, *12*, 166. [CrossRef]

Florence, E. S., Fleischman, D., Mulcahy, R., & Wynder, M. (2022). Message framing effects on sustainable consumer behaviour: A systematic review and future research directions for social marketing. *Journal of Social Marketing*, *12*(4), 623 – 652. [CrossRef]

Gupta, R. K., Rajeshwaran, J., Ojha, A., Rathore, P., Afsar, M., & Bhattacharya, A. (2018). Effect of anti-smoking advertising on the ındian population: A comparative behavioural and electrophysiological outcome study. *Indian Journal of Clinical Psychology*, *45*(2), 39 – 47. [CrossRef]

Harris, J. M., Ciorciari, J., & Gountas, J. (2019). Consumer neuroscience and digital/social media health/social cause advertisement effectiveness. *Behavioral Sciences*, *9*(4), 42. [CrossRef]

Hyland, A., Wakefield, M., Higbee, C., Szczypka, G., & Cummings, K. M. (2006). Anti-tobacco television advertising and indicators of smoking cessation in adults: A cohort study. *Health Education Research*, *21*(2), 296 – 302. [CrossRef]

https://julişus[CrossRef].

Kasbekar, M. P. (2018). Application of eye tracking in advertising performance: A case analysis on P&G's Tide Plus. *Global Journal for Research Analysis*, *7*(2). [CrossRef]

Kiviruusu, O., Berg, N., Piirtola, M., Viertiö, S., Suvisaari, J., Korhonen, T., & Marttunen, M. (2024). Life-course associations between smoking and depressive symptoms: A 30-year Finnish follow-up study. *Nicotine and Tobacco Research*, *26*(7), 843 – 851. [CrossRef]

Koşar, A., & Tor Kadıoğlu, C. (2020). Türkiye'de nöropazarlama alanındaki lisansüstü tezlerin içerik analizi yöntemiyle incelenmesi. In İ. Yayınevi (Ed.). *Yönetim, liderlik ve pazarlama* (pp. 205 – 221).

Leas, E. C., Myers, M. G., Strong, D. R., Hofstetter, C. R., & Al-Delaimy, W. K. (2015). Recall of anti-tobacco advertisements and effects on quitting behavior: Results from the California smokers cohort. *American Journal of Public Health*, *105*(2), e90 – e97. [CrossRef]

Lewandowska, B., & Kasia, W. (2022, 9 Mayıs). Attention measurement with eye-tracking & K-coefficient – explained. *RealEye*. https://www.realeye.io/blog/143-attention-measurements-k-coefficient.

Lindstrom, M. (2012). *Buyology: How everything we believe about why we buy is wrong*. Random House.

Mansi, S. A., Pigliautile, I., Porcaro, C., Pisello, A. L., & Arnesano, M. (2021). Application of wearable EEG sensors for indoor thermal comfort measurements. *ACTA IMEKO*, *10*(4), 214 – 220. [CrossRef]

McDuff, D., & El Kaliouby, R. (2016). Applications of automated facial coding in media measurement. *IEEE Transactions on Affective Computing*, *8*(2), 148 – 160. [CrossRef]

Mennella, R., Patron, E., & Palomba, D. (2017). Frontal alpha asymmetry neurofeedback for the reduction of negative affect and anxiety. *Behaviour Research and Therapy*, *92*, 32 – 40. [CrossRef]

Morán-Mirabal, L. F., Martínez-Álvarez, L. M., & Ruiz-Ramirez, J. A. (2024, April). Muse 2 headband specifications (neuronal tracking). https://hdl.handle.net/112867656561476.

Moretti, D. (2024). About Julius AI. *Academia.edu*. https://www.academia.edu/124535026/ABOUT_JULIUS_AI.

Morin, C. (2011). Neuromarketing: The new science of consumer behavior. *Society*, *48*(2), 131 – 135. [CrossRef]

Nogueira, S. O., McNeill, A., Fu, M., Kyriakos, C. N., Mons, U., Fernández, E., & Vardavas, C. I. (2018). Impact of anti-smoking advertising on health-risk knowledge and quit attempts across six European

countries from the EUREST-PLUS ITC Europe Survey. *Tobacco Induced Diseases*, *16*, A5. [CrossRef]

Ohme, R., Reykowska, D., Wiener, D., & Choromanska, A. (2010). Application of frontal EEG asymmetry to advertising research. *Journal of Economic Psychology*, *31*(5), 785 – 793. [CrossRef]

Park, H., & Lee, C. (2021). Effects of anti-smoking advertising messages on smokers. *Asia-Pacific Journal of Convergent Research Interchange*, *7*(9), 131 – 140. [CrossRef]

Pei, G., & Li, T. (2021). A literature review of EEG-based affective computing in marketing. *Frontiers in Psychology*, *12*, 602843. [CrossRef]

Plassmann, H., Ramsøy, T. Z., & Milosavljevic, M. (2012). Branding the brain: A critical review and outlook. *Journal of Consumer Psychology*, *22*(1), 18 – 36. [CrossRef]

Schmälzle, R., Cooper, N., O'Donnell, M. B., Tompson, S., Lee, S., Cantrell, J., Vettel, J. M., & Falk, E. B. (2020). The effectiveness of online messages for promoting smoking cessation resources: Predicting nationwide campaign effects from neural responses in the EX campaign. *Frontiers in Human Neuroscience*, *14*, 565772. [CrossRef]

Shen, L. (2015). Targeting smokers with empathy appeal anti-smoking public service announcements: A field experiment. *Journal of Health Communication*, *20*(5), 573 – 580. [CrossRef]

Špakov, O., & Miniotas, D. (2007). Visualization of eye gaze data using heat maps. *Elektronika ir Elektrotechnika*, *115*(2).

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211*(4481), 453 – 458. [CrossRef]

Wakefield, M., Bayly, M., Durkin, S., Cotter, T., Mullin, S., Warne, C., & International Anti-Tobacco Advertisement Rating Study Team (2013). Smokers' responses to television advertisements about the serious harms of tobacco use: Pre-testing results from 10 low-to middle-income countries. *Tobacco Control*, *22*(1), 24 – 31. [CrossRef]

Wang, A. L., Ruparel, K., Loughead, J. W., Strasser, A. A., Blady, S. J., Lynch, K. G., Romer, D. D., Cappella, J. N., Lerman, C., & Langleben, D. D. (2013). Content matters: Neuroimaging investigation of brain and behavioral impact of televised anti-tobacco public service announcements. *Journal of Neuroscience*, *33*(17), 7420 – 7427. [CrossRef]

Wedel, M., & Pieters, R. (2006). Eye tracking for visual marketing. *Foundations and Trends® in Marketing*, *1*(4), 231 – 320. [CrossRef]

Yang, D. J. (2018). Exploratory neural reactions to framed advertisement messages of smoking cessation. *Social Marketing Quarterly*, *24*(3), 216 – 232. [CrossRef]

Yıldız, D., & Uzunsakal, E. (2018). Alan araştırmalarında güvenilirlik testlerinin karşılaştırılması ve tarımsal veriler üzerine bir uygulama. *Uygulamalı Sosyal Bilimler Dergisi*, *2*(1), 14 – 28.

Zhao, G., Zhang, Y., & Ge, Y. (2018). Frontal EEG asymmetry and middle line power difference in discrete emotions. *Frontiers in Behavioral Neuroscience*, *12*, 225. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Change in Smoking Outcome Expectation Scale and Anti-Smoking Self-Efficacy Scale of the Students During University Education: Repeated Cross-Sectional Study

Mehmet Ali Kurçer[1], Merve Bektaş[2], Ebru Katar[2]

[1]Department of Public Health, Bursa Uludağ University Faculty of Medicine, Bursa, Türkiye
[2]Department of Public Health, Zonguldak Bülent Ecevit University Faculty of Medicine, Zonguldak, Türkiye

ORCID iDs of the authors: M.A.K. 0000-0003-2672-1079, M.B. 0000-0002-6300-547X, E.K. 0009-003-9867-3501

Main Points

- Negative outcome expectations in students show a significant increase from first year to last year of the university education.
- Prevalence of smoking in students tends to increase from first year to last year of the university education.
- The rate of students fighting against smoking significantly increases from the first to second year but decreases in fourth year.
- Changes in "self-efficacy to resist social influences to smoke" and "self-efficacy to use strategies" differ according to departments and years.
- Findings show the necessity of providing implementations/services for the protection of students from starting smoking from the beginning to the end of the university education.

Abstract

Adolescents are more likely to smoke when they exhibit negative attitudes toward anti-smoking and have low self-efficacy to avoid smoking. This study aims to evaluate changes in the prevalence of smoking, smoking outcome expectations (positive/negative), and anti-smoking self-efficacy among students during their four-year university education. About 435 students who started university in 2018 and graduated in 2021 comprised the participants of this repeated cross-sectional study. The Smoking Outcome Expectation Scale and Anti-Smoking Self-Efficacy Scale were used to assess smoking opposition. The prevalence of smoking among students tends to increase from the first year to the fourth year of education. The rate of students fighting against smoking significantly increases from the first year (45%) to the second year (49.3%) but decreases in the fourth year (42.8%) ($p < .05$). Negative smoking outcome expectations show a significant increase after the first year in all departments ($p < .001$). Self-efficacy to resist social influences to smoke decreases significantly in engineering and social sciences in the final year of university ($p < .001$). Despite the increasing negativity in students' smoking outcome expectations, the decrease in anti-smoking self-efficacy and the decline in students' support for anti-smoking measures are reflected in the increase in smoking prevalence throughout university education. These findings indicate the necessity of implementing measures to protect students from starting smoking from the beginning to the end of university education.

Keywords: Anti-smoking self-efficacy, anti-smoking, smoking in university, smoking outcome expectation

Corresponding author:
Merve Bektaş
E-mail:
mervebkt@gmail.com

Received: May 24, 2024
Revision Requested: April 12, 2025
Last Revision Received: May 8, 2025
Accepted: July 1, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

Smoking is a significant public health problem. Approximately six million people die from smoking each year, and it also causes excessive healthcare costs and productivity loss in society (WHO, 2015). Research shows that the prevalence of smoking varies among students in different countries and

Cite this article as: Kurçer, M. A., Bektaş, M., & Katar, E. (2025). Change in Smoking Outcome Expectation Scale and Anti-Smoking Self-Efficacy Scale of the students during university education: Repeated cross-sectional study. *Addicta: The Turkish Journal on Addictions*, 12(3), 278-285.

DOI: 10.5152/ADDICTA.2025.25093

between male and female students in the same country. While lower rates of smoking are observed in regions of the USA and Australia, higher rates are documented in countries such as Türkiye and Spain (Smith et al., 2007). The smoking prevalence among male students in Türkiye ranges from 24.1% to 37.78%, among female students from 7.7% to 15%, and the overall average from 15.8% to 23.7% (Babaoğlu, 2017). There is ample evidence globally to suggest that early initiation of tobacco use drives the tobacco epidemic. A tobacco survey study showed that one out of every eight young people in the age group of 15 – 24 years was using some form of tobacco (Grover et al., 2020). Smoking rates increase, especially among females, adolescents, and young adults. Those who start smoking before the age of 21 are more likely to become addicted, and individuals who try smoking in adolescence become highly addicted and have more difficulty quitting smoking (Warren et al., 2006). Young people are exposed to pro-tobacco messages promoted by the tobacco industry, which increases the risk of starting smoking among university students (Abu Shomar et al., 2014). The desire to be different and independent, the effort to be included in a group of friends, and the desire to be accepted by their peers may drive young people to smoke (Wang et al., 2012). The fact that many smokers start smoking in their youth indicates that intervention policies and programs designed to prevent smoking should focus on youth (Jøsendal et al., 2012). Expecting positive outcomes is an important factor for young people to start smoking (Dalton et al., 1999), and self-efficacy is another important factor affecting the smoking attitudes of adolescents (Bandura, 2014).

Adolescents are more likely to smoke when they exhibit negative attitudes toward anti-smoking, have low self-efficacy to avoid smoking, and lack knowledge about the health risks of smoking (Su et al., 2015). Individuals with high self-efficacy to resist smoking may reduce their attempts to smoke (Bektas et al., 2010). Rejecting smoking offers and having high anti-smoking self-efficacy are found to be protective factors in preventing youth from starting smoking (Chang et al., 2006).

The aim of this research is to evaluate changes in the prevalence of smoking, changes in negative or positive smoking expectations, and changes in anti-smoking self-efficacy among students during their four-year university education.

Material and Methods

The study population consisted of all students who started their university education in 2018 and graduated in 2021 from the faculties of Zonguldak Bülent Ecevit University. Due to the suspension of education during the COVID-19 pandemic, data could not be collected in 2020. This research was conducted with the approval of the Zonguldak Bülent Ecevit University Human Research Ethics Committee (protocol number 337, dated April 2, 2018).

Informed consent was obtained from all participants. All methods were carried out in accordance with the Strengthening the reporting of observational studies in epidemiology (STROBE) guidelines and the Helsinki Declaration. All experimental protocols were approved by the Zonguldak Bülent Ecevit University Human Research Ethics Committee.

In 2018, when the research began, seven faculties of the university were selected using the cluster method. The aim was to follow up 490 first-year students until they graduated. There were 60 students from the Faculty of Pharmacy, 105 from the Faculty of Economics, 85 from the Department of International Trade, 90 from the Department of Finance, 70 from the Department of Physical Therapy and Rehabilitation, 20 from the Department of Metallurgy Engineering, and 60 from the Department of Civil Engineering. Participants who did not agree to participate or decided not to attend school were excluded, and the research started with the remaining 435 students. The participation rate was 89% at the beginning of the research.

The collection of data was conducted through surveys, including the Smoking Outcome Expectation Scale (SOES), Anti-Smoking Self-Efficacy Scale (ASSES), and 11 questions about sociodemographic features. The survey was administered to all the participants based on their voluntary participation using a face-to-face method each year. Participants were asked to voluntarily participate in the research at the beginning by obtaining signed informed consent.

The SOES and ASSES were used to assess smoking opposition. The SOES and ASSES were developed by Chen-Ju Chen et al. in 2014 to measure outcome expectations for smoking and self-efficacy for smoking opposition in adolescents (Chen et al., 2015).

The SOES has six items and two sub-units: positive and negative outcome expectations. Scores for each item range from 1 (strongly agree) to 4 (strongly disagree), and total sub-unit scores range from 3 (lowest) to 12 (highest). The positive outcome sub-unit consists of items 1, 2, and 3, and the negative sub-unit consists of items 4, 5, and 6. The Cronbach's alpha coefficients of the sub-units are 0.78 and 0.76, respectively.

The ASSES has 15 items and 3 sub-units: self-efficacy to reject illegal tobacco use, self-efficacy to resist social influences to smoke, and self-efficacy to use strategies. Scores for each item range from 1 (I never do) to 4 (I definitely do), and total scale scores range from 15 (lowest) to 60 (highest). The Cronbach's alpha coefficients are 0.88 for the total scale and 0.88, 0.86, and 0.78 for the sub-units, respectively. The validity and reliability of ASSES for early adolescents was previously established by Bektas et al. in İzmir in 2017 (Bektas et al., 2017). This was the first time the scale was applied to university students in this research, with an internal consistency coefficient of 0.87.

In addition to the scales, a questionnaire with 11 questions about sociodemographic features, students' smoking status, and attitudes toward anti-smoking efforts was also administered.

Prevalence of smoking was given as prevalence of current smoking. Current smoking prevalence was evaluated based on the standard NHIS current smoking definition (Senol et al., 2006). According to the NHIS current smoking definition, the term Current smoking term includes everyday smoking and sometimes smoking in this study.

A total of 435 students were reached in the first year, 375 in 2019, and 350 in 2021. Data could not be collected in 2020 due to the suspension of education because of COVID-19.

Sixty participants were lost from 2018 to 2019 and 25 more from 2019 to 2021 due to their own decision to give up the research or change their university. The reasons for the participants to leave the research were due to their lack of time to complete the survey, feeling hesitant to reveal their smoking status, and struggles with attitudes toward smoking. Forty-two of the students changed their university. Twenty-seven students reported that they lacked the time to complete the survey and sixteen indicated that they felt hesitant to reveal their smoking status and attitudes toward smoking struggle. Thirty-six of the lost ones were female, and 44 were male.

For the statistical analysis, IBM SPSS 21 software program was utilized. The Kolmogorov – Smirnov test confirmed the normal distribution of the data. Continuous variables are presented with mean values and standard deviations. Categorical variables are presented with numbers and percentages. The chi-square test was used to evaluate categorical variables, and *t*-test, ANOVA, and repeated-measures tests were used to evaluate dependent continuous variables. Statistical significance was accepted as <.05.

Results

Students were followed up during their university education years, and changes in their smoking status year by year according to their departments are shown in Table 1.

The prevalence of current smoking in university students tends to increase from the first year (2018) to the fourth year (2021) of education (39.5%, 41.1%, 48,8%) ($p < .001$)*.

Current smoking prevalence in health sciences students (22.2%, 30.1%, 36.4%) is significantly lower than that in social sciences (42.9%, 41%, 53.5%) and engineering (56.3%, 59.3%, 53.6%) in each of the 3 years ($p < .001$)*.

While there is no significant increase in the current smoking prevalence of students in engineering (56.3%, 59.3%, 53.6%), the smoking prevalence of students in social sciences (42.9%, 41%, 53.5%) and in health sciences (22.2%, 30.1%, 36.4%) significantly increases ($p < .001$)*.

The changes in students' attitudes toward the anti-smoking struggle based on their smoking status are shown in Table 2.

About 67.4% of non-smokers, 26.2% of current smokers in 2018; 69.5% of non-smokers, 28.6% of current smokers in 2019; 77.2% of non-smokers, 9.7% of current smokers are engaged in 2021. The rate of students participating in the anti-smoking struggle is higher among non-smokers than current smokers in each of the 3 years ($p < .05$)*. About 45% of the students in 2018, 49.3% in 2019, and 42.8% in 2021 fought against smoking. This rate of fighting against smoking significantly increases from the first year to the second year but decreases in the fourth year ($p < .05$)*.

The changes in students' attitudes toward anti-smoking measures based on their smoking status are shown in Table 3.

About 94% of non-smoking students in 2018, 91.4% in 2019, and 91.6% in 2021 rate prohibition of smoking indoors as a necessary measure in the struggle against smoking. The most necessary measure is rated as the prohibition of smoking indoors by non-smoking students ($p < .001$)*.

About 19.8% of the current smoking students in 2018, 21.5% in 2019, and 10.5% in 2021 rate increasing cigarette prices as a necessary measure in the struggle against smoking. The measure supported by current smoking students is increasing cigarette prices ($p < .001$)*.

Non-smoking students find measures like indoor smoking bans, banning smoking scenes in media, and increasing cigarette prices significantly more necessary each year than smoking students ($p < .001$)*.

The changes in outcome expectation and refusal self-efficacy during university education by gender are given in Table 4.

Negative outcome expectation scores of females significantly increase in the final year ($p < .001$)**.

Females' negative outcome expectation and refusal self-efficacy scores are significantly higher than males ($p < .05$) in total.

Table 1.
Smoking Status of the Students According to Years and Departments

		Smoking Status									
		I Smoke Everyday		I Smoke Sometimes		I Have Never Smoked		I Gave Up Smoking		Total	
Department		*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
2018 *n* = 435	Health sciences	18	14.8	9	7.4	89	72.9	6	V	122	100
	Social sciences	59	25.3	41	17.6	122	52.4	11	V	233	100
	Engineering	31	38.8	14	17.5	33	41.2	2	2.5	80	100
2019 *n* = 375	Health sciences	18	17.5	13	12.6	65	63.1	7	6.8	103	100
	Social sciences	68	31.9	20	9.4	102	47.8	23	10.9	213	100
	Engineering	22	37.3	13	22.0	19	32.2	5	8.5	59	100
2021 *n* = 350	Health sciences	20	20.8	15	15.6	55	57.3	6	6.2	96	100
	Social sciences	64	34.6	35	18.9	62	33.5	24	10.8	185	100
	Engineering	25	36.2	12	17.4	27	39.1	5	7.2	69	100

Table 2.
The Changes in Attitudes of the Students Toward Anti-Smoking Struggle in Terms of Smoking Status of the Students

	Smoking Status					
	2018 *n* = 435		2019 *n* = 375		2021 *n* = 350	
Anti-Smoking Struggle	**Smoking *N* (%)**	**Not Smoking *N* (%)**	**Smoking *N* (%)**	**Not Smoking *N* (%)**	**Smoking *N* (%)**	**Not Smoking *N* (%)**
I have no effort	116 (67.4)	111 (42.2)	107 (69.5)	76 (34.4)	132 (77.2)	61 (34.1)
I support	45 (26.2)	151 (57.4)	44 (28.6)	141 (63.8)	34 (19.9)	116 (64.8)
On the contrary I am in favor of smoking	11 (6.4)	1 (0.4)	3 (1.9)	4 (1.8)	5 (2.9)	2 (1.1)
Total	172 (100)	263 (100)	154 (100)	221 (100)	171 (100)	179 (100)

Chi-square: $p < .05$.*

Scores for "outcome expectation," as well as total refusal self-efficacy scores, significantly decrease in both genders through the final year ($p < .001$)**.

The comparisons of outcome expectation and refusal self-efficacy by year and department are provided in Table 5.

Positive outcome expectation is significantly higher in engineering than in other faculties in 2019 ($p < .05$)*. Negative outcome expectation shows a significant increase after the first year in all faculties ($p < .001$)**.

Refusal self-efficacy scores are significantly higher in the final year only for health sciences students ($p < .05$)*.

"To resist social influences to smoke" scores decrease significantly in engineering and social sciences in the final year ($p < .001$). While "self-efficacy to use strategies" increases in health sciences and social sciences, it decreases in engineering ($p < .001$).

"To reject illegal tobacco use scores increased both among faculties and over the years only in the senior Health Sciences faculties ($p < .05$*, $p < .001$**)."

Table 3.
The Changes in Attitude of the Students Toward Anti-Smoking Measures in Terms of Smoking Status of the Students During Their University Education

		Smoking Status					
		2018		2019		2021	
Measures		**Smoking *N* %**	**Not Smoking *N* %**	**Smoking *N* %**	**Not Smoking *N* %**	**Smoking *N* %**	**Not Smoking *N* %**
Prohibition of smoking indoors	Necessary	110 (64.0)	247 (94.0)*	112 (72.7)	202 (91.4)*	119 (69.6)	164 (91.6)*
	Unnecessary	29 (16.9)	8 (3.0)	23 (14.9)	8 (3.6)	27 (15.8)	5 (2.8)
	No matter	33 (19.2)	8 (3.0)	19 (12.4)	11 (5.0)	25 (14.6)	10 (5.6)
Bans on smoking scenes in movies and Tv shows	Necessary*	43 (25.0)	107 (40.7)*	38 (24.6)	79 (35.7)*	44 (25.7)	70 (39.1)*
	Unnecessary	96 (55.8)	83 (31.6)	85 (55.2)	89 (40.0)	100 (58.5)	74 (41.3)
	No matter	33 (19.2)	73 (27.8)	31 (20.2)	53 (24.0)	27 (15.8)	35 (19.6)
Warnings of "harmful for health" on cigarette packages	Necessary	56 (32.6)	49 (18.6)*	37 (24.1)	49 (22.2)	47 (27.6)	106 (59.2)*
	Unnecessary	84 (48.8)	183 (69.6)	51 (33.1)	123 (55.7)	87 (50.8)	54 (30.2)
	No matter	32 (18.6)	31 (11.8)	66 (42.8)	49 (22.2)	37 (21.6)	19 (10.6)
Cigarette prices	It should be more expensive	34 (19.8)	202 (76.8)*	33 (21.5)	155 (70.1)*	18 (10.5)	92 (51.4)*
	It should be cheaper	18 (10.5)	31 (11.8)	24 (15.6)	32 (14.5)	131 (76.6)	42 (23.5)
	Prices are normal	120 (69.8)	30 (11.4)	97 (62.9)	34 (15.4)	22 (12.9)	45 (25.1)
Prohibition of smoking under 18 years	Necessary	147 (85.5)	236 (89.7)*	126 (82)	191 (86.4)*	149 (87.1)	172 (96.1)*
	Unnecessary	13 (7.6)	9 (3.4)	18 (11.5)	17 (7.7)	11 (6.4)	5 (2.8)
	It can be sold with consent of parents	12 (7)	18 (6.8)	10 (6.5)	13 (5.9)	11 (6.4)	2 (1.1)

*Chi-square: $p < .001$.

Table 4.
The Changes in Outcome Expectation and Refusal Self-Efficacy Scores of the Students During Their University Education in Terms of Gender

Male				Female		
Outcome Expectation	**2018 Mean ± SD**	**2019 Mean ± SD**	**2021 Mean ± SD**	**2018 Mean ± SD**	**2019 Mean ± SD**	**2021 Mean ± SD**
Positive	4.9 ± 2.37	5.2 ± 2.56	5.3 ± 2.48	4.4 ± 2.00	4.6 ± 2.11	4.9 ± 2.36
Negative	8.0 ± 1.93	9.9 ± 2.47	9.3 ± 2.64	8.1 ± 1.74	10.1 ± 2.54	11.6 ± 4.29*
Refusal Self-efficacy						
To reject illegal tobacco use	5.8 ± 1.94	5.9 ± 1.91	5.6 ± 1.90	6.7 ± 1.74*,**	6.4 ± 3.84*,**	6.0 ± 1.72*,**
To resist social influences to smoke	21.8 ± 6.33	21.5 ± 4.59	14.9 ± 5.07	21.9 ± 2.45	23.3 ± 4.10	16.5 ± 4.30*,**
To use strategies	20.9 ± 7.22	21.3 ± 7.11	22.4 ± 7.14	21.5 ± 7.00	22.8 ± 7.57	23.2 ± 7.62*,**
Total	48.5 ± 9.56	48.7 ± 9.56	42.9 ± 8.41	51.1 ± 8.79*,**	52.5 ± 8.79*,**	45.7 ± 11.96*,**

Note: SD = Standard deviation.
*t-test: $p < .05$.
**Repeated-measures test: $p < .001$.

Discussion

The prevalence of current smoking among students increases from the first year to the last year of university. When examined by department, the smoking prevalence remains high and does not rise significantly in engineering. However, the prevalence increases continuously in social sciences and health sciences. There are very few studies that monitor the smoking tendencies of university students from the year they enroll until they graduate. Senol and colleagues found that the prevalence of smoking gradually increased in the first 4 years of their studies in Antalya, Türkiye, in line with this study (Senol et al., 2006). This study, unlike Senol's study, is valuable in showing the increasing prevalence in a sample that represents all students of the university, not just those in the medical faculty.

While the smoking prevalence in health sciences departments is lower than that in other departments, it still increases during the crucial university period, including for medical students. Previous research has shown that despite expanding medical knowledge, smoking rates increase in upper grade levels (Sönmez et al., 2017; Mayda et al., 2007; Kara et al., 2011). It has been shown that although the problem is greater in the non-health faculties of the university, the university in general is the place where many students start smoking. This also suggests that knowledge alone does not necessarily translate to changed smoking behavior (Livaditis et al., 2001; Richmond, 1999). Attitudes toward smoking, methods for deterrence, and problem-solving skills have been found to be deterrents to starting smoking (Lotecka et al., 1983; Supnick et al., 1984).

The rate of supporting the anti-smoking struggle is significantly lower among smoking students compared to non-smoking students. Similarly, previous studies have found that non-smokers are more likely to recommend quitting smoking than smokers (Yaman et al, 2021; Atay et al., 2012). This indicates the need to develop strategies to increase smokers' support for anti-smoking measures.

The students' anti-smoking attitudes did not increase significantly from the year they started school until they finished school. This finding also reveals that university students have not developed sufficient awareness about the fight against smoking over the years.

In this study, almost all non-smoking university students evaluated the ban on smoking in closed areas as a necessary measure in the fight against smoking from the year they registered until their graduation. Support for this measure is significantly higher among non-smoking students than among smokers. The measure that students support the least during their educational years is increasing cigarette prices. Support for this measure is significantly higher among non-smoking students than among smokers. The measure of banning smoking scenes in the media is also significantly necessary among non-smoking students compared to smokers during their educational period. No anti-smoking tendency study has been found in the literature that monitors university students throughout their educational life. In the study conducted by Martinez and his colleagues in Barcelona (Spain), when only one year of data was examined, it was found that anti-smoking support was as high among smokers as among non-smokers, and the difference between them was not significant. This study reveals that smokers are more insensitive to the fight against smoking compared to their Spanish peers in the Turkish sample (Martinez et al., 2017).

An interesting finding is the significant decrease in ASSES scores, especially in the final year of university, for both male and female students. This decreasing trend was observed across all departments, with engineering students having the lowest ASSES scores throughout their education. The higher initial smoking prevalence in engineering may contribute to the lower anti-smoking self-efficacy in non-smoking students in this department (Baykan et al., 2014; Borland et al., 2006; Inandi et al., 2013; Karatay et al., 2019).

On the other hand, "self-efficacy to reject illegal tobacco use" and "self-efficacy to use strategies" scores increase significantly

Table 5.
The Comparisons of Outcome Expectation and Refusal Self-Efficacy Scores in Terms of Years and Departments During University Education

	Health Sciences				Engineering				Social Sciences			
Outcome Expectation	**2018 Mean ± SD**	**2019 Mean ± SD**	**2021 Mean ± SD**	**2018 Mean ± SD**	**2019 Mean ± SD**	**2021 Mean ± SD**	**2018 Mean ± SD**	**2019 Mean ± SD**	**2021 Mean ± SD**	**2018 Mean ± SD**	**2019 Mean ± SD**	**2021 Mean ± SD**
Positive	4.3 ± 1.97	4.6 ± 2.43	4.4 ± 1.96	4.6 ± 2.24	4.8 ± 2.61*	4.2 ± 2.18	4.9 ± 2.27	4.7 ± 2.14	4.23 ± 1.87	4.6 ± 2.24	4.8 ± 2.61*	4.2 ± 2.18
Negative	8.1 ± 1.68	11.1 ± 3.32**	10.4 ± 2.65**	7.6 ± 1.89	11.8 ± 4.07**	10.4 ± 2.2**	8.1 ± 1.87	10.1 ± 3.75**	11.2 ± 3.96**	7.6 ± 1.89	11.8 ± 4.07**	10.4 ± 2.2**
Refusal Self-efficacy												
To reject illegal tobacco use	5.6 ± 1.75	5.6 ± 1.82	6.2 ± 1.75**	5.5 ± 1.78	5.5 ± 1.88	5.8 ± 1.96	5.9 ± 1.78	5.9 ± 1.84	5.6 ± 1.78	5.5 ± 1.78	5.5 ± 1.88	5.8 ± 1.96
To resist social influences to smoke	18.9 ± 2.96	18.8 ± 2.67	17.7 ± 5.84	17.9 ± 3.36	17.9 ± 3.34	14.4 ± 5.38*	18.9 ± 3.02	18.9 ± 2.76	15.7 ± 4.66*	17.9 ± 3.36	17.9 ± 3.34	14.4 ± 5.38*
To use strategies	19.6 ± 6.83	19.6 ± 7.20	22.8 ± 6.20**	21.4 ± 6.12	21.4 ± 7.35	20.3 ± 8.07*	21.7 ± 5.65	21.7 ± 6.84	23.7 ± 7.55*	21.4 ± 6.12	21.4 ± 7.35	20.3 ± 8.07*
Total	44.1 ± 11.56	44.0 ± 10.40	46.7 ± 8.41**	44.8 ± 10.79	44.1 ± 8.79	40.5 ± 11.96	46.5 ± 8.79	46.5 ± 10.14	45.0 ± 11.96	44.8 ± 10.79	44.1 ± 8.79	40.5 ± 11.96

Note: SD = Standard deviation.
*ANOVA: $p < .05$.
**Repeated-measures test: $p < .001$.

in health sciences students. Additionally, while there is no change in positive outcome expectation, negative outcome expectation increases significantly, especially in female students, by the final year.

Nyman and colleagues found that the smoking refusal self-efficacy level was significantly higher in girls than in boys in early adolescents from Finland and Portugal (Nyman et al., 2024). This finding is consistent with the current study's findings. The current study study went a step further than Nyman's study and showed that this difference increased in favor of girls during the academic years. Another situation that is not found in the literature, and that was only examined in the current study, is that the expectation of smoking-related results in all faculties of the university increased significantly in the later years of the university compared to the first year. Another finding that is not found in the literature is that the refusal self-efficacy scores in engineering faculties decreased significantly in the graduation year compared to other faculties of the university. This finding may indicate that engineering faculty students and males should be more sensitive in interventions against smoking in universities.

These findings highlight the necessity of developing tailored health promotion strategies for each faculty to address the specific needs and trends observed in smoking-related attitudes and behaviors during university education.

Limitations and Suggestions for Future Research

Although this study aimed to reveal the changes in students' smoking status, participation in the fight against smoking, outcome expectation, and refusal self-efficacy scores over the four-year period from the beginning of university until graduation, data for 2020 could not be collected due to the pandemic.

The findings of this study indicate concerning trends in smoking-related attitudes and behaviors among university students.

The prevalence of smoking has increased, particularly among students in health-related faculties. This is concerning, as these students are expected to be role models for healthy behaviors.

Moreover, the pandemic appears to have exacerbated negative smoking outcome expectations, especially among female students. At the same time, anti-smoking self-efficacy has decreased across all students.

Notably, both smoking and non-smoking students have shown a decrease in support for anti-smoking measures after the pandemic period. This suggests the need for targeted interventions to reinforce the importance of tobacco control efforts among the university population.

These findings underscore the necessity of implementing comprehensive strategies to protect students from initiating or continuing smoking behaviors throughout their university education. Tailored programs that address the specific needs and trends observed in different faculties will be crucial in combating the rising smoking prevalence and promoting healthy behaviors among future professionals

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: This study was approved by the Ethics Committee of Zonguldak Bülent Ecevit University University (Approval No.: 337; Date: 02.04.2018).

Informed Consent: Informed consent was obtained from the participants who agreed to take part in the study in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – M.A.K., M.B.; Design – M.A.K., M.B.; Supervision – M.A.K.; Resources – M.A.K., M.B., E.K.; Materials – N/A; Data Collection and/or Processing – N/A; Analysis and/or Interpretation – M.A.K., M.B., E.K.; Literature Search – M.A.K., M.B., E.K.; Writing Manuscript – M.A.K., M.B., E.K.; Critical Review – M.A.K., M.B.

Declaration of Interests: The authors have no conflicts of interest to declare.

Funding: The authors declare that this study received no financial support.

References

Abu Shomar, R. T., Lubbad, I. K., El Ansari, W., Al-Khatib, I. A., & Alharazin, H. J. (2014). Smoking, awareness of smoking-associated health risks, and knowledge of national tobacco legislation in Gaza, Palestine. *Central European Journal of Public Health*, *22*(2), 80 – 89. [CrossRef]

Atay, Ö. B., & Kurçer, M. A. (2012). Sigara içmeyen üniversite öğrencilerinin sigaraya karşı tutumları ve etkileyen faktörler. *TAF Preventive Medicine Bulletin*, *11*(3).

Babaoglu, U. T., Simsek, S., Ozdenk, S., Demir, G., & Cevizci, S. (2017). Prevalence of smoking and risk factors among students at a university in Turkey. *Journal of Clinical and Analytical Medicine*, *8*(1), 68 – 73.

Bandura, A. (2014). Social-cognitive theory. In *An introduction to theories of personality* (pp. 341 – 360). Psychology Press.

Baykan, Z., & Naçar, M. (2014). Tıp fakültesi öğrencilerinin sigara kullanımı ve tütün kanununa ilişkin görüşleri. *Dicle Tıp Dergisi*, *41*(3), 483 – 490.

Bektas, İ., Bektas, M., Ayar, D., Kudubeş, A. A., Selekoglu, Y., Sal Altan, S., Çelik, İ., & Tuna, A. (2017). The psychometric properties of the Turkish version of the smoking outcome expectation scale and the anti-smoking self-efficacy scale for early adolescents. *Journal of Substance Use*, *22*(6), 648 – 655. [CrossRef]

Bektas, M., Ozturk, C., & Armstrong, M. (2010). An approach to children's smoking behaviors using social cognitive learning theory. *Asian Pacific Journal of Cancer Prevention: APJCP*, *11*(4), 1143 – 1149.

Borland, R., Yong, H. H., Siahpush, M., Hyland, A., Campbell, S., Hastings, G., Cummings, K. M., & Fong, G. T., & Fong, G. T. (2006). Support for and reported compliance with smoke-free restaurants and bars by smokers in four countries: Findings from the International Tobacco Control (ITC) Four Country Survey. *Tobacco Control*, *15* (Suppl. 3), iii34 – iii41. [CrossRef]

Centers for Disease Control and Prevention (CDC) (1994). Cigarette smoking among adults—United States, 1992, and changes in the definition of current cigarette smoking. *Morbidity and Mortality Weekly Report*, *43*(19), 342 – 346.

Chang, F. C., Lee, C. M., Lai, H. R., Chiang, J. T., Lee, P. H., & Chen, W. J. (2006). Social influences and self - efficacy as predictors of youth smoking initiation and cessation: A 3 - year longitudinal study of vocational high school students in Taiwan. *Addiction*, *101*(11), 1645 – 1655. [CrossRef]

Chen, C. J., Yeh, M. C., Tang, F. I., & Yu, S. (2015). The smoking outcome expectation scale and anti-smoking self-efficacy scale for early adolescents: Instrument development and validation. *Journal of School Nursing*, *31*(5), 363 – 373. [CrossRef]

Dalton, M. A., Sargent, J. D., Beach, M. L., Bernhardt, A. M., & Stevens, M. (1999). Positive and negative outcome expectations of smoking: Implications for prevention. *Preventive Medicine*, *29*(6 Pt 1), 460 – 465. [CrossRef]

Grover, S., Anand, T., Kishore, J., Tripathy, J. P., & Sinha, D. N. (2020). Tobacco use among the youth in India: Evidence from Global Adult Tobacco Survey-2 (2016 – 2017). *Tobacco Use Insights*, *13*, 1179173X20927397. [CrossRef]

Inandi, T., Caman, O. K., Aydin, N., Önal, A. E., Kaypmaz, A., Turhan, E., Erguder, T., & Warren, W. C., & Warren, W. C. (2013). Global Health Professions Student Survey-Turkey: Second-hand smoke exposure and opinions of medical students on anti-tobacco law. *Central European Journal of Public Health*, *21*(3), 134 – 139. [CrossRef]

Jøsendal, O., & Aarø, L. E. (2012). Adolescent smoking behavior and outcome expectancies. *Scandinavian Journal of Psychology*, *53*(2), 129 – 135. [CrossRef]

Kara, S., Baş, F. Y., & Açıkalın, C. (2011). Sigara içme davranışları ve etkili faktörler: Tıp ve Diş Hekimliği Fakültelerinin ilk ve son sınıf öğrencileri üzerinde çalışma. *Smyrna Tıp Dergisi*, *1*(1), 16 – 21.

Karatay, G., & Baş, N. G. (2019). Factors affecting substance use and self-efficacy status of students in eastern Turkey. *Ciencia and Saúde Coletiva*, *24*(4), 1317 – 1326. [CrossRef]

Livaditis, M., Samakouri, M., Kafalis, G., Tellidou, C., & Tzavaras, N. (2001). Sociodemographic and psychological characteristics associated with smoking among Greek medical students. *European Addiction Research*, *7*(1), 24 – 31. [CrossRef]

Lotecka, L., & Macwhinney, M. (1983). Enhancing decision behavior in high school "smokers". *International Journal of the Addictions*, *18*(4), 479 – 490. [CrossRef]

Martínez, C., Méndez, C., Sánchez, M., & Martínez-Sánchez, J. M. (2017). Attitudes of students of a health sciences university towards the extension of smoke-free policies at the university campuses of Barcelona (Spain). *Gaceta Sanitaria*, *31*(2), 132 – 138. [CrossRef]

Mayda, A. S., Tufan, N., & Baştaş, S. (2007). Düzce Tıp Fakültesi öğrencilerinin sigara konusundaki tutumları ve içme sıklıkları. *TSK Koruyucu Hekimlik Bülteni*, *6*(5), 364 – 370.

Nyman, J., Salanterä, S., Pasanen, M., & Parisod, H. (2024). Effectiveness of a digital health game intervention on early adolescent smoking refusal self-efficacy. *Health Education and Behavior*, *51*(4), 562 – 572. [CrossRef]

Richmond, R. (1999). Teaching medical students about tobacco. *Thorax*, *54*(1), 70 – 78. [CrossRef]

Senol, Y., Donmez, L., Turkay, M., & Aktekin, M. (2006). The incidence of smoking and risk factors for smoking initiation in medical faculty students: Cohort study. *BMC Public Health*, *6*(1), 128. [CrossRef]

Smith, D. R., & Leggat, P. A. (2007). An international review of tobacco smoking among medical students. *Journal of Postgraduate Medicine*, *53*(1), 55 – 62. [CrossRef]

Sönmez, C. I., Başer, D. A., Aydoğan, S., Uludağ, G., Dinçer, D., & Topaluğurlu, B. (2017). Düzce Üniversitesi Tıp Fakültesi öğrencilerinin sigara içme sıklığı ve sigara ile ilgili bilgi, tutum ve davranışları. *Konuralp Medical Journal*, *9*(2), 160 – 166.

Su, X., Li, L., Griffiths, S. M., Gao, Y., Lau, J. T. F., & Mo, P. K. H. (2015). Smoking behaviors and intentions among adolescents in rural China: The application of the Theory of Planned Behavior and the role of social influence. *Addictive Behaviors*, *48*, 44 – 51. [CrossRef]

Supnick, J. A., & Colletti, G. (1984). Relapse coping and problem solving training following treatment for smoking. *Addictive Behaviors*, *9*(4), 401 – 404. [CrossRef]

Wang, Y., Storr, C. L., Green, K. M., Zhu, S., Stuart, E. A., Lynne-Landsman, S. D., Clemans, K. H., Petras, H., Kellam, S. G., & Ialongo, N. S. (2012). The effect of two elementary school-based prevention interventions on being offered tobacco and the

transition to smoking. *Drug and Alcohol Dependence*, *120*(1 – 3), 202 – 208. [CrossRef]

Warren, C. W., Jones, N. R., Eriksen, M. P., Asma, S., & Global Tobacco Surveillance System (GTSS) collaborative group (2006). Patterns of global tobacco use in young people and implications for future chronic disease burden in adults. *Lancet*, *367*(9512), 749 – 753. [CrossRef]

World Health Organization (2015). *WHO report on the global tobacco epidemic*. Geneva, Switzerland: World Health Organization.

Yaman Güncan, N., Kurcer, M. A., & Erdogan, Z. (2021). The evaluation of the smoking cessation behaviors of coal miners according to the health belief model: A cross-sectional study. *Archives of Environmental and Occupational Health*, *76*(8), 539 – 546. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

REVIEW

Alcohol Consumption among Shift and Night Workers: A Scoping Review

Triki Amira[1], Amel Kchaou Fendri[1], Imen Ben Hnia[1], Ahmed Trigui[2], Nada Kotti[1], Mounira Hajjaji[1], Kaouthar Hammami Jmal

[1]Department of Occupational Medicine, Hedi Chaker University of Sfax Faculty of Medicine, Sfax, Tunisia
[2]Department of Preventive Medicine, Hedi Chaker University Hospital, Sfax, Tunisia

ORCID iDs of the authors: T.A. 0009-0004-8741-6929, A.K.F. 0000-0002-5553-307X, N.K. 0000-0001-8438-8521, M.H. 0000-0002-1951-0508, K.J.H. 0000-0002-7657-1016.

Main Points

- Consistent association between shift work and alcohol consumption: There is sufficient evidence that shift work is associated with alcohol consumption, particularly night shifts. In all occupations, shift workers are at increased risk of excessive alcohol consumption and developing alcohol-related disorders.
- Disruption of circadian rhythm leads to alcohol consumption: The disruption of circadian rhythm caused by night work leads to sleep disorders and psychosomatic problems. Many workers turn to alcohol to cope with the resulting stress and fatigue.
- Regional and sectoral variations: The effect of shift work on alcohol consumption varies considerably from one geographical region to another and from one sector to another. The strongest associations are seen in East Asian countries and in healthcare settings, reflecting cultural and occupational influences.
- Gender differences in alcohol consumption among shift workers: Women who work night shifts, particularly those aged 50 years and older, are more vulnerable to alcohol consumption and related disorders. Therefore, preventive measures and workplace interventions need to be gender specific.

Abstract

Shift work, especially night work, is known to be a generator of stress. Although many workers turn to alcohol to cope with this matter, the association between shift work and alcohol consumption remains uncertain. The scoping review aims to underscore the relationship between shiftwork and alcohol consumption. A scoping review was performed based on research published in PubMed, CINAHL, and the Cochrane Library from 2012 to July 2024. Only studies with clearly distinguishing shift workers from day workers were included. The recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses_ScR guidelines for scoping review were followed. A total of 21 studies were included. Most studies were performed in Finland, Australia, Japan, and Norway. The most used questionnaires were the Alcohol Use Disorders Identification Test, Epworth Sleepiness Scale, and Munich Chronotype Questionnaire for Shift-Workers. Concerning the findings, 17 studies reported a positive and significant association between alcohol consumption and shift work. Conflicting or negative results were found in four studies. Eight of the studies focused on health workers (e.g., nurses, psychiatrists, and hospital staff), 2 on factory workers, and one on airline employees. The others were related to transport workers and maintenance staff. This scoping review highlighted a consistent link between shift work and increased alcohol consumption in various working fields. Further strategies like sleep hygiene education and stress management are recommended to enhance the well-being of shift workers.

Keywords: Addictions to alcohol, circadian rhythms, night work, shift work

Corresponding Author:
A. Kchaou Fendri,
E-mail:
amel_kchaou@hotmail.fr

Received: September 30, 2024
Revision Requested: November 29, 2024
Last Revision Received: December 7, 2024
Accepted: February 22, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Cite this article as: Amira, T., Kchaou Fendri, A., Hnia, I. B., Trigui, A., Kotti, N., Hajjaji, M., & Jmal, K. H. (2025). Alcohol consumption among shift and night workers: a scoping review. *Addicta: The Turkish Journal on Addictions*, 12(3), 286-293.

DOI: 10.5152/ADDICTA.2025.24252

Introduction

Work plays a vital role in ensuring financial stability, fostering social connections, and providing a sense of professional identity.

Over the last decades, many fields have undergone significant growth due to fast-changing technology. This rapid evolution has led to a significant increase in the demand for non-traditional working schedules. To ensure continuous services, shift work, particularly night shifts, has become indispensable in many economic fields, such as healthcare, manufacturing, transportation, and emergency services (Reinganum & Thomas, 2024).

The disruption of the sleep-wake cycle and the lack of sleep lead to alterations in the biological clock, contributing to the deterioration of the health of professionals (Steele et al., 2021).

This disruption of the circadian rhythm causes various psychosomatic problems and disorders such as fatigue, insomnia (Chang & Li, 2022), metabolic disorders (Poggiogalle et al., 2018; Potter et al., 2016), cardiovascular diseases (Chellappa et al., 2019; Costello & Gumz, 2021), cognitive impairment (Srinivasan et al., 2010), and reduced performance (Steele et al., 2021).

Shift work, especially night work, also generates stress and difficulties in workers' family and social lives due to irritability, nervousness, anxiety and social isolation (Silva & Costa, 2023).

To cope with these challenges, many turn to alcohol as an easy way to relax and relieve stress (Pasupathy et al., 2022; Sayette, 2017). Unfortunately, this behavior can exacerbate existing health issues and increase vulnerability to alcohol dependency.

In addition, modernization and urbanization have further exacerbated alcohol consumption trends, making it a pressing public health issue worldwide. The literature shows that a growing number of articles deal with the potential effects of alcohol on various aspects of people's daily lives such as divorce and job loss (Airagnes et al., 2019; Thomas et al., 2022).

However, the association between shift work and alcoholism is not always discussed in depth. As a result, the effect of shift work and its implications for impaired quality of life in terms of stress, sleep deprivation, social isolation, and anxiety on the one hand, and the consumption of alcohol as a coping mechanism on the other, remain unclear.

Understanding these dynamics is essential for developing effective interventions to mitigate the associated risks.

The scoping review aims to fill these gaps by evaluating the existing evidence on the relationship between shift work, its subtypes, and alcohol consumption. By exploring this relationship, the aim is to generate practical insights that can inform targeted interventions, improve workplace conditions, and promote healthier coping mechanisms among shift workers.

Methods

A scoping review methodology was performed based on the framework of Arksey and O'Malley (Arksey & O'Malley, 2005). The recommendations of The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were followed (Tricco et al., 2018).

Stage 1: Identifying the Research Question

The primary research question for this review is "What is the relationship between shift work and alcohol consumption?"

Population, Concept, and Context framework was used to determine relevant terms and studies. The review's population of interest consisted of adult workers aged 18 years and older working on shift work in various domains. The main theme of interest was alcohol consumption, measured as frequency (e.g., daily, weekly), with several measures on the pattern of drinking, such as binge drinking, and also on the outcome of drinking, such as alcohol use disorders.

Stage 2: Identifying Relevant Studies

The initial search was carried out on July 7, 2024, in 3 databases: PubMed, CINAHL, and the Cochrane Library. The search focused on articles published from 2012 to July 2024 in order to capture recent trend and data. The search strategy was undertaken in English using several keywords: "alcohol consumption" or "Alcohol Drinking" [Mesh] or "Binge drinking" [Mesh]) AND ("shift work" or "night shift" or "shift work schedule" [Mesh]).

Stage 3: Selecting the Studies

The data extraction process for the review was guided by defined criteria, such as the author's first name, year of publication, country of study and study design (cross-sectional or cohort). Population characteristics included the number of participants and a comparison between night and day workers. Data collection included information on frequency and patterns of alcohol consumption (including binge drinking), as well as outcome measures of alcohol use disorders. Studies not clearly distinguishing night shift workers from day workers or non-shift workers were excluded. Studies that only reported on alcohol consumption but did not provide any quantitative data were excluded. The search was restricted to quantitative observational studies, such as cross-sectional, cohort, and case-control studies. Qualitative studies, case reports, systematic reviews, meta-analyses, interventional studies, and non-peer-reviewed sources were excluded. Exclusion criteria were developed to assist in study selection (Table 1).

Stage 4: Charting the Data

Data to be charted include:

- Author(s), year of publication, study location.
- Aim(s) of the study.
- Study population, inclusion and exclusion criteria, number of patients.
- Study design (cross-sectional or cohort).

First of all, duplicate citations were removed and then article titles and abstracts were sequentially reviewed to determine which articles met criteria for full-text review.

Two out of 3 reviewers charted the data and independently compared independently the extracted information to ensure completeness.

Table 1.
Exclusion categories used for title and abstract review

Exclusion Category	Description if Applicable
Not relevant	Article that did not focus on night shift work or alcohol
Not human	Research with non-human animals
Not adults	Study with samples composed exclusively of individuals under age 18
Not written in English	
Review articles	Article that did not present original research (meta-analyses, systematic reviews)
Not peer-reviewed	Dissertations, magazine articles, conference proceedings, news alerts, opinion pieces

The next step involved selecting articles based on the screening of titles and abstracts independently using a 2-stage selection approach. In the first step, studies that did not meet the eligibility criteria were excluded. Next, the full-text articles of potentially relevant studies were examined. In cases of discrepancies in inclusion criteria, the reviewers discussed with a third reviewer. Any disagreements were resolved by discussion with a fourth reviewer. All steps were clearly reported. The main variables extracted included study design, population characteristics, measures of alcohol consumption, and shift work modalities.

Stage 5: Collating, summarizing, and reporting the findings

The final selection of the studies is summarized in a PRISMA flow diagram. The results of the scoping review are presented in graphical and table format (Table 2). A narrative synthesis was adopted to elaborate on the findings and describe how the results are linked to the research objective.

Results

In the initial search, a total of 432 studies were identified. After that, 77 duplicate records were eliminated. The remaining 355 articles were screened based on their titles and abstracts. Of those, 260 studies were excluded after the first screening. A total of 95 eligible articles underwent a full-text review. After this, 74 further studies were excluded due to a lack of data, inappropriate population, or methodological gap (Figure 1).

A total of 21 studies were included in this review, conducted in various regions and covering a wide range of worker populations. Most were cross-sectional designs ($n = 16$) with a few cohort studies ($n = 5$). Sample sizes ranged from 118 to 100,612 participants.

Eight of the studies focused on health workers (e.g., nurses, psychiatrists and hospital staff), two on factory workers, one on airline employees, and the others related to transport workers, maintenance staff. Mainly studies were performed in Finland (Hemiö et al., 2020), Australia (Dorrian et al., 2017; Dorrian & Skinner, 2012), Japan (Morikawa et al., 2014; Tada et al., 2014), Korea (Bae et al., 2017; Jung et al., 2022; Kim et al., 2024; Pham & Park, 2019), China (Li et al., 2023; Lu et al., 2016) and Norway (Buchvold et al., 2019; Saksvik - Lehouillier et al., 2013). The most used questionnaires were Alcohol Use Disorders Identification Test (AUDIT), Epworth Sleepiness Scale (ESS) and Munich Questionnaire Chronotype standardized tools for shift workers.

The results showed that 17 studies reported a positive and significant association between alcohol consumption and night shift work or shift work. Of the rest four studies, three studies found no significant relationship, and only one found a negative association.

In a sample of Finnish airline workers, working at night was associated with excessive alcohol consumption among employees. This was particularly marked among women. In addition, the study by Dorrian and Skinner (2012) analyzed data from an Australian household survey and found that shift workers had significantly higher rates of drinking alcohol at short-term risky levels (OR = 2.10, 95% CI [1.08 – 4.12]). Risky levels were defined here as seven or more drinks for men and five or more drinks for women, compared with workers who did not have a shift schedule. This possibly reflects the use of alcohol as a sleep aid during shift-associated sleeping problems.

Swanson et al. (2023) also showed the influence of circadian misalignment among 750 nurses on alcohol consumption, finding that heavy drinkers with night shifts had a later chronotype.

Furthermore, in Pham and Park's (2019) study, it was noted that Korean women working night shifts were more likely to develop alcohol use disorders than daytime workers ($p = .006$). In fact, the risk of alcohol use disorders was 2.23 times higher among female night workers compared to female day workers.

Regarding the impact of the duration and frequency of night shifts on alcohol intake, a strong correlation was found. Research by Dorrian et al. (2017) found that Australian shift workers who worked 12-hour rotating shifts had a higher self-reported binge drinking rate than those who only worked 8-hour shifts. Similarly, in Buchvold et al.'s (2019) longitudinal cohort study of 1371 Norwegian nurses, an increase in the number of hours worked per week was related to higher alcohol use; however, no significant differences were observed between night and day workers when followed up over the 6-year period. In this context, Saksvik-Lehouillier et al. (2013) showed that new night shift workers (less than 1 year) had significantly higher alcohol consumption compared to experienced night shift workers (6 years or more).

In terms of geographical and work-related aspects, marked differences were identified in the results. Indeed, in China, the psychiatrists who had less than 3 night shifts per month reported a significantly higher risk of alcohol misuse (Li et al., 2023).

On the other hand, it was Kim et al. (2024) reported that among 11,972 Korean workers, those who worked night shifts and suffered from poor sleep patterns had the highest risk of developing alcohol use disorder, especially if they worked long hours.

Table 2.
Summary of analyzed studies

Reference	Methodology	Population	Work System	Questionnaire	Results
Kim et al. (2024)	Cross-sectional study	*N* = 11,972 Korean workers	Poor sleep patterns, night shifts	Alcohol Use Disorders Identification Test (AUDIT)	Poor sleep patterns were associated with higher odds of alcohol use disorders in both males (Adjusted Odds Ratio (AOR) = 1.22, 95% CI [1.07 – 1.39]) and females (AOR = 1.21, 95% CI [1.03 – 1.41]). - Night shift workers with poor sleep patterns had the highest association with alcohol use disorders, especially among those working long hours
Swanson et al. (2023)	Cross-sectional survey	USA *N* = 750 nurses, (COVID-19 pandemic)	Night shift vs. standard shift nurses	AUDIT, Munich Chronotype Questionnaire Shift (MCTQ-Shift)	-Binge drinkers working night shifts had more than twice the odds of contracting COVID-19 (OR = 2.08, 95% CI [0.75 – 5.79]). -Night shift workers also had a significantly later chronotype, which was associated with circadian misalignment.
Li et al. (2023)	Cross-sectional study	*N* = 3549 Chinese psychiatrists	High workloads, including long hours	AUDIT	-Alcohol misuse was significantly associated with fewer night shifts per month.
Jung et al. (2022)	Longitudinal study (2005 – 2019)	*N* = 4046 Korean workers	Fixed daytime vs. shift work, schedule transitions	Self-reported drinking behaviors	-Workers transitioning to shift work had a higher risk of binge drinking (AOR = 1.19, 95% CI [1.02 – 1.49]). -Shift workers showed a modest increase in unhealthy behaviors (AOR = 1.11, 95% CI [1.01 – 1.26]).
Hamieh et al. (2022)	Longitudinal study	France *N* = 47 ,288 men and 53,324 women (CONSTANCES cohort)	Atypical working hours (night shifts, weekends, non-fixed schedules)	Self-reported alcohol use	-Night shifts were associated with increased alcohol use (OR=1.12 to 1.14), particularly in those working non-fixed hours. -Weekend work was linked to higher alcohol consumption (OR=1.09 to 1.14).
Adane et al. (2022)	Cross-sectional study	Ethiopia *N* = 398 healthcare workers	Two-shift and 3-shift schedules with >10-night shifts per month	Insomnia Severity Index (ISI), Epworth Sleepiness Scale (ESS), and International Classification of Sleep Disorders (ICSD-3)	-Alcohol consumption significantly associated with shift work sleep disorder (AOR = 2.6, 95% CI [1.45 – 4.92]).
Plescia et al. (2021)	Cross-sectional study	*N* = 392 Italian workers	Day vs. night work	AUDIT-C, ISI	-Night workers reported higher alcohol consumption and binge drinking -Insomnia strongly correlated with alcohol abuse.
Proper et al. (2021)	Longitudinal study	*N* = 1633 Dutch workers	Shift vs. non-shift workers	SF-36 Mental Health and Physical Functioning Scales	- Shift workers showed no significant differences in mental or physical health compared to non-shift workers. However, smoking and physical inactivity mediated health outcomes. -Alcohol consumption was not statistically significant.
Hemiö et al. (2020)	Prospective cohort study	*N* = 366 Finnish airline employees	Shift work	Work stress questionnaire, ESS, food intake questionnaire	-Increased night shifts were associated with significant alcohol consumption among women.
Pham & Park (2019)	Cross-sectional study	*N* = 26,895 Korean workers	Night work vs. day work	AUDIT and EuroQol-5D (EQ-5D)	-Female night workers had a higher risk of Alcohol use disorder (AUD).

Buchvold et al. (2019)	Longitudinal cohort study	*N* = 1371 Norwegian nurses	various shift schedules including night shifts	AUDIT	-No significant differences in alcohol consumption between night and day workers.
Bae et al. (2017)	Cross-sectional study (2010 – 2012)	*N* = 11,680 Korean adults	Day work vs. shift work (evening, night, rotating)	Self-reported alcohol consumption	-Female shift workers aged ≥50 years were more likely to engage in high-risk drinking (OR = 2.22; CI = 1.53 – 3.23), smoking (OR = 5.55; CI = 3.60 – 8.55), and inadequate sleep (OR = 1.50; CI = 1.10 – 2.05). -No significant associations for men.
Dorrian et al. (2017)	Cross-sectional study	*N* = 118 Australian shift workers	12-hour and 8-hour rotating shifts	Cancer Council Dietary Questionnaire, Shiftwork Index	-12-hour rotating shift workers reported higher alcohol consumption and binge drinking.
Lu et al. (2016)	Cross-sectional study	*N* = 1654 Chinese steel workers	Rotating shift workers (morning, afternoon, and night shifts) vs. daytime workers	Self-administered lifestyle and health questionnaires	-Shift workers had higher alcohol consumption, smoking rates, and poor sleep compared to daytime workers. -Elevated white blood cell (WBC) counts were also observed.
Ramin et al. (2015)	Cross-sectional study (Nurses' Health Study II)	USA *N* = 54,724 nurses	Night shift vs. day shift (rotating, permanent)	Food Frequency Questionnaire (FFQ)	-No significant difference in alcohol consumption between night shift and day shift workers. -Higher body mass index (BMI), caffeine intake, and smoking were more prominent in night shift workers.
Buchvold et al. (2015)	Cross-sectional study	*N* = 2059 Norwegian nurses	Night vs. day shifts	AUDIT-C	-Night shifts were not significantly related to alcohol misuse. -However, more hours worked per week were associated with higher alcohol consumption.
Tada et al. (2014)	Cross-sectional study	*N* = 2758 Japanese female nurses	Rotating shift vs. daytime work	Self-administered food and lifestyle questionnaires	-Shift workers had higher BMI and consumed more alcohol and sugar-sweetened beverages compared to day workers.
Morikawa et al. (2014)	Cross-sectional study	*N* = 3398 male Japanese factory workers	Blue-collar vs. white-collar, fixed vs. shift work	Job Content Questionnaire, Depression Scale	-Younger workers (20 – 29 years) in shift work had a higher risk of heavy drinking (OR = 4.22, 95% CI [1.07 – 16.62]). -Psychosocial factors such as low social support were predictive of heavy drinking.
Morikawa et al. (2013)	Cross-sectional survey	*N* = 909 Japanese factory workers	Day vs. night shift worker	Diet History Questionnaire (DHQ), self-reported sleep quality	-Night-shift workers with poor sleep had significantly higher odds of heavy drinking (OR = 2.17, 95% CI [1.20 – 3.93]).
Saksvik-Lehouillier et al.	Cross-sectional study	*N* = 749 Norwegian nurses	New vs. experienced night workers	AUDIT	-New night workers had significantly higher alcohol consumption compared to experienced workers.
Dorrian & Skinner (2012)	Cross-sectional study (Household, Income and Labour Dynamics in Australia (HILDA) survey)	*N* = 2090 Australian workers	Shift work schedules	Alcohol consumption patterns	-Shift workers were twice as likely to engage in risky alcohol consumption compared to day workers.

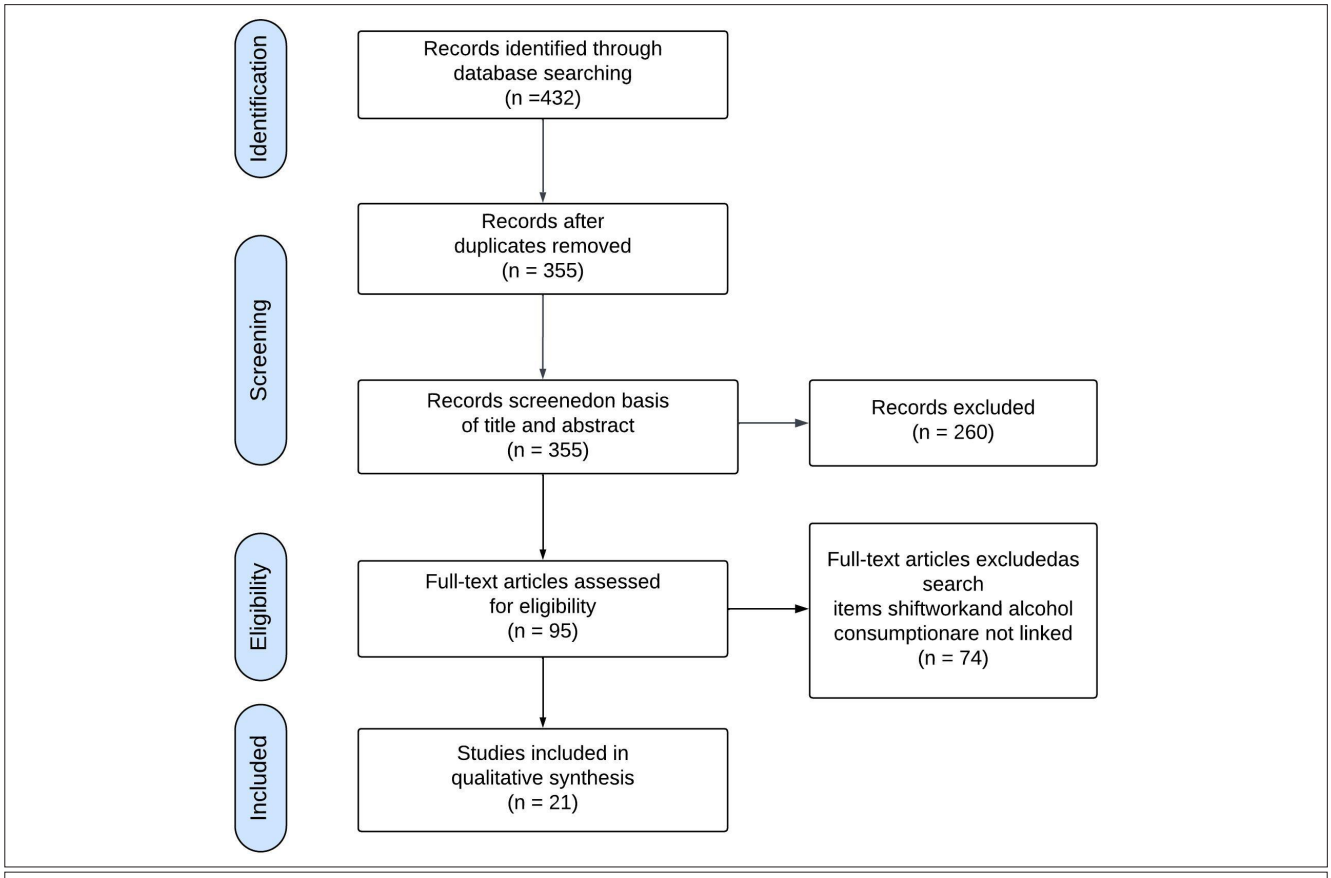


Figure 1 Flowchart of Search Strategy.

In a Japanese cross-section of male factory workers, Morikawa et al. (2013) found significantly higher rates of alcohol use as a sleep aid at least once a week among night-shift workers (OR = 1.52, 95% CI [0.95 – 2.41], p = .07) than among day-shift workers (OR = 0.64, 95% CI [0.24 – 1.69], p = .03).

In occidental countries, Ramin et al. (2015) reported in a cross-sectional study conducted in the USA: (Nurses' Health Study II) among 54,724 nurses on night shift vs. day shift (rotating, permanent) using the Food Frequency Questionnaire, that there was no significant difference in alcohol consumption between night and day shift workers.

In African countries, such as Ethiopia, Adane et al. (2022) conducted a cross-sectional study among 398 healthcare workers with 2- or 3-shift schedules, involving more than 10 nights of work per month. The study relied on the Insomnia Severity Index (ISI), the Epworth Sleepiness Scale (ESS), and the International Classification of Sleep Disorders (ICSD-3). It demonstrated that alcohol binge drinking (more than 210 g/week) was significantly associated with shift-work sleep disorder (AOR = 2.6, 95% CI [1.45 – 4.92]).

Discussion

This scoping review found a strong correlation between shift work and alcohol consumption in different sectors, particularly in strained occupations such as healthcare and manufacturing. Night workers, compared to day workers, appear more likely to engage in behaviors such as binge drinking and alcohol use. Many studies have shown that night workers, especially females aged more than 50 years, noted higher levels of alcohol consumption, usually as a coping solution for sleep disturbance, fatigue, and stress.

These findings are in line with the literature, which suggests that shift work leads to alcohol abuse as a form of self-medication to fall asleep (Ebrahim et al., 2013). In addition, insufficient or poor-quality sleep appears to be linked to alcohol consumption as a means of reducing insomnia-related anxiety (Hasler & Pedersen, 2020). However, the relationship between the mechanism of circadian rhythm disturbances and binge alcohol consumption has not been explained in most of the studies.

In the findings, geographical differences were evident, with stronger associations between night shift work and alcohol consumption observed in East Asian countries such as Korea and Japan, particularly among female workers, compared to Scandinavian studies, such as those carried out in Norway. Scandinavian regions reported a low difference in alcohol intake between night and day workers. This might be explained by cultural variations in alcohol use or availability in the general population. In East Asian countries, social norms often encourage drinking during after-work gatherings or corporate events, even for night shift workers. In contrast, Scandinavian nations, such as Norway, enforce strict alcohol regulations, including high taxes and limited sale hours, which discourage excessive consumption and minimize disparities between night and day workers (WHO, 2023)

Limitations

Certain strengths and limitations can be noted in this review. In fact, as most of the research data on this subject is cross-sectional in nature, it is very difficult to draw conclusions about causality between night work and alcohol consumption. Moreover, most of these studies are based on self-reported measures. This may lead to study bias, under-reporting, or misreporting of alcohol consumption. Biomarkers such as gamma-glutamyl transferase or other biological assays should be used advantageously in studies.

Conclusion

This study showed a consistent link between shift work, especially night shift work, and increased alcohol consumption in various working fields. Indeed, shift workers could use alcohol as a coping strategy for stress, fatigue, reduced ability, and sleep disturbances.

Further strategies like sleep hygiene education programs and workplace-based stress management, are recommended to encourage shift workers to adopt a healthy work condition and suitable lifestyle.

Promoting workplace awareness campaigns on the risks of alcohol consumption and training supervisors to identify and address early signs of alcohol misuse could complement these efforts. Furthermore, integrating periodic health assessments and providing access to mental health support services can play a crucial role in preventing alcohol use disorders.

Future research should explore the effectiveness of such interventions and consider the role of cultural and regional differences in shaping alcohol-related behaviors among shift workers.

Data Availability Statement: The data that support the findings of thisstudy are available on request from the corresponding author.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – A.K., K.J.H.; Design – I.B.H., A.T.; Supervision – N.K., M.H.; Resources – A.T., A.T.; Materials – A.K., I.B.H.; Data Collection and/or Processing – A.K., A.T.; Analysis and/or Interpretation – A.K., N.K.; Literature Search – A.T., A.T.; Writing Manuscript – A.T., A.T.; Critical Review – K.J.H., M.H.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

References

Adane, A., Getnet, M., Belete, M., Yeshaw, Y., & Dagnew, B. (2022). Shift-work sleep disorder among health care workers at public hospitals, the case of Sidama national regional state, Ethiopia. A multicenter cross-sectional study. *PLoS One*, *17*(7), e0270480. [CrossRef]

Airagnes, G., Lemogne, C., Meneton, P., Plessz, M., Goldberg, M., Hoertel, N., Roquelaure, Y., Limosin, F., & Zins, M. (2019). Alcohol, tobacco and cannabis use are associated with job loss at follow-up: Findings from the CONSTANCES cohort. *PLoS One*, *14*(9), e0222361. [CrossRef]

Arksey, H., & O'Malley, L. (2005). Scoping studies. Towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19 – 32. [CrossRef]

Bae, M.-J., Song, Y.-M., Shin, J.-Y., Choi, B.-Y., Keum, J.-H., & Lee, E.-A. (2017). The association between shift work and health behavior. Findings from the Korean national health and nutrition examination survey. *Korean Journal of Family Medicine*, *38*(2), 86 – 92. [CrossRef]

Buchvold, H. V., Pallesen, S., Øyane, N. M. F., & Bjorvatn, B. (2015). Associations between night work and BMI, alcohol, smoking, caffeine and exercise. A cross-sectional study. *BMC Public Health*, *15*, 1112. [CrossRef]

Buchvold, H. V., Pallesen, S., Waage, S., Moen, B. E., & Bjorvatn, B. (2019). Shift work and lifestyle factors. A 6-year follow-up study among nurses. *Frontiers in Public Health*, *7*, 281. [CrossRef]

Chang, W.-P., & Li, H.-B. (2022). Influence of shift work on rest-activity rhythms, sleep quality, and fatigue of female nurses. *Chronobiology International*, *39*(4), 557 – 568. [CrossRef]

Chellappa, S. L., Vujovic, N., Williams, J. S., & Scheer, F. A. J. L. (2019). Impact of circadian disruption on cardiovascular function and disease. *Trends in Endocrinology and Metabolism*, *30*(10), 767 – 779. [CrossRef]

Costello, H. M., & Gumz, M. L. (2021). Circadian rhythm, clock genes, and hypertension. Recent advances in hypertension. *Hypertension*, *78*(5), 1185 – 1196. [CrossRef]

Dorrian, J., Heath, G., Sargent, C., Banks, S., & Coates, A. (2017). Alcohol use in shiftworkers. *Accident; Analysis and Prevention*, *99*(B), 395 – 400. [CrossRef]

Dorrian, J., & Skinner, N. (2012). Alcohol consumption patterns of shiftworkers compared with dayworkers. *Chronobiology International*, *29*(5), 610 – 618. [CrossRef]

Ebrahim, I. O., Shapiro, C. M., Williams, A. J., & Fenwick, P. B. (2013). Alcohol and sleep I. Effects on normal sleep. *Alcoholism, Clinical and Experimental Research*, *37*(4), 539 – 549. [CrossRef]

Hamieh, N., Airagnes, G., Descatha, A. *et al.* (2022). Atypical working hours are associated with tobacco, cannabis and alcohol use: longitudinal analyses from the CONSTANCES cohort. *BMC Public Health 22*, 1834. [CrossRef]

Hasler, B. P., & Pedersen, S. L. (2020). Sleep and circadian risk factors for alcohol problems. A brief overview and proposed mechanisms. *Current Opinion in Psychology*, *34*, 57 – 62. [CrossRef]

Hemiö, K., Lindström, J., Peltonen, M., Härmä, M., Viitasalo, K., & Puttonen, S. (2020). The association of work stress and night work with nutrient intake. A prospective cohort study. *Scandinavian Journal of Work, Environment and Health*, *46*(5), 533 – 541. [CrossRef]

Jung, S., Lee, S.-Y., & Lee, W. (2022). The effect of change of working schedule on health behaviors. Evidence from the Korea Labor and Income Panel study (2005 – 2019). *Journal of Clinical Medicine*, *11*(6), 1725. [CrossRef]

Kim, C. R., Kim, S. Y., Kim, J., Park, E.-C., & Ha, M. J. (2024). Association between sleep patterns and alcohol use disorders in workers. *PLoS One*, *19*(8), e0308418. [CrossRef]

Li, W., Chen, L., Hsu, M., Mo, D., Xia, L., Min, K., Jiang, F., Liu, T., Liu, Y., Liu, H., & Tang, Y. L. (2023). The association between workload, alcohol use, and alcohol misuse among psychiatrists in China. *Frontiers in Psychiatry*, *14*, 1171316. [CrossRef]

Lu, L.-F., Wang, C.-P., Tsai, I.-T., Hung, W.-C., Yu, T.-H., Wu, C.-C., Hsu, C.-C., Lu, Y.-C., Chung, F.-M., & Jean, M.-C. Y. (2016). Relationship between shift work and peripheral total and differential leukocyte counts in Chinese steel workers. *Journal of Occupational Health*, *58*(1), 81 – 88. [CrossRef]

Morikawa, Y., Nakamura, K., Sakurai, M., Nagasawa, S.-Y., Ishizaki, M., Nakashima, M., Kido, T., Naruse, Y., & Nakagawa, H. (2014). The effect of age on the relationships between work-related factors and heavy drinking. *Journal of Occupational Health*, *56*(2), 141 – 149. [CrossRef]

Morikawa, Y., Sakurai, M., Nakamura, K., Nagasawa, S.-Y., Ishizaki, M., Kido, T., Naruse, Y., & Nakagawa, H. (2013). Correlation between

shift-work-related sleep problems and heavy drinking in Japanese male factory workers. *Alcohol and Alcoholism*, *48*(2), 202 – 206. [CrossRef]

Pasupathy, R., Gho, J., Duhart, B., & Queen, C. (2022). Alcohol consumption messages in Korean dramas: The globalization of South Korean drinking norms. *Global Health Promotion*, *29*(3), 57 – 65. [CrossRef]

Pham, T.-T., & Park, B. (2019). Alcohol use disorder and health-related quality of life in Korean night-shift workers. A cross-sectional study using the KNHANES 2007 – 2015 data. *PLoS One*, *14*(4), e0214593. [CrossRef]

Plescia F, Cirrincione L, Martorana D, Ledda C, Rapisarda V, Castelli V, Martines F, Vinnikov D, Cannizzaro E. (2021). Alcohol Abuse and Insomnia Disorder: Focus on a Group of Night and Day Workers. *Int J Environ Res Public Health*, *18*(24), 13196. [CrossRef]

Poggiogalle, E., Jamshed, H., & Peterson, C. M. (2018). Circadian regulation of glucose, lipid, and energy metabolism in humans. *Metabolism: Clinical and Experimental*, *84*, 11 – 27. [CrossRef]

Potter, G. D. M., Skene, D. J., Arendt, J., Cade, J. E., Grant, P. J., & Hardie, L. J. (2016). Circadian rhythm and sleep disruption. Causes, metabolic consequences, and countermeasures. *Endocrine Reviews*, *37*(6), 584 – 608. [CrossRef]

Proper KI, Jaarsma E, Robroek SJW, Schram JLD, Boshuizen H, Picavet HSJ, Verschuren WMM, van Oostrom SH. (2021). The mediating role of unhealthy behavior in the relationship between shift work and perceived health. BMC Public Health, *21*(1), 1300. [CrossRef]

Ramin, C., Devore, E. E., Wang, W., Pierre-Paul, J., Wegrzyn, L. R., & Schernhammer, E. S. (2015). Night shift work at specific age ranges and chronic disease risk factors. *Occupational and Environmental Medicine*, *72*(2), 100 – 107. [CrossRef]

Reinganum, M. I., & Thomas, J. (2024). Shift work hazards. In *StatPearls*. StatPearls Publishing. http://www.ncbi.nlm.nih.gov/books/NBK589670/

Saksvik-Lehouillier, I., Bjorvatn, B., Hetland, H., Sandal, G. M., Moen, B. E., Magerøy, N., Åkerstedt, T., & Pallesen, S. (2013). Individual, situational and lifestyle factors related to shift work tolerance among nurses who are new to and experienced in night work. *Journal of Advanced Nursing*, *69*(5), 1136 – 1146. [CrossRef]

Sayette, M. A. (2017). The effects of alcohol on emotion in social drinkers. *Behaviour Research and Therapy*, *88*, 76 – 89. [CrossRef]

Silva, I., & Costa, D. (2023). Consequences of shift work and night work: A literature review. *Healthcare*, *11*(10), 1410. [CrossRef]

Srinivasan, V., Singh, J., Pandi-Perumal, S. R., Brown, G. M., Spence, D. W., & Cardinali, D. P. (2010). Jet lag, circadian rhythm sleep disturbances, and depression. The role of melatonin and its analogs. *Advances in Therapy*, *27*(11), 796 – 813. [CrossRef]

Steele, T. A., St Louis, E. K. S., Videnovic, A., & Auger, R. R. (2021). Circadian rhythm sleep-wake disorders. A contemporary review of neurobiology, treatment, and dysregulation in neurodegenerative disease. *Neurotherapeutics*, *18*(1), 53 – 74. [CrossRef]

Swanson, G. R., Schwartz, B. A., Joyce, C., & Keshavarzian, A. (2023). Binge drinking alcohol and circadian misalignment in night shift nurses is associated with decreased resiliency to COVID-19 infection. *Alcohol, Clinical and Experimental Research*, *47*(5), 908 – 918. [CrossRef]

Tada, Y., Kawano, Y., Maeda, I., Yoshizaki, T., Sunami, A., Yokoyama, Y., Matsumoto, H., Hida, A., Komatsu, T., & Togo, F. (2014). Association of body mass index with lifestyle and rotating shift work in Japanese female nurses. *Obesity*, *22*(12), 2489 – 2493. [CrossRef]

Thomas, N. S., Kuo, S. I.-C., Aliev, F., McCutcheon, V. V., Meyers, J. M., Chan, G., Hesselbrock, V., Kamarajan, C., Kinreich, S., Kramer, J. R., Kuperman, S., Lai, D., Plawecki, M. H., Porjesz, B., Schuckit, M. A., Dick, D. M., Bucholz, K. K., & Salvatore, J. E. (2022). Alcohol use disorder, psychiatric comorbidities, marriage and divorce in a high-risk sample. *Psychology of Addictive Behaviors: Journal of the Society of Psychologists in Addictive Behaviors*, *36*(4), 364 – 374. [CrossRef]

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., Lewin, S., et al. (2018). PRISMA extension for scoping reviews (PRISMA-ScR). Checklist and explanation. *Annals of Internal Medicine*, *169*(7), 467 – 473. [CrossRef]

World Health Organization (2023). *Reducing alcohol consumption, the Nordic way: Alcohol monopolies, marketing bans and higher taxation*. World Health Organization Regional Office for Europe. https://www.who.int/europe/news/item/30-06-2023-reducing-alcohol-consumption--the-nordic-way--alcohol-monopolies--marketing-bans-and-higher-taxation

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Prevalence of Alcohol Use and Alcohol Use Disorder and Risk Factors among University Students: A Cross-Sectional Study in Trabzon, Türkiye

Cansu Agrali Gundogmus[1], Sevil Turhan[1], Abdul Kadir Albayraktar[1], Yusuf Emre Bostan[1], Murat Topbas[1], Nazim Ercument Beyhun[1], Aykut Karahan[2], Samiye Cilem Bilginer[3], Nihan Kalkandeler Ozdin[4], Gizem Nur Sakar[5]

[1]Department of Public Health, Karadeniz Technical University Faculty of Medicine, Trabzon, Türkiye
[2]Department of Mental Health and Diseases, Karadeniz Technical University Faculty of Medicine, Trabzon, Türkiye
[3]Department of Child Adolescent Mental Health and Diseases, Karadeniz Technical University Faculty of Medicine, Trabzon, Türkiye
[4]Uskudar University Faculty of Sociology, İstanbul, Türkiye
[5]Department of Child Development, Avrasya University Faculty of Health Sciences, Trabzon, Türkiye

ORCID iDs of the authors: C.A.G. 0000-0003-2911-9665, S.T. 0000-0002-8534-2928, A.K.A. 0000-0002-3708-4493, Y.E.B. 0000-0003-2418-1793, M.T. 0000-0003-4047-4027, N.E.B. 0000-0002-4664-9070, A.K. 0000-0001-7028-9362, S.C.B. 0000-0003-3375-3183, N.K.O. 0000-0002-3362-363X, G.N.S. 0000-0001-5696-0674.

Main Points

- The results show that the rate of alcohol use among university students is significantly higher than that of the general population.
- The identified risk factors included students staying away from the family, students' use of any tobacco product.
- A close friend's alcohol use was found to be the factor that increased the risk the most.

Abstract

The aim of the study was to evaluate the prevalence of alcohol use, prevalence of alcohol use disorders, and risk factors among university students in Trabzon province. This study was a cross-sectional study conducted on undergraduate and associate degree students studying at universities. The questionnaire was administered to 6492 undergraduate students to ensure a representative sample of 33201 students from all faculties and grade levels. The prevalence of alcohol use disorder was determined with the Alcohol Use Disorders Identification Test. Alcohol use disorder is defined as a score of eight points and above on the Alcohol Use Disorders Identification Test. Multivariate logistic regression analyses were performed to examine factors associated with alcohol use and alcohol use disorder. The prevalence of alcohol use was 24.1% (95% CI 23.0 – 25.2) and the prevalence of alcohol use disorder was 4.9% (95% CI 4.3 – 5.4) among 6213 students included in the analysis. Among 6213 students included in the analysis, the prevalence of alcohol use was 24.1% (95% CI 23.0 – 25.2) and the prevalence of alcohol use disorder was 4.9% (95% CI 4.3 – 5.4). The results show that the rate of alcohol use among university students is significantly higher than that of the general population. Residing separately from the family, students using any tobacco product, parents using alcohol, and close friends using alcohol were found to be risk factors.

Keywords: Alcohol use disorders, binge drinking, prevalence, risk factors, university students drinking

Corresponding author:
Cansu Agrali Gundogmus
E-mail:
cns.agrali@gmail.com

Received: September 19, 2024
Revision Requested: November 7, 2024
Last Revision Received: December 19, 2024
Accepted: February 22, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

Alcohol use impacts adverse health, social, and legal outcomes, which are interrelated (Griswold et al., 2018). Alcohol use is a significant risk factor for many diseases, disabilities, and mortality, and can lead to alcohol use disorder (AUD) (Alcohol Use, 2018). Alcohol use disorders negatively impact individuals,

Cite this article as: Agrali Gundogmus, C., Turhan, S., Albayraktar, A.K., Bostan, Y.E., Topbas, M., Beyhun, N.E., Karahan, A., Bilginer, S.C., Kalkandeler Ozdin, N., & Sakar, G.N. (2025). Prevalence of alcohol use and alcohol use disorder and risk factors among university students: A cross-sectional study in Trabzon, Türkiye. *Addicta: The Turkish Journal on Addictions*, 12(3), 294-301.

DOI: 10.5152/ADDICTA.2025.24030

families, and society, yet the global disease burden from alcohol continues to rise, with one-third affecting people aged 15 – 29 (Das et al., 2016). According to data from the Turkish Statistical Institute, the prevalence of alcohol use between the ages of 15 and 24 increased between 2010 and 2019 in Türkiye (2010: 8.6%; 2012: 7.4%; 2014: 13.3%; 2016: 9.3%; 2019: 11.4%) (TÜIK, 2019). In a general population survey conducted in 25 provinces in Türkiye, the lifetime prevalence of alcohol use was found to be 28.3% and alcohol use in the last 12 months was found to be 14.3% (Ilhan et al.,2016). Studies on university students in Türkiye from 2003 to 2019 reported alcohol use prevalence between 16.9% and 65.3% (Alaçam et al., 2015; Çam et al., 2020; Coşkun et al., 2019; Dayi et al., 2015; Demirci & Eker, 2017; Görgün et al., 2010; Havaçeliği Atlam & Yüncü, 2017; Koca & Oğuzöncül, 2015; Yilmaz et al., 2020). Alcohol use disorder prevalence was found to be 4.9% and 13.5% in studies conducted on university students in 2013 and 2019, respectively (Çam et al., 2020; Havaçeliği Atlam & Yüncü, 2017). Young adults are considered the most at-risk group for alcohol use. Despite alcohol being prohibited in higher education institutions and the implementation of Türkiye's anti-addiction education program since 2014, alcohol use remains high among university students compared to the general population (Ayvasik & Sümer, 2010; Görgün et al., 2010; Havaçeliği Atlam & Yüncü, 2017).

Prevalence studies among university students are essential to assess the scope of health problems and identify priority areas for public health interventions. The COVID-19 pandemic has significantly impacted students in Trabzon, as well as across Türkiye and globally. The uncertainties caused by school closures and the shift to online learning (e.g., access to technology, dormitory closures, and job losses for working students) may have led to notable behavioral changes. Stress, economic shifts, and changes in living conditions, such as moving out of dorms or in with friends, could have influenced alcohol use patterns. The study evaluated the prevalence of alcohol use, hazardous drinking, and contributing factors among university students in Trabzon. Students who completed the questionnaire form appropriately were included in the analysis.

Material and Methods

Population and Data Collection

Cross-sectional surveys allow for the cost-effective screening of multiple health problems or diseases within a single survey, known as "multi-purpose scans". To assess the prevalence and factors influencing tobacco, substance, alcohol use, and behavioral addictions, an integrated project was planned involving students from three universities in Trabzon. Three studies with different aims and hypotheses were conducted within this project.

The sample size for the project was calculated using Open Epi Version 3.01 software. For Karadeniz Technical University , with a population of 19,820 students (excluding waiting, second education, and preparatory students), the minimum sample size was 2708, based on a 50% expected prevalence, 1.75% deviation, and 95% CI. To account for potential errors, the sample size was increased by 25%, targeting 3500 participants. The study was later expanded to include Trabzon University and Avrasya University . Based on Karadeniz Technical University sample/population ratio (0.18), the target sample size was set at 1800 for Trabzon University (out of 8983 students) and 700 for Avrasya University (out of 4398 students). The sample was weighted by faculties, programs, and academic years to ensure representativeness. Participants were informed on the first page of the questionnaire and a box was left for informed consent approval. The consenting students checked the box and agreed to participate in the study. About 6492 undergraduate students who agreed to participate in the study participated in the survey.

Assessment of Alcohol Use and Alcohol Use Disorder

The student's alcohol use status was determined by comparing their response to the question "Do you use alcohol?" with their responses to the Alcohol Use Disorders Identification Test (AUDIT) scale. Students who had consumed alcohol within the past 12 months were classified as alcohol users. Terms from the WHO "Global Status Report on Alcohol and Health" were adapted into Turkish as "consumes," "doesn't consume," and "never consume" based on definitions from the 2020 Health Statistics Yearbook (TÜIK, 2019).

AUDIT, developed by the World Health Organization in 1989, is the gold standard for screening AUD (Saunders et al., 1993). The Turkish version's validity and reliability were established by Saatçioğlu et al. (Evren, 2019). The scale's total score is 40, and a score of eight or above indicates AUD (hazardous or harmful use). Alcohol Use Disorders Identification Test is a widely used, reliable tool that accurately predicts AUD based on DSM-5 diagnostic criteria (Foxcroft et al., 2015; Hagman, 2016). Measurement invariance for AUDIT has been confirmed across gender, age, and education levels (Skogen et al., 2019).

The study's dependent variables were alcohol use status and AUD status. Independent variables included sociodemographic and personal characteristics, reasons for alcohol use, and factors related to university education.

Statistical Analysis

The research data were analyzed using the IBM SPSS 23.0 (IBM SPSS Corp.; Armonk, NY, USA) software. Descriptive statistics were presented as numbers and percentages. Categorical variables were compared using the chi-square test. Multivariate analysis was conducted with the binary logistic regression test. One of the correlated factors was added to the model and variables with a high amount of missing data were not added to the model. Model fit was evaluated with the Hosmer-Lemeshow Test. The Nagelkerke R2 value was used to evaluate the explanatory power. The data were standardised according to age. A *p*-value of less than .05 was considered statistically significant.

Ethical Approvals

The approval letter (2021/372) and letter dated June 28, 2022 (numbered 24237859 – 412) were obtained from Karadeniz Technical University, Scientific Research Ethics Committee. The research was supported by Karadeniz Technical University Scientific Research Projects (BAP) Coordination Unit.

Results

Among the 6213 students analyzed, 24.1% were current alcohol users, and 4.9% had AUD. The prevalence of current alcohol use by university was 26.4% at Karadeniz Technical University, 17.6% at Trabzon University, and 26.4% at Avrasya University. The prevalence of AUD was 4.9% at Karadeniz Technical University,

4.0% at Trabzon University, and 6.6% at Avrasya University (Figure 1). Factors associated with alcohol use and AUD prevalence are shown in Table 1, with the most common reason for alcohol use being to have fun. Table 2 presents the reasons for alcohol use among students with and without AUD.

Multivariate analysis results for alcohol use and AUD risk factors are shown in Table 3. For alcohol use, risk factors included male gender, living in student housing, tobacco use, maternal and paternal alcohol use, and alcohol use by close friends. Studying at Trabzon was found to be protective, while academic year and faculty type were not significant. For AUD, male gender, paternal alcohol use, and alcohol use by close friends were identified as risk factors. Parental education level and university-related factors (academic year, faculty type) were not associated with AUD risk.

Discussion

This study evaluated the prevalence of AUD and influencing factors among students studying at three different universities in the province of Trabzon in the north of Türkiye and provides data for studies to be conducted to prevent alcohol use among university students.

Alcohol Use Prevalence Risk Factors

In this study, the prevalence of alcohol use among university students within the last 12 months was 24.1%. Previous studies conducted in Türkiye between 2003 and 2019 reported alcohol use rates among university students ranging from 16.9% to 65.3% (Alaçam et al., 2015; Çam et al., 2020; Coşkun et al., 2019; Dayi et al., 2015; Demirci & Eker, 2017; Görgün et al., 2010; Havaçeliği Atlam & Yüncü, 2017; Koca & Oğuzöncül, 2015; Yilmaz et al., 2020).

A 2020 study in Myanmar involving 2349 students from seven universities found a lifetime alcohol use prevalence of 36.2%, with 20.3% reporting use in the last 30 days (Htet et al., 2020). In Botswana, a 2018 study of 2000 students reported a 31.9% prevalence of alcohol use (Olashore et al., 2017). A study conducted in 2018 in Iran with 7330 students found a 7.8% prevalence of alcohol use in the last year (Taremian et al., 2018), while a 2017 study in Nigeria reported a lifetime alcohol use prevalence of 27.5% among 2412 students (Oe et al., 2017). In the USA, a 2017 study found that 91.3% of medical students at a university in Minnesota had consumed alcohol in the past year (Ayala et al., 2017). A 2015 study in Serbia involving 2285 students reported a 77.7% prevalence of alcohol use (Višnjić et al., 2015).

Comparing these results, the alcohol use prevalence in the study was lower than in Myanmar, Botswana, Serbia, and the USA but higher than in Iran, and similar to that in Nigeria. Differences in how alcohol use was measured (e.g., lifetime vs. past 12 months), study years, regions, and definitions of alcohol use may explain these variations. Other factors include national alcohol policies, community actions, alcohol availability, marketing and advertising restrictions, and pricing policies (Chegeni et al., 2020). University alcohol policies may have also influenced the differences in results. Globally, alcohol use prevalence is reported at 43.0%, with regional variations: 32.2% in Africa, 54.1% in the USA, 2.9% in the Eastern Mediterranean, 59.9% in Europe, 33.1% in Southeast Asia, and 53.8% in the Western Pacific (Griswold et al., 2018). This study found a higher rate compared to the predominantly Muslim Eastern Mediterranean region and lower rates compared to other regions. Cultural differences and varying policies between countries may contribute to these differences.

The COVID-19 pandemic has been linked to increased stress, anxiety, and depression, particularly among university students, and alcohol use has been associated with heightened stress and anxiety during this time (Gavurova et al., 2020). In a 2020 online survey in the USA, 26.9% of university students reported increased alcohol consumption during the pandemic (Firkey et al., 2022). Although this study was conducted during a period of relaxed COVID-19 restrictions and does not compare pre- and post-pandemic periods, it is well-documented that university students were affected by the pandemic's global impact (Aslan et al., 2020; Gavurova et al., 2020; Pollard et al., 2020).

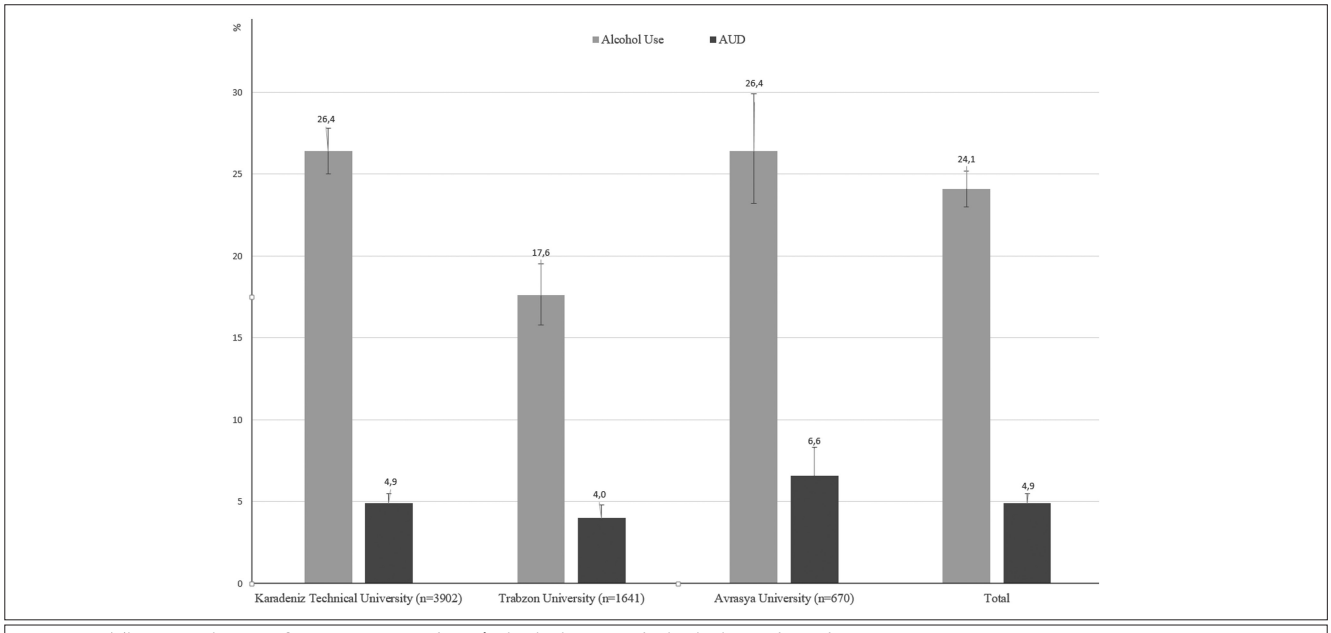


Figure 1. The prevalance of university students' alcohol use and alcohol use disorders.

Table 1.
Students' Sociodemographic and Personal Characteristics (N = 6213)

	Alcohol Use			AUD		
	n	**%***	***p***	***n***	**%***	***p***
Sex (*n* = 6213)						
Female	648	17.9	<.001	89	2.5	<.001
Male	848	32.6		213	8.2	
Age (year) (*n* = 6213)						
19 or under	288	20.7	<.001	46	3.3	.003
20 – 21	664	23.1		142	4.9	
22 or over	544	28.0		114	5.9	
Academic year (*n* = 6213)						
1st class	449	21.9	<.001	88	4.3	.310
2nd class	463	22.5		111	5.4	
3rd class	260	27.2		42	4.4	
4th class and above	324	28.1		61	5.3	
Faculty Type (*n* = 6213)						
Health-related	308	24.9	.440	62	5.0	.770
Non-health related	1188	23.9		240	4.8	
Place of residence (*n* = 6200)						
Home with family	356	17.7	<.001	69	3.4	<.001
Shared student house	511	45.1		119	10.5	
Dormitory	626	20.5		112	3.7	
Tobacco use						
User	919	55.9	<.001	239	14.5	<.001
Does not use	574	12.6		62	1.4	
Maternal education (*n* = 6193)						
Elementary or below	778	19.5	<.001	154	3.9	<.001
Secondary education	448	30.6		92	6.3	
Higher education	263	35.4		56	7.5	
Paternal education (*n* = 6142)						
Elementary or below	602	20.6	<.001	126	4.3	.051
Secondary education	487	25.9		103	5.5	
Higher education	394	29.3		71	5.3	
Mother alcohol use status (*n* = 5607)						
User	135	81.3	<.001	27	16.3	<.001
Does not use	1244	22.9		240	4.4	
Father's alcohol use status (*n* = 5562)						
User	393	66.3	<.001	82	13.8	<.001
Does not use	976	19.6		186	3.7	
Close friend alcohol use status (*n* = 5616)						
User	706	62.5	<.001	161	14.2	<.001
Does not use	655	14.6		105	2.3	

AUD, alcohol use disorder.
* The column percentage is given.
#(1 USD =13.3197 TL on 31st December 2021 for the X1, 1 USD=15.9094 TL May 20, 2020 for the X2, and 1 USD = 17.1865 TL on June 10, 2022 for the X3).

In a 2011 study by Atlam involving 1,434 students at Ege University, the lifetime prevalence of alcohol use was 55.6% (Havaçeliği Atlam & Yüncü, 2017). The results of this study are comparable to those from Nigde Halisdemir University but lower than those from other studies. This difference may be due to this study reflecting alcohol use in the last 12 months, while many other studies report lifetime prevalence. Additionally, this study included students from all departments and faculties at all universities in Trabzon, whereas other studies did not specify which departments were involved. Factors such as the presence of anti-addiction centres or the activities of health, culture, and sports departments at universities may also have contributed to the differences in alcohol use prevalence.

In a 2015 study conducted with 7905 university students in Spain, risky alcohol use prevalence was 45.5% in females and 54.5% in males (López et al., 2019). These findings, along with other national

Table 2.
Reasons for Alcohol Use According to Having or Not Having Alcohol Use Disorder

	Total		AUD		Non-AUD		
	n	**%***	***n***	**%***	***n***	**%***	***p***
Having fun	1075	71.9	225	74.5	850	71.2	253
Feeling good	557	37.2	147	48.7	410	34.3	<.001
Like the taste	463	30.9	119	39.4	344	28.8	<.001
Adapting to environments	249	16.6	62	20.5	187	15.7	.042
Psychological problems	174	11.6	85	28.1	89	7.5	<.001
Being a family habit	41	2.7	16	5.3	25	2.1	.002
Presence of financial problems	39	2.6	17	5.6	22	1.8	<.001
Envying those who use it	9	0.6	3	1.0	6	0.5	.324
No special reason	383	25.6	54	17.9	329	27.6	<.001

AUD, alcohol use disorder.
*The column percentage is given.

Table 3.
Regression Analysis of Factors Associated with Alcohol Use and Alcohol Use Disorder

		Alcohol Use*	AUD**
		AOR (95% CI)	**AOR (95% CI)**
Age	Year	1.01 (0.97 – 1.05)	1.03 (0.97 – 1.09)
Sex	Female	1	1
	Male	**1.45** (1.24 – 1.71)	**2.09** (1.55 – 2.81)
Place of residence	Home with family	1	1
	Shared student house/dormitory	**1.38** (1.16 – 1.67)	1.17 (0.84 – 1.62)
Tobacco use	Does not use	1	1
	User	6.85 (5.81 – 8.07)	**7.71** (5.53 – 10.74)
Maternal education	Elementary and below	1	1
	Secondary education	**1.46** (1.19 – 1.79)	1.26 (0.89 – 1.78)
	Higher education	**1.59** (1.21 – 2.011)	1.53(0.98 – 2.41)
Paternal education	Elementary and below	1	
	Secondary education	0.94 (0.77 – 1.15)	0.84(0.59 – 1.18)
	Higher education	1.14 (0.90 – 1.45)	0.77(0.51 – 1.16)
Mother's alcohol use	Does not use	1	1
	User	**3.69** (2.12 – 6.46)	1.08(0.59 – 1.98)
Father's alcohol use	Does not use	1	1
	User	**4.44** (3.44 – 5.71)	**1.89**(1.31 – 2.73)
Close friend's alcohol use	Does not use	1	1
	User	**5.78** (4.84 – 6.89)	**3.04**(2.27 – 4.08)
Academic year	1st class	1	1
	2nd class	1.01 (0.82 – 1.24)	1.25(0.88 – 1.78)
	3rd class	1.26 (0.97 – 1.62)	0.92(0.59 – 1.44)
	4th class and above	1.18 (0.92 – 1.53)	1.06(0.69 – 1.64)
Faculty type	Health-related	1	1
	Non-health related	1.05 (0.86 – 1.30)	0.95 (0.66 – 1.36)
Model *p*-value		<0.001	<0.001

AOR, adjusted odds ratio; AUD, alcohol use disorder.
*Nagelkerke R Square: 0.451 Hosmer and Lemeshow Test: 0.549.
**Nagelkerke R Square: 0.267 Hosmer and Lemeshow Test: 0.726.

and international studies, align with the results, which also show that alcohol use is higher among males than females (Demirci & Eker, 2017; Gavurova et al., 2020). A global burden of disease review on alcohol use in 195 countries found that the gender gap in alcohol use is linked to socioeconomic status (SES). As SES increases, the difference in alcohol use between men and women narrows; as SES decreases, alcohol use among women declines. Additionally, societal expectations regarding women's roles in motherhood, pregnancy, and caregiving, combined with the harmful effects of alcohol on pregnancy, may deter women from drinking. Cultural perceptions and biological differences, such as lower alcohol tolerance in women, may also explain the lower prevalence of alcohol use among females (Sánchez-Puertas et al., 2022).

In univariate analysis, both maternal and paternal education levels significantly affected students' alcohol use. However, in multivariate analysis, only maternal education was found to be a risk factor. The risk of alcohol use was 1.46 times higher for students whose mothers had completed secondary education and 1.57 times higher for those whose mothers had completed higher education compared to those whose mothers had a primary education or less. In a study conducted at Kırklareli University with 902 university students, it was reported that the risk of alcohol use of students whose mothers were graduates of higher education was 3.3 times higher than that of the group whose mothers were illiterate or literate (Ulukoca et al., 2013). Another study in 2018 found that as maternal education increased, so did the prevalence of alcohol use, and paternal education was also linked to alcohol use (Güner, 2019). This may be because women with higher education are often more distanced from traditional structures, potentially influencing their views on alcohol use or fostering a positive attitude towards it. Higher education levels may also

bring social environments and professional life where alcohol use is more accepted, and greater economic independence may provide students with more resources for alcohol consumption.

In this study, alcohol use by close friends was found to increase the risk of alcohol use by 5.76 times. A 2020 study among university students in Myanmar found that alcohol use by close friends increased the likelihood of alcohol use by 7.5 times (Htet et al., 2020). Similarly, a 2018 study in Iran reported that alcohol or substance use by close friends raised the risk of alcohol use by 3.2 times (Taremian et al., 2018). These findings, including this study, consistently show that alcohol use among close friends is a significant risk factor. The sense of belonging within friend groups may encourage group drinking behaviors, leading to increased alcohol use, especially during university years when peer influence is stronger, and social interactions often involve alcohol (Hagman, 2016).

Alcohol Use Disorder Risk Factors

Globally, the prevalence of AUD is 5.1%, with regional variations: 3.7% in Africa, 8.2% in the Americas, 0.8% in the Eastern Mediterranean, 8.8% in Europe, 3.9% in Southeast Asia, and 4.7% in the Western Pacific (Griswold et al., 2018; WHO, 2018). Although Türkiye falls within the WHO European region, AUD prevalence differs. Variations in definitions used in population studies may explain these differences, as universal diagnostic criteria for AUD remain the same. Higher AUD prevalence in university surveys compared to general population surveys suggests that university students are at greater risk for AUD (López et al., 2019).

A family history of alcohol use is a known risk factor for AUD (Murphy et al., 2016). A 2018 study in Mexico found that students whose mothers or both parents consumed alcohol had a higher risk of AUD than those whose fathers consumed alcohol (Villegas-Pantoja et al., 2018). In a study by Çam et al., father's alcohol use increased the risk of AUD by 1.7 times, and mother's alcohol use raised the risk by 1.5 times in male students. However, in this study, mother's alcohol use was not a risk factor, but father's alcohol use increased the risk of AUD by 1.8 times.

In this study, alcohol use by close friends also increased the risk of AUD by 4.6 times. Another study found that alcohol use by close friends raised the risk of AUD by 2.5 times among university students (Çam et al., 2020). Peer alcohol use creates a social environment that normalizes drinking, where young people may feel pressure to drink to avoid exclusion, disapproval, or missing out on social interactions. Shared thoughts, behavior patterns, or risk factors among close friends likely contribute to the increased risk of developing AUD.

Limitations

This study is a powerful research that represents all students of all universities in Trabzon, unlike studies that are generally conducted by selecting a single faculty. The current users were determined by asking the question about alcohol use as 'Are yo using alcohol?'. Those who have used alcohol before are not included. Results on AUD were compared with studies using the AUDIT scale in university students. There were difficulties in comparing the results of different studies due to the diversity of the cut-off score, application and evaluation of the AUDIT scale used in the detection of AUD. The last two questions of AUDIT are influenced by past alcohol use. Although the diagnostic criteria for AUD are universal, definitions of AUD used in population studies differ (53). In the literature, there are various expressions in the terminology of alcohol-related disorders such as, "alcohol dependence," "harmful pattern of use of alcohol," where dependence is the more severe manifestation, "alcohol use disorder," "binge drinking," "excessive alcohol consumption," "risky alcohol comsuption," "problematic alcohol use," "hazardous alcohol use." The difference in these definitions also made comparisons difficult. In addition, the cross-sectional design does not reveal cause and effect relationships. The data were collected from the students who attended the classes. students completed the test by self-rating test. It is not known whether the students who are absent from the course have the characteristics that will affect the study results (such as absenteeism due to alcohol use or AUD, illness, being in treatment).

The prevalence of alcohol use and AUD among university students in Trabzon was higher than in general population studies but consistent with other university studies. Given that alcohol use among university students is higher than in the general population, tailored intervention programs should be developed for this group. Risk factors identified include living away from family, tobacco use, parental alcohol consumption, and alcohol use by close friends.

These results revealed that alcohol use should be combated in these universities. Within the scope of this struggle, peer interaction should be prioritised, student clubs should be established in universities and existing student clubs should be more active. In addition, the importance of family and family support in the pre-university period should not be ignored. In addition, the results showed that the prevalence of alcohol use increased in the later years of university education. In order to prevent this, in the first years of university education, first year courses that are aimed at preventing alcohol use or that include more comprehensive topics (health and social effects of alcohol use, methods of coping with the problems experienced in the first years of university, resources where students can receive priority health services after the health problem experienced and access to these resources, etc.) can be added to the curriculum. In universities, rectorate-based centres that provide special health services to faculties and colleges can be established, and cooperation can be made with existing centres. Centres supported by psychiatrists and psychologists, which can recognise risk groups and direct them to activities should be established. In these centres, students should be given priority in health services.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: This study was approved by Ethics Committee of Karadeniz Technical University (Approval no.: 2021/372; Date: 28.06.2022).

Informed Consent: Written informed consent was obtained from the participants who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – C.A.G., S.T.; Design – C.A.G., S.T., A.K.A., Y.E.B., N.E.B., M.T.; Supervision – S.T., N.E.B., M.T.; Resources – C.A.G., S.T., A.K.A., Y.E.B.; Materials – C.A.G., S.T., A.K.A., Y.E.B., N.E.B., M.T.; Data Collection and/or Processing – C.A.G, S.T., A.K.A, Y.E.B., N.E.B., M.T., A.K., S.C.B., N.K., G.N.S.; Analysis and/or Interpretation – C.A.G., S.T., A.K.A., Y.E.B., N.E.B., M.T.; Literature Search – C.A.G., S.T., A.K.A., Y.E.B., N.E.B., M.T., A.K., S.C.B., N.K., G.N.S.; Writing – C.A.G, S.T.; Critical Review – C.A.G., S.T., A.K.A., Y.E.B., N.E.B., M.T.

Acknowledgments: The authors would like to express our sincere gratitude to Dr. Funda Cansun for her invaluable assistance in reviewing and correcting the entire content of this article. As a native speaker, her meticulous attention to detail and linguistic expertise significantly improved the clarity and coherence of the text.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The research was supported by the Karadeniz Technical University Scientific Research Projects Coordination Unit (project no TDI-2022-10007).

References

Alaçam, H., Korkmaz, A., Efe, M., Şengül, C. B., & Şengül, C. (2015). Pamukkale Üniversitesi öğrencilerinde alkol ve sigara bağımlılığı taraması. *Pamukkale Medical Journal*, *8*(2), 82 – 87. [CrossRef]

Aslan, I., Ochnik, D., & Çınar, O. (2020). Exploring perceived stress among students in Türkiye during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, *17*(23), 8961. [CrossRef]

Ayala, E. E., Roseman, D., Winseman, J. S., & Mason, H. R. C. (2017). Prevalence, perceptions, and consequences of substance use in medical students. *Medical Education Online*, *22*(1), 1392824. [CrossRef]

Ayvasik, H. B., & Sümer, H. C. (2010). Individual differences as predictors of illicit drug use among Turkish college students. *Journal of Psychology*, *144*(6), 489 – 505. [CrossRef]

Bunik, M. (2018). Alcohol use. In *Breastfeeding telephone triage* (3rd ed) (pp. 1 – 1). American Academy of Pediatrics. [CrossRef]

Çam, C., Kılınç, A., Ahmet, A., Önsüz, M. F., & Metintaş, S. (2020). Evaluation of hazardous alcohol consumption prevalence of university students in Türkiye. *European Journal of Public Health*, *30*(Suppl. 5). [CrossRef]

Chegeni, M., Kamel Khodabandeh, A., Karamouzian, M., Shokoohi, M., Abedi, L., Khalili, M., Rajaei, L., Ardalan, G., & Sharifi, H. (2020). Alcohol consumption in Iran: A systematic review and meta-analysis of the literature. *Drug and Alcohol Review*, *39*(5), 525 – 538. [CrossRef]

Coşkun, F., Özçırpıcı, B., & Özgür, S. (2019). Alcohol and drug usage of undergraduate students in Gaziantep University Central Campus. *Ortadoğu Tıp Dergisi*, *11*(2), 143 – 147. [CrossRef]

Das, J. K., Salam, R. A., Arshad, A., Finkelstein, Y., & Bhutta, Z. A. (2016). Interventions for adolescent substance abuse: An overview of systematic reviews. *Journal of Adolescent Health*, *59*(4S), S61 – S75. [CrossRef]

Dayi, A., Gulec, G., & Mutlu, F. (2015). Prevalence of tobacco, alcohol and substance use among Eskisehir Osmangazi University students. *Dusunen Adam*, *28*(4), 309 – 318. [CrossRef]

Demirci, M., & Eker, E. (2017). Üniversite öğrencilerinin madde bağımlılığı Sıklığı Ve Madde kullanım özellikleri. *Journal of Anadolu Bil Vocational School of Higher Education*, *48*(48), 63 – 84.

Evren, C. (2019). Alkol ve madde kullanım Bozukluklarında Kullanılabilecek Ölçekler. In *Alkol ve madde kullanım Bozuklukları temel başvuru kitabı* (1. baskı, pp. 739 – 741). Türk Psikiyatri Derneği Yayınları.

Firkey, M. K., Sheinfil, A. Z., & Woolf-King, S. E. (2022). Substance use, sexual behavior, and general well-being of U.S. college students during the COVID-19 pandemic: A brief report. *Journal of American College Health: J of ACH*, *70*(8), 2270 – 2275. [CrossRef]

Foxcroft, D. R., Smith, L. A., Thomas, H., & Howcutt, S. (2015). Accuracy of alcohol use disorders identification test for detecting problem drinking in 18 – 35 year-olds in England: Method comparison study. *Alcohol and Alcoholism*, *50*(2), 244 – 250. [CrossRef]

Gavurova, B., Ivankova, V., & Rigelsky, M. (2020). Relationships between perceived stress, depression and alcohol use disorders in university students during the COVID-19 pandemic: A socio-economic dimension. *International Journal of Environmental Research and Public Health*, *17*(23), 8853. [CrossRef]

Griswold, M. G., Fullman, N., Hawley, C., Arian, N., Zimsen, S., Tymeson, H. D., Venkateswaran, V., Tapp, A. D., Forouzanfar, M. H., Salama, J. S., Abate, K. H., Abate, D., Abay, S. M., Abbafati, C., Abdulkader, R. S., Abebe, Z., Aboyans, V., Abrar, M. M., Acharya, P., & Gakidou, E. (2018). Alcohol use and burden for 195 countries and territories, 1990 – 2016: A systematic analysis for the Global Burden of Disease Study 2016. *Lancet*, *392*(10152), 1015 – 1035. [CrossRef]

Görgün, S., Tiryaki, A., & Topbaş, M. (2010). Üniversite Öğrencilerinde madde kullanma Ve Anne Babaya Bağlanma Biçimleri. *Anadolu Psikiyatri Dergisi*, *11*(4), 305 – 312.

Güner, B. (2019). Üniversite öğrencilerinde uyuşturucu madde kullanım Alışkanlıkları ve Yaygınlığı: Aydın Adnan Menderes Üniversitesi örneği. *Aydın Adnan Menderes University Journal of Institute of Social Sciences*, *6*(2), 81 – 95.

Hagman, B. T. (2016). Performance of the AUDIT in detecting DSM-5 alcohol use disorders in college students. *Substance Use and Misuse*, *51*(11), 1521 – 1528. [CrossRef]

Havaçeliği Atlam, D., & Yüncü, Z. (2017). Relationship between cigarette, alcohol, substance use disorders and familial drug use in university students. *Journal of Clinical Psychiatry*, *20*(3), 161 – 170. [CrossRef]

Htet, H., Saw, Y. M., Saw, T. N., Htun, N. M. M., Lay Mon, K. L., Cho, S. M., Thike, T., Khine, A. T., Kariya, T., Yamamoto, E., & Hamajima, N. (2020). Prevalence of alcohol consumption and its risk factors among university students: A cross-sectional study across six universities in Myanmar. *PLoS One*, *15*(2), e0229329. [CrossRef]

Ilhan, M. N., Arikan, Z., Kotan, Z., Tunçoğlu, T., Pinarci, M., Taşdemir, A., Ay, B., & Koçak, N. (2016). Prevalence and socio-demographic determinants of tobacco, alcohol, substance use and drug misuse in the general population in turkey. *Noro Psikiyatri Arsivi*, *53*(3), 205 – 212. [CrossRef]

Koca, B., & Oğuzöncül, A. F. (2015). İnönü Üniversitesi Sağlık Yüksekokulu öğrencilerinin sigara, alkol, madde kullanımı, madde kullanımına etki eden etmenler ve aileden aldıkları sosyal desteğin etkisi. *Kocaeli Tıp Dergisi*, *4*(2), 4 – 13.

López, V., Paladines, B., Vaca, S., Cacho, R., Fernández-Montalvo, J., & Ruisoto, P. (2019). Psychometric properties and factor sX2cture of an Ecuadorian version of the Alcohol Use Disorders Identification Test (AUDIT) in college students. *PLoS One*, *14*(7), e0219618. [CrossRef]

Murphy, E., O'Sullivan, I., O'Donovan, D., Hope, A., & Davoren, M. P. (2016). The association between parental attitudes and alcohol consumption and adolescent alcohol consumption in Southern Ireland: A cross-sectional study. *BMC Public Health*, *16*(1), 821. [CrossRef]

Oe, J., Ei, A., Em, O., Se, A., Aj, U., Ofonime, D., & Johnson, E. (2017). The prevalence and factors affecting psychoactive substance use among undergraduate students in University of Uyo, Nigeria. *Journal of Community Medicine and Primary Health Care*, *29*(2), 11 – 22. [CrossRef]

Olashore, A. A., Frank-Hatitchki, B., & Ogunwobi, O. (2017). Diagnostic profiles and predictors of treatment outcome among children and adolescents attending a national psychiatric hospital in Botswana.

Child and Adolescent Psychiatry and Mental Health, *11*(1), 8. [CrossRef]

Pollard, M. S., Tucker, J. S., & Green, H. D. (2020). Changes in adult alcohol use and consequences during the COVID-19 pandemic in the US. *JAMA Network Open*, *3*(9), e2022942. [CrossRef]

Sánchez-Puertas, R., Ruisoto, P., López-Núñez, C., & Vaca-Gallegos, S. (2022). Gender differences in transdiagnostic predictors of problematic alcohol consumption in a large sample of college students in Ecuador. *Frontiers in Psychology*, *13*, 784896. [CrossRef]

Saunders, J. B., Aasland, O. G., Babor, T. F., De La Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption - II. *Addiction*, *88*(6), 791 – 804. [CrossRef]

Skogen, J. C., Thørrisen, M. M., Olsen, E., Hesse, M., & Aas, R. W. (2019). Evidence for essential unidimensionality of AUDIT and measurement invariance across gender, age and education. Results from the WIRUS study. *Drug and Alcohol Dependence*, *202*, 87 – 92. [CrossRef]

Taremian, F., Yaghubi, H., Pairavi, H., Hosseini, S. R., Zafar, M., & Moloodi, R. (2018). Risk and protective factors for substance use among Iranian university students: A national study. *Substance Abuse Treatment, Prevention, and Policy*, *13*(1), 46. [CrossRef]

TÜIK (2019). Türkiye sağlık araştırması. *Tuik*.

Ulukoca, N., Gökgöz, Ş., & Karakoç, A. (2013). Kırklareli Üniversitesi Öğrencileri Arasında Sigara, Alkol ve Madde Kullanım Sıklığı. *Fırat Tıp Dergisi*, *18*(4), 230 – 234.

Yilmaz, G., İbiş, S., & Aktuğ, K. B. (2020). Üniversite Öğrencilerinin Sigara Alkol ve Uyuşturucu Madde Kullanma Durumları. *Niğde Ömer Halisdemir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *2*(2), 73 – 80.

Villegas-Pantoja, M., Guzmán-Facundo, F., Alonso-Castillo, M., de la Rubia, J. M., & López-García, K. (2018). Parenting behaviors and their relationship with alcohol involvement in Mexican teenagers and young adults. *Journal of Child and Adolescent Substance Abuse*, *27*(4), 227 – 237. [CrossRef]

Višnjić, A., Jović, S., & Grbeša, G. (2015). Alcohol consumption among students-A cross-sectional study at Three Largest Universities in Serbia. *Srpski Arhiv za Celokupno Lekarstvo*, *143*(5 – 6), 301 – 308. [CrossRef]

World Health Organization (2018). *Global status report on alcohol and health*.

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Emergency Department Admissions of Alcohol and Substance Use Disorders: A Two-Year Comparison from a University Hospital in Türkiye

Ibrahim Sungur[1], **Gulser Karakoc Tugrul**[2], **Damla Isman Haznedaroglu**[1], **Ozlem Kuman Tuncel**[1]

[1]Department of Psychiatry, Ege University Faculty of Medicine, İzmir, Türkiye
[2]Department of Psychiatry, Sandikli State Hospital, Afyonkarahisar, Türkiye

ORCID iDs of the authors: I.S. 0009-0005-1043-2100, G.K.S. 0000-0003-0219-9853, D.I.H. 0000-0001-8161-8918, O.K.T. 0000-0002-9632-6173.

Main Points

- The proportion of emergency department consultations related to alcohol and substance use disorders significantly increased from 2018 to 2023.
- Alcohol use disorder prevalence more than doubled, especially among female patients, where it tripled, indicating a narrowing gender gap.
- There was a rise in comorbid alcohol use disorder and substance use disorder, with most of these patients presenting with polysubstance use disorder.
- Suicide attempts and violent behavior remained the leading causes of psychiatric consultations among alcohol and substance use disorder patients, highlighting the need for crisis-oriented emergency interventions.
- The increase in alcohol and substance use disorder – related hospitalizations and the frequent need for parenteral sedation underscore the growing severity of these cases and the necessity of integrated, gender-sensitive intervention strategies in emergency department settings.

Abstract

Alcohol and substance use disorders present a growing public health challenge and are a significant cause of emergency department consultations. This study aims to compare the prevalence and clinical features of alcohol and substance use disorders – related emergency department admissions in 2 distinct years, 2018 (pre-pandemic) and 2023 (post-pandemic), at Ege University Medical Faculty Hospital in Türkiye. A retrospective cross-sectional analysis was conducted using psychiatric consultation data from the emergency department in 2018 and 2023. A total of 3189 adult patients who received psychiatric evaluation were included. Demographic and clinical data were extracted from electronic health records. Alcohol and substance use disorder diagnoses were made based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria. Alcohol and substance use disorders – related emergency department consultations increased from 19.8% in 2018 to 28.0% in 2023 ($p < .001$). The prevalence of substance use disorder rose from 14.5% to 17.7% ($p = .014$), while alcohol use disorder nearly doubled from 7.4% to 16.1% ($p < .001$). Among females, substance use disorder increased from 5.8% to 9.8% ($p = .003$), and alcohol use disorder tripled from 2.6% to 8.7% ($p < .001$). Comorbid alcohol use disorder and substance use disorder also showed a significant rise (2.1% – 5.7%, $p < .001$). Alcohol use disorder – related hospitalizations increased from 4.5% to 12.6% ($p = .01$). Suicide attempts and violent behavior remained leading reasons for psychiatric consultation. The findings reveal a significant rise in alcohol and substance use disorders – related emergency department admissions, particularly among females. The increase in psychiatric crises such as violence and suicide attempts highlights the need for gender-sensitive prevention strategies and better training for emergency department staff to manage alcohol and substance use disorder – related emergencies.

Keywords: Addiction, alcohol use disorder, COVID-19, emergency department, substance use disorder

Corresponding Author: Ozlem Kuman Tuncel
E-mail: ozlem.kuman.tuncel@ege.edu.tr

Received: April 9, 2025
Revision Requested: May 31, 2025
Last Revision Received: June 5, 2025
Accepted: June 22, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Cite this article as: Sungur, I., Karakoc Tugrul, G., Isman Haznedaroglu, D., & Kuman Tuncel, O. (2025). Emergency department admissions of alcohol and substance use disorders: A two-year comparison from a university hospital in Türkiye. *Addicta: The Turkish Journal on Addictions*, 12(3), 302-308.

DOI: 10.5152/ADDICTA.2025.25405

Introduction

Alcohol and substance use disorders (ASUDs) are a major public health concern, contributing to increased morbidity, mortality, and healthcare costs (World Health Organization (WHO), 2018). Both alcohol use disorder (AUD) and substance use disorder (SUD), which include the use of illicit drugs and misused prescription medications, place a significant burden on healthcare systems, particularly emergency departments (EDs) (White et al., 2018).

Emergency departments often serve as the first point of contact for individuals experiencing the acute effects of ASUD, including intoxication, withdrawal, psychiatric crises, and complications such as trauma or overdose. Recent studies have shown substantial increases in ASUD-related ED visits worldwide (Armoon et al., 2021). For example, in the United States, between 2006 and 2014, alcohol-related ED visits rose by 47%, with the rate of visits for acute alcohol consumption rising by 40% and those related to chronic alcohol use increasing by 58% (Armoon et al., 2021). Additionally, the total cost of alcohol-related emergency care increased from $4.1 billion to $15.3 billion (Armoon et al., 2021). Substance use disorder also contributes heavily to emergency service use, particularly in cases involving polysubstance use (Peden et al., 2000). These visits are often complex, requiring coordination of psychiatric, medical, and addiction care (Beckerleg & Hudgins, 2022; Peden et al., 2000). A study conducted in the United States found that substance use – related visits increased by 45%, accounting for 2.93% of total ED visits in 2013 and 4.25% in 2018 (Venkatesh et al., 2022). Moreover, the COVID-19 pandemic significantly altered ED visits due to ASUD. Overdose-related emergency department presentations and the number of overdose deaths increased during the COVID-19 pandemic (Shreffler et al., 2021). Also, despite the overall decrease in ED visits during the COVID-19 pandemic, the proportion of visits related to ASUD increased (Myran et al., 2021; Venkatesh et al., 2022).

Similar to many other countries, Türkiye has experienced these global trends. National reports and studies have highlighted the increasing prevalence of alcohol and substance use in the general population (Ulaş et al., 2017; Ünübol & Hızlı Sayar, 2021). In 2019, alcohol use was reported as 22.1%, and substance use was reported as 3.1% in Türkiye (Republic of Turkey Ministry of Interior Turkish National Police Counter Narcotics Department, 2019). Additionally, in 2023, male dominance was reported for substance use. There was an increase in substance-related deaths compared to 2022 (Republic of Turkey Ministry of Interior Turkish National Police Counter Narcotics Department, 2023). However, ASUD-related ED visits, their clinical characteristics, and trends in Türkiye have been insufficiently studied. To address this gap, the present study compares ASUD-related ED admissions in 2018 and 2023 at a large university hospital in Türkiye. The primary aim is to evaluate changes in the prevalence and clinical characteristics of ASUD cases before and after the pandemic. By identifying emerging patterns, this study seeks to inform clinical practice and public health strategies targeting ASUD in emergency settings.

Material and Methods

Study Design and Setting

This retrospective cross-sectional study was conducted at the ED of Ege University Medical Faculty Hospital in Türkiye. This study was designed as a retrospective cross-sectional analysis comparing two distinct time points. Alcohol and substance use disorder – related psychiatric consultations were compared at 2 separate years: 2018 (pre-pandemic) and 2023 (post-pandemic).

Participants and Data Collection

We included all adult patients (aged 18 and above) who received a psychiatric consultation upon admission to the ED in 2018 and 2023. The total number of consultations was 1515 in 2018 and 1674 in 2023. No cases were excluded. Clinical and demographic data were extracted from electronic health records. Diagnoses of AUD and SUD were made based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria, as documented by the evaluating psychiatrist. The years 2018 and 2023 were selected due to their data completeness and clinical comparability. Both years reflect standard operational periods unaffected by the peak disruptions of the COVID-19 pandemic. The years 2020 to 2022 were excluded due to potential confounding from pandemic-related changes in healthcare access and ED utilization patterns. The study was approved by the Ege University Ethics Committee (number 24-8T/94, approval date August 22, 2024). Informed consent was obtained from the participants.

Statistical Analysis

Statistical analyses were performed with the Statistical Package for Social Sciences (SPSS) for PC (version 25) software (IBM SPSS Corp.; Armonk, NY, USA). Categorical variables were compared using Pearson's chi-square test. For continuous variables, the Shapiro – Wilk test was used to assess normality. Normally distributed variables were expressed as mean ± standard deviation; non-normally distributed variables were expressed as median with interquartile range (IQR) and compared using the Mann – Whitney *U* test. Binomial logistic regression models were applied to assess temporal changes in the prevalence of AUD and SUD. Separate models were constructed for male and female patients to investigate gender-specific trends. A *P*-value of <.05 was considered statistically significant.

Results

In 2018, 1515, and in 2023, 1674 adult patients who applied to the ED were evaluated by psychiatry. In these consultation data, 759 (50.1%) patients were female in 2018, and 840 (50.2%) were female in 2023. A total of 300 (19.8%) and 470 (28.1%) patients with ASUD received psychiatric consultation, respectively. In 2023, 96 patients were diagnosed with comorbidity of AUD and SUD. Additionally, 91 (94.8%) of these patients were diagnosed with polysubstance use disorder. The demographics and characteristics of ASUD patients in 2018 and 2023 are shown in Table 1. In 2023, among the 50 hospitalized patients with ASUD, 28.0% (n = 14) were admitted due to suicidal ideation or attempts, 26.0% (n = 13) due to violent behavior, 18.0% (n = 9) for acute psychotic episodes, 10.0% (n = 5) for substance intoxication or withdrawal, and 8.0% (n = 4) for alcohol withdrawal or intoxication.

The demographics and clinical characteristics of patients with ASUD admitted to the emergency department in 2018 and 2023 were compared. The total number of ASUD-related admissions increased significantly from 19.8% (n = 300) in 2018 to 28.0% (n

Table 1.
Demographics and Characteristics of Patients with Alcohol and Substance Use Disorders

Demographics and Characteristics		ASUD in 2018 (*n* = 300*)	ASUD in 2023 (*n* = 470**)
Age (years), mean ± SD		31.98 ± 12.17	32.44 ± 10.91
Female gender, *n* (%)		58 (19.3)	132 (28.1)
Substance use disorder, *n* (%)		220 (73.7)	297 (63.2)
Alcohol use disorder, *n* (%)		112 (37.3)	269 (57.2)
Co-use, *n* (%)		32 (10.6)	96 (20.4)
Hospitalization, *n* (%)		21 (7.0)	50 (10.6)
Ambulance use, *n* (%)		N/A	82 (17.4)
Accompanied by law enforcement, *n* (%)		N/A	7 (1.5)
Parenteral injection/sedation needed, *n* (%)		N/A	225 (47.9)
History of past psychiatric admission, *n* (%)		N/A	373 (79.4)
Reason for ED application, *n* (%)	Suicide attempt	88 (29.3)	139 (29.5)
	Violent behavior	86 (28.6)	70 (14.9)
	Suicidal thoughts	75 (25.0)	48 (10.2)
	Psychotic symptoms	18 (6.0)	48 (10.2)
	Others	33 (11.0)	165 (35.1)
Suicide attempt methods (*n* = 80 in 2018, *n* = 139 in 2023 for suicide attempts), *n* (%)	Drugs	33 (41.2)	59 (42.4)
	Cutting	36 (45.0)	48 (34.5)
	Jumping	6 (7.5)	11 (7.9)
	Others	5 (6.2)	21 (15.1)
Substance types (*n* = 220 in 2018, *n* = 297 in 2023), *n* (%)	Multiple SU	168 (76.3)	220 (74.0)
	Pregabalin	N/A	25 (8.4)
	Cannabinoid	29 (13.1%)	20 (6.7)
	Methamphetamine	N/A	18 (6.0)
	Others	2 (0.9)	14 (4.7)
Comorbid psychiatric diagnosis, besides ASUD, *n* (%)	BPD	9 (3.0)	84 (17.8)
	Psychotic disorders	19 (6.3)	46 (9.7)
	Depression	10 (3.3)	14 (2.9)
	Others	57 (19.0)	35 (7.4)

Note: ASUD = Alcohol and substance use disorder; BPD = Bipolar disorder; ED = Emergency department; N/A = Not available; SD = Standard deviation; SU = Substance use.
*n = 300 otherwise noted.
**n = 470 otherwise noted.

= 470) in 2023. The detailed comparisons of demographics and clinical characteristics between years are shown in Table 2a.

A gender-specific analysis was conducted, and the gender distribution of SUD and AUD among patients admitted to the ED in 2018 and 2023 is shown in Table 2b.

The gender disparity in AUD persisted across the years, but the increase was particularly notable among females, where the percentage more than tripled from 2018 to 2023. The gender distribution specifically for AUD among patients in 2018 and 2023 is shown in Table 2c.

To further explore the temporal dynamics of substance and AUDs by gender, stratified binomial logistic regression analyses was conducted for males and females separately. Among female patients, there was a significant increase in the likelihood of both AUD and SUD. Specifically, the odds of AUD increased by approximately 3.5 times per year (OR = 3.52, 95% CI = [2.12 – 5.81], $p < .001$), while the odds of SUD increased by 1.76 times annually (OR = 1.76, 95% CI = [1.20 – 2.57], $p = .004$). However, among male patients, a significant increase was observed only for AUD (OR = 2.22, 95% CI = [1.69 – 2.91], $p < .001$), whereas no statistically significant change was detected for SUD over time (OR = 1.15, 95% CI = [0.91 – 1.44], $p = .248$).

Table 2a.
Comparisons of Data from 2018 vs. 2023. The Demographics and Clinical Characteristics of Alcohol and Substance Use Disorder

Variables		2018 (*n* = 1515)	2023 (*n* = 1674)	Statistics
Total ASUD application		300 (19.8)	470 (28.0)	$p < .001$*, $x^2 = 29.729$
Total ASUD age, years, median (IQR)		29.0 (16)	29.0 (16)	$p = .87$**, $Z = -1.457$
SUD, *n* (%)	Yes	220 (14.5)	297 (17.7)	$p = .01$*, $x^2 = 6.072$
	No	1296 (85.5)	1377 (82.3)	
AUD, *n* (%)	Yes	112 (7.4)	269 (16.1)	$p < .001$*, $x^2 = 56.911$
	No	1403 (92.6)	1405 (83.9)	
SUD age, median (IQR)		25.5 (11)	26.0 (11)	$p = .050$**, $Z = -1.956$
AUD age, median (IQR)		38.0 (21.25)	35.0 (18)	$p = .004$**, $Z = 2.855$
Comorbidity AUD and SUD, *n* (%)	Yes	32 (2.1)	96 (5.7)	$p < .001$*, $x^2 = 27.088$
	No	1483 (97.9)	1578 (94.3)	
Female SUD, *n* (%)	Yes	44 (5.8)	82 (9.8)	$p = .003$*, $x^2 = 8.635$
	No	715 (94.2)	758 (90.2)	
Female AUD, *n* (%)	Yes	20 (2.6)	73 (8.7)	$p < .001$*, $x^2 = 26.690$
	No	739 (97.4)	767 (91.3)	
Male SUD, *n* (%)	Yes	176 (23.3)	215 (25.8)	$p = .24$*, $x^2 = 1.335$
	No	580 (76.7)	619 (74.2)	
Male AUD, *n* (%)	Yes	92 (12.2)	196 (23.5)	$p < .001$*, $x^2 = 34.331$
	No	664 (87.8)	638 (76.5)	
Total ASUD hospitalization, *n* (%)	Yes	21 (7.0)	50 (10.6)	$p = .88$*, $x^2 = 2.896$
	No	279 (93.0)	420 (89.4)	
SUD hospitalization, *n* (%)	Yes	19 (8.6)	31 (10.4)	$p = .49$*, $x^2 = 0.469$
	No	201 (91.4)	266 (89.6)	
AUD hospitalization, *n* (%)	Yes	5 (4.5)	34 (12.6)	$p = .01$*, $x^2 = 5.752$
	No	107 (95.5)	235 (87.4)	

Note: ASUD = Alcohol and substance use disorder; AUD = Alcohol use disorder; IQR = Interquartile range; SUD = Substance use disorder. Statistically significant results are indicated in bold.
*Pearson chi-square.
**Mann – Whitney *U* test.

Discussion

This study found a substantial increase in ASUD-related emergency department psychiatric consultations between 2018 and 2023. The proportion of patients diagnosed with AUD more than doubled, and SUD cases also rose significantly. The most notable increase was observed among female patients, whose rates of both AUD and SUD nearly tripled. Additionally, there was a marked rise in comorbid AUD and SUD, particularly involving polysubstance use.

Table 2b.
The Gender Distribution and Alcohol Use Disorder Comorbidity of Patients with Substance Use Disorder

		Substance Use Disorder		
Year 2018		**Yes**	**No**	**Statistics**
Gender, *n* (%)	Female	44 (5.8)	715 (94.2)	$p < .001$*, $x^2 = 93.268$
	Male	176 (23.3)	580 (76.7)	
AUD, *n* (%)	Yes	32 (28.6)	80 (71.4)	$p < .001$*, $x^2 = 19.233$
	No	188 (13.4)	1215 (86.6)	
Year 2023		**Yes**	**No**	
Gender, *n* (%)	Female	82 (9.8)	758 (90.2)	$p < .001$*, $x^2 = 73.570$
	Male	215 (25.8)	619 (74.2)	
AUD, *n* (%)	Yes	96 (35.7)	173 (64.3)	$p < .001$*, $x^2 = 70.726$
	No	201 (14.3)	1204 (85.7)	

*Pearson Chi-Square conducted, AUD: Alcohol Use Disorder, Statistically significant results are indicated in bold.

The observed increase in the proportion of ED admissions related to ASUD following the onset of the COVID-19 pandemic aligns with findings in existing literature (Mojica - Perez et al., 2024; Venkatesh et al., 2022). The pandemic significantly altered healthcare utilization patterns and substance use behaviors worldwide. Lockdown measures, social isolation, economic hardships, and disruptions in mental health services contributed to increased alcohol and substance use. Studies have reported heightened stress levels and anxiety during the pandemic, leading many individuals to increase their use of alcohol and other substances (Mungmunpuntipantip & Wiwanitkit, 2021; Torun & Coşkunol, 2020), which may result in an upsurge in SUDs and related emergencies (Kovačić Petrović et al., 2024; Satre et al., 2020). Additionally, some individuals who previously engaged in social drinking escalated to hazardous levels of alcohol consumption due to increased home alcohol availability and a lack of structured routines (Aydın & Söyler, 2022; Houston et al., 2024). The pandemic also affected healthcare access, with many individuals delaying routine medical care, including treatment for ASUD. As a result, a greater proportion of patients presented to the ED in more severe states, requiring urgent intervention (Houston et al., 2024). The disruption of addiction treatment services, such as in-person counseling and rehabilitation programs, may have further

Table 2c.
The Gender Distribution Specifically for Alcohol Use Disorder

		Alcohol Use Disorder		
Year 2018		**Yes**	**No**	**Statistics**
Gender, *n* (%)	Female	20 (2.6)	739 (97.4)	$p < .001$*, $x^2 = 50.289$
	Male	92 (12.2)	664 (87.8)	
Year 2023		**Yes**	**No**	
Gender, *n* (%)	Female	73 (8.7)	767 (91.3)	$p < .001$*, $x^2 = 68.065$
	Male	196 (23.5)	638 (76.5)	

*Pearson chi-square. Statistically significant results are indicated in bold.

contributed to the increase in ED visits. Therefore, it is crucial to strengthen outpatient systems to reduce the burden on emergency services.

One of the most striking findings of this study is the marked rise in ASUD among female patients. Between 2018 and 2023, the prevalence of SUD among females nearly doubled, while that of AUD more than tripled. This aligns with emerging literature suggesting that the gender gap in SUD is narrowing (McHugh et al., 2018; White, 2020). Historically, the male population has exhibited higher rates of SUD, but recent findings indicate that the female population has an increasing rate of ASUD (Fonseca et al., 2021; İsmail et al., 2023). This increase is particularly concerning as the female population with ASUD often faces more severe health consequences, including higher risks of liver disease, cardiovascular issues, and mental health disorders compared to their male counterparts (Kay et al., 2010; White, 2020). Additionally, this population has a higher risk for risky sexual behavior and unplanned pregnancies (Connery et al., 2014). Furthermore, the female population tends to progress from initial use to dependence more rapidly than the male population, a phenomenon known as "telescoping" (Fonseca et al., 2021). This significant rise in ASUD in the female population underscores the need for gender-specific prevention, screening, and intervention strategies (Bashirian et al., 2021). Programs tailored to address the unique risk factors and barriers faced by the female population could be crucial in curbing this alarming increase. However, the data show a portion of the female population which reduces the generalizability. It was also found that the median age of patients with SUD slightly increased, while the median age for AUD decreased over the 5 years. This finding is concerning given that the early onset of AUD is associated with a higher risk of developing alcohol dependence and other related disorders later in life (DeWit et al., 2000). Public health interventions should focus on early education and prevention efforts targeting younger populations to mitigate these risks. Another significant finding from this study is the increase in comorbidity of AUD and SUD among patients. From 2018 to 2023, the number of patients in this patient group nearly tripled over the years, and most of those patients were diagnosed with polysubstance use disorder. Comorbidity of AUD and SUD is often associated with more severe health outcomes, including higher rates of emergency applications, psychiatric comorbidities, increased risk of overdose, more complex clinical presentations, and even death (Kaminer et al., 2024; Rizk et al., 2021). Polysubstance use disorder was prominent in both years, which is noteworthy because it is well-established as a contributor to psychiatric comorbidities such as mood disorders and psychotic disorders (Davis et al., 2023). These findings highlight the need for ED healthcare workers to be equipped with the resources and training necessary to manage the complexities of patients with polysubstance use disorder. Integrated care approaches that address both the psychiatric and substance use needs of these patients may be particularly effective and preventive.

It must be emphasized that suicidality and violent behavior are common reasons for ED admissions among ASUD patients, which is another critical finding. In 2023, nearly half of the substance use-related ED consultations were due to suicide attempts or violent behavior. This is in line with existing research that links SUD, particularly polysubstance use disorder, with an increased risk of violent behavior and self-harm (Fernández-Montalvo et al., 2012; Lamsma et al., 2020). However, a significant portion of ASUD patients had a history of prior psychiatric admissions, with 79.4% reporting such admissions in 2023. This finding suggests that approximately 20% of patients with ASUD receive their first opportunity for intervention for this problem in ED. Therefore, healthcare providers in ED must be knowledgeable about how to approach this population. Additionally, nearly eight out of ten patients had a history of seeking help from a psychiatrist. This can be interpreted as indicating that this population is actively requesting help for their issues. Furthermore, the need for parenteral sedation was notably high. Nearly half of the patients were sedated with antipsychotics and short-acting benzodiazepines during their ED visits. This indicates the severe nature of psychiatric symptoms in ASUD patients, necessitating more robust protocols for managing psychiatric crises in the ED. The association between SUD and psychiatric emergencies underscores the need for comprehensive risk assessments and crisis intervention strategies in ED. The rise in ASUD-related hospitalizations, particularly those related to AUD, further underscores the growing severity of these cases. The significant increase in hospitalizations due to AUD (from 4.5% in 2018 to 12.6% in 2023) reflects the escalating impact of alcohol on public health. This increase is consistent with global reports that have noted an increase in alcohol-related harm (Acevedo et al., 2022), highlighting the need for enhanced screening and intervention strategies within EDs to effectively identify and manage AUD (Strayer et al., 2023). Also, alcohol withdrawal syndrome and its most severe manifestation, delirium tremens (DT), pose significant challenges in EDs for these patient populations (Strayer et al., 2023; Teeratanatorn et al., 2025). Alcohol withdrawal syndrome, which occurs in individuals who abruptly reduce or stop heavy, prolonged alcohol use, can lead to a wide range of symptoms, from mild tremors and anxiety to severe conditions like seizures and delirium (McKeon et al., 2008). DT, characterized by confusion, hallucinations, and severe autonomic hyperactivity, can be life-threatening, with high mortality rates if left untreated (Strayer et al., 2023). However, treatment reduces death rates effectively. Implementing routine alcohol use screening in ED settings, along with brief interventions and referrals to specialized treatment programs, could help reduce the burden of AUD-related hospitalizations.

Limitations and Directions for Future Research

Several limitations must be acknowledged. The study had a retrospective design with data collected from past medical records, which may not always accurately reflect patient medication and follow-up. As this study only analyzed data from psychiatric consultations in the ED, there may be a loss of information regarding patients who did not receive consultation. Additionally, the study was conducted at a single university hospital in Türkiye, which may limit the generalizability of the results to other settings or countries. Future studies should include multiple centers and consider prospective designs to validate and expand upon these findings.

Despite these aforementioned limitations, this study underscores an important health problem and highlights the increase in ASUD-related ED admissions and the associated clinical

challenges. The findings emphasize the need for targeted public health interventions, gender-specific strategies, and integrated care approaches to address the growing burden of ASUD on emergency healthcare services. Future research should continue to monitor these increases and evaluate the effectiveness of interventions designed to reduce ASUD-related harm in the ED setting.

Consistent with global trends, this study highlights a significant increase in ASUD-related emergency department admissions between 2018 and 2023, with a particularly concerning rise in ASUD among the female population. Additionally, a major proportion of these patients exhibited violent behavior and suicidal attempts, which is an important crisis burden for the ED. These increases call for enhanced public health strategies and crisis management strategies, including gender-sensitive prevention programs and improved training for ED staff in managing the complexities of ASUD. Future research should focus on longitudinal monitoring of these increases and the effectiveness of targeted interventions.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: This study was approved by the Ethics Committee of Ege University (Approval No.: 24-8T/94 Date: August 22, 2024).

Informed Consent: Written informed consent was obtained from the patients who agreed to participate in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – O.K.T., G.K.T.; Design – O.K.T., I.S.; Supervision – O.K.T., D.I.H.; Resources – I.S., G.K.T.; Materials – I.S., G.K.T.; Data Collection and/or Processing – I.S., G.K.T.; Analysis and/or Interpretation – O.K.T., D.I.H., I.S., G.K.T.; Literature Search – I.S.; Writing – I.S.; Critical Review – O.K.T., D.I.H., G.K.T.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

References

Acevedo, A., Rodriguez Borja, I., Alarcon Falconi, T. M., Carzo, N., & Naumova, E. (2022). Hospitalizations for alcohol and opioid use disorders in older adults: Trends, comorbidities, and differences by gender, race, and ethnicity. *Substance Abuse: Research and Treatment*, *16*, 11782218221116733. [CrossRef]

Armoon, B., Grenier, G., Cao, Z., Huỳnh, C., & Fleury, M. J. (2021). Frequencies of emergency department use and hospitalization comparing patients with different types of substance or polysubstance-related disorders. *Substance Abuse Treatment, Prevention, and Policy*, *16*(1), 89. [CrossRef]

Aydın, N., & Celikay Soyler, H. Ç. (2022). The relationship between alcohol use – smoking and psychological resilience in the COVID-19 pandemic. *Addicta: The Turkish Journal on Addictions*, *9*(2), 126 – 136. [CrossRef]

Bashirian, S., Barati, M., Mohammadi, Y., Zarnagh, H. G., & Bagheri, S. (2021). Women who use drugs: Pattern of substance use and relapse. *ADDICTA: The Turkish Journal on Addictions*, *8*(2), 108 – 112. [CrossRef]

Beckerleg, W., & Hudgins, J. (2022). Substance use-related emergency department visits and resource utilization. *Western Journal of Emergency Medicine*, *23*(2), 166 – 173. [CrossRef]

Connery, H. S., Albright, B. B., & Rodolico, J. M. (2014). Adolescent substance use and unplanned pregnancy: Strategies for risk reduction. In *Obstetrics and Gynecology Clinics of North America*, *41*(2), 191 – 203. [CrossRef]

Davis, A., McMaster, P., Christie, D. C., Yang, A., Kruk, J. S., & Fisher, K. A. (2023). Psychiatric comorbidities of substance use disorders: Does dual diagnosis predict inpatient detoxification treatment outcomes? *International Journal of Mental Health and Addiction*, *21*(6), 3785 – 3799. [CrossRef]

DeWit, D. J., Adlaf, E. M., Offord, D. R., & Ogborne, A. C. (2000). Age at first alcohol use: A risk factor for the development of alcohol disorders. *American Journal of Psychiatry*, *157*(5), 745 – 750. [CrossRef]

Fernández-Montalvo, J., López-Goñi, J. J., & Arteaga, A. (2012). Violent behaviors in drug addiction: Differential profiles of Drug-addicted patients with and without violence problems. *Journal of Interpersonal Violence*, *27*(1), 142 – 157. [CrossRef]

Fonseca, F., Robles-Martínez, M., Tirado-Muñoz, J., Alías-Ferri, M., Mestre-Pintó, J. I., Coratu, A. M., & Torrens, M. (2021). A gender perspective of addictive disorders. In *Current Addiction Reports*, *8*(1), 89 – 99. [CrossRef]

Houston, P. D., Vittinghoff, E., & Marcus, G. M. (2024). Changes in alcohol consumption during the COVID-19 pandemic: A longitudinal cohort study using smart-breathalyzer data. *Scientific Reports*, *14*(1), 3304. [CrossRef]

Ismail, R., Mohammed Nawi, A., Abdul Manaf, M. R., Hassan, M. R., Mohd, H. A., Ibrahim, N., Tan Abdullah, I. H., & Shukor, S. (2023). Risk and protective factors in predicting drug and substance abuse among Malaysian youths. *ADDICTA: The Turkish Journal on Addictions*, *10*(1). [CrossRef]

Kaminer, Y., Burke, R., Zhornitsky, S., Gill, J., Zajac, K., & Hesselbrock, V. (2024). Youth fatal drug overdose and suicide: Trends in Connecticut, 2019 – 2021. *American Journal on Addictions*, *33*(3), 327 – 334. [CrossRef]

Kay, A., Taylor, T. E., Barthwell, A. G., Wichelecki, J., & Leopold, V. (2010). Substance use and women's health. In *Journal of Addictive Diseases*, *29*(2), 139 – 163. [CrossRef]

Kovačić Petrović, Z., Peraica, T., Blažev, M., & Kozarić-Kovačić, D. (2024). Association between prolonged stress caused by COVID-19 pandemic and earthquakes and quality of life, anxiety, depression, psychoactive substances, and problematic alcohol use in adult Croatian population. *Frontiers in Psychiatry*, *15*, 1295977. [CrossRef]

Lamsma, J., Cahn, W., & Fazel, S. (2020). Use of illicit substances and violent behaviour in psychotic disorders: Two nationwide case-control studies and meta-analyses. *Psychological Medicine*, *50*(12), 2028 – 2033. [CrossRef]

McHugh, R. K., Votaw, V. R., Sugarman, D. E., & Greenfield, S. F. (2018). Sex and gender differences in substance use disorders. *Clinical Psychology Review*, *66*, 12 – 23. [CrossRef]

McKeon, A., Frye, M. A., & Delanty, N. (2008). The alcohol withdrawal syndrome. *Journal of Neurology, Neurosurgery, and Psychiatry*, *79*(8), 854 – 862. [CrossRef]

Mojica-Perez, Y., Livingston, M., Pennay, A., & Callinan, S. (2024). Examining how the first year of the COVID - 19 pandemic affected alcohol use in different socio - demographic groups in an Australian representative longitudinal sample. *Addiction*, *119*(12), 2176 – 2184. [CrossRef]

Mungmunpuntipantip, R., & Wiwanitkit, V. (2021). COVID-19 pandemic and drug use disorder. In *ADDICTA: The Turkish Journal on Addictions*, *8*(1), 92 – 93. [CrossRef]

Myran, D. T., Cantor, N., Pugliese, M., Hayes, T., Talarico, R., Kurdyak, P., Qureshi, D., & Tanuseputro, P. (2021). Sociodemographic changes

in emergency department visits due to alcohol during COVID-19. *Drug and Alcohol Dependence*, *226*, 108877. [CrossRef]

Peden, M., Van Der Spuy, J., Smith, P., & Bautz, P. (2000). Substance abuse and trauma in Cape Town. *South African Medical Journal*, *90*(3), 251 – 255.

Republic of Turkey Ministry of Interior Turkish National Police Counter Narcotics Department. (2019). *Turkish Drug Report 2019*.

Republic of Turkey Ministry of Interior Turkish National Police Counter Narcotics Department. (2023). *Turkish Drug Report 2023*.

Rizk, M. M., Herzog, S., Dugad, S., & Stanley, B. (2021). Suicide risk and addiction: The impact of alcohol and opioid use disorders. *Current Addiction Reports*, *8*(2), 194 – 207. [CrossRef]

Satre, D. D., Iturralde, E., Ghadiali, M., Young-Wolff, K. C., Campbell, C. I., Leibowitz, A. S., & Sterling, S. A. (2020). Treatment for anxiety and substance use disorders during the COVID-19 pandemic: Challenges and strategies. *Journal of Addiction Medicine*, *14*(6), e293 – e296. [CrossRef]

Shreffler, J., Shoff, H., Thomas, J. J., & Huecker, M. (2021). Brief report: The impact of COVID-19 on emergency department overdose diagnoses and county overdose deaths. *American Journal on Addictions*, *30*(4), 330 – 333. [CrossRef]

Strayer, R. J., Friedman, B. W., Haroz, R., Ketcham, E., Klein, L., LaPietra, A. M., Motov, S., Repanshek, Z., Taylor, S., Weiner, S. G., & Nelson, L. S. (2023). Emergency department management of patients with alcohol intoxication, alcohol withdrawal, and alcohol use disorder: A white paper prepared for the american academy of emergency medicine. *Journal of Emergency Medicine*, *64*(4), 517 – 540. [CrossRef]

Teeratanatorn, H. O., S., Ratta-apha, H. O., W., Wansrisuthon, H. O., W., Puangtai, H. O., S., Sa-nguanpanich, H. O., N., Sitdhiraksa, H. O., N., & Kooptiwoot, H. O., S. (2025). Factors associated with alcohol withdrawal or alcohol-withdrawal delirium among inpatients with alcohol use in a general hospital setting: A comparison before and during the COVID-19 pandemic. *ADDICTA: The Turkish Journal on Addictions*, *11*(3), 357 – 365. [CrossRef]

Torun, H. O., & Coşkunol, H. (2020). Lessons learned from a pandemic: Covid-19 and substance use. *ADDICTA: The Turkish Journal on Addictions*, *7*(4), 277 – 281. [CrossRef]

Ulaş, H., Binbay, T., Kırlı, U., Elbi, H., & Alptekin, K. (2017). The epidemiology of alcohol use in Izmir, Turkey: Drinking pattern, impairment and help-seeking. *Social Psychiatry and Psychiatric Epidemiology*, *52*(7), 887 – 899. [CrossRef]

Ünübol, H., & Hızlı Sayar, G. (2021). Prevalence and sociodemographic determinants of substance use in turkey. *European Addiction Research*, *27*(6), 447 – 456. [CrossRef]

Venkatesh, A. K., Janke, A. T., Kinsman, J., Rothenberg, C., Goyal, P., Malicki, C., D'Onofrio, G., Taylor, A., & Hawk, K. (2022). Emergency department utilization for substance use disorders and mental health conditions during COVID-19. *PLOS One*, *17*(1), e0262136. [CrossRef]

White, A. M. (2020). Gender differences in the epidemiology of alcohol use and related harms in the United States. *Alcohol Research: Current Reviews*, *40*(2), 1. [CrossRef]

White, A. M., Slater, M. E., Ng, G., Hingson, R., & Breslow, R. (2018). Trends in alcohol - related emergency department visits in the United States: Results from the nationwide emergency department sample, 2006 to 2014. *Alcoholism, Clinical and Experimental Research*, *42*(2), 352 – 359. [CrossRef]

World Health Organization(WHO) (2018). *Global status report on alcohol and health 2018: Executive summary*. Geneva: World Health Organization.

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Causes of Drop Out in Substance Use Disorder Treatment: A Mixed-Method Study

Nurhalime Akkaya, Kübra Akın, İlker Aktürk, Ömer Miraç Yaman

Department of Social Work, Istanbul University-Cerrahpasa, Graduate School of Education, İstanbul, Türkiye

ORCID iDs of the authors: N.A. 0000-0002-6521-7687, K.A. 0009-0001-0079-3018, İ.A. 0000-0003-4305-0297, Ö.M.Y. 0000-0001-9989-8575.

Main Points

- The findings of the study show that treatment motivation is one of the most important factors in the sustainability of treatment.
- The findings of the study show that the reasons for leaving substance addiction treatment vary widely and are affected by psychosocial and economic conditions.
- The social environment plays an important role in individuals leaving treatment. Individuals who do not have social support and who have people or factors in their social environment that push them to use substances leave treatment more easily.
- It is understood that individuals who do not voluntarily participate in treatment due to pressure from their families or social environment and legal sanctions leave treatment more easily.
- The results of the study show that it is easier for young people to leave treatment than it is for older people.

Abstract

This study examines the reasons for dropout from substance abuse treatment from the perspectives of clients and professionals. Using a mixed-methods approach, data were collected from 37 clients and 39 professionals. Findings indicate that dropout reasons primarily stem from individual factors, with the most common reasons being the desire to continue substance use, psychological challenges, and belief in self-recovery. Of the clients, 81% reported personal reasons, 10.5% reported therapy-related reasons, and 8.5% reported treatment center-related reasons for leaving treatment. Professionals highlighted a lack of readiness for change and insufficient individualized treatment. In-depth interviews revealed five main categories of dropout reasons: individual factors, beliefs about substance use, family dynamics and lack of social support, approach to treatment, and legal processes. The study underscores the multifaceted nature of treatment dropout and the need for interventions at the micro, mezzo, and macro levels. Raising awareness and providing information are suggested as ways to enhance treatment sustainability.

Keywords: Barriers to treatment, patient compliance, relapse, substance-related disorders

Corresponding author:
Nurhalime Akkaya
E-mail:
nurhalime.akkaya@ogr.iuc.edu.tr or nurhalimeakkaya@gmail.com

Received: December 2, 2024
Revision Requested: March 12, 2025
Last Revision Received: April 14, 2025
Accepted: April 20, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

With the understanding of substance use habits, various pharmacological and psychosocial treatment approaches have been developed (McHugh et al., 2010, p. 511). Among the most common psychosocial approaches are motivational therapies, cognitive-behavioral therapies, and crisis management approaches. These treatment approaches can be used either concurrently or sequentially as they provide support to individuals from different perspectives (Myers, 2019). Since motivation is one of the fundamental factors in the recovery process, motivational interviewing is frequently employed in the treatment of substance use disorders (Apodaca & Longabaugh, 2009; DiClemente et al., 2017). Cognitive-behavioral therapies, on the other hand, are primarily utilized for relapse prevention. These interventions are particularly beneficial in recognizing situations that trigger

Cite this article as: Akkaya, N., Akın, K., Aktürk, İ., & Yaman, Ö. M. (2025). Causes of drop out in substance use disorder treatment: A mixed-method study. *Addicta: The Turkish Journal on Addictions*, 12(3), 309-319.

the urge to use substances and in learning coping strategies (Morin et al., 2017).

Cognitive impairments can be observed in individuals with substance dependence (Ramey & Regier, 2019; Teichner et al., 2002). These impairments can complicate the observation of treatment efficacy (Teichner et al., 2002). Except in exceptional cases, treatment effectiveness is associated with an adequate number of sessions and regular, voluntary participation in treatment (Burke & Gregoire, 2007; Teichner et al., 2002). Indicators of treatment success include completing the planned treatment or remaining in treatment for an extended period, reduced substance use compared to pre-treatment levels, and improved relapse management skills (Jihad et al., 2022; Williams & Chang, 2000, p. 158). Premature termination of treatment is common in substance use disorder treatment, though it can also be observed in other therapeutic contexts, and it negatively affects recovery outcomes (López - Goñi et al., 2012, p. 78).

Studies have linked treatment dropout to various factors, including low motivation for treatment, reluctance to change, hopelessness about treatment outcomes, participation in treatment due to family pressure, dissatisfaction with the therapist, insufficient fulfillment of social service needs by the treatment institution, personal problems, and financial constraints (Ball et al., 2006; Şimşek et al., 2019). However, most studies have been conducted with individuals who have remained in treatment (Ball et al., 2006). Research focusing on the perspectives of professionals remains limited. Moreover, the predominance of quantitative studies (Bøhle et al., 2023; Jihad et al., 2022; Kelly et al., 2010) poses challenges in addressing qualitative factors. Dropout studies also consider individuals' sociodemographic characteristics. Factors such as age, education level, marital status, and employment status have been identified as significant in treatment processes (Basu et al., 2017). Gender, however, is frequently excluded from evaluations, likely due to the limited representation of women in samples (Weisner et al., 2003). According to the 2022 United Nations Office on Drugs and Crime (UNODC) report, while half of women who misuse substances consume amphetamines or their derivatives, only one in five individuals receiving treatment for amphetamine use is female (UNODC, 2022, p. 4). Barriers to women's participation in treatment include domestic responsibilities, social stigma, and fears of losing child custody during treatment (UNODC, 2022, p. 27). From this perspective, "being a woman" itself could be considered a reason for dropout; however, the underrepresentation of women in studies prevents this aspect from being fully explored.

This research examines the reasons for treatment dropout in substance use disorder treatment. What distinguishes this study from others is its evaluation of dropout reasons from the perspectives of both clients and treatment practitioners. Furthermore, it employs both quantitative and qualitative research methods.

The study aims to understand the reasons behind treatment dropout in substance use disorder treatment encountered in the field and to propose potential solutions. It is hoped that the findings will serve as a guide for professionals working in the field.

Material and Methods

This study was conducted using a mixed-methods research approach. The research design was an explanatory sequential design, in which the primary aim was to first gather quantitative data, followed by a detailed explanation of these findings through qualitative insights (Creswell, 2021, p. 6). Supporting the quantitative data with qualitative findings was deemed essential to clarify the identified issues and to provide a comprehensive evaluation of potential solutions. A mixed-methods approach was chosen to gain a deeper understanding of the problem.

In this study, quantitative methods were employed to generate generalizable measurements, while qualitative methods were used to explore participants' perspectives in greater depth. This combination allowed for a more robust and nuanced exploration of the research questions.

Research Problem

This research aims to evaluate the reasons for frequent dropouts in substance use disorder treatment. The need for such a study arises from the fact that this issue poses significant barriers to the treatment process. It is anticipated that incorporating evaluations from both clients and professionals will provide a multidimensional perspective on the problem and offer guidance for practitioners in their interventions.

Research Sample

Prior to data collection, preliminary interviews were conducted with two psychologists, a psychiatrist, and a social worker working in the field of substance use disorder treatment to develop the survey questionnaire. All participants in these initial interviews were women. One psychologist had 1 year of experience in the field, while the other had 5 years; the social worker had 4 years, and the psychiatrist had 2 years of experience. The purposive sampling method was adopted in the selection of the sample for this study.

The quantitative data for the study were collected from 37 clients and 39 professionals, while the qualitative data were gathered from three psychologists and three social workers. Among the professionals who participated in the quantitative study, 21 were psychologists, 9 were social workers, 2 were psychological counselors, 2 were sociologists, 2 were addiction counselors, and 1 was a psychiatrist. Two of the participants in the qualitative study also participated in the quantitative part of the research. This study was conducted in Türkiye, and the data were collected between October 15, 2023 and April 21, 2024.

Data Collection Method

The data collection form for this research was developed based on a review of the literature and findings from pilot interviews. A total of 118 preliminary items were identified. Due to terminological differences, some items were directed exclusively at clients, while others were presented only to professionals. The survey was prepared and administered online using the Qualtrics Survey platform. Clients were presented with 114 items, while professionals were provided with 117 items. Participants who selected 10 reasons from the list were then asked to rank these reasons in order of importance in the next section of the survey Table 1.

Table 1.
Premises Presented in the Research Questions

	Being single	Being married	Being young	Being older	Fear of failure	Being unprepared for changes	Desire to continue Using Substances	Belief in self-healing	Fear of withdrawal symptoms	Difficulty managing loneliness	Difficulty understanding the treatment process	Disliking the program's rules
Reasons stemming from the individual themselves	Change in the individual's idea of quitting substance use	Inability to accept the state of being substance-free after treatment	Not being confident enough about quitting substance use	Treatment not being suitable for the individual's character (Asked only to clients)	Difficulty accepting the idea of lifelong sobriety	Lack of self-confidence	The belief that they will not be satisfied with their personality after treatment	Lack of a valid reason to continue treatment	Loss of motivation to continue the treatment program	Fear of losing friends who use substances	Difficulty in occupying free time during periods of abstinence	Difficulty managing personal hygiene and self-care
	Missing the state of being under the influence of substances	Difficulty coping with being away from	Difficulty managing feelings of guilt and shame	Difficulty managing emotions	Psychological problems and difficulties	Do not think that you will be stigmatized by this treatment	High levels of stress	Difficulty managing boredom	Difficulty managing anger	Difficulty managing depression and sadness	Difficulty managing the impact of trauma history	Making statements or engaging in actions that complicate continuing treatment
	Declines in cognitive skills	Mental health problems such as depression and anxiety	Unstable housing situation	Being a racial minority	Probation decision	Other legal issues	High levels of substance use severity	High levels of substance use severity	Physical health problems	Lack of health insurance	Child care issues	Inability to forgive oneself for an action or thoughts of punishing oneself
	Losing your job due to treatment	Lack of economic means to pay treatment or medication fees	Being the breadwinner of the family	Family responsibilities	Insufficient support from family or social circle	Difficulty managing thoughts of suicide or self-harm	Presence of someone in the family who requires care (disabled etc.)	Starting treatment due to pressure from family or social environment	Insecure attachment style (Only asked to professionals)	Maladaptive personality structure (Only asked to professionals)	Personality disorders (Only asked to professionals)	Psychiatric diagnosis (Asked only to professionals)
Reasons stemming from the therapy process, theraoist, or staff	Lack of trust or conflicts with the therapist	Length of therapy period	Thoughts of becoming addicted to the drug used	Side effects of the drug used - adversely affecting health	Failure to meet expectations from treatment	Effect of other patients on Relapsee to substance use	Not wanting to share the same room with other patients	The idea that one is better off than other patients	Inability to form a therapeutic alliance	Poor communication skills of the therapist	Therapist not providing appropriate feedback	The therapist's inability to manage the client's indecisiveness
	The therapist's inability to manage the client's rejection	The therapist's inability to manage the client's anger	The therapist's inability to manage the client's fear	The therapist's inability to manage the client's sadness	The therapist's inability to manage the client's depression	The therapist's inability to manage the client's anxiety	The therapist's inability to manage the client's trauma	The therapist's inability to manage the client's crisis	Therapist's failure to manage client's relapse	The therapist's inability to manage the client's family problems	The therapist's inability to manage the client's legal problems	Therapist's inability to manage client's employment issues
	The therapist's inability to manage the client's financial problems	The therapist's inability to manage the client's health problems	The therapist's inability to manage the client's accommodation problems	The therapist's inability to manage the client's educational problems	The therapist's inability to manage the client's social problems	The therapist's inability to manage the client's mental problems	The therapist's inability to manage the client's cultural problems	Insufficient experience or training of the therapist	The therapist's inability to manage the client's resistance	The therapist's inability to manage the client's boundaries	Therapist's lack of empathy	Lack of cultural competence of the therapist
Reasons stemming from the treatment center	Poor treatment environment	Lack of tracking services	Concerns about confidentiality of client information	Long waiting lines	Lack of family involvement in treatment	Lack of peer support in treatment	Inability to be matched with the correct treatment program (short-long term)	Lack of appropriate treatment options	High treatment cost	Inflexible treatment schedules	Lack of individualized treatment programs	The treatment center is far away
	Difficulties with transportation facilities	Having difficulty paying transportation fees	Difficulty managing time for treatment	Insufficient health services in the treatment center	Insufficient educational services in the treatment center	Inadequate social services in the treatment center	Insufficient accommodation services in the treatment center	Insufficient legal services in the treatment center	Insufficient employment services in the treatment center	Insufficient transportation to the center of treatment		

The second phase of the research employed in-depth interviews, a qualitative research method, to evaluate the quantitative findings. In qualitative studies, the validity of the research must be controlled during the processes of data presentation and analysis. It is essential to identify the key concepts central to the study's validity (Kümbetoğlu, 2019, p. 51). In this study, the accurate analysis of frequently recurring expressions among the parameters presented to participants was considered critical for ensuring validity. Furthermore, the second phase of the research was expected to enhance credibility, transferability, and confirmability (Kümbetoğlu, 2019, p. 50). The survey form used in the study was designed based on a combination of literature review and professional opinions to ensure its credibility.

Data Analysis

The quantitative data of the study were analyzed using SPSS v. 27.0 (IBM SPSS Corp.; Armonk, NY, USA) software. The items were categorized based on their ranking preferences. The internal consistency score (Cronbach's alpha) of the preferences among 76 participants was found to be 0.79. For clients with substance use disorder treatment experience, the internal consistency score was 0.88, while for professionals, it was 0.67. The internal consistency scores of the participants' responses to the preferences were deemed sufficient (Vaske et al., 2017). The frequency analysis examined the frequency of preferences and the percentage of each preference relative to the total number of participants. Additionally, descriptive statistics of the sociodemographic data of the participants were also performed.

Qualitative data were collected through in-depth, face-to-face interviews. With the written consent of the participants, the interviews were recorded, transcribed, and resulted in a 58-page transcript. The transcript was thoroughly reviewed and analyzed using content analysis, with participants' statements categorized into topics. A total of 143 topics were mentioned by participants during the interviews. From these topics, 17 codes were generated and further grouped into 5 categories. The coding key used to develop these codes is presented in Table 2.

Table 2.
Code Key

Category	Code
Individual factors and psychological states	Lack of motivation
	Demographic characteristics
	Lack of awareness
	Fear of the change process
	Psychological reasons
Beliefs and experiences regarding substance use	Irrational beliefs
	Fear of deprivation
	First treatment experience
Family dynamics and lack of social support	Lack of family support
	Circle of friends
	Dysfunction of social support systems
Approach to the treatment process and obstacles	Resistance to treatment
	Physical disabilities
	Treatment methods
	Role of the therapist
Legal processes	Concern about the treatment being recorded in the record
	Legal sanctions

Permissions for the Study

Data were collected anonymously and on a voluntary basis. Ethics committee approval for this research was received from the Istanbul University-Cerrahpaşa Social and Human Sciences Research Ethics Committee (Decision Number 2023/395 Date: 07.11.2023).

Findings

The findings of the study are presented in two parts: those obtained through quantitative methods and those obtained through qualitative methods.

Findings from Quantitative Research

A total of 76 individuals participated in the study, including 37 patients who had discontinued substance use disorder treatment and 39 professionals experienced in substance use disorder treatment.

Findings Related to Clients

The patients participating in the study, who had experienced dropout from substance use disorder treatment, ranged in age from 19 to 54, with an average age of 30.45 years. Among the participants, 1 was female, and 36 were male. Eleven participants reported continuing substance use.

Regarding substances used, 14 participants reported using methamphetamine, 11 heroin, 3 cannabis, 1 methamphetamine and cannabis, 1 methamphetamine, synthetic cannabinoids (Bonzai), and cannabis resin, 1 synthetic cannabinoids (Bonzai), 1 pregabalin (Lyrica), 1 A4, and 1 a combination of alcohol, tobacco, cannabis, LSD (Liserjik Asit Dietilamid), methamphetamine, MDMA (3,4-metilenedioksi-N-metilamfetamin or extacy), and DMT (Dimetiltriptamin). Three participants did not specify the substances they used.

Table 3 presents the top ten preferences most frequently selected by the participants. Additionally, the top three preferences in rankings were highlighted. If multiple preferences had the same frequency, they were also included in the table. For example, "Desire to continue using substances" was chosen as the first preference by eight participants, "Being married" by three participants, and "Inability to accept the state of being under the influence of substances after treatment" by three participants. The "Desire to continue using substances" was the most selected item as the first, second, fourth, fifth, and seventh preference.

The option "Desire to continue using substances" was selected by 28 participants, making it the most frequently chosen item. This option was marked once by participants who used heroin in any of their rankings and was selected by 70.6% of participants who used methamphetamine. Following this, the most frequently chosen items were psychological issues and challenges, fear of failure, and belief in self-healing.

Table 3.
The Top Ten Premises Most Preferred by the Participants

Order of Preference	The Ten Most Preferred Premises	Number of Preferences	%
1st choice	Desire to continue using the substance	8	21.6
2nd choice	Fear of withdrawal symptoms Desire to continue using the substance	4	10.8
3rd choice	Having difficulty staying away from family Psychological problems and difficulties	3	8.1
4th choice	Difficulty in spending free time when not using substances Desire to continue using the substance	3	8.1
5th choice	Desire to continue using the substance	6	16.2
6th choice	Belief that you can heal on your own	4	10.8
7th choice	Desire to continue using the substance, Difficulty managing depression and sadness, Side effects of the drug used - adversely affecting health, Difficulty in anger management, Loss of motivation to continue the treatment program, Difficulty understanding the treatment process, Inability to accept not being under the influence of substances after treatment	2	5.4
8th choice	Difficulty managing emotions, Difficulty in spending free time when not using substances	3	8.1
9th choice	Lack of individualized treatment programs, Psychological problems and difficulties	4	10.8
10th choice	Poor treatment environment	3	8.1

Of the selected reasons, 81% originated from the client themselves, 10.5% were attributed to the therapy process, therapist, or personnel, and 8.5% were related to the treatment center.

Findings Related to Professionals' Opinions

The professionals ranged in age from 24 to 51, with an average age of 32.07. Among the participants, 11 were women, and 28 were men. The group included 21 psychologists, nine social workers, two psychological counselors, two sociologists, two psychiatric nurses, two addiction counselors, and one psychiatrist.

Regarding education levels, 14 participants held bachelor's degrees, 21 held master's degrees, and four held doctoral degrees. In terms of professional experience in the field of substance addiction, six participants had 0 – 1 years of experience, 19 had 1 – 5 years, 12 had 5 – 10 years, and two had over 10 years.

Table 4 presents the top ten most frequently selected items by professionals. The top three items from the rankings are also highlighted. If multiple items had the same frequency, they were included in the table as well.

Among the reasons selected by professionals, 83.3% originated from the client themselves, 10.3% were attributed to the therapy process, therapist, or personnel, and 5.1% were related to the treatment center.

Evaluation of Responses Given by Clients and Professionals to the Items

Participants ranged in age from 19 to 54, with an average age of 31.29 (SD = 7.68). Of the participants, 12 were female and 64 were male.

The most frequently selected items by both clients and professionals are presented in Table 5. Both sample groups identified "Desire to continue using substances" as the primary reason for dropout. Additionally, "Psychological issues and challenges" and "Belief in self-healing" were among the top-ranked items for both groups.

Findings from Qualitative Research

In this section, findings from in-depth interviews are presented. These findings are introduced as professionals' interpretations of the dropout reasons frequently observed in the quantitative findings. Qualitative interviews were conducted with three social workers and three psychologists. The findings obtained from the interviews were analyzed using thematic analysis.

A total of 143 topics were identified. Overlapping topics were grouped into common codes. The 17 identified codes were divided into five categories. Under the category of "Individual factors and psychological states," expressions related to the individual's perspective on the process, sociodemographic characteristics, psychological states, and challenges were grouped. Under the category of "Beliefs and experiences related to substance use," reasons for dropout related to the individual's irrational beliefs, prejudices, and past negative experiences with the treatment process were grouped. Under the category of "Family dynamics and lack of social support," statements related to the lack of family and partner support, the influence of friends on dropping out, and the lack of formal or informal social support were grouped. Under the category of "Approach to the treatment process and barriers," reasons for dropout related to the individual's perceptions of the treatment process, the therapist,

Table 4.
The Most Common Drop out Reasons According to Professional Opinions

Order of Preference	Top Ten Most Preferred Items	Number of Preferences	%
1	Not being ready for change	13	33.3
2	Desire to continue using the substance, Psychological problems and difficulties, There is no valid reason to continue treatment, Fear of withdrawal symptoms, Inability to accept not being under the influence of substances after treatment, Loss of motivation to continue the treatment program	3	7.7
3	Desire to continue using the substance	9	23.1
4	Difficulty managing emotions	4	10.3
5	Belief that you can heal on your own	4	10.3
6	Psychological problems and difficulties	6	15.4
7	Difficulty managing depression and sadness, Not being confident enough to stop using the substance, Difficulty managing feelings of guilt and shame	3	7.7
8	Psychiatric diagnosis	3	7.7
9	Difficulty managing depression and sadness	4	10.3
10	Insufficient support from family or social circle, Difficulty in spending free time when not using substances, Lack of individualized treatment programs	3	7.7

and the treatment center were grouped. Under the category of "Legal processes," statements about dropping out due to the fear of treatment being recorded in official records and dropping out because the individual started treatment as a legal sanction were included.

Individual Factors and Psychological Conditions: "Substance Use as a Coping Mechanism for Their Problems"

According to professionals, the likelihood of dropping out of treatment increases if individuals lack or have reduced motivation. The concepts of "desire" and "motivation" were emphasized during the interviews. If a client believes they are not dependent on substances, they struggle to focus on the process, and their motivation tends to decline.

Clients' sociodemographic characteristics were also considered significant factors during the treatment process. It is thought that being young and having a low socioeconomic status makes it easier to drop out of treatment. Individuals without sufficient economic resources may find it difficult to cope with challenges and may use substances as a coping mechanism. Younger individuals, on the other hand, struggle to adapt to the demanding and stability-requiring nature of addiction treatment. Professional P3 described this situation as follows: "Addiction treatment is a challenging process that requires stability. It can be difficult to keep someone in treatment, especially because the age of onset for substance use is young, making the treatment process harder for them."

The reason for initiating substance use was evaluated as a significant factor in the continuity of treatment. According to professionals, some clients use substances to cope with psychological problems, and treatment, for them, means taking away their coping mechanism. Professional S3 explained this as follows: "*The client turns to alcohol and substance use because they fail to develop a healthy coping mechanism against the psychological problems and traumatic memories they have experienced. We often observe this in our clients. They might have a problem with their family, experience sexual abuse, or relationship issues, etc. Such situations already push them toward substance use.*"

Professionals state that if a client believes they are not dependent and thinks they can manage the process alone, they may drop out of treatment. However, once the individual realizes they cannot

Table 5.
Premises Most Frequently Preferred by Professionals and Clients

	Client Answers	Professional Answers
1	Desire to continue using the substance	Desire to continue using the substance
2	Psychological problems and difficulties	Not being ready for change
3	Fear of failure	Psychological problems and difficulties
4	Belief that you can heal on your own	Difficulty in spending free time when not using substances
5	Fear of withdrawal symptoms	Belief that you can heal on your own

handle the process independently, they may return to treatment. Therefore, it is essential for the person to first acknowledge their dependency.

Traumatic experiences, as well as histories of neglect and abuse, were identified by professionals as reasons for dropping out. Among the emotions clients struggle to manage during the treatment process, anger was considered the most significant. Professional P3 attributed this to withdrawal symptoms, explaining that the urge to use substances triggers anger, and the anger subsides when the substance is used.

Professionals define addiction as "a brain disease." They note that having an unhealthy brain leads to faulty emotions and thoughts, which can drive substance use. These faulty emotions and thoughts can also cause withdrawal symptoms during the treatment process and lead to dropping out.

The treatment process often brings changes to clients' work lives, social lives, and family relationships. If the individual cannot cope with these changes, they may return to substance use. Professional S3 noted that one of the main challenges is the debts incurred during the period of substance use, which leads to economic difficulties. Social work interventions are employed to address these challenges and help clients stay in the treatment process.

Beliefs and Experiences Related to Substance Abuse

Professionals believe that individuals' irrational beliefs about substance use—such as the notion that treatment will not work, medications will be ineffective, or they will become dependent on the prescribed medication—contribute to dropout. Additionally, professionals think that the experiences of people in their social environment who have undergone treatment but failed to quit substance use may also lead to dropout. According to professionals, some clients drop out of treatment due to their own negative experiences. Professional S2 noted that at the beginning of addiction treatment, individuals often participate with irrational beliefs, fail to understand the treatment process, and may not adapt to the patience and stability required by the process. Therefore, both S2 and P3 emphasized that initial sessions are particularly important for helping the client understand the process, develop realistic expectations, and establish a therapeutic bond with the professional.

Family Dynamics and Lack of Social Support

Professionals consider the social environment of individuals a critical factor for the continuity of treatment. If there are negative influences in the social environment, changing this environment and distancing the client from it are seen as measures that can help keep the client in treatment. Since loneliness is viewed as a factor that encourages substance use, preventing individuals from being isolated is also regarded as a crucial element for sustaining treatment. For this reason, professionals often refer to addiction as "a disease of loneliness."

According to professionals, if a client does not receive family or partner support, they are more likely to drop out of treatment. Professional P3 highlighted the importance of maternal support, stating: "Mothers, especially, play a significant role in the recovery of addicts. The compassion shown by a mother to her child may be instrumental in motivating the client to pursue treatment."

The influence of friends during treatment is another factor. For example, friends may offer substances with the attitude of "just once won't hurt," which can push the individual back into the cycle of addiction. According to P3, even if the client's treatment is successful, having people in their social circle who use or sell substances increases the likelihood of relapse.

Social media platforms that clients engage with also play a significant role in the treatment process. Through the content they consume, individuals may develop an interest in substances, resume use, or even discover new substances.

Approach to the Treatment Process and Barriers

The first step in retaining a client in treatment is considered to be the "initial session." Meeting the client's expectations, the professional's approach, and the client's increased awareness during the initial session are factors that can help retain the client in treatment. If the client is initially reluctant and no progress is made during the first session to overcome this reluctance, the client may drop out. Professional P3 explained this situation as follows: "Clients who have a bad initial experience and fail to establish good communication with their therapist, unfortunately, look for recovery paths outside the treatment system and fall into networks that further entrench their addiction."

Professionals commonly agree that educating clients about addiction and increasing their awareness can help prevent dropout. Explaining what to expect during treatment, the potential withdrawal symptoms, and how to manage them is identified as a critical aspect of the process. Additionally, professionals note that individuals who have previously experienced treatment tend to stay in treatment longer, as they already know what to expect.

Professionals view themselves as a vital part of the treatment process. If a connection or compatibility cannot be established between the client and the professionals involved, the client may drop out. Medication-based treatments and treatment programs can also lead to dropouts. According to professionals, clients may reject the medication prescribed for treatment or leave the program out of fear that they will become dependent on the medication. Short treatment programs, in particular, are seen as problematic since clients may not fully understand the root causes of their issues, nor do they provide an opportunity to delve deeper into these issues. Consequently, clients may leave the program feeling misunderstood or unable to express themselves adequately.

Professionals suggest that clients who cannot adapt to the treatment process are more likely to drop out. Treatment programs often include opportunities to engage in activities during free time, but according to professionals, during the addiction process, clients may use idle time as an opportunity to think about or seek substances.

The physical environment and human factors within treatment centers can also contribute to dropouts. Experts note that drug dealers sometimes discreetly position themselves near treatment centers, and other clients may facilitate access to substances.

In the initial phase of the study, professionals commented on the divergence of perspectives between clients and professionals regarding treatment dropout. Some professionals noted that "observing individuals from an external perspective is healthier" and attributed their more accurate understanding of the issue to their professional expertise. The concept of terminology emerged as another critical factor in treatment processes. For example, while a professional may describe a client's desire to "fill their free time," the client may not perceive this time as "free." Aligning terminology between professionals and clients is seen as a factor that could help retain clients in treatment.

Legal Processes

According to professionals, individuals who start treatment due to legal sanctions are more likely to drop out. Voluntary participation in treatment is considered to be associated with longer retention in the program. Experts view individuals seeking treatment primarily to avoid legal consequences—such as incarceration—as a high-risk group for dropping out. Professional S2 described this situation as follows: "*They do something related to addiction treatment to avoid punishment or jail time, but their desire to use substances still persists.*"

Fear of stigmatization due to substance use and concerns about the treatment being recorded in official records can also discourage clients from continuing treatment. Professional P3 attributed this issue to the use of electronic health records in medication-assisted treatments. According to P3, clients tend to avoid treatment programs that are registered in electronic record systems and instead opt for informal, unregistered psychotherapy sessions.

Discussion

This study aims to explore the reasons for dropout from substance addiction treatment. Quantitative and qualitative findings were collected from individuals who have experienced substance addiction treatment and professionals with experience in this field. Reasons for dropout, identified through literature review and preliminary interviews, were presented to individuals with addiction treatment experience and professionals to determine the most common causes of treatment dropout. The most frequently observed reasons for dropout in the field were analyzed using quantitative methods and revisited in-depth with professionals through interviews.

In evaluating the quantitative data, participants' primary preferences among the presented items were prioritized. For individuals with addiction treatment experience, the most commonly selected reason was the "desire to continue using substances," whereas for professionals, it was "lack of readiness for change." This indicates the factor each group considered most important in treatment dropout. More than half of the participants selected the desire to continue using substances in at least one of their preferences. Enjoying substance use and craving it again are considered significant driving forces against treatment, as reflected in the literature (Zemore et al., 2021).

The importance of the concepts of desire and motivation in addiction treatment also stood out in the in-depth interviews. Individuals who join treatment due to external pressure rather than their own will are more likely to drop out. Field studies emphasize the role of the family as a supportive factor in sustaining addiction treatment. According to research, if the family does not play a supportive role during the treatment process, individuals are more likely to drop out (Acevedo et al., 2020). The findings of this study also highlight the importance of family and social support. However, this study also reveals the counterproductive effect of coercion by the family. When family members force or pressure individuals into treatment, the likelihood of dropout increases.

One of the prominent reasons for dropout identified in the responses of both professionals and clients was psychological problems and difficulties. During in-depth interviews, professionals interpreted psychological challenges as factors that both push individuals away from and pull them toward substance use. Individuals may want to quit substances due to the psychological difficulties caused by substance use, yet in the later stages, they may return to substance use as they struggle to cope with negative emotions (Rogers et al., 2020).

Another frequently mentioned reason for dropout in clients' responses was fear of failure. Professionals, on the other hand, associated this with a lack of readiness for change. According to professionals, substance use can serve as a coping mechanism for negative emotions. Without this mechanism, individuals may struggle to find ways to cope with challenges, leading them to continue or return to substance use.

Belief in self-healing is also highlighted as a reason for treatment dropout in the responses of both professionals and clients. In-depth interviews revealed that irrational beliefs during the treatment process are a common cause of dropout. One of these beliefs is the idea that the client can recover on their own. On the other hand, clients may leave treatment believing that medication-assisted treatment will not work or that they will become dependent on the medication used in the treatment. The experiences of clients themselves or those in their social circle who have participated in such treatments can also reinforce these irrational beliefs and prejudices. These findings regarding the impact of incorrect beliefs and negative experiences on treatment dropout provide significant insights into the literature (Landrum et al., 2015).

Another dropout reason highlighted in the clients' responses is the fear of withdrawal symptoms. Individuals who cannot cope with withdrawal symptoms often choose to resume substance use to avoid these symptoms (Farhoudian et al., 2022).

A prominent reason for dropout reason in professionals' responses was the inability of clients to occupy their free time during periods of abstinence, leading them back to substance use. Professionals participating in the interviews stated that they plan activities to fill this free time to prevent clients from returning to substance use.

The purpose of the in-depth interviews was to evaluate findings obtained through quantitative methods. The responses provided by professionals were grouped into five codes: individual factors and psychological conditions, beliefs and experiences related to substance use, family dynamics and lack of social support, approach to the treatment process and barriers, and legal

processes. Individual factors include responses related to the client's perspective on the process, motivation, demographic characteristics, level of awareness, fears, and psychological difficulties. According to the professionals, important factors contributing to dropout include a lack of motivation, psychological difficulties (as also highlighted in the quantitative findings), youth, low socioeconomic status, lack of awareness about the harms of substance use, and fear of the changes brought about by recovery.

Beliefs and experiences related to substance use were also evident in the quantitative findings. An example of this is the belief that individuals can heal themselves. According to the professionals, clients with incorrect beliefs about addiction treatment or those who have had negative experiences themselves—or witnessed such experiences in their social circle—are more likely to drop out. Therefore, education and awareness initiatives are crucial to keeping individuals engaged in treatment.

The importance of initial sessions in sustaining treatment emerged strongly in the in-depth interviews. Research on substance addiction treatment also reveals that a significant proportion of clients discontinue treatment after the initial sessions (Ormbostad et al., 2021). According to professionals, if clients cannot change their incorrect beliefs during the initial sessions or fail to establish a therapeutic bond with their therapist, they are more likely to leave treatment.

Interviews with treatment providers highlighted that a lack of family and partner support is a significant factor contributing to dropout. Similarly, the absence of support from friends and social networks was also identified as a contributing factor (Sevin & Erbay, 2019). Studies show that functional social support has a positive effect on staying in treatment for longer periods of time (Acar et al., 2022; Yaman, 2014). Professionals stated that a lack of formal and informal social support systems leads individuals to drop out of treatment. These supports represent clients' material and emotional resources. Experiencing economic losses or lacking resources to maintain their livelihoods during the treatment process are factors that make participation in treatment more difficult (Pagano et al., 2021).

According to treatment providers' evaluations, individuals' approach to the treatment process and barriers related to treatment contribute significantly to dropouts. Clients may resist adapting to treatment or face difficulties in establishing rapport with professionals. Additionally, factors such as the interventions applied during treatment, the planned treatment model, and the duration of the treatment may also lead to dropout (Keskin et al., 2024)The increasing number of individuals with substance addiction and those seeking treatment has limited the time available for individual sessions in treatment programs. The lack of individual sessions or sessions that are either longer or shorter than expected may affect the sustainability of treatment. The literature indicates that the duration of sessions influences dropout rates, with shorter sessions being more effective in keeping clients engaged in treatment (Lappan et al., 2020).

Treatment providers also reported that individuals might drop out of treatment due to legal processes. Those subject to legal sanctions for substance use may be compelled to join treatment while legal proceedings are ongoing. However, treatment initiated as a result of a sanction, and therefore without the individual's voluntary participation, is often associated with dropout. At this point, desire and motivation emerge as critical factors. If a client starts treatment due to pressure from family members or their social environment, or as a result of legal sanctions, the sustainability of the treatment becomes more challenging. Individuals may be mandated to attend treatment due to offenses committed under the influence of addictive substances. Globally and in Türkiye, substance use is often punished with custodial sentences, alongside mandatory treatment measures (Kahveci Düztaş, 2011; U.S. Department of Health and Human Services, 2024). Alternative sentencing methods aim not only to rehabilitate and educate offenders but also to reduce the costs and burden on prisons (U.S. Department of Health and Human Services, 2024). However, the effectiveness of these measures is a topic of debate (Türkmen, 2018). Additionally, individuals have concerns about the treatment process itself. Fear of treatment being recorded in their official files can lead clients to drop out. Clients may also worry about the implications of electronic health records, as these may discourage them from continuing treatment. Both client and treatment provider responses indicate that the primary reasons for dropout often stem from the clients themselves. However, treatment providers are more likely than clients to attribute dropout to the treatment process. Providers criticize the limited application of individualized treatment methods and view this as a factor driving clients to leave treatment. Dropout reasons related to the therapy process, the relationship between the therapist and the client, and the treatment center were cited relatively less frequently by both clients and providers. In-depth interviews also revealed that treatment providers were less likely to focus on treatment-related issues when discussing dropout causes compared to other factors.

Limitations and Directions/Suggestions for Future Research

- The limited sample size of this study may make it difficult to draw generalizable conclusions on the subject. Studies covering different regions and larger samples may increase the generalizability of the findings.
- In this study, the majority of the sample group leaving substance addiction treatment consisted of male participants. The limited number of female participants is a limitation of this study and reduces its generalizability. Future studies that include female participants and allow for evaluation across genders are also needed.
- The fact that this study is cross-sectional study may make it difficult to understand the reasons for dropouts from treatment. Future longitudinal studies on this subject may provide insight into the reasons for dropouts from treatment.
- Although this study addresses the substances used by the participants, dropouts from treatment were not addressed according to substance types. More specific studies may be effective in solving this problem.
- Applied studies addressing the effects of treatment interventions on dropouts from treatment are important for the sustainability of treatment.
- Although the reasons for leaving substance abuse treatment were generally addressed in this study, the number of participants who used legal substances such as cigarettes and alcohol was limited. Therefore, this study focuses more on illegal substance use.

This study aimed to evaluate the reasons for dropping out of substance addiction treatment from the perspectives of individuals participating in treatment and treatment providers. Prominent dropout reasons were revisited through in-depth interviews with treatment providers and analyzed further. The interviews revealed that participants' personality traits, psychological conditions, desire and motivation, family dynamics, social support, beliefs and experiences, voluntary participation, approaches to treatment, and barriers related to the treatment process all play significant roles in the sustainability of treatment. According to the findings, younger individuals are more likely to drop out of treatment. This tendency may be related to their impulsivity and lack of experience compared to older individuals. Based on the study's results, providing information and raising awareness about the outcomes of addiction treatment for individuals and their families are believed to positively impact treatment sustainability. The findings also indicate that individuals who participate in treatment due to legal sanctions are more likely to drop out. Thus, it is suggested that mandatory treatments conducted without the individual's voluntary participation should be reevaluated, and functional sanctions that yield better outcomes should be implemented. It was observed that the reasons for dropping out of treatment are interconnected and interdependent. Various contexts, including the client's and their family's knowledge, the approach of the providers, the treatment environment, and formal and informal resources, play a role at micro, mezzo, and macro levels. The study demonstrates that the factors hindering treatment are multidimensional, and solutions require the combined efforts of micro and mezzo systems as well as macro-level policies. Therefore, while individuals may be excluded from the treatment system due to economic insufficiencies, the lack of supportive policies further contributes to their dropping out of treatment.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethics committee approval for this study was obtained from the Istanbul University-Cerrahpaşa Social and Human Sciences Research Ethics Committee at its meeting on 11.10.2023 with the decision number 2023/395.

Informed Consent: Informed consent was obtained from the participants who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – N.A., İ.A., Ö.M.Y.; Design – N.A., İ.A., Ö.M.Y.; Supervision – İ.A., Ö.M.Y.; Resources – N.A., K.A., İ.A.; Materials – N.A., İ.A., Ö.M.Y.; Data Collection and/or Processing – N.A., K.A.; Analysis and/or Interpretation – N.A., İ.A.; Literature Search – N.A., K.A.; Writing – N.A., İ.A.; Critical Review – İ.A., Ö.M.Y.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this studyhas received no financial support.

References

Acar, B., Çakır, G., Karaköse, Ş., & Yaman, Ö. M. (2022). Alkol ve madde bağımlısı bireylerin tedavi süreçlerinde ve motivasyonlarında sosyal destek sistemlerinin etkisi. *Bağımlılık Dergisi*, *23*(4), 452 – 463.

Acevedo, A., Harvey, N., Kamanu, M., Tendulkar, S., & Fleary, S. (2020). Barriers, facilitators, and disparities in retention for adolescents in treatment for substance use disorders: A qualitative study with treatment providers. *Substance Abuse Treatment, Prevention, and Policy*, *15*(1), 1 – 13. [CrossRef]

Apodaca, T. R., & Longabaugh, R. (2009). Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. *Addiction*, *104*(5), 705 – 715. [CrossRef]

Ball, S. A., Carroll, K. M., Canning-Ball, M., & Rounsaville, B. J. (2006). Reasons for dropout from drug abuse treatment: Symptoms, personality, and motivation. *Addictive Behaviors*, *31*(2), 320 – 330. [CrossRef]

Basu, D., Ghosh, A., Sarkar, S., Patra, B. N., Subodh, B. N., & Mattoo, S. K. (2017). Initial treatment dropout in patients with substance use disorders attending a tertiary care de-addiction centre in north India. *Indian Journal of Medical Research*, *146*(Suppl 2), S77 – S84. [CrossRef]

Bøhle, K., Otterholt, E., & Bjørkly, S. K. (2023). A prospective biopsychosocial repeated measures study of stress and dropout from substance addiction treatment. *Substance Abuse and Rehabilitation*, *14*, 61 – 75. [CrossRef]

Burke, A. C., & Gregoire, T. K. (2007). Substance abuse treatment outcomes for coerced and noncoerced clients. *Health and Social Work*, *32*(1), 7 – 15. [CrossRef]

Creswell, J. W. (2021). Karma yöntem araştırmalarına giriş [A concise introduction to mixed methods research] (M. Sözbilir, Trans.). Pegem Akademi. [CrossRef]

DiClemente, C. C., Corno, C. M., Graydon, M. M., Wiprovnick, A. E., & Knoblach, D. J. (2017). Motivational interviewing, enhancement, and brief interventions over the last decade: A review of reviews of efficacy and effectiveness. *Psychology of Addictive Behaviors*, *31*(8), 862 – 887. [CrossRef]

Farhoudian, A., Razaghi, E., Hooshyari, Z., Noroozi, A., Pilevari, A., Mokri, A., Mohammadi, M. R., & Malekinejad, M., & Malekinejad, M. (2022). Barriers and facilitators to substance use disorder treatment: An overview of systematic reviews. *Substance Abuse: Research and Treatment*, *16*, 11782218221118462. [CrossRef]

Jihad, N., Tandon, T., & Yasir, C. (2022). Reasons for dropout of adolescent substance users from urban private counseling centers in Kerala. *International Journal of Creative Research Thoughts (IJCRT)*, *10*(3).

Kahveci Düztaş, S. (2011). Madde kullanım suçu ile denetimli serbestlik kurumuna yönlendirilen kişilerin profil özellikleri ve bağımlılık şiddetlerinin ölçülmesi [Measuring the profile characteristics and addiction severity of individuals referred to the probation institution for drug use offenses] [Unpublished master's thesis]. Institute of Forensic Medicine, Istanbul University, Istanbul.

Kelly, J. F., Kahler, C. W., & Humphreys, K. (2010). Assessing why substance use disorder patients drop out from or refuse to attend 12-step mutual-help groups: The "REASONS" questionnaire. *Addiction Research and Theory*, *18*(3), 316 – 325. [CrossRef]

Keskin, M. M., Gürel, M., Aktürk, İ., & Yaman, Ö. M. (2024). Madde bağımlılığı tedavisinde ilaç kullanımının reddine dair nitel bir değerlendirme [A qualitative evaluation of refusal of medication use in substance addiction treatment]. Bingöl Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, *27*, 186 – 200.

Kümbetoğlu, B. (2019). Qualitative Methods and Research in Sociology and Anthropology. Bağlam Publishing.

Landrum, B., Knight, D. K., Becan, J. E., & Flynn, P. M. (2015). To stay or not to stay: Adolescent client, parent, and counselor perspectives on leaving substance abuse treatment early. *Journal of Child and Adolescent Substance Abuse*, *24*(6), 344 – 354. [CrossRef]

Lappan, S. N., Brown, A. W., & Hendricks, P. S. (2020). Dropout rates of in - person psychosocial substance use disorder treatments: A systematic review and meta - analysis. *Addiction*, *115*(2), 201 – 217. [CrossRef]

López - Goñi, J. J., Fernández - Montalvo, J., & Arteaga, A. (2012). Addiction treatment dropout: Exploring patients' characteristics. *American Journal on Addictions*, *21*(1), 78 – 85. [CrossRef]

McHugh, R. K., Hearon, B. A., & Otto, M. W. (2010). Cognitive behavioral therapy for substance use disorders. *Psychiatric Clinics of North America*, *33*(3), 511 – 525. [CrossRef]

Morin, J.-F. G., Harris, M., & Conrod, P. J. (2017). A review of CBT treatments for substance use disorders. In *The Oxford handbook of cognitive and behavioral therapies*. Oxford University Press. [CrossRef]

Myers, B. (2019). Psychotherapy for substance use disorders. In *Global mental health and psychotherapy* (pp. 241 – 256). Elsevier. [CrossRef]

Ormbostad, H. A. K., Otterholt, E., & Stallvik, M. (2021). Investigating patients' perceptions of residential substance use treatment: Is dropout a deliberate or impulsive act? *Journal of Social Work Practice in the Addictions*, *21*(3), 255 – 272. [CrossRef]

Pagano, A., Hosakote, S., Kapiteni, K., Straus, E. R., Wong, J., & Guydish, J. R. (2021). Impacts of COVID-19 on residential treatment programs for substance use disorder. *Journal of Substance Abuse Treatment*, *123*, 108255. [CrossRef]

Ramey, T., & Regier, P. S. (2019). Cognitive impairment in substance use disorders. *CNS Spectrums*, *24*(1), 102 – 113. [CrossRef]

Rogers, A. H., Shepherd, J. M., Garey, L., & Zvolensky, M. J. (2020). Psychological factors associated with substance use initiation during the COVID-19 pandemic. *Psychiatry Research*, *293*, 113407. [CrossRef]

Sevin, M. D., & Erbay, E. (2019). AMATEM'de ikinci kez tedavi gören madde Bağımlılarının madde Kullanımına ilişkin yaşam Deneyimleri. *Addicta: The Turkish Journal on Addictions*, *6*(3).

Şimşek, M., Aktürk, İ., Dinç, M., Işık, S., & Ögel, K. (2019). Bir bağımlılık danışma merkezinde uygulanan tedavi programına yönelik etkililik değerlendirmesi: YEDAM örneği [Effectiveness evaluation of a treatment program implemented in an addiction counseling center: The YEDAM example]. *Turkish Journal on Addictions*, *6*, 795 – 817.

Teichner, G., Horner, M. D., Roitzsch, J. C., Herron, J., & Thevos, A. (2002). Substance abuse treatment outcomes for cognitively impaired and intact outpatients. *Addictive Behaviors*, *27*(5), 751 – 763. [CrossRef]

Türkmen, M. (2018). Ceza sosyolojisi açısından Türkiye'de ceza adalet politikaları ve denetimli serbestlik [Penal justice policies and probation in Turkey from the perspective of penal sociology]. *Akdeniz İnsani Bilimler Dergisi*, *8*(1), 379 – 397.

United States Department of Health and Human Services (2024). What are drug courts? https://www.hhs.gov/opioids/treatment/drug-courts/index.html.

UNODC (2022). *World drug report*. United Nations Office on Drugs and Crime.

Vaske, J. J., Beaman, J., & Sponarski, C. C. (2017). Rethinking internal consistency in Cronbach's alpha. Leisure Sciences, *39*(2), 163 – 173. [CrossRef]

Weisner, C., Ray, G. T., Mertens, J. R., Satre, D. D., & Moore, C. (2003). Short-term alcohol and drug treatment outcomes predict long-term outcome. *Drug and Alcohol Dependence*, *71*(3), 281 – 294. [CrossRef]

Williams, R. J., & Chang, S. Y. (2000). A comprehensive and comparative review of adolescent substance abuse treatment outcome. *Clinical Psychology: Science and Practice*, *7*(2), 138 – 166. [CrossRef]

Yaman, Ö. M. (2014). Uyuşturucu madde bağımlısı gençlerin aile içi ilişkilere yönelik görüşleri: Esenler-Bağcılar örneği. *Addicta: The Turkish Journal on Addictions*, *1*(1), 99 – 132.

Zemore, S. E., Ware, O. D., Gilbert, P. A., & Pinedo, M. (2021). Barriers to retention in substance use treatment: Validation of a new, theory-based scale. *Journal of Substance Abuse Treatment*, *131*, 108422. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

CASE REPORT

Disulfiram Encephalopathy Presenting with Delirium, Epilepsy, and a Manic Episode: A Case Report

Zehra Uçar Hasanlı, Mustafa Danışman, Gamze Zengin İspir, Kübra Sezer Katar

Ankara Training and Research Hospital, Alcohol and Drug Addiction Treatment Center, Ankara, Türkiye

ORCID iDs of the authors: Z.U.H. 0000-0001-7657-4973, M.D. 0000-0002-7403-8840, G.Z.İ. 0000-0003-3936-6619, K.S.K. 0000-0001-7184-7960.

Main Points

- Disulfiram can cause encephalopathy presenting with delirium, epilepsy, and mania.
- Disulfiram-associated encephalopathy and disulfiram-induced psychosis should be considered in disulfiram-using patients with neuropsychiatric symptoms.
- The patient developed a manic episode after initial symptoms resolved, with a family history suggesting genetic vulnerability to bipolar affective disorder.
- Monitoring for severe neuropsychiatric side effects in patients on disulfiram is important, particularly for those with a psychiatric history or a family history.

Abstract

Disulfiram is an agent used in the treatment of alcohol use disorder and causes a disulfiram-ethanol reaction, which can result in serious adverse effects when taken with alcohol. Although rare, disulfiram can cause neuropsychiatric side effects even in the absence of alcohol consumption. This article presents a case of delirium, epileptic seizures, and a subsequent manic episode that developed on the 30th day of disulfiram treatment. A 50-year-old male patient diagnosed with alcohol use disorder and started on disulfiram treatment presented on the 30th day of treatment with complaints of disorientation, paranoid thoughts, agitation, and speech impairment. Following intramuscular haloperidol administration, the patient experienced a generalized tonic-clonic seizure. No evidence of alcohol or other substance use was found on examination. Electroencephalography revealed epileptiform activity. Disulfiram was discontinued, and antipsychotic/antiepileptic treatment was initiated. The patient was discharged on the fifth day but returned 2 days later with insomnia, increased speech, and grandiose delusions. The patient had a family history of bipolar disorder, and clinical evaluation suggested that he was in a manic episode. Valproic acid was added to the treatment, and the patient was discharged after improvement of symptoms. Cases of delirium, epilepsy, or mania associated with disulfiram use have been reported in the literature; however, there are no reports of these three clinical presentations occurring together. It is thought that disulfiram may have triggered these neuropsychiatric effects by inhibiting the dopamine β-hydroxylase enzyme and thereby increasing dopamine levels. This case is noteworthy as the first reported case of delirium, epilepsy, and mania developing in association with disulfiram.

Keywords: Delirium, disulfiram, encephalopathy, epilepsy, mania

Corresponding author:
Zehra Uçar Hasanlı
E-mail:
zehraucar93@gmail.com

Received: May 2, 2025
Revision Requested: June 22, 2025
Last Revision Received: June 24, 2025
Accepted: July 20, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

Disulfiram, one of the medications used in alcohol use disorder (AUD), exhibits aversive effects through a reaction called disulfiram-ethanol reaction (DER) when used in combination with alcohol, manifesting various adverse effects (Lanz et al., 2023). Especially when administered under observation (supervision), the effectiveness of disulfiram therapy lies

Cite this article as: Uçar Hasanlı, Z., Danışman, M., Zengin İspir, G., & Sezer Katar, K. (2025). Disulfiram encephalopathy presenting with delirium, epilepsy, and a manic episode: A case report. *Addicta: The Turkish Journal on Addictions*, 12(3), 320-323.

DOI:10.5152/ADDICTA.2025.25426

in involving family members capable of monitoring the patient (Axelrath, 2024).

The tolerable mild side effects of disulfiram therapy include dizziness, headache, impotence, and altered taste perception. On the other hand, disulfiram use can lead to neuropsychiatric side effects such as delirium, psychosis, lack of concentration, memory impairment, ataxia, and seizures (Lanz et al., 2023).

This article aims to contribute to the literature by presenting a case of disulfiram-related encephalopathy with sudden-onset disorientation, restlessness, disorganized speech, persecution delusions, and subsequently developing a manic episode following a seizure on the 30th day of disulfiram therapy.

Case Presentation

Consenting to disulfiram therapy under the diagnosis of AUD, a 50-year-old married male with a history of recurrent depression diagnoses and antidepressant medication use was discharged from the clinic with supervised disulfiram treatment under the observation of his spouse. On the 30th day of disulfiram therapy, he was brought to the clinic by his relatives due to disorganized speech, disorganized behavior, persecution delusions that started the day before, and increased psychomotor agitation. His relatives measured his blood pressure at home as 180/105 mmHg. In the initial mental status examination, his orientation to place, time, and person was impaired, and his cooperation was limited. The patient's speech rate had increased, and he had paranoid delusions.

Upon the relatives' confirmation of regular disulfiram intake and absence of any alcohol consumption, the patient was initially treated with intramuscular haloperidol 5 mg under the preliminary diagnosis of disulfiram-induced psychotic reaction. Ten minutes after the administration of haloperidol, the patient experienced a generalized tonic-clonic seizure lasting for 2 minutes. The patient's blood pressure was measured at 170/110. A dose of 10 mg diazepam was administered in a bolus form, and the disulfiram therapy was discontinued. The patient had postictal confusion and was admitted to the intensive care unit (ICU). On the same day, the patient had another seizure and received intravenous (IV) diazepam again.

The brain computed tomography and laboratory tests were normal. Ethanol was detected as <10, and gamma glutamyl transferase (GGT) was found to be 46. Substance metabolites were not seen in the urine analysis. The cranial magnetic resonance imaging revealed no pathological findings or diffusion restriction. With a Clinical Institute Withdrawal Assessment for Alcohol, Revised (CIWA-AR) value of 7, the patient was diagnosed with disulfiram encephalopathy accompanied by delirium and epilepsy, and the treatment was arranged with haloperidol 10 mg/day and quetiapine 25 mg/day. The patient was consulted by internal medicine, infectious diseases, and neurology specialists to rule out organic etiology during this period. No additional recommendations were made by internal medicine or infectious diseases specialists. Electroencephalography (EEG) was requested by the neurology department. The EEG performed on the second day of ICU was interpreted as an "epileptiform anomaly characterized by slow and sharp waves in the fronto-centro-temporal regions."

After the second day in the intensive care unit, without experiencing seizures anymore and with stabilized vital signs, except for a slight increase in speech rate, the patient was discharged on the fifth day with a treatment of quetiapine 25 mg/day, having discontinued haloperidol. No additional treatment was recommended by neurology specialists at discharge.

Two days later, the patient was re-admitted to the clinic complaining of insomnia, increased speech, and racing thoughts, with a preliminary diagnosis of a manic episode. During the psychiatric examination upon re-admission, increased and pressured speech, racing thoughts, increased goal-directed activities, and grandiose delusions were observed. The Young Mania Rating Scale was calculated as 20, and olanzapine 5 mg was initiated. The patient's complaints intensified on the second day of this re-admission, and the Young Mania Rating Scale increased to 35. The treatment was adjusted to olanzapine 20 mg, haloperidol 10 mg, quetiapine 300 mg, and valproic acid 1250 mg (valproic acid blood level on the fifth day: 73 mg/L).

As the manic symptoms improved, after a detailed anamnesis was obtained from the patient and their relatives, it was discovered that the patient's deceased mother had a history of bipolar disorder and lithium treatment. Having shown improvement with a decrease in the Young Mania Rating Scale to 5 during the 2-week hospitalization period, the patient was discharged on valproic acid 1250 mg/day, olanzapine 20 mg/day, and quetiapine 300 mg/day. The definitive diagnosis for the patient was confirmed as disulfiram encephalopathy, presenting with delirium, epilepsy, and a manic episode.

Written informed consent was obtained from the patient for this case report.

Discussion

In patients diagnosed with AUD, the occurrence of delirium or epileptic seizures should first prompt consideration of alcohol withdrawal syndrome (AWS) (Day & Daly, 2022). In the presented case, the patient discharged with supervised disulfiram therapy showed average GGT values, a CIWA-AR score of 7, and a history indicating no alcohol consumption, leading to the divergence from the diagnoses of Delirium Tremens (DT) and epilepsy attributed to AWS.

Cases of seizures following DER or singular use of disulfiram have been reported in the literature (Nogueira et al., 2021). These seizures often do not recur upon discontinuation of disulfiram. Although the mechanism of how disulfiram induces seizures is unknown, even without the synergistic effect of alcohol consumption, the seizure threshold may be lower due to decreasing norepinephrine levels and increasing dopamine levels in the brain. Additionally, disulfiram may lead to EEG changes resembling delirium due to hypoxia in the central nervous system (Kulkarni & Bairy, 2015).

Researchers have observed that 37.5% of patients experiencing seizures had hypertension, too, and within 6 weeks after treatment, there was a decline in both seizures and hypertension symptoms (Kulkarni & Bairy, 2015). After discontinuation of disulfiram therapy in patients experiencing seizures related to its

use, the recurrence of seizures is not expected. The EEG findings, hypertension, regression of delirium, and seizures after discontinuation of disulfiram therapy and initiation of antiepileptic agents in the presented case align with these reported findings in the literature (Heung et al., 2018). In this case, it's hypothesized that disulfiram, through a possible shared neurobiological basis like dopamine β-hydroxylase inhibition, might have been closely associated with seizures, hypertension, and a manic episode (increased dopamine) (Gupta & Spoorthy, 2022).

Although rare, disulfiram-associated delirium and psychosis typically manifest within the first few months of disulfiram therapy (Das et al., 2017). The development of delirium in individuals using disulfiram is often associated with a DER or a psychotic process (Ghosh et al., 2019). Similarly, disulfiram-associated psychosis usually accompanies the clinical picture of delirium (Iwashige & Shibasaki, 2006).

Lidden and Satran classified three groups of disulfiram-related psychotic reactions: primarily delirium features without significant psychotic traits (Group 1); significant depression, manic, or paranoid features in addition to delirium (Group 2); and depressive, acute manic, or psychotic traits without delirium (Group 3). Of 52 cases of disulfiram psychosis, only five were actual psychosis cases, while others were toxic delirium associated with disulfiram use (Liddon & Satran, 1967). In this case, the initial presence of delirium symptoms alongside psychotic features, followed by the resolution of delirium and the emergence of manic episodes, aligns with these findings in the literature. The inhibition of dopamine β-hydroxylase by disulfiram may result in increased dopamine levels in the Central Nervous System (CNS), leading to psychotic symptoms (Mandula et al., 2024) and mood alterations (Ceylan et al., 2007).

The literature presents cases of manic episodes following disulfiram use (Ceylan et al., 2007; Gupta & Spoorthy, 2022; İnaltekin & Yağcı, 2022; Li & Shen, 2008; Lin et al., 2020; Mackie & Clark, 1994; Maşalı et al., 2009). Manic episodes were observed in two of these cases with a disulfiram dosage of 1500 mg/day (Ceylan et al., 2007; Li & Shen, 2008), in three cases with therapeutic doses (500 mg/day) during the first month (Maşalı et al., 2009), second month (Gupta & Spoorthy, 2022), and at the fifth month (İnaltekin & Yağcı, 2022), and in another case with a lower dose (200 mg/day) in the second month (Lin et al., 2020). Two of these cases also had delirium accompanying manic episodes (Li & Shen, 2008; Mackie & Clark, 1994). In psychotic conditions associated with disulfiram, including mania, clinicians should consider avoiding prolonged, unnecessary use of antipsychotics as the psychotic condition tends to regress 1 – 14 days (average interval: 7.5 days) after disulfiram discontinuation (Das et al., 2017).

Maşalı et al. (Maşalı et al., 2009) presented a patient with increased speech and grandiose delusions on the 30th day of disulfiram treatment and received haloperidol but, upon symptom improvement, was discharged without medication on the 7th day. However, a week later, the patient's manic symptoms recurred. Similarly, the patient was discharged after the improvement of psychotic symptoms following haloperidol and quetiapine treatment on the fifth day of ICU admission but was re-admitted on the second day post discharge with a diagnosis of a manic episode. Discontinuation of disulfiram in psychotic conditions, including mania, should be considered, as disulfiram can have effects for up to 2 weeks, and premature termination of treatment may lead to relapses (Maşalı et al., 2009).

The higher prevalence of psychiatric complications associated with disulfiram in Eastern countries raises the possibility of genetic factors playing a role in disulfiram-induced psychosis. Patients with a family history of psychosis might have a higher likelihood of a genetic background for disulfiram-induced psychosis (Melo et al., 2014). Although this case has a family history of bipolar disorder, the occurrence of the first manic episode not in the expected 20s or 30s but at 50 years old raises the suspicion that the manic episode might be due to disulfiram treatment.

While cases have been reported of disulfiram-associated delirium, psychosis/mania, epileptic seizures, or concurrent delirium and psychosis, encountering a case with concomitant disulfiram-induced delirium, epilepsy, and mania during the same period is unprecedented. This case holds the distinction of being the first case where disulfiram-induced delirium, epilepsy, and manic attacks co-occurred due to disulfiram use.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Informed Consent: Written informed consent was obtained from the patient who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – Z.U.H., M.D., G.Z.İ., K.S.K.; Design – Z.U.H., M.D., G.Z.İ., K.S.K.; Supervision – N/A; Resources – N/A; Materials – Z.U.H., M.D., G.Z.İ., K.S.K.; Data Collection and/or Processing – Z.U.H., M.D., G.Z.İ., K.S.K.; Analysis and/or Interpretation – N/A; Literature Search – N/A; Writing Manuscript – Z.U.H.; Critical Review – Z.U.H., M.D., G.Z.İ., K.S.K.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

References

Axelrath, S. (2024). Disulfiram should remain second-line treatment for most patients with alcohol use disorder. *Journal of Addiction Medicine*, *18*(6), 617 – 618. [CrossRef]

Ceylan, M. E., Turkcan, A., Mutlu, E., & Onal, O. (2007). Manic episode with psychotic symptoms associated with high dose of disulfiram: A case report. *Journal of Clinical Psychopharmacology*, *27*(2), 224 – 225. [CrossRef]

Das, N., Mahapatra, A., & Sarkar, S. (2017). Disulfiram induced psychosis: Revisiting an age-old entity. *Asian Journal of Psychiatry*, *30*, 94 – 95. [CrossRef]

Day, E., & Daly, C. (2022). Clinical management of the alcohol withdrawal syndrome. *Addiction*, *117*(3), 804 – 814. [CrossRef]

Melo, R. C., Lopes, R., & Alves, J. C. (2014). A case of psychosis in disulfiram treatment for alcoholism. *Case Reports in Psychiatry*, *2014*, 561092. [CrossRef]

Ghosh, A., Basu, D., Pradeep, C., & Subodh, B. (2019). Disulfiram-induced psychosis at a therapeutic dose and in clear sensorium: Two case demonstrations. *Journal of Mental Health and Human Behaviour*, *24*(1), 57 – 59. [CrossRef]

Gupta, P., & Spoorthy, M. S. (2022). Disulfiram induced mania – A case report. *Indian Journal of Psychiatry*, *64*(Suppl. 3), S677.

Heung, J., Poon, J. Y.-K., Tung, C.-K., Yeung, S.-W., & Lam, M. (2018). Confusion in sobriety: A case study on disulfiram encephalopathy in a middle-aged male patient. *Alcohol and Alcoholism*, *53*(4), 497 – 498. [CrossRef]

İnaltekin, A., & Yağcı, İ. (2023). Mania as a result of using disulfiram at the prescribed amount during the fifth month of maintenance therapy: A case report. *Addicta: The Turkish Journal on Addictions*, 10(1), 20-22.

Iwashige, T., & Shibasaki, M. (2006). Disulfiram-induced delirium: A case report. *Nihon Arukoru Yakubutsu Igakkai Zasshi*, *41*(6), 535 – 540.

Kulkarni, R. R., & Bairy, B. K. (2015). Disulfiram-Induced de novo convulsions without alcohol challenge: Case series and review of literature. *Indian Journal of Psychological Medicine*, *37*(3), 345 – 348. [CrossRef]

Lanz, J., Biniaz-Harris, N., Kuvaldina, M., Jain, S., Lewis, K., & Fallon, B. A. (2023). Disulfiram: Mechanisms, applications, and challenges. *Antibiotics*, *12*(3), 524. [CrossRef]

Li, M.-Y., & Shen, Y.-C. (2008). Manic episode with psychosis following a lower than recommended dosage regimen of disulfiram. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *32*(1), 311 – 312. [CrossRef]

Liddon, S. C., & Satran, R. (1967). Disulfiram (Antabuse) psychosis. *American Journal of Psychiatry*, *123*(10), 1284 – 1289. [CrossRef]

Lin, Y., Tsai, P.-C., & Cheng, Y.-C. (2020). High-dose disulfiram-induced delirium and manic features: A case report. *Taiwanese Journal of Psychiatry*, *34*(2), 96 – 97. [CrossRef]

Mackie, J., & Clark, D. (1994). Cannabis toxic psychosis while on disulfiram. *British Journal of Psychiatry*, *164*(3), 421 – 421. [CrossRef]

Mandula, S. K., Mukherjee, D., Chakravarty, P. J., & Bhattacharya, S. (2024). Disulfiram-induced psychosis still an important clinical entity: A case series. *Industrial Psychiatry Journal*, *33*(Suppl 1), S229 – S232. (doi:[CrossRef]

Maşalı, B., Atış, Y., & Yeşilbursa, D. (2009). Sürdürüm Dozunda Disülfiram Kullanımına Bağlı Mani Olgusu. *Klinik Psikofarmakoloji Bülteni*, *19*(Suppl. 1): S270-S272.

Nogueira, V., Mendes, M. A., Pereira, I., & Teixeira, J. (2021). Disulfiram-induced epileptic seizures. *BMJ Case Reports*, *14*(3), e236296. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

The Relationship of Smartphone Addiction with Sleep Quality, Eating Attitudes, and Obesity

Deniz Dolaş, Mustafa Nogay Coşkun, Ali Erdoğan

Department of Psychiatry, Akdeniz University Faculty of Medicine, Antalya, Türkiye

ORCID iDs of the authors: D.D. 0009-0009-0470-0550, M.N.C. 0000-0003-0574-6664, A.E. 0000-0003-0329-6778.

Main Points

- About 45.9% of the participants were found to have smartphone addiction.
- Smartphone addiction causes worse sleep quality.
- Factors associated with smartphone addiction include the absence of chronic physical illness, the presence of psychiatric illness, poor sleep quality, poor eating attitude, average daily smartphone, internet, and social media usage time.
- There is no relationship between obesity and smartphone addiction.

Abstract

We aimed to examine the relationship between smartphone addiction and sleep quality, eating attitudes, and obesity. This research included 407 university students aged 18 – 30 years who had been using smartphones for at least the last 6 months. The Smartphone Addiction Scale-Short Form, Pittsburgh Sleep Quality Index, and Eating Attitudes Test were administered to all participants along with the Sociodemographic Data Form. Participants' height and weight were recorded based on self-reports. Smartphone addiction was found in 45.9% of the students. The median value of the Pittsburgh Sleep Quality Index scale was higher in participants with smartphone addiction than in those without smartphone addiction ($p < .001$). The absence of chronic physical illness, presence of psychiatric illness, duration of internet use, duration of smartphone use, duration of social media use, poor sleep quality, and poor eating attitudes were found to be associated with smartphone addiction. It can be said that nearly half of the participants may have smartphone addiction and sleep quality is impaired in those with smartphone addiction. Additionally, smartphone addiction is associated with the presence of psychiatric illness, poor sleep quality, and poor eating attitudes, but not with obesity.

Keywords: Eating disorder, obesity, sleep disorder, smartphone addiction, social media

Corresponding author:
Mustafa Nogay Coşkun
E-mail:
mustafanogay@gmail.com

Received: June 22, 2024
Revision Requested: March 3, 2025
Last Revision Received: March 26, 2025
Accepted: April 13, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

In recent years, smartphone users have expanded dramatically, and they are now an essential part of everyday life. By 2023, more than half of the global population is reported to own a smartphone (GSMA, 2024). Although the widespread use of smartphones has brought many conveniences to lives, the problems arising from the overuse of these devices cannot be ignored. Overuse can reach the level of addiction. In this case, which can be called smartphone addiction (SA), people use their smartphones uncontrollably. This use disrupts people's functionality. Despite this harm, people continue to use impulsively and show withdrawal symptoms (Panova & Carbonell, 2018). Smartphone addiction rates are found to be extremely high in studies. For example, SA among adolescents in India is reported to range between 39% and 44% (Davey & Davey 2014). In the research performed in the United Kingdom with 1043 participants aged 18 – 30 years, the rate of SA was 38.9% (Sohn et al., 2021). In the research performed among 771 university students in Türkiye, 42.4% of people were found to be addicted to their smartphones (Uzunçakmak et al., 2022). In a review of 39 studies, it was reported that SA rates among nursing students in 15 countries ranged from 19% to 72% (Zhou et al., 2024). One

Cite this article as: Dolaş, D., Coşkun, M. N., & Erdoğan, A. (2025). The relationship of smartphone addiction with sleep quality, eating attitudes, and obesity. *Addicta: The Turkish Journal on Addictions*, 12(3), 324-330.

DOI: 10.5152/ADDICTA.2025.24097

study reported the prevalence of SA to be 41.93% among medical students in seven Asian countries (Zhong et al., 2022).

SA is associated with many problems. One of the most important of these is sleep disorders. An association has been observed between sleep disorders and SA. Studies have reported that as SA scores increase, sleep disorder scores increase (Sanusi et al., 2022; Nikolic et al., 2023). Another problem is eating disorders. The excessive use of smartphones excessively is closely linked to eating disorders, eating behaviors, and lifestyle (Wang et al., 2023). It has been reported that poor eating attitudes increase as SA increases (Çakir Kardeş et al., 2023). It is also highlighted that children's and teenagers' obesity may be linked to inappropriate smartphone use (Ma et al., 2021). A connection has been found between obesity, eating habits, and SA. It has been observed that eating habits are impacted by SA, which elevates body weight (Örnek & Gündoğmuş, 2022). In light of all this literature, it can be said that SA is an important health problem that needs to be investigated.

This study contributes to the existing literature by examining the combined impact of smartphone addiction, sleep quality, and eating attitudes among university students, a topic that has been explored separately but not comprehensively. Specifically, the study investigates the relationships between smartphone addiction, daily social media and internet use, and eating behaviors. This study will contribute to the literature on the effects of smartphone addiction on eating attitudes and obesity.

The following sub-objectives were determined:

Sub-objective 1: To investigate the relationship between smartphone addiction and sleep quality.

Sub-objective 2: To investigate the association between smartphone addiction, daily internet use, and eating attitudes.

Based on these objectives, the following hypotheses were formulated:

H1: Higher smartphone addiction is associated with poorer sleep quality.

H2: Higher smartphone addiction is associated with problematic eating attitudes.

H3: Increased daily social media use is associated with problematic eating attitudes.

Material and Methods

Participants, Study Design, and Methodology

We recruited 407 volunteer participants between the ages of 18 and 30 years, who were studying at Akdeniz University Faculty of Medicine, agreed to participate in the study after being informed about the research, and met the inclusion and exclusion criteria. Physical and psychiatric illnesses of participants were assessed through self-report. Participants were asked to disclose their medical history, including any diagnosed conditions, during the data collection process. Sociodemographic Data Form, Smartphone Addiction-Short Form (SAS-SV) (Kwon et al., 2013), Pittsburgh Sleep Quality Index (PSQI) (Agargun, 1996), Eating Attitude Test (EAS) (Garner & Garfinkel, 1979; Savaşır & Erol, 1989) were applied to the participants. In addition, the height and weight of all participants were taken as declarations, and body mass indexes (BMI) were calculated. Ethics committee approval was obtained from the Akdeniz University Faculty of Medicine Clinical Research Ethics Committee (Decision No: KAEK-695, Date: September 13, 2023). The participants were informed about the research and then signed consent was obtained from all participants. The principles of the Declaration of Helsinki were followed throughout all phases of the study.

Inclusion Criteria

- To be between the ages of 18 and 30.
- Using a smartphone for at least the last 6 months.

Exclusion Criteria

- Presence of comorbidity of psychiatric disorders other than depression and anxiety disorders according to DSM-5 (e.g., psychotic disorder, schizoaffective disorder, eating disorder, etc.).
- Presence of severe physical illness (e.g., liver failure, kidney failure, cancer, etc.).
- Infection and infectious disease.
- History of neurological disease.

At the time of the study, nearly 2000 students were enrolled in the medical faculty. However, not all could be reached. A total of 357 students declined participation, and 14 students were excluded due to the predefined exclusion criteria.

The data for this study were collected between September 24, 2023, and December 24, 2023. This study uses a cross-sectional survey model to examine the relationships between smartphone addiction, sleep quality, and eating attitudes among university students (Creswell & Creswell, 2017). Participants were selected using a convenience sampling method, and only those who met the inclusion criteria and did not meet any exclusion criteria were invited to participate. Convenience sampling was used to select participants who were readily accessible and available to participate (Sekaran, 2003). This method was chosen to facilitate the data collection process while focusing on a specific group of participants, i.e., medical faculty students, to ensure a more homogenous sample and reduce potential biases.

Data Collection Tools

Sociodemographic and Clinical Data Form

It is a semi-structured information collection tool developed by the researchers for the study to collect sociodemographic and clinical data. The form contains questions about the participant's age, gender, marital status, grade in medical school, presence of chronic disease, regular medication use, and presence of psychiatric illness.

Smartphone Addiction Scale-Short Form

This scale was developed to detect SA (Kwon et al. 2013). This scale consists of six factors (daily life disturbance, positive expectancy, withdrawal, cyberspace-oriented relationship, overuse, and tolerance from the original version of the SA scale), each with ten items and ratings based on a six-item Likert scale. The cut-off values are 33 for women and 31 for men. A higher score

corresponds to a greater likelihood of SA, whereas a lower score indicates a decreased likelihood. In this study, the reliability of the scale was reassessed, and Cronbach's alpha was found to be 0.870, supporting its previously established validity and reliability (Noyan et al., 2015).

Pittsburgh Sleep Quality Index

Buysse et al. developed this index in 1989. It consists of seven parts (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction) with scores from 19 items. Those with a total score of five or below were considered good sleepers; higher scores indicated poorer quality sleep. Although previous studies reported a Cronbach's alpha of 0.870, in the present study, the reliability analysis yielded a Cronbach's alpha of 0.653 for 25 items, indicating a moderate level of internal consistency. (Buysse et al., 1989; Agargun, 1996).

Eating Attitudes Test

It was developed in 1979. The Turkish validity and reliability study was conducted by Savaşır and Erol. The scale consists of six items in a 4-point Likert type. A maximum of three points can be obtained from each question on the scale (120 points in total). Thirty was shown to be the cut-off threshold for eating attitude disorder. In the present study, Cronbach's alpha was found to be 0.872 for 40 items, indicating a high level of internal consistency (Garner & Garfinkel, 1979; Savaşır & Erol, 1989).

Body Mass Index

Body mass divided by the square of the height.

Statistical Analysis

Data were analyzed using IBM SPSS 25 (IBM SPSS Corp.; Armonk, NY, USA). The compatibility of continuous variables with normal distribution was examined by the Kolmogorov-Smirnov test. (– . Categorical variables in the study were presented as frequency (n) and percentage (%), and continuous variables were presented as mean ± standard deviation, median (interquartile range [IQR], 25th – 75th percentile), and minimum – maximum values. In the correlation analysis between continuous variables, Spearman Rho correlation analysis was used because the data were not normally distributed. In independent two-group analyses, Independent Samples *t*-test was used for normally distributed data and Mann – Whitney *U* Test was used for non-normally distributed data. Pearson Chi-Square Test, Fisher Freeman Halton Exact Test, Post Hoc Bonferroni correction, and Yates correction were used in the analysis of independent categorical variables. Logistic regression analysis was performed to determine the independent risk factors associated with SA. The results are presented with odds ratio (OR) and 95% CIs. The statistical significance level was accepted as 0.05.

Results

The participants' mean age was 21.15 ± 2.17 years (min: 18 to max: 29). Because of SAS-SV scale-specific scoring, 45.9% (n = 187) of the patients were found to have SA. According to the PSQI score, 32.9% (n = 134) of the participants had sleep problems. According to the EAS scale, 8.8% (n = 36) of the participants were characterized as having a disordered eating attitude. Other sociodemographic data are summarized in Table 1.

Table 1.
Sociodemographic and Clinical Characteristics of All Participants

		n **(407)**	**%**
Gender	Woman	203	49.9
	Male	204	50.1
Marital status	Single	404	99.3
	Married	2	0.5
	Divorced	1	0.2
Classroom	1	89	21.9
	2	70	17.2
	3	70	17.2
	4	44	10.8
	5	73	17.9
	6	61	15.0
Chronic physical illness	Yes	47	11.5
	No	360	88.5
Psychiatric illness (depression and anxiety)	Yes	50	12.3
	No	357	87.7
Regular use of medication	Yes	82	20.1
	No	325	79.9
Body mass index (BMI) category	Underweight	31	7.6
	Normal	262	64.4
	Overweight	84	20.6
	Obese	30	7.4
Most frequently used social media application	Instagram	250	61.4
	X (Twitter)	88	21.6
	TikTok	19	4.7
	Other	50	12.3
Age (years) (Median) (IQR) (min-max)	21 (19 – 23) (18 – 29)		
Height (cm) (Median) (IQR) (min-max)	171 (165 – 179) (147 – 198)		
Weight (kg) (Median) (IQR) (min-max)	65 (57 – 80) (41 – 130)		
BMI (kg/m²) (Median) (IQR) (min-max)	22.69 (20.31 – 25.56) (15.24 – 39.68)		
Smartphone Addiction Scale (Median) (IQR) (min-max)	30 (23 – 38) (11 – 60)		
Eating Attitude Scale (Median) (IQR) (min-max)	11 (7 – 19) (0 – 83)		
Pittsburgh Sleep Quality Index (Median) (IQR) (min-max)	4 (3 – 6) (0 – 16)		
Daily internet use (hours) (Median) (IQR) (min-max)	4 (3 – 6) (1 – 12)		
Daily smartphone use (hours) (Median) (IQR) (min-max)	4 (3 – 6) (1 – 14)		
Daily social media use (hours) (Median) (IQR) (min-max)	3 (2 – 4) (0 – 13)		

Table 2.
Comparison of Participants with and without Smartphone Addiction

		Participants without Smartphone Addiction (n = 220)		Participants with Smartphone Addiction (n = 187)		
		n	**%**	***N***	**%**	***p***
Gender	Woman	110	50.0	93	49.7	0.957*
	Male	110	50.0	94	50.3	
Chronic physical illness	Yes	32	14.5	15	8.0	0.058*
	No	188	85.5	172	92.0	
Psychiatric illness	Yes	20	9.1	30	16.0	**0.033***
	No	200	90.9	157	84.0	
Sleep disturbance	Yes	58	26.4	76	40.6	**0.002***
	No	162	73.6	111	59.4	
Eating Behavior	Normal	205	93.2	166	88.8	0.165*
	Unhealthy	15	6.8	21	11.2	
Most frequently used social media application	Instagram	153	69.5	97	51.9	**<0.001α**
	X (Twitter)	39	17.7	49	26.2	
	TikTok	4	1.8	15	8.0	
	Other	24	19.9	26	13.9	
Age (years)		21 (19 – 23)		21 (19 – 23)		0.424 μ
BMI (kg/m²)		22.23 (20.28 – 25.59)		23.03 (20.44 – 25.39)		0.290 μ
Smartphone Addiction Scale*		23 (19 – 28)		39 (35 – 43)		**<0.001** μ
Eating Attitude Scale*		10 (7 – 16)		12 (7 – 21)		0.061 μ
Pittsburgh Sleep Quality Index*		4 (2 – 6)		5 (3 – 7)		**<0.001** μ
Daily internet use (hours)*		4 (3 – 5)		5 (4 – 6)		**<0.001** μ
Daily smartphone use (hours)*		4 (3 – 5)		5 (4 – 6)		**<0.001** μ
Daily social media use (hours)*		2 (1 – 3)		3 (2 – 5)		**<0.001** μ

μ Mann – Whitney *U* test, *Med* (IQR)-. Bold values indicate statistically significant results (p < 0.05).
*Pearson Ki-Kare test, Yates Correction, *n* (%).
α Pearson Ki-Kare test, Yates Correction, Post-Hoc Bonferroni Düzeltmesi *n* (%).

The comparison of sociodemographic characteristics of those with and without SA according to the SAS-SV scale is summarized in Table 2.

When participants with and without sleep problems were compared, the average daily internet and smartphone usage times were higher in participants with sleep problems ($p < .001$ and $p = .002$, respectively). The proportion of participants with disordered eating behavior in those with sleep problems (14.9%) was significantly higher than the proportion of participants without disordered eating behavior (5.9%) ($p = .005$).

To examine the relationship between smartphone addiction and sleep quality (H1), a Spearman's rho correlation analysis was conducted. Similarly, to test the hypotheses that daily social media use is correlated with eating attitudes (H2) and that increased daily social media use is associated with problematic eating attitudes (H3), another Spearman's rho correlation analysis was performed. The results are presented in Table 3.

The comparison of participants in terms of preclinical and clinical periods is summarized in Table 4.

Variables that may affect SA were analyzed by logistic regression analysis. According to the results of the analysis, not having a chronic disease increases the likelihood of SA by 1.952 times (OR: 1.952; 95% CI: (1.022 – 3.728); $p = .043$). Having a psychiatric illness increases the likelihood of SA by 1.911 times (OR: 1.911; 95% CI: (1.045 – 3.493); $p = .035$). The likelihood of SA increases 1.251 times (OR: 1.251; 95% CI: (1.140 – 1.372); $p < .001$) when average daily internet use increases by one unit, 1.475 times (OR: 1.475; 95% CI: (1.305 – 1.668); $p < .001$), 1.860 times (OR: 1.860; 95% CI: (1.581 – 2.188); $p < .001$) when daily social media use increases by one unit, 1.113 times (OR: 1.113; 95% CI: (1.041 – 1.191); $p = .002$) and 1.022 times (OR: 1.022; 95% CI: (1.005 – 1.040); $p < .001$) when the EAS scale increases by one unit.

Discussion

In recent years, SA has emerged as an extremely common problem among young people. Different rates are reported in studies conducted in different countries regarding SA. For example, rates such as 44% in India and 38.9% in the United Kingdom have been reported (Davey & Davey 2014; Sohn et al., 2021). Smartphone addiction is also extremely high in Türkiye. Overall, 42.4% of 771

Table 3.
Correlation between Age, Duration of Daily Use and Scale Scores

Spearman's rho		Age	Daily Internet	Everday Smartphone	Daily Social Media	Smartphone Addiction Scale	Sleep Quality Scale	Eating Attitude Scale
Age	r	1						
Daily internet	r	0.005	1					
Everday smartphone	r	−0.108*	0.486**	1				
Daily social media	r	−0.123*	0.367**	0.629**	1			
Smartphone Addiction Scale	r	0.042	0.310**	0.402**	0.481**	1		
Sleep Quality Scale	r	−0.037	0.181**	0.145**	0.072	0.198**	1	
Eating Attitude Scale	r	−0.071	0.01	0.107*	0.046	0.145**	0.238**	1

*Correlation is significant at 0.05 level. Bold values indicate statistically significant results ($p < 0.05$).
**Correlation is significant at 0.01 level.

Turkish college students were found to be affected by SA in a research (Uzunçakmak et al., 2022). In this study, 45.9% of the participants were found to have SA because of SAS-SV-specific scoring. It is possible to argue that the high rate of young individuals in the sample—whose median age was 21—was a result of their dependency ratio.

Indeed, SA is reported to be an important problem, especially in the young population (Zhong et al., 2022). There may be many reasons for SA in young people. Depression, anxiety, insomnia, and lack of social support seem to be associated with SA (Aker et al., 2017). Therefore, SA is an important problem that needs to be addressed in a multidimensional way. The fact that almost half of the participants in the study had SA can be interpreted as a significant proportion of young people in the country are faced with SA. It is believed that urgent preventive public health interventions are necessary for this behavioral addiction.

Table 4.
Comparison of Preclinical (First, Second and Third Year Students) and Clinical Years (Fourth, Fifth and Final Year Students)

Variables (n = 407)	Education Periods: Preclinical (n = 229)	Education Periods: Clinical (n = 178)	p
Smartphone Addiction Scale *	30.6±9.96	30.66±10.17	0.957 α
Sleep Quality Scale **	4 (3 – 7)	4 (2 – 6)	0.009μ
Eating Attitude Scale **	12 (7 – 19)	10 (6 – 18)	0,036μ
Smartphone Addiction Status			0.875*
No dependency	123 (53.7)	97 (54.5)	
Dependency	106 (46.3)	81 (45.5)	
Sleep Problem Status			0.160*
No Sleep Problems	147 (64.2)	126 (70.8)	
Sleep Problems	82 (35.8)	52 (29.2)	
Eating Behavior			0.931*
Normal	208 (90.8)	163 (91.6)	
Unhealty eating attitude	21 (9.2)	15 (8.4)	

μ Mann – Whitney U test, *Med* (IQR)-. Bold values indicate statistically significant results ($p < 0.05$).
*Pearson Ki-Kare test, Yates Correction, n (%).
α Independent Samples t-test, Ort ± Standard deviation.

One of the study's key findings is that 32.9% of the participants had sleep problems, and the presence of sleep problems was significantly higher in people with SA than in people without SA. This research revealed a link between SA and sleep disturbance. It is well known that sleep disorders and SA are related. A study of 761 medical students reported significant associations between SA and poor sleep quality (Nikolic et al., 2023). Strong associations between the PDQI score and the SA scale were discovered in a different study involving 420 dental students, suggesting that poorer sleep quality corresponds with higher levels of SA (Sanusi et al., 2022). In a study conducted in the United Kingdom with 1043 participants aged 18 – 30 years, sleep quality was found to be worse in those with SA compared to those without, and SA was associated with poor sleep (Sohn et al., 2021). In particular, it has been reported that smartphone use near the onset of sleep may delay the circadian rhythm and therefore affect total sleep time and sleep quality (Lin et al., 2019). In patients presenting to outpatient clinics with sleep disorders, SA should be questioned in addition to diseases such as depression and anxiety. It is also reported in the literature that SA is associated with spending too much time on the smartphone and with diseases such as depression (Nikolic et al., 2023). There are relationships between SA and mental health. In one study, 574 medical students were evaluated and it was found that for every unit increase in SA, there was an increase in levels of neuroticism, stress, anxiety, and depression (Lei et al., 2020). This study revealed a correlation between SA and psychiatric illnesses such as anxiety and depression. Therefore, it should be kept in mind that the patient may have SA in addition to diseases such as depression and anxiety. In this study, the amount of time spent using a smartphone was found to be associated with SA. Therefore, it is thought that keeping young people away from smartphones as much as possible and directing them to sports and cultural activities instead of spending time on smartphones may be protective.

Additionally, there may be a connection between eating habits and the usage of smartphones, according to reports. It has been found that SA causes changes in eating behavior and SA may be a precursor of eating disorders. In a study conducted in Korea, 63.4% of the 372 students who participated in the evaluation ate snacks while watching television, using a computer, or using a smartphone, and 48.1% of the participants ate snacks while using a smartphone. In both cases, smartphone overexposure (≥2 hours per day) was the most common. Additionally, it was found that a greater proportion of participants in the group overexposed to smartphones spent more money on snacks, preferred fast food, ice cream, and fizzy drinks. The group that was overexposed also had higher intakes of cookies, ice cream, and fizzy beverages. As a result, it was shown that longer smartphone use was associated with less desirable snack preferences/consumption and other dietary behaviors in students (Kim & Pae, 2017). In a different study, the three categories of danger, potential, and general SA were applied to eighty teenage smartphone addicts. The subjects' food habits and way of life were then examined and the mineral content of their hair assessed. Fast food consumption and twice-daily snacking were comparatively higher in the danger group, and a higher SA was linked to a lower average weekly sleep duration. All subjects had higher concentrations of lead and lower-than-average concentrations of selenium in their hair mineral analyses. Furthermore, of the three groups, the aluminum levels in the hazard group were the highest and exceeded the normal range. An association between excessive smartphone use and eating habits was discovered (Lim & Kim, 2018). In another study conducted with university students in Korea, negative eating behaviors such as frequent skipping of breakfast, irregular eating, preference for processed foods, overeating, and skipping meals were reported by frequent smartphone users (Lim et al., 2016). It has also been reported that both smartphone and internet addiction and disordered eating behavior have a positive and significant relationship with overweight (Tayhan Kartal & Yabancı Ayhan, 2021). In a study conducted in the country, 325 students were evaluated. Based on the regression analysis performed to determine the predictors of being overweight, it was found that being addicted to smartphones increased the risk of having a weight problem by two times (Coban, 2021). Akıncı et al. examined 90 obese men aged 18 – 45 years who were monitored for obesity to investigate SA's impact on sleep quality and BMI values. It was shown that BMI values were higher in patients with higher SA scores, and poor sleep quality and SA affected BMI in obese individuals (Akıncı et al., 2023). According to the Eating Attitude Test, which is another scale included in the study, the rate of participants who were characterized as having a disordered eating attitude was 8.8%. In the regression analysis, SA is linked to a poor eating attitude. The findings align with previous research in the field. It is thought that being addicted to smartphones may cause behaviors such as skipping meals, eating quickly, and snacking. This is because people may not want to waste time on regular meals in order to return to activities on their phones as soon as possible. Therefore, individuals with SA should be evaluated for eating behaviors. In this study, no relationship was found between BMI and SA. This finding might be explained by the fact that the study's sample was young and obesity is uncommon in this age range.

Limitations and Directions for Future Research

The fact that it is one of the limited number of studies evaluating the relationship between SA and sleep, eating behavior, and obesity together can be considered a strength of this study. However, the results should be evaluated by considering some limitations. The fact that the study was single-center and cross-sectional creates a limitation to generalize the findings obtained for the entire population with SA. The fact that the scales used are self-report scales can be considered a limitation, as a limitation to reveal the possibility that the participants' answers to the questions may be influenced by social norms or affected by memory problems. The lack of a control group and the lack of an unstructured psychiatric interview are among the limitations of the study. Power analysis was not conducted for the sample size, as the study initially aimed to reach all medical faculty students. However, not all students could be included, which may have impacted the representativeness of the sample. It can be said that almost half of young people are at risk of SA, and those with SA have worse sleep quality. Factors associated with SA are the absence of chronic physical illness, the presence of psychiatric illness, poor sleep quality, poor eating attitude, average daily smartphone, internet and social media usage time. However, it can be concluded that there is no relationship between obesity and SA. Smartphone addiction has become a public health problem, and urgent measures should be taken. Future studies should include larger and more diverse samples to increase the generalizability of findings. Additionally, structured psychiatric interviews and objective sleep assessments (e.g., polysomnography or actigraphy) should be used to obtain more reliable data. Studies with control groups should be conducted to better differentiate the effects of smartphone addiction. Furthermore, longitudinal studies are needed to determine causal relationships between smartphone addiction, sleep quality, and eating behaviors. Although no direct relationship between smartphone addiction and obesity was found in this study, future research could explore the potential long-term metabolic effects of excessive smartphone use, including sedentary behavior and changes in dietary habits.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics Committee Approval: The study was approved by the Akdeniz University Faculty of Medicine Clinical Research Ethics Committee (September 13, 2023 - Decision No: KAEK-695). This study was conducted in accordance with the Declaration of Helsinki.

Informed Consent: Written informed consent was obtained from the patients/patient who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – D.D., A.E.; Design – D.D., A.E.; Supervision – A.E.; Resources – D.D.; Materials – D.D.; Data Collection and/or Processing – D.D.; Analysis and/or Interpretation – M.N.C.; Literature Search – D.D., A.E.; Writing – M.N.C., A.E.; Critical Review – M.N.C., A.E.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

References

Adnan Coban, D. (2021). Investigation of the relationship between smartphone addiction and overweight on university students. *Annals of Medical Research*, *26*(10), 2172 – 2176. [CrossRef]

Agargun, M. Y. (1996). Validity and reliability of Pittsburgh Sleep Quality Index. *Turkish Journal of Psychiatry*, *7*, 107 – 115.

Aker, S., Şahin, M. K., Sezgin, S., & Oğuz, G. (2017). Psychosocial factors affecting smartphone addiction in university students. *Journal of Addictions Nursing*, *28*(4), 215 – 219. [CrossRef]

Akıncı, T., Okumus, N., & Altay, M. (2023). The effects of smartphone addiction on sleep quality and obesity level in obese men. *Journal of Medicine and Palliative Care*, *4*(6), 656 – 662. [CrossRef]

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research*, *28*(2), 193 – 213. [CrossRef]

Çakir Kardeş, V., Çölgeçen, A. D., Çetin, H., Önder, S., Çirak, B. Ş., Tenk, S., Kiciman, M. Z., Kart, B., Öztürk, S., Tap, D. A., Akbaba, Y. A., Alfaris, A. R., Abu Hamed, A., & Alhasan, İ. (2023). The evaluation of the relation between smartphone addiction and eating attitudes among medical students. *Middle Black Sea Journal of Health Science*, *9*(2), 296 – 311. [CrossRef]

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Davey, S., & Davey, A. (2014). Assessment of smartphone addiction in Indian adolescents: A mixed method study by systematic-review and meta-analysis approach. *International Journal of Preventive Medicine*, *5*(12), 1500 – 1511.

Garner, D. M., & Garfinkel, P. E. (1979). The Eating Attitudes Test: An index of the symptoms of anorexia nervosa. *Psychological Medicine*, *9*(2), 273 – 279. [CrossRef]

GSMA. (2024). Smartphone owners are now the global majority, New GSMA report reveals. *Newsroom*. https://www.gsma.com/newsroom/press-release/smartphone-owners-are-now-the-global-majority-new-gsma-report-reveals/.

Kim, H., & Pae, M. (2017). Lifestyle, dietary behavior and snack preference of upper-grade elementary school students in Cheongju according to the usage time of smartphones. *Korean Journal of Community Nutrition*, *22*(1), 40 – 52. [CrossRef]

Kwon, M., Lee, J. Y., Won, W. Y., Park, J. W., Min, J. A., Hahn, C., Gu, X., Choi, J. H., & Kim, D. J., Choi, J. H., & Kim, D. J. (2013). Development and validation of a smartphone addiction scale (SAS). *PLoS One*, *8*(2), e56936. [CrossRef]

Lei, L. Y. C., Ismail, M. A. A., Mohammad, J. A. M., & Yusoff, M. S. B. (2020). The relationship of smartphone addiction with psychological distress and neuroticism among university medical students. *BMC Psychology*, *8*(1), 97. [CrossRef]

Lim, H. S., & Kim, S. K. (2018). Analysis of health habit and hair mineral nutrition status of media addicted adolescent. *Journal of Nutrition and Health*, *51*(4), 295 – 306. [CrossRef]

Lim, S. H., Kim, M. H., & Choi, M. K. (2016). Dietary life status according to smart device use of university students in Korea. *Korean Journal of Food and Nutrition*, *29*(3), 363 – 370. [CrossRef]

Lin, P. H., Chen, K. L., & Yang, S. Y. (2019). The relationship between sleep quality and internet addiction among female college students. *Frontiers in Neuroscience*, *13*, 456820. [CrossRef]

Ma, Z., Wang, J., Li, J., & Jia, Y. (2021). The association between obesity and problematic smartphone use among school-age children and adolescents: A cross-sectional study in Shanghai. *BMC Public Health*, *21*(1), 2067. [CrossRef]

Nikolic, A., Bukurov, B., Kocic, I., Vukovic, M., Ladjevic, N., Vrhovac, M., Pavlović, Z., Grujicic, J., Kisic, D., & Sipetic, S. (2023). Smartphone addiction, sleep quality, depression, anxiety, and stress among medical students. *Frontiers in Public Health*, *11*, 1252371. [CrossRef]

Noyan, C. O., Enez Darçın, A., Nurmedov, S., Yılmaz, O., & Dilbaz, N. (2015). Turkish validity and reliability study of the Short Form of Smartphone Addiction Scale in university students. *Anatolian Journal of Psychiatry/Anadolu Journal of Psychiatry*, *16*. [CrossRef]

Örnek, B. Y., & Gündoğmuş, İ. (2022). The effects of smartphone and internet gaming addiction on eating attitudes among university students. *Psychiatry Investigation*, *19*(1), 1 – 8. [CrossRef]

Panova, T., & Carbonell, X. (2018). Is smartphone addiction really an addiction? *Journal of Behavioral Addictions*, *7*(2), 252 – 259. [CrossRef]

Sanusi, S. Y., Al-Batayneh, O. B., Khader, Y. S., & Saddki, N. (2022). The association of smartphone addiction, sleep quality and perceived stress amongst Jordanian dental students. *European Journal of Dental Education*, *26*(1), 76 – 84. [CrossRef]

Savaşır, I., & Erol, N. (1989). Anorexia neurosis symptoms index. *Turkish Journal of Psychology*, *7*, 19 – 25.

Sekaran, U. (2003). *Research methods for business: A skill-building approach* (4th ed). John Wiley & Sons.

Sohn, S. Y., Krasnoff, L., Rees, P., Kalk, N. J., & Carter, B. (2021). The association between smartphone addiction and sleep: A UK cross-sectional study of young adults. *Frontiers in Psychiatry*, *12*, 629407. [CrossRef]

Tayhan Kartal, F., & Yabancı Ayhan, N. (2021). Relationship between eating disorders and internet and smartphone addiction in college students. *Eating and Weight Disorders*, *26*(6), 1853 – 1862. [CrossRef]

Uzunçakmak, T., Ayaz-Alkaya, S., & Akca, A. (2022). Prevalence and predisposing factors of smartphone addiction, sleep quality and daytime sleepiness of nursing students: A cross-sectional design. *Nurse Education in Practice*, *65*, 103478. [CrossRef]

Wang, J., Hao, Q. H., Peng, W., Tu, Y., Zhang, L., & Zhu, T. M. (2023). Relationship between smartphone addiction and eating disorders and lifestyle among Chinese college students. *Frontiers in Public Health*, *11*, 1111477. [CrossRef]

Zhong, Y., Ma, H., Liang, Y. F., Liao, C. J., Zhang, C. C., & Jiang, W. J. (2022). Prevalence of smartphone addiction among Asian medical students: A meta-analysis of multinational observational studies. *International Journal of Social Psychiatry*, *68*(6), 1171 – 1183. [CrossRef]

Zhou, B., Mui, L. G., Li, J., Yang, Y., & Hu, J. (2024). A model for risk factors harms and of smartphone addiction among nursing students: A scoping review. *Nurse Education in Practice*, *75*, 103874. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Problematic Pornography Use, Psychopathology, and Body Connection: Associations and Sex Differences

Robin Engelhardt[1], Jürgen Maes[1], Nicholas C. Borgogna[2], Timo von Oertzen[3], Marc N. Potenza[4,5,6,7], Shane W. Kraus[8]

[1]Institute for Psychology, Bundeswehr University Faculty of Human Sciences, Munich, Germany
[2]University of Alabama, Birmingham, USA
[3]Thomas Bayes Institute, Berlin, Germany
[4]Department of Psychiatry and the Child Study Center, Yale University School of Medicine, New Haven, USA
[5]The Connecticut Mental Health Center, New Haven, USA
[6]The Connecticut Council on Problem Gambling, Wethersfield, USA
[7]Department of Neuroscience and the Wu Tsai Institute, Yale University, New Haven, USA
[8]Department of Psychology, University of Nevada, Las Vegas, USA

ORCID iDs of the authors: R.E. 0009-0006-8300-8252, J.M. 0009-0008-2276-098X, N.C.B. 0000-0002-5085-3656, T.von.O. 0000-0002-3830-235X, M.N.P. 0000-0002-6323-1354, S.W.K. 0000-0002-0404-9480

Main Points

- Sex differences in the association between psychological distress and PPU among male and female US university students.
- The BPS is a valid screening tool to assess PPU in male and female US university students.
- Body connection is associated with PPU in US university students.

Abstract

Problematic pornography use is an increasingly relevant phenomenon in the United States. Especially young and male individuals seem to be vulnerable to experiencing problems with their pornography use. Previous research suggests that additional psychological symptoms may relate to problematic pornography use in some populations, and little is known about associations with body connection. Therefore, the current study examined associations between problematic pornography use and symptoms of psychological distress, impulsivity, and body connection in a large sample of male and female US university students (n = 1525). Results indicated positive associations between problematic pornography use on the one hand and psychological symptoms and body dissociation on the other hand. However, when predicting problematic pornography use by all variables in a regression model, the association with body dissociation became negative in male and unrelated in female students while associations with body awareness became statistically significant and positive in both groups. In addition, a sex difference for the association with psychological distress was found. Further work is needed to examine the association between problematic pornography use and body connection, as well as the potential sex effect found in relation to psychological distress. Therefore, we recommend further sex-informed and longitudinal analyses investigating problematic pornography use.
Keywords: Addictive behavior, body connection, compulsive sexual behavior, pornography, psychological distress, psychopathology

Corresponding author: Robin Engelhardt,
E-mail: robin.engelhardt@unibw.de

Received: September 20, 2024
Revision Requested: February 8, 2025
Last Revision Received: February 23, 2025
Accepted: April 25, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.
Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

Pornography use is prevalent in the United States (US). In a recent nationally representative sample, a 12-month prevalence of 59.1% in men and 20.5% in women was reported (Grubbs et al., 2022). In a sample of adults using the internet (aged 18 – 73 years), a one-month prevalence of 91.5% in men and 60.2% in women was observed (Solano et al., 2020). Problematic pornography use (PPU) is

Cite this article as: Engelhardt, R., Maes, J., Borgogna, N. C., von Oertzen, T., Potenza, M. N., & W. Kraus, S. (2025). Problematic pornography use, psychopathology, and body connection: associations and sex differences. *Addicta: The Turkish Journal on Addictions*, 12(3), 331-338.

characterized by functional or psychological impairments and poor behavioral control (Grubbs & Kraus, 2021; Fernandes & Griffiths, 2021). Young individuals (Lim et al., 2017; Shirk et al., 2021) and college students specifically (Cooper et al., 2000) may be experiencing PPU, with men, relative to women, generally more likely to experience PPU (Bőthe et al., 2019; Bőthe et al., 2021; Okabe et al., 2021).

Mental-health-related concerns have been associated with PPU across different populations. For instance, PPU has been linked to depression and anxiety symptoms in Asian (college) students (Chen L. et al., 2021; Okabe et al., 2021; Ye et al., 2021) and to impulsivity in Croatian men (Rousseau et al., 2021). These associations have also been demonstrated in US veterans (Shirk et al., 2020; Kraus et al., 2020) and within a mixed US sample (n = 757) including university students (Borgogna et al., 2018). As for impulsivity, specifically negative urgency seems to be PPU-related (Kraus et al., 2020; Zhang et al., 2022). These resultsneed further replication, though, as similar correlations in mixed populations from the US as well as in Asian college students were observed, we expected them to also emerge in samples of US university students.

In addition to impulsivity, anxiety, and depression, another construct appears to be potentially relevant. In research over the last two decades, body connection has been proposed and demonstrated to contribute importantly to sexual health and psychopathology (Price, 2005; 2007; Silverstein et al., 2011; Blycker & Potenza, 2018). Much research has been dedicated to body-oriented therapy in recovery from sexual abuse (Price, 2003; 2005; 2006; 2007). Other research has examined the role of body connection in sexual dysfunction (Seal & Meston, 2007; Silverstein et al., 2011). Carvalheira et al (2017) demonstrated that participants who reported various sexual difficulties were more dissociated from their bodies. However, PPU was not assessed among these sexual difficulties. Due to the current lack of research examining the association between body connection and PPU, we reviewed mindfulness research as a proxy because mindfulness, by definition, may represent a related construct (Bishop et al., 20024; Baer et al., 2006; Mehling, 2009; Carvelheira et al., 2017), enabling us to form hypotheses on the association between body connection and PPU. Carvalheira et al (2017) posited that being connected to and aware of the body are central to mindfulness. Appropriately, mindfulness skills may contribute to shaping body connection (Mehling, 2009). Dispositional mindfulness generally seems to predict positive sexual outcomes (Pepping et al., 2018). Accordingly, mindfulness-based approaches may be an effective treatment approach for problematic sexual behavior (Fraumeni-McBride, 2019; Blycker & Potenza, 2018; Holas et al., 2021; Reid et al., 2014). Based on these mindfulness outcomes, we assume that body connection would similarly associate with PPU. Specifically, we expected that body awareness would be negatively, and body dissociation positively, associated with PPU.

As discussed elsewhere (Grubbs & Kraus, 2023), further research is needed to standardize and test screening tools for those reporting issues with PPU in both clinical and nonclinical populations (Fernandez & Griffiths, 2021). However, ongoing debates surrounding the diagnostic classification of PPU complicate current standardization efforts. For example, PPU may be subsumed within a diagnosis of Compulsive Sexual Behavior Disorder (CSBD;Kraus & Sweeney, 2019; Gola & Kraus, 2021) or may reflect an addictive disorder (Brand et al., 2022). Unlike many other PPU-related measures, the Brief Pornography Screen (BPS) was initially developed as a brief screening tool for probable PPU in clinical and nonclinical samples and in response to debates about classification (Kraus et al., 2020; Lew - Starowicz et al., 2022). BPSitems seem to largely cover the overlapping domains between all 3 approaches (Kraus et al., 2020; Carnes et al., 2014; Kafka, 2010; WHO, 2018), though its central focus assesses features of PPU characterized by impaired control (i.e., failures to stop/moderate one's pornography use) and craving (Chen L. et al., 2021; Kraus et al., 2016). Since the BPS appears to be a particularly promising screening tool for future research and has not yet been widely validated in university populations, we sought to evaluate the factor structure of the BPS within this population before applying it to examine associations with PPU. Based on frequently observed sex differences between PPU in men and women (Bőthe et al., 2019; Bőthe et al., 2021; Okabe et al., 2021), we aimed to separate the main analyses of this study according to sex and also explore potential group differences.

Present Study

The current study had several aims. First, we examined the factor structure of the BPS. We evaluated measurement invariance across sex groups (males, females). In keeping with prior work (Kraus et al., 2020), we hypothesized that the confirmatory factor analysis (CFA) would support a single-factor solution. We then performed correlation analyses between psychological distress (i.e., anxiety and depression symptoms), impulsivity (i.e., negative urgency), and body connection (i.e., body awareness, body dissociation) in men and women. We hypothesized that the associations would be statistically significant and positive, except for body awareness, which we hypothesized would be associated negatively with BPS scores. Since differences have been noted between men and women with regard to PPU, we hypothesized more PPU (i.e., scores exceeding BPS cut-off and higher scores) in men compared to women. We tested structural invariance between BPS scores, psychological distress, negative urgency, and body awareness as moderated by sex. We expected to find stronger relationships between BPS scores and psychological distress and negative urgency for men relative to women. We also explored differences in associations between body connection and PPU.

Material and Methods

Procedure and Participants

Data was collected from a cross-sectional online survey, performed between March 2020 and May 2021, involving students at two US universities: one in the Intermountain West and the other in the Deep South. Others have previously published from this dataset on different topics (Habashy et al., 2023; Borgogna et al., 2023). Ethics approval for this study was obtained from the IRB at the University of Nevada, Las Vegas (#1545894-5). Writen informed consent was obtained within the survey for anonymized participant information to be published. The original sample consisted of 2288 participants. Upon data cleaning (mainly involving instances with >80% of data missing), 2186 participants remained. Of these, 1525 (609 men and 916 women

according to sex assigned at birth) reported having used pornography during the past year, completed the BPS, and were included in further analyses. The average age was 20 years (*SD* = 3.9; median = 19). Sample demographics are presented in Table 1.

Measures

The BPS is a five-item tool assessing PPU during the past six months (Kraus et al., 2020). Participants were asked to rate their problems with pornography use. Response options for items (e.g., "You find yourself using pornography more than you want to") range on a three-point scale from 0 "never" to 2 "very often." A previous nationally representative US sample and other multinational populations indicated a unidimensional factor structure (Kraus et al., 2020). Tests on normal distribution resulted in the rejection of the normal distribution hypothesis (Kolmogorov – Smirnov test: $p < .001$; Shapiro – Wilk test: $p < .001$) and indicated a floor effect (skewness = 1.08; kurtosis = 0.24). Cronbach's alpha of the BPS in this sample was .87 in all participants, .87 in men, and .86 in women.

Psychological distress (Cronbach's alpha = .87) was assessed by a five-item scale derived from the DSM-5 Cross-Cutting Symptom Measures (CCSM) for depression and anxiety over the prior two weeks. Symptom frequency was rated for items such as "Feeling nervous, anxious, frightened, worried, or on edge?" on a five-point Likert scale from 0 "none at all" to 4 "nearly every day" (Narrow et al., 2013; Clarke & Kuhl, 2014).

The Short Version of the Urgency, Lack of Premeditation, Lack of Perseverance, Sensation Seeking, and Positive Urgency Impulsive Behavior Scale (S-UPPS-P) Negative Urgency subscale (Cronbach's alpha = .73) assesses the impulsivity dimension of negative urgency over the prior two months with four items (e.g., "When I feel bad, I will often do things I later regret in order to make myself feel better now"). Response options range along a four-point Likert scale from 1 "agree strongly" to 4 "disagree strongly" (Cyders et al., 2014; McCredie et al., 2020).

The Scale of Body Connection (SBC) assesses body awareness (SBC-BA; Cronbach alpha = .79) with 12 items, e.g., "I listen for information from my body about my emotional state" and bodily dissociation (SBC-BD; Cronbach alpha = .78) with 8 items, e.g., "I feel separated from my body when I am engaged in sexual activity," over the prior 2 months (Price & Thompson, 2007). We applied the SBC to measure domains of body connection due to the scale's validity and reliability (Price & Thompson, 2007, Price et al., 2017) as well as its prior use in multiple studies of sexual health (Carvalheira et al., 2017; Price, 2003; 2005; 2006; 2007; Seal & Meston, 2007; Silverstein et al., 2011). Response options ranged within a five-point Likert scale from 0 "not at all" to 4 "all of the time" (Price & Thompson, 2007, Price et al., 2017). Item 18 from the SBC-BA dimension had not been included in the original dataset, though the reliability of the subscale remained good (Cronbach's alpha = .79). Consequently, associations were analyzed independently for both subscales, which was in alignment with our expectation that PPU would correlate positively to SBC-BD and negatively to SBC-BA. Descriptive measurement statistics in men and women are presented in Table 2.

Table 1.
Demographic Statistics of Sample (n = 1525)

	n	%	M (*SD*)
Age			20 (3.9)
Sex[1]			
Man	609	39.9	
Women	916	60.1	
Sexual orientation			
Heterosexual	891	58.4	
Bisexual to some extent	491	32.2	
Gay	36	2.4	
Lesbian	30	2.0	
Pansexual	46	3.0	
Asexual	9	0.6	
Other	22	1.4	
Religion			
Protestant	121	8.0	
Roman Catholic	392	25.9	
Mormon	19	1.3	
Orthodox	19	1.3	
Jewish	16	1.1	
Muslim	18	1.2	
Buddhist	33	2.2	
Hindu	4	0.3	
Atheist	141	9.3	
Agnostic	169	11.2	
Spiritual, but no religious commitment	321	21.2	
Something else	261	17.2	
Race			
White	440	28.9	
Hispanic/Latino	265	17.4	
Black	150	9.8	
Asian	338	22.2	
Native American	8	0.5	
Middle Eastern	21	1.4	
Multiple races	285	18.6	
Prefer not to share	7	0.5	
Other	11	0.7	

[1]Sex was assessed according to the assignment at birth.
SD, standard deviation

Data Analysis

Using IBM Statistical Package for Social Sciences (SPSS) Statistics Version 28.0.1.0 (IBM SPSS Corp.; Armonk, NY, USA), we examined variable statistics including frequencies, means (*M*), standard deviations (*SD*), and internal consistency, as well as preparatory Kolmogorov – Smirnov and Shapiro – Wilk tests.

Table 2.
Brief Pornography Screen—Clinical Cut-Off and Group Differences

	Clinical Cut-Off > 4 (%)	Mean (SD)	Mann – Whitney *U* test		
All	452 (29.6)	2.40 (2.75)			
			Middle range	U	Asymp. Sign.
Men	266 (43.7)	3.34 (2.97)	910.03	189,378	< .001
Women	186 (20.3)	1.78 (2.41)	665.24		

SD, standard deviation.

Significant group differences between men and women in BPS scores were examined by non-parametric Mann – Whitney *U* tests. Degrees of asymptotic significance were evaluated as statistically significant if $p < .05$, very significant if $p < .01$, and extremely significant if $p < .001$.

In R Statistics, multigroup CFA was used to examine the factor structure of the BPS in male and female college students. Fit indices were interpreted following standard structural equation modeling (SEM) guidelines (c.f., Kline, 2023). Latent variables were then estimated for all variables of interest using maximum likelihood estimation with robust standard errors. Problematic pornography use was estimated by BPS items, psychological distress by CCSM items, and negative urgency by S-UPPS-P-N items. To adjust for high item count on the SBC-BA and SBC-BD subscales, a parceling procedure was employed. This involved conducting an exploratory factor analysis fitted to a one-factor solution. Items were then assigned to one of three parcels per subscale iteratively in a counterbalanced fashion (Little et al., 2002). This ensured that both subscales were estimated with a minimal number of indicators (three in each case) that maximized covariance coverage. Structural equation modeling was then used to estimate the bivariate correlations between the latent variables, followed by regression analyzes in which BPS scores were regressed on each of the other latent variables simultaneously split by group. We completed our analyzes by conducting structural invariance tests to examine if path strengths differed between groups (i.e., moderation). These were conducted by subtracting unstandardized paths in the female group from the male group and estimating the bias-corrected bootstrapped confidence intervals (CIs) around the difference (1,000 samples). A 95% CI that does not contain "0" is roughly equivalent to $p < .05$. Because structural invariance assumes equality of factor loadings between groups for all indicators, measurement invariance was tested across all variables simultaneously. Measurement invariance was determined by testing a constrained model against a freely estimated one, with a non-significant Chi-square difference test suggesting no significant degradation, and thus, measurement invariance.

Results

Men reported more PPU (i.e., numerically higher BPS scores and higher cut-off exceedance frequency) than women. Approximately 44% of men and 20% of women reported BPS scores that reached or exceeded the suggested clinical cut-off score of 4. BPS scores were statistically different between the sexes (see Table 2).

The multigroup CFA (Figure 1) yielded an excellent fit $\chi^2(18) = 55.84$, $p < .001$, CFI = .981, TL I= .979, RMSEA = .053 (90% CI: .037, .068), and SRMR = .033. We then tested measurement invariance to ensure correlational analyzes were appropriate across latent variables. The initial configural measurement model evidenced good fit: $\chi^2(1,100) = 2,376.09$, $p < .001$, CFI = .929, TLI = .919, RMSEA = .039 (90% CI: .037, .041), and SRMR = .047. Next, we constrained all factor loadings to be equal between groups. This model also evidenced good fit: $\chi^2(1,125) = 2401.82$, $p < .001$, CFI = .929, TLI = .921, RMSEA = .039 (90% CI: .036, .041), and SRMR = .048. The Chi-square difference testing suggested no significant difference between models: $\chi^2(25) = 26.84$, $p = .364$,

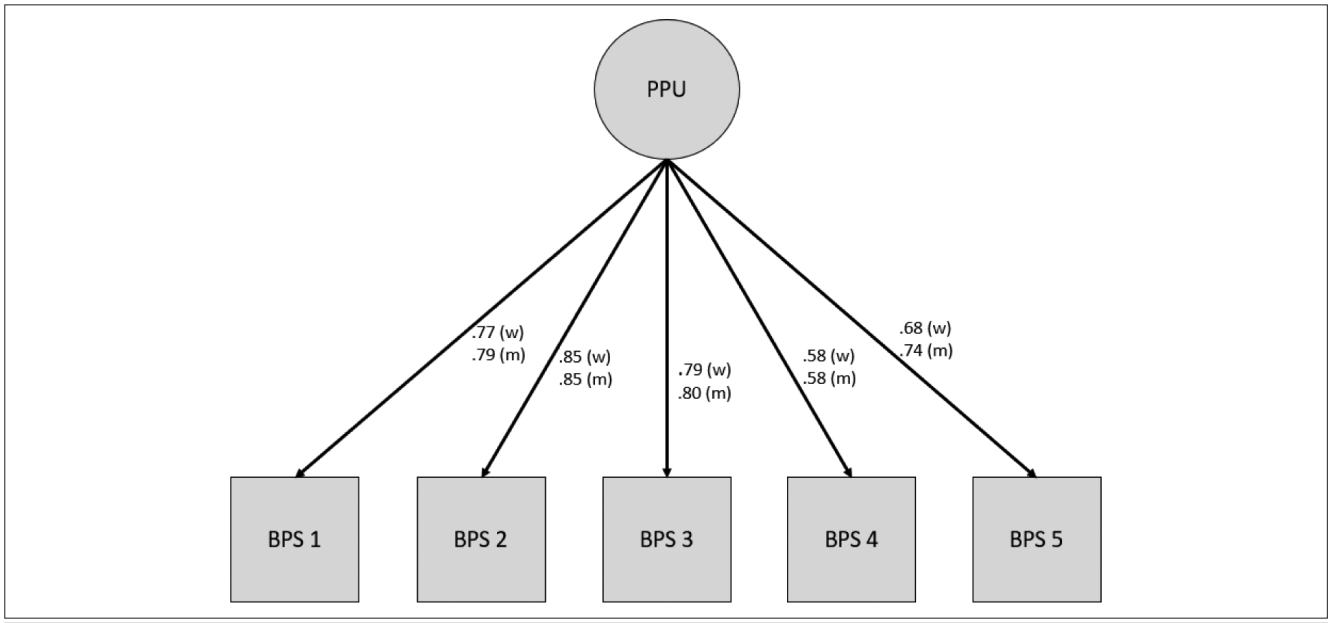


Figure 1. One-Factor Model as tested by Confirmatory Factor Analysis; w, women; m, men.

Table 3.
Bivariate Correlations Across Latent Variables

Variable	1	2	3	4	5
BPS[1]	–	.18***	−.04	.22***	.26***
CCSM[2]	.30***	–	.14***	.63***	.48***
SBC-BA[3]	.05	.10	–	.16***	−.01
SBC-BD[4]	.26***	.59***	.24***	–	.55***
S-UPPS-P-N[5]	.37***	.40***	−.05	.53***	–

Scoring has been adjusted such that higher scores indicate more negative urgency. Men below the diagonal, women above.
[1]Brief Pornography Screen, [2]Cross-Cutting Symptom Measures, [3]Scale of Body Connection-Body Awareness, [4]Scale of Body Connection-Body Dissociation, [5]Short-Urgency-Premeditation-Perseverance-Sensation Seeking-Positive Urgency-Negative Urgency.
***$p < .001$.
BPS, brief pornography screen; CCSM, cross-cutting symptom measures, SBC-BA, scale of body connection-body awareness; SBC-BD, scale of body connection-bodydissociation;S-UPPS-P-N,short-urgency-premeditation-perseverance-sensation seeking-positive urgency-negative urgency.

Table 4.
Adjusted Regression Coefficients

BPS[1] correlates	Males	Females
CCSM[2]	.20**[a]	−.03
SBC-BA[3]	.28***	.30***
SBC-BD[4]	−.17*	.03
S-UPPS-P-N[5]	.40***	.27***

Scoring has been adjusted such that higher scores indicate more negative urgency. [a]path was significantly stronger for men relative to women.
[1]Brief Pornography Screen, [2]Cross-Cutting Symptom Measures, [3]Scale of Body Connection-Body Awareness, [4]Scale of Body Connection-Body Dissociation, [5]Short-Urgency-Premeditation-Perseverance-Sensation Seeking-Positive Urgency-Negative Urgency.
*$p < .05$, **$p < .01$, $p < .001$.
BPS, brief pornography screen; CCSM, cross-cutting symptom measures, SBC-BA, scale of body connection-body awareness; SBC-BD, scale of body connection-bodydissociation;S-UPPS-P-N,short-urgency-premeditation-perseverance-sensation seeking-positive urgency-negative urgency.

meaning metric invariance was evident and between-group correlational tests can be employed.

As shown in Table 3, bivariate correlations across the latent variables suggested the BPS scores were modestly positively correlated (i.e., small or moderate) with all other variables in the measurement model, with the exception of SBC-BA scores, which were uncorrelated with BPS scores for men or women. In addition, CCSM scores depicted a small positive correlation with body awareness in women, and this relationship was statistically insignificant in men. Intercorrelations between CCSM scores, body dissociation, and impulsivity were moderate and positive in both men and women.

Results from regression analyzes are shown in Table 4. S-UPPS-P-Negative Urgency remained the strongest correlate for both groups. CCSM scores remained a positive correlate for males but not females. Suppression effects were evident for body connection scales such that SBC-BA became a significant (weak) positive correlate of BPS scores in men and women, and SBC-BD demonstrated a very weak negative correlate with BPS scores in men and was non-significantly related to BPS scores in women. Structural invariance tests indicated only the path between CCSM and BPS scores differed by sex, with the path being significantly stronger in men ($\Delta B = .17$, 95% CI: .03, .29). Altogether, the structural model accounted for 23% of the BPS variance in men and 15% in women.

Discussion

The current study examined the factor structure of the BPS within a sample of US university students and its relation to body connection, negative urgency, and psychological distress in men and women. Overall, the CFA yielded a good fit for the one-factor model, thus extending prior results (Kraus et al., 2020). A substantial percentage of pornography-using university students (44% of men and 20% of women) met or exceeded the suggested clinical threshold, supporting previous findings indicating that many young individuals (Lim et al., 2017; Shirk et al., 2021) and college students specifically (Cooper et al., 2000) may be experiencing PPU. Notably, the proportion of men exceeding the cut-off was over twice as much as that observed in women. This observation aligns well with recent BPS findings (for a review see Engelhardt et al., 2025). The sex effect may in part reflect sex differences in sexual stimulation. In this regard, men seem to respond comparatively more pronouncedly to visual stimulation, while women tend to respond rather to emotional stimulation (Chung et al., 2013, Hamann et al., 2004). As pornography use might rather serve visual arousal, it might be less appealing to women compared to men. This could also explain higher frequency rates of pornography use in men compared to women (Grubbs et al., 2022; Solano et al., 2020), with frequency of use generally associated with PPU (Engelhardt et al., 2025).

BPS scores positively correlated with CCSM scores in both men and women. Associations between BPS and CCSM scores seem consistent with previous research in US veteran populations (Shirk et al., 2021) and Asian (college) students (Okabe et al., 2021; Ye et al., 2021; Chen J. et al., 2021). However, when including SBC-BA, SBC-BD, and S-UPPS-P-N scores in regression analysis, CCSM scores remained associated with BPS scores only in men, suggesting that psychological distress and PPU may relate to each other differently in both sexes. This was supported by the findings of structural invariance testing, revealing a significant difference in this path between the sexes. A common explanation for the association between psychological symptoms and PPU is that individuals may cope with their psychological distress through pornography use, which then becomes dysregulated (Testa et al., 2024). A sex difference in coping through pornography may reflect differences in amygdala activation in response to sexual stimuli. As the responsiveness of the amygdala to visual sexual stimulation appears less pronounced in women (Hamann et al., 2024), pornography use might be a less effective/distractive coping strategy for women compared to men. Furthermore, the regression model suggests that the relationship with psychological distress in women is rather determined by its shared variance with other variables than by its unique contribution to PPU. Variables such as impulsivity and body connection may serve as mediators for this relationship in women. However, further research is needed to investigate the sex-related difference, especially in longitudinal studies.

The positive correlations between S-UPPS-P-N and BPS scores in both men and women are consistent with previous research indicating associations between impulsivity and PPU in male Croatian adolescents (Rousseau et al., 2021), Polish adults (Kraus et al., 2020), and US military veterans (Shirk et al., 2021). Impulsivity remained a positive predictor in the regression model. These findings appear particularly reasonable since compulsive sexual behavior, such as PPU, involves repetitive failures to control sexual urges, consistent with CSBD's classification as an impulse control disorder (WHO, 2018). We did not find differences in the strength of this association between men and women, suggesting a relevant role for impulsivity in relation to PPU in college-attending US men and women.

In bivariate correlational analysis, BPS scores were also associated positively with SBC-BD scores in both men and women according to our expectations. This association might reflect coping behavior with bodily dissociative states or a tendency to dissociate from one's body as a result of pornography use. An association between dissociation and sexual addiction has been previously discussed (Griffin-Shelly et al., 1995), and mechanisms warrant further investigation. The association with SBC-BA scores, on the other hand, was not statistically significant in either men or women. In the multiple regression analysis, the association with SBC-BA scores became positively significant in both sexes, and the association with SBC-BD scores became weakly negatively associated in men, while statistically insignificant in women. SBC-Body Awareness scores became a statistically significant positive predictor in both men and women. A priori predictions for these associations were made based on mindfulness research (Chandiramani, 2017; Blycker & Potenza, 2018; Fraumeni-McBride, 2019) and were contrary to our predictions. The regression results indicate suppression effects which are difficult to interpret. They are attributable to our procedure of constructing regression models despite SBC-BA and SBC-BD demonstrating only weak, and in some cases, non-significant bivariate correlations with BPS. Indeed, some of the predictors evidenced stronger between covariate relations (e.g., SBC-BD and CCSM), meaning error variance between the covariates was suppressed, artificially increasing, and in the case of SBC-BD in men, inverting the relationships with BPS. We suggest readers interpret the suppression effects cautiously. Likely, the bivariate correlations between SBC-BA and SBC-BD with BPS are more reliable.

Body awareness might also play a role in the context of coping through pornography use (Darvish et al., 2018; Leonard, 2010). Speculatively, this may involve coping with uncomfortable body sensations through parasympathetic-sympathetic switches (Graber et al., 1991; Krüger et al., 1998; Exton et al., 1999; Meston & Brandford, 2007). This may align with Phillips (2018) who found a negative association between pornography use and mindfulness, explained through experiential avoidance. However, the extent to which features of pornography use may relate to increased bodily awareness during sexual activities more generally also warrants consideration and examination. Thus, further work assessing the association between PPU and body awareness and body dissociation in men and women is needed, particularly as motivations for using pornography vary across men and women (Bőthe et al., 2021).

As expected, men and women differed notably in the average severity of self-reported PPU symptoms. The association between CCSM and BPS scores was also more robust in the regression model and only significant in men. Other association strengths did not differ significantly between men and women. Based on findings with the CCSM, we recommend sex-separated analyses when examining PPU and its associations with mental health in future studies. Additionally, future studies should consider a wider range of sexual and gender identities.

The current study presents both limitations and strengths. As this study relies on self-reported data from a convenience sample, information bias (Althubaiti, 2016) may be a limiting factor. Due to the cross-sectional design, no assumptions of causality can be made. Results cannot be generalized to help-seeking populations. Furthermore, the only impulsivity dimension measured was negative urgency. Other impulsivity dimensions (e.g., positive urgency, sensation-seeking) warrant investigation given their links to addictive behaviors and clinically relevant phenomena (Willie et al., 2022; Tani et al., 2020, Pautrat et al., 2022). Another limitation is that all BPS correlations, with the exception of that with impulsivity, were small and should therefore be interpreted cautiously. A further limitation lies in the interpretation of the suppression effect, which might be meaningful but could also reflect a statistical reduction of error in the regression model. In particular, the interpretation of the initially statistically insignificant association with body awareness should be interpreted cautiously. In addition, the absence of participants' socioeconomic status is noted as a limitation. Since associations between body connection and PPU have not been previously demonstrated, we recommend further studies to examine the relationships between PPU and body connection. In addition, we recommend examining the demonstrated associations with psychological distress and negative urgency in longitudinal studies to better understand the underlying mechanisms. We recommend that researchers further examine potential sex differences in PPU and its associations.

In conclusion, we believe the BPS is psychometrically sound as a screening tool for PPU among university students. Problematic pornography use was related to psychological symptoms in university students. Further research is warranted specifically on the relationships between PPU and body connection, and PPU and psychological distress, especially in longitudinal studies and among help-seeking populations.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: This study was approved by the Ethics Committee of the University of Nevada, Las Vegas (Approval No: 1545894-5, Date: March 11, 2020).

Informed Consent: Written informed consent was obtained from the participants who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – R.E., J.M., S.W.K. Design – R.E., J.M., S.W.K., T.v.O., N.C.B., M.N.P.; Supervision – J.M., S.W.K., M.N.P, T.v.O., N.C.B.; Resources – S.W.K.; Materials – S.W.K.; Data Collection and/or Processing – S.W.K., N.C.B.; Analysis and/or Interpretation – R.E., N.C.B., T.v.O.; Literature Search – R.E.; Writing – R.E., N.C.B.; Critical Review – J.M., S.W.K., M.N.P, T.v.O., N.C.B.

Declaration of Interests: Marc N Potenza is a Section Editor at Addicta: The Turkish Journal on Addictions, however, his involvement in the

peer-review process was solely as an author. The other authors have no conflict interest to declare.

Funding: J.M. & R.E. were founded by dtec.bw – Digitalization and Technology Research Center of the Bundeswehr. dtec.bw is funded by the European Union – NextGenerationEU. S.W.K. was supported by the Kindbridge Research Institute.

References

Althubaiti, A. (2016). Information bias in health research: Definition, pitfalls, and adjustment methods. *Journal of Multidisciplinary Healthcare*, *9*, 211 – 217. [CrossRef]

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*(1), 27 – 45. [CrossRef]

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting, D., & Devins, G., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, *11*(3), 230 – 241. [CrossRef]

Blycker, G. R., & Potenza, M. N. (2018). A mindful model of sexual health: A review and implications of the model for the treatment of individuals with compulsive sexual behavior disorder. *Journal of Behavioral Addictions*, *7*(4), 917 – 929. [CrossRef]

Borgogna, N. C., Duncan, J., & McDermott, R. C. (2018). Is scrupulosity behind the relationship between problematic pornography viewing and depression, anxiety, and stress? *Sexual Addiction and Compulsivity*, *25*(4), 293 – 318. [CrossRef]

Borgogna, N. C., Meyer, C. L., Trussell, M. R., Garos, S., & Kraus, S. W. (2023). Further understanding the correlations between sexting and mental health: Considerations for sex and sexual identity. *Cyberpsychology, Behavior and Social Networking*, *26*(5), 323 – 331. [CrossRef]

Bőthe, B., Koós, M., Tóth-Király, I., Orosz, G., & Demetrovics, Z. (2019). Investigating the associations of adult ADHD symptoms, hypersexuality, and problematic pornography use among men and women on a largescale, non-clinical sample. *Journal of Sexual Medicine*, *16*(4), 489 – 499. [CrossRef]

Bőthe, B., Tóth-Király, I., Bella, N., Potenza, M. N., Demetrovics, Z., & Orosz, G. (2021). Why do people watch pornography? The motivational basis of pornography use. *Psychology of Addictive Behaviors*, *35*(2), 172 – 186. [CrossRef]

Brand, M., Rumpf, H. J., Demetrovics, Z., Müller, A., Stark, R., King, D. L., Goudriaan, A. E., Mann, K., Trotzke, P., Fineberg, N. A., Chamberlain, S. R., Kraus, S. W., Wegmann, E., Billieux, J., & Potenza, M. N. (2022). Which conditions should be considered as disorders in the ICD-11 designation of "other specified disorders due to addictive behaviors"? *Journal of Behavioral Addictions*, *11*(2), 150 – 159.

Carnes, P. J., Hopkins, T. A., & Green, B. A. (2014). Clinical relevance of the proposed sexual addiction diagnostic criteria: Relation to the Sexual Addiction Screening Test-Revised. *Journal of Addiction Medicine*, *8*(6), 450 – 461. [CrossRef]

Carvalheira, A., Price, C., & Neves, C. F. (2017). Body awareness and bodily dissociation among those with and without sexual difficulties: Differentiation using the scale of body connection. *Journal of Sex and Marital Therapy*, *43*(8), 801 – 810. [CrossRef]

Chandiramani, K. (2017). A role for mindfulness meditation in treating sexual addiction. In *The Routledge international handbook of sexual addiction* (pp. 260 – 267). Abingdon, UK: Routledge.

Chen, J. K., Chang, C. W., Wang, Z., Wang, L. C., & Wei, H. S. (2021). Cyber deviance among adolescents in Taiwan: Prevalence and correlates. *Children and Youth Services Review*, *126*, 106042. [CrossRef]

Chen, L., Jiang, X., Luo, X., Kraus, S. W., & Bőthe, B. (2022). The role of impaired control in screening problematic pornography use: Evidence from cross-sectional and longitudinal studies in a large help-seeking male sample. *Psychology of Addictive Behaviors*, *36*(5), 537 – 546. [CrossRef]

Chung, W. S., Lim, S. M., Yoo, J. H., & Yoon, H. (2013). Gender difference in brain activation to audio-visual sexual stimulation; do women and men experience the same level of arousal in response to the same video clip? *International Journal of Impotence Research*, *25*(4), 138 – 142. [CrossRef]

Clarke, D. E., & Kuhl, E. A. (2014). DSM-5 cross-cutting symptom measures: A step towards the future of psychiatric care? *World Psychiatry*, *13*(3), 314 – 316. [CrossRef]

Cooper, A., Delmonico, D. L., & Burg, R. (2000). Cybersex users, abusers, and compulsives: New findings and implications. *Sexual Addiction & Compulsivity*, *7*(1 – 2), 5 – 29. [CrossRef]

Cyders, M. A., Littlefield, A. K., Coffey, S., & Karyadi, K. A. (2014). Examination of a short (English version) of the UPPS-P Impulsive Behavior Scale. Addictive Behaviors, *39*(9), 1372 – 1376.

Darvish Molla, M., Shirazi, M., & Nikmanesh, Z. (2018). The role of difficulties in emotion regulation and thought control strategies on pornography use. *Practice in Clinical Psychology*, *6*(2), 119 – 128. [CrossRef]

Engelhardt, R., Maes, J., Way, B. M., Borgogna, N. C., & Kraus, S. W. (2025). Screening for problematic pornography use with the brief pornography screen: A scoping review (Current Addiction Reports). *Current Addiction Reports*, *12*(1), 22. [CrossRef]

Exton, M. S., Bindert, A., Krüger, T., Scheller, F., Hartmann, U., & Schedlowski, M. (1999). Cardiovascular and endocrine alterations after masturbation-induced orgasm in women. *Psychosomatic Medicine*, *61*(3), 280 – 289. [CrossRef]

Fernandez, D. P., & Griffiths, M. D. (2021). Psychometric instruments for problematic pornography use: A systematic review. *Evaluation and the Health Professions*, *44*(2), 111 – 141. [CrossRef]

Fraumeni-McBride, J. (2019). Addiction and mindfulness; pornography addiction and mindfulness-based therapy ACT. *Sexual Addiction and Compulsivity*, *26*(1 – 2), 42 – 53. [CrossRef]

Gola, M., & Kraus, S. W. (2021). Sexual Addiction vs. CSBD. *Compulsive Sexual Behavior Disorder*, *7*, 7 – 16.

Graber, B., Balogh, S., Fitzpatrick, D., & Hendricks, S. (1991). Cardiovascular changes associated with sexual arousal and orgasm in men. *Annals of Sex Research*, *4*(2), 151 – 165.

Griffin-Shelley, E., Benjamin, L., & Benjamin, R. (1995). Sex addiction and dissociation. *Sexual Addiction and Compulsivity*, *2*(4), 295 – 306. [CrossRef]

Grubbs, J. B., Floyd, C. G., Griffin, K. R., Jennings, T. L., & Kraus, S. W. (2022). Moral incongruence and addiction: A registered report. *Psychology of Addictive Behaviors*, *36*(7), 749 – 761. [CrossRef]

Grubbs, J. B., Floyd, C. G., & Kraus, S. W. (2023). Pornography use and public health: Examining the importance of online sexual behavior in the health sciences. *American Journal of Public Health*, *113*(1), 22 – 26. [CrossRef]

Grubbs, J. B., & Kraus, S. W. (2021). Pornography use and psychological science: A call for consideration. *Current Directions in Psychological Science*, *30*(1), 68 – 75. [CrossRef]

Grubbs, J. B., Perry, S. L., Grant Weinandy, J. T., & Kraus, S. W. (2022). Porndemic? A longitudinal study of pornography use before and during the COVID-19 pandemic in a nationally representative sample of Americans. *Archives of Sexual Behavior*, *51*(1), 123 – 137. [CrossRef]

Habashy, J., Benning, S. D., Renn, B. N., Borgogna, N. C., Lawrence, E. M., & Kraus, S. W. (2023). Psychometric properties of the eating disorder examination questionnaire: Factor analysis and measurement invariance by the intersection of race and gender. *Eating Behaviors*, *48*, 101696. [CrossRef]

Hamann, S., Herman, R. A., Nolan, C. L., & Wallen, K. (2004). Men and women differ in amygdala response to visual sexual stimuli. *Nature Neuroscience*, *7*(4), 411 – 416. [CrossRef]

Holas, P., Draps, M., Kowalewska, E., Lewczuk, K., & Gola, M. (2020). A pilot study of mindfulness-based relapse prevention for compulsive sexual behaviour disorder. *Journal of Behavioral Addictions*, *9*(4), 1088 – 1092. [CrossRef]

Kafka, M. P. (2010). Hypersexual disorder: A proposed diagnosis for DSM-V. *Archives of Sexual Behavior*, *39*(2), 377 – 400. [CrossRef]

Kline, R. B. (2023). *Principles and practice of structural equation modeling*. New York: Guilford Publications.

Kraus, S. W., Gola, M., Grubbs, J. B., Kowalewska, E., Hoff, R. A., Lew-Starowicz, M., Martino, S., Shirk, S. D., & Potenza, M. N., Shirk, S. D., & Potenza, M. N. (2020). Validation of a brief pornography screen across multiple samples. *Journal of Behavioral Addictions*, *9*(2), 259 – 271. [CrossRef]

Kraus, S. W., Martino, S., & Potenza, M. N. (2016). Clinical characteristics of men interested in seeking treatment for use of pornography. *Journal of Behavioral Addictions*, *5*(2), 169 – 178. [CrossRef]

Kraus, S. W., & Sweeney, P. J. (2019). Hitting the target: Considerations for differential diagnosis when treating individuals for problematic use of pornography. *Archives of Sexual Behavior*, *48*(2), 431 – 435. [CrossRef]

Krüger, T., Exton, M. S., Pawlak, C., von zur Mühlen, A., Hartmann, U., & Schedlowski, M. (1998). Neuroendocrine and cardiovascular response to sexual arousal and orgasm in men. *Psychoneuroendocrinology*, *23*(4), 401 – 411. [CrossRef]

Leonard, A. (2010). An investigation of masturbation and coping style. In 38th Annual Western Pennsylvania Undergraduate Psychology Conference (pp. 1 – 5). https://www.drspeg.com/research/2010/masturbation.pdf

Lew - Starowicz, M., Draps, M., Kowalewska, E., Obarska, K., Kraus, S. W., & Gola, M. (2022). Tolerability and efficacy of paroxetine and naltrexone for treatment of compulsive sexual behaviour disorder. *World Psychiatry*, *21*(3), 468 – 469. [CrossRef]

Lim, M. S. C., Agius, P. A., Carrotte, E. R., Vella, A. M., & Hellard, M. E. (2017). Young Australians' use of pornography and associations with sexual risk behaviours. *Australian and New Zealand Journal of Public Health*, *41*(4), 438 – 443. [CrossRef]

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling: A Multidisciplinary Journal*, *9*(2), 151 – 173. [CrossRef]

McCredie, M. N., Harris, B., Regan, T., Morey, L. C., & Fields, S. A. (2021). Development and validation of a validity scale for use with the UPPS-P and Short UPPS-P Impulsive Behavior Scales. *Journal of Personality Assessment*, *103*(6), 752 – 761. [CrossRef]

Mehling, W. E., Gopisetty, V., Daubenmier, J., Price, C. J., Hecht, F. M., & Stewart, A. (2009). Body awareness: Construct and self-report measures. *PLOS One*, *4*(5), e5614. [CrossRef]

Meston, C. M., & Bradford, A. (2007). Autonomic nervous system influences: The role of the sympathetic nervous system in female sexual arousal. Institute Conference on the Psychophysiology of Sexual Desire, Arousal, and Behavior, Bloomington (pp. 66 – 82). Indiana University Press.

M. P. (2010). Hypersexual disorder: A proposed diagnosis for DSM-V. *Archives of Sexual Behavior*, *39*(2), 377 – 4.

Narrow, W. E., Clarke, D. E., Kuramoto, S. J., Kraemer, H. C., Kupfer, D. J., Greiner, L., & Regier, D. A. (2013). DSM-5 field trials in the United States and Canada, Part III: development and reliability testing of a cross-cutting symptom assessment for DSM-5. *American Journal of Psychiatry*, *170*(1), 71 – 82. [CrossRef]

Okabe, Y., Takahashi, F., & Ito, D. (2021). Problematic pornography use in Japan: A preliminary study among university students. *Frontiers in Psychology*, *12*, 638354. [CrossRef]

Pautrat, M., Le Guen, A., Barrault, S., Ribadier, A., Ballon, N., Lebeau, J. P., & Brunault, P. (2022). Impulsivity as a risk factor for addictive disorder severity during the COVID-19 lockdown: Results from a mixed quantitative and qualitative study. *International Journal of Environmental Research and Public Health*, *20*(1), 705. [CrossRef]

Pepping, C. A., Cronin, T. J., Lyons, A., & Caldwell, J. G. (2018). The effects of mindfulness on sexual outcomes: The role of emotion regulation. *Archives of Sexual Behavior*, *47*(6), 1601 – 1612. [CrossRef]

Phillips, L. (2018). Self-compassion in pornography users: A moderation analysis. *Doctoral Dissertations and Projects*, *1696*.

Price, C. (2005). Body-oriented therapy in recovery from child sexual abuse: An efficacy study. *Alternative Therapies in Health and Medicine*, *11*(5), 46 – 57.

Price, C. (2006). Body-oriented therapy in sexual abuse recovery: A pilot-test comparison. *Journal of Bodywork and Movement Therapies*, *10*(1), 58 – 64. [CrossRef]

Price, C. (2007). Dissociation reduction in body therapy during sexual abuse recovery. *Complementary Therapies in Clinical Practice*, *13*(2), 116 – 128. [CrossRef]

Price, C. J., & Thompson, E. A. (2007). Measuring dimensions of body connection: Body awareness and bodily dissociation. *Journal of Alternative and Complementary Medicine*, *13*(9), 945 – 953. [CrossRef]

Price, C. J., Thompson, E. A., & Cheng, S. C. (2017). Scale of Body Connection: A multisample construct validation study. *PLoS One*, *12*(10), e0184757. [CrossRef]

Reid, R. C., Bramen, J. E., Anderson, A., & Cohen, M. S. (2014). Mindfulness, emotional dysregulation, impulsivity, and stress proneness among hypersexual patients. *Journal of Clinical Psychology*, *70*(4), 313 – 321. [CrossRef]

Rousseau, A., Bőthe, B., & Štulhofer, A. (2021). Theoretical antecedents of male adolescents' problematic pornography use: A longitudinal assessment. *Journal of Sex Research*, *58*(3), 331 – 341. [CrossRef]

Seal, B. N., & Meston, C. M. (2007). The impact of body awareness on sexual arousal in women with sexual dysfunction. *Journal of Sexual Medicine*, *4*(4 Pt 1), 990 – 1000. [CrossRef]

Shirk, S. D., Saxena, A., Park, D., & Kraus, S. W. (2021). Predicting problematic pornography use among male returning US veterans. *Addictive Behaviors*, *112*, 106647. [CrossRef]

Silverstein, R. G., Brown, A. C. H., Roth, H. D., & Britton, W. B. (2011). Effects of mindfulness training on body awareness to sexual stimuli: Implications for female sexual dysfunction. *Psychosomatic Medicine*, *73*(9), 817 – 825. [CrossRef]

Solano, I., Eaton, N. R., & O'Leary, K. D. (2020). Pornography consumption, modality and function in a large internet sample. *Journal of Sex Research*, *57*(1), 92 – 103. [CrossRef]

Streiner, D. L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment*, *80*(1), 99 – 103. [CrossRef]

Tani, F., Ponti, L., & Ghinassi, S. (2020). Sensation seeking and gambling behavior in adolescence: Can externalizing problems moderate this relationship? *International Journal of Environmental Research and Public Health*, *17*(23), 8986. [CrossRef]

Testa, G., Villena-Moya, A., & Chiclana-Actis, C. (2024). Emotional dysregulation and coping strategies in the context of problematic pornography use: A narrative review. *Current Addiction Reports*, *11*(2), 229 – 241. [CrossRef]

Willie, C., Gill, P. R., Teese, R., Stavropoulos, V., & Jago, A. (2022). Emotion-driven problem behaviour: The predictive utility of positive and negative urgency. *Brain and Neuroscience Advances*, *6*, 23982128221079573. [CrossRef]

World Health Organization (2018). ICD-11 for mortality and morbidity statistics. https://icd.who.int/browse11/l-m/en

Ye, S., Cheng, H., Zhai, Z., & Liu, H. (2021). Relationship between social anxiety and Internet addiction in Chinese college students controlling for the effects of physical exercise, demographic and academic variables. *Frontiers in Psychology*, *12*, 698748. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

The Mediating Role of Interpersonal Emotion Regulation in the Effect of Parasocial Relationships on Social Media Addiction and the Moderating Role of Death Anxiety: A Cross-Sectional Study

Sevgi Koroglu[1,2], Metin Yıldız[3], Gulgun Durat[1]

[1]Department of Nursing, Sakarya University Faculty of Health Sciences, Sakarya, Türkiye
[2]Department of Nursing, Sakarya University Institute of Health Sciences, Sakarya, Türkiye
[3]Department of Midwifery, Sakarya University Faculty of Health Sciences, Sakarya, Türkiye

ORCID iDs of the authors: S.K. 0000-0002-8060 – 9216, M.Y. 0000-0003-0122 – 5677, G.D. 0000-0002-9889-3622

Main Points

- The level of parasocial interaction increases social media addiction; parasocial relationships reduce social anxiety and loneliness, enhancing the sense of belonging, which in turn leads to social media addiction.
- There is a positive correlation between death anxiety and social media addiction; death anxiety is mitigated through the sense of digital immortality created by social media.
- Parasocial interactions on social media are used for emotion regulation, which further increases social media addiction. Additionally, death anxiety plays a moderating role in this relationship.

Abstract

This study examines the relationship between parasocial interactions and social media addiction, as well as the moderating effect of death anxiety and the mediating role of interpersonal emotion regulation. A sample of 400 university students who use Facebook, Instagram, and/or Twitter participated in this study. Data analysis software (SPSS 25.0, R-4.1.3, G*Power 3.1) was used to process all data. Social media addiction is significantly influenced by parasocial interactions, and interpersonal emotion regulation has a substantial impact on social media addiction. Through interpersonal emotion regulation, the indirect effect of parasocial interaction on social media addiction was found to be significant. Furthermore, when death anxiety is strong, the impact of parasocial interaction on social media addiction is reduced.
Keywords: Anxiety, death anxiety, emotion regulation, parasocial, social media

Corresponding author:
Sevgi Koroglu,
E-mail:
sevgikoroglu@sakarya.edu.tr

Received: August 30, 2024
Revision Requested: December 7, 2024
Last Revision Received: March 27, 2025
Accepted: April 25, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.
Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

Globally, the number of social media users has reached 5.04 billion, accounting for approximately 62.3% of the world's population (Information and Communication Technologies Authority, 2024). Social media has gained popularity due to its ability to provide social support, facilitate access to information, and enhance life satisfaction (Mitropoulou et al., 2022). However, despite its benefits, problematic social media use has emerged as a significant global concern. Social media addiction is characterized by an uncontrollable urge that results in substantial time and effort expenditure, negatively impacting individuals' social, occupational, and functional domains, as well as their psychosocial well-being and interpersonal relationships (Cheng et al., 2021; Mitropoulou et al., 2022).

Theoretical Framework

Self-Determination Theory posits that three fundamental psychological needs—competence, relatedness, and autonomy—drive human motivation and

Cite this article as: Koroglu, S., Yıldız, M., & Durat, G. (2025). The mediating role of interpersonal emotion regulation in the effect of parasocial relationships on social media addiction and the moderating role of death anxiety: A cross-sectional study. *Addicta: The Turkish Journal on Addictions*, 12(3), 339-347.

behavior. Relatedness involves forming connections with others and fostering a sense of belonging. To satisfy these innate drives, individuals engage in parasocial interactions to fulfill their need for social connection and belonging (Akhtar & Islam, 2023; Chung & Cho, 2017). A parasocial relationship is a one-sided bond that an individual develops with a real or fictional media figure through media consumption. The satisfaction derived from parasocial relationships is comparable to that obtained from real friendships (de Bérail et al., 2019). Parasocial relationships formed on social media encompass feelings of closeness, trust, and identification with media figures, resembling elements of real interpersonal relationships (Yang et al., 2022). Individuals who derive social fulfillment from parasocial relationships may use social media more frequently to compensate for real-life loneliness, thereby fostering addictive behaviors (de Bérail et al., 2019).

Social media addiction is considered an escape mechanism for managing emotional dysregulation. Interpersonal emotion regulation refers to how individuals manage their emotional responses and states while interacting with others. This process occurs within sociological contexts, requiring individuals to engage in emotional involvement, expression, and regulation (Bintaş-Zörer & Yorulmaz, 2022). Social media fosters positive emotions and facilitates coping with unpleasant feelings by enabling interactions in a structure that mimics real-life, bidirectional relationships (Lotun, 2022). Moreover, parasocial interactions influence individuals' motivation, satisfaction, and social impact (Astarini & Sumardi, 2022; Aw & Labrecque, 2020; Chiu & Huang, 2015; Hasan et al., 2022). These factors lead individuals to rely on parasocial figures for emotional regulation (Marino et al., 2019). Consequently, forming a parasocial bond with a beloved fictional character facilitates emotional regulation and alleviates negative emotions. Both one-way and two-way interactions help individuals distance themselves from negative emotions, reinforcing social media use (Lotun, 2022). In summary, parasocial interactions shape individuals' emotional responses and regulation through interpersonal emotion regulation. Understanding the intricate relationship between addiction and interpersonal emotion control in parasocial interactions is crucial for comprehending social media addiction.

Death anxiety refers to the distress associated with individuals' awareness of their mortality (Kumpasoğlu et al., 2021). According to Terror Management Theory (TMT), individuals develop various psychological defenses, either consciously or unconsciously, to cope with death anxiety (Pyszczynski et al., 2021). The TMT suggests that individuals' pursuit of symbolic immortality leads them to construct digital immortality by integrating their unique identities and lifestyles into social media. Additionally, attachment motivation may facilitate the formation of parasocial relationships through social media, compensating for real-life relationships. Symbolic immortality and relational attachment serve to mitigate death anxiety (Kumpasoğlu et al., 2021). Belonging to a social community is perceived as a mechanism for controlling anxiety and coping with one's continued existence. Within this context, developing an attachment to social media and forming online relationships can help reduce death anxiety (Kumpasoğlu et al., 2021). However, the current literature lacks sufficient research exploring the causal link between parasocial relationship styles and death anxiety.

Objective and Significance of the Study

This study provides an innovative contribution to the literature by integrating psychological and behavioral mechanisms into a comprehensive model that examines the mediating role of interpersonal emotion regulation and the moderating role of death anxiety in the relationship between parasocial relationships and social media addiction. Previous research has primarily explored the link between parasocial relationships and social media addiction in the context of social interaction anxiety (Tatem & Ingram, 2022). However, this study expands the existing framework by investigating the effects of emotion regulation strategies and death anxiety on this relationship. Specifically, the concept of interpersonal emotion regulation has not been sufficiently examined in studies related to social media addiction (Liu & Ma, 2019). Therefore, this study focuses on understanding how interpersonal emotion regulation influences social media addiction.

Previous research on death anxiety has primarily examined this concept in relation to loneliness and empathy (Ahmadimajd, 2024). Additionally, studies have demonstrated that emotion regulation strategies can reduce death anxiety through social support (Chukwuorji et al., 2020). However, the specific relationship between death anxiety and social media addiction remains underexplored. Furthermore, death anxiety has been found to mediate the relationship between Machiavellianism and social media addiction (Kumpasoğlu et al., 2021). By examining the influence of death anxiety on social media addiction, this study seeks to fill a significant gap in the literature.

Similarly, research on difficulties in emotion regulation has established its association with social anxiety and problematic internet use (Sertbaş et al., 2020). However, limited studies have investigated how emotion regulation difficulties influence the relationship between parasocial relationships and social media addiction. This study contributes to the literature by elucidating how emotion regulation processes shape this relationship.

By incorporating parasocial relationships, interpersonal emotion regulation, and death anxiety into a unified model, this study aims to provide a holistic understanding of their impact on social media addiction. Understanding the moderating role of death anxiety and the mediating role of emotion regulation could help individuals manage their social media use more consciously. Additionally, by examining the effects of parasocial relationships on online social network addiction, this study contributes to the understanding how individuals meet their emotional regulation needs through digital interactions.

Accordingly, this study addresses the following research questions:

1. Do parasocial relationships influence social media addiction among university students?
2. Does death anxiety moderate the relationship between parasocial relationships and social media addiction among university students?
3. Does emotion regulation mediate the relationship between parasocial relationships and social media addiction among university students?

Material and Methods

Participants and Procedures

This cross-sectional study was conducted at a public university in Sakarya, Türkiye, involving a sample selected from a total of 1000 students enrolled in the midwifery and nursing departments. Young adults are among the most active social media users, making them a crucial demographic group for examining the psychological effects of social media use (Parija et al., 2020; Prybutok & Ryan, 2015). Therefore, the study focused on university students as the target population.

The sample size was determined using the population sampling formula with a 95% CI, establishing that a minimum of 278 participants would be sufficient. However, to account for potential dropouts, rejections, and incomplete responses, the final sample size was increased to 400 students. To assess the reliability of the results, a post hoc power analysis was conducted, indicating that the sample size was adequate for the study ($\alpha = 0.05$, 98% power, and a medium effect size) (Cohen, 2013).

The study received ethical approval from the Sakarya University Social and Human Sciences Ethics Committee (Approval No: E-61923333-050.99-242836, Date: 03/05/2023). Inclusion criteria required participants to be actively enrolled in nursing or midwifery programs and to have at least one active social media account (e.g., Facebook, Instagram, Twitter). Participants under the age of 18, or those who did not complete the survey in its entirety, were excluded from the study.

Between May 15, 2023, and January 5, 2024, students were informed about the purpose and scope of the study after their classes, and those interested in participating were identified. Before completing the survey, students provided written informed consent. Only fully completed surveys were considered valid for analysis.

Data Collection Instruments

Bergen Social Media Addiction Scale

This scale was developed by Andreassen et al. in 2012 (Andreassen et al., 2012) and was adapted into Turkish by Demirci in 2019 to assess social media addiction. The six-item scale measures six core criteria of addiction: preoccupation, mood modification, tolerance, withdrawal, conflict, and relapse. It is structured as a five-point Likert scale, ranging from 1 (very rarely) to 5 (very often). The total score ranges from 6 to 30, with higher scores indicating greater levels of social media addiction (Demirci, 2019). In this study, the Cronbach's alpha reliability coefficient was found to be 0.90.

Interpersonal Emotion Regulation Scale

Developed by Hofmann et al. in 2016 (Hofmann et al., 2016) and translated into Turkish by Gökdağ et al. in 2019, this scale evaluates individuals' emotion regulation strategies in social situations. It consists of four subdimensions: perspective-taking, soothing, enhancing positive emotions, and social modeling. The scale includes 20 items rated on a 5-point Likert scale ranging from 1 (not at all true) to 5 (completely true). The total score ranges from 20 to 100, with lower scores indicating a greater tendency to seek external support for emotion regulation. According to Gökdağ et al. (2019), there are no reverse-coded items in the scale. In this study, the Cronbach's α reliability coefficient was found to be 0.95.

Thorson-Powell Death Anxiety Scale

This scale was revised by Thorson and Powell in 1992 (Thorson & Powell, 1992) and was adapted into Turkish by Karaca and Yıldız in 2001 to assess individuals' fear of death. It is a 25-item Likert-type scale, ranging from 0 (very positive) to 4 (very negative). Negative statements are reverse-scored to calculate the final score. Specifically, 17 items contain positive statements, while 8 items contain negative statements. The total score ranges from 0 to 100, with the following classifications: 0 – 25 (very low), 26 – 50 (mild), 51 – 75 (moderate), and 76 – 100 (very high) (Karaca & Yıldız, 2001). In this study, the Cronbach's α reliability coefficient was 0.94.

Parasocial Interaction Scale

Originally developed by Rubin et al. in 1985 (Rubin et al., 1985) and translated into Turkish by Arda in 2006, this 13-item scale measures parasocial interactions. It employs a 5-point Likert system, ranging from "strongly disagree" to "strongly agree." Higher scores indicate a higher degree of parasocial interaction. The total score ranges from 13 to 65 (Arda, 2006). In this study, the Cronbach's α reliability coefficient was found to be 0.93.

Data Analysis

In this study, various statistical methods were applied using SPSS-25 (IBM SPSS Corp.; Armonk, NY, USA) and R-4.1.3 software. The assumption of normality was tested using skewness and kurtosis scores in SPSS-25 to evaluate model suitability and minimize deviation effects. The skewness values ranged from −0.39 to −0.01, and kurtosis values ranged from −0.94 to −0.81, indicating that the data followed a normal distribution (Blanca et al., 2013). The assumption of linearity was assessed using scatterplots in SPSS-25, confirming the appropriateness of the model for linear regression analysis. Multicollinearity issues were examined using Pearson's Product-Moment Correlation, Variance Inflation Factor (VIF), tolerance values, and Condition Index (CI) analysis in SPSS-25. These procedures ensured the reliability of variable relationships and addressed potential model deviations. The results showed a tolerance level greater than 0.1, a VIF value below 2 (O'Brien, 2007), and CI values below 10 (Kim, 2019), confirming the absence of multicollinearity issues in the model.

Autocorrelation was tested using the Durbin-Watson test in SPSS-25 to assess the independence of error terms. This analysis is crucial for detecting dependencies among consecutive data points. The results indicated that the Durbin-Watson values ranged between 1.5 and 2.5, suggesting no autocorrelation in the model (White, 1992).

Mediation analysis was conducted to examine the effect of interpersonal emotion regulation in the relationship between parasocial interaction and social media addiction. This analysis was performed in R using Andrew F. Hayes' published R scripts. Path analysis was carried out using the "lavaan" package in R. Moderator analyses were conducted in SPSS using Hayes' Process macro to evaluate the effect of death anxiety. In both moderation and mediation analyses, the statistical significance

of relationships was assessed using the bootstrap technique, with 5000 resamples within a 95% CI.

Results

Overall, 80.8% (n = 323) of the participants were female, all were single, 91.8% (n = 367) reported no history of mental illness, and 62.5% (n = 250) perceived their income as equal to their expenses. The mean age of the sample was 19.63 ± 0.98 years (range: 18 – 21). Participants reported spending an average of 4.48 ± 2.45 hours per day on social media, with a range of 1 to 15 hours (Table 1).

The mean total scores for the study scales were as follows: 39.59 ± 13.38 for the Parasocial Interaction Scale, 53.52 ± 20.79 for the Thorson-Powell Death Anxiety Scale, 54.68 ± 15.74 for the Interpersonal Emotion Regulation Questionnaire, and 18.58 ± 5.96 for the Bergen Social Media Addiction Scale (Table 2).

According to the findings presented in Table 3, the total effect of the parasocial interaction variable on interpersonal emotion regulation was strong and significant (coefficient = 0.73, p < .0000). This model accounted for 38.57% of the variance in the Interpersonal Emotion Regulation Scale (R^2 = 0.39). The CI (LLCI = 0.64, ULCI = 0.82) supported the statistical significance of this relationship. Additionally, the direct effect of interpersonal emotion regulation on social media addiction was found to be significant (coefficient = 0.10, p < .0000), with bootstrap CIs (LLCI = 0.06, ULCI = 0.13) confirming the stability of this effect. The effect of death anxiety on social media addiction was also statistically significant (coefficient = 4.74, p = .0015), and CIs (LLCI = 1.82, ULCI = 7.66) indicated the reliability of this relationship. Similarly, the direct effect of parasocial interaction

Table 1.
Demographic Characteristics of the Participants (n = 400)

Demographic Characteristics		*n*	%
Gender	Female	323	80.8
	Male	77	19.3
Marital status	Single	400	100
	Married	0	0
Perceived level of income	Income less than expenses	125	31.3
	Income equal to expenses	250	62.5
	Income more than expenses	25	6.3
The presence of mental illness	Yes	33	8.3
	No	367	91.8
	$\bar{X}$ ± SD (Min-Max)		
Age (years)	19.63 ± 0.98 (18 – 21)		
Time spent on social media (hours)	4.48 ± 2.45 (1 – 15)		

Table 2.
Scale Mean Scores of the Participants (n = 400)

	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Parasocial Interaction Scale	14.00	70.00	39.59	13.38	−0.08	−0.89
Thorson-Powell Death Anxiety Scale	.00	100.00	53.52	20.79	−0.03	−0.81
Interpersonal Emotion Regulation Questionnaire	18.00	90.00	54.68	15.74	−0.13	−0.89
Social modelling	6.00	30.00	18.42	5.61	−0.03	−0.86
Appeasement	4.00	20.00	11.85	3.84	−0.02	−0.88
Increasing positive emotions	4.00	20.00	13.27	4.19	−0.27	−0.93
Perspective taking	4.00	20.00	11.12	3.86	−0.01	−0.89
Bergen Social Media Addiction Scale	6.00	30.00	18.58	5.96	−0.39	−0.94

Table 3.
Direct Effects of Independent Variables on Dependent Variables

	Coefficient	R^2	SE	*t*	*p*	LLCI	ULCI	Durbin-Watson	VIF
Parasocial Interaction Scale → Interpersonal Emotion Regulation Questionnaire (Total Effect)	0.73	0.39	0.05	15.81	.0000	0.64	0.82	1.82	1.00
Interpersonal Emotion Regulation Questionnaire → Social Media Addiction Scale (Direct Effect)	0.10	0.54	0.02	5.52	.0000	0.06 (bootstrap)	0.13 (bootstrap)	1.65	1.00
Death Anxiety Scale → Social Media Addiction Scale (Direct Effect)	4.74	0.54	1.49	0.0015	.0015	1.82	7.66	1.54	1.00
Parasocial Interaction Scale → Social Media Addiction Scale (Direct Effect)	0.31	0.54	0.06	5.75	.0000	0.21 (bootstrap)	0.42 (bootstrap)	1.61	1.00

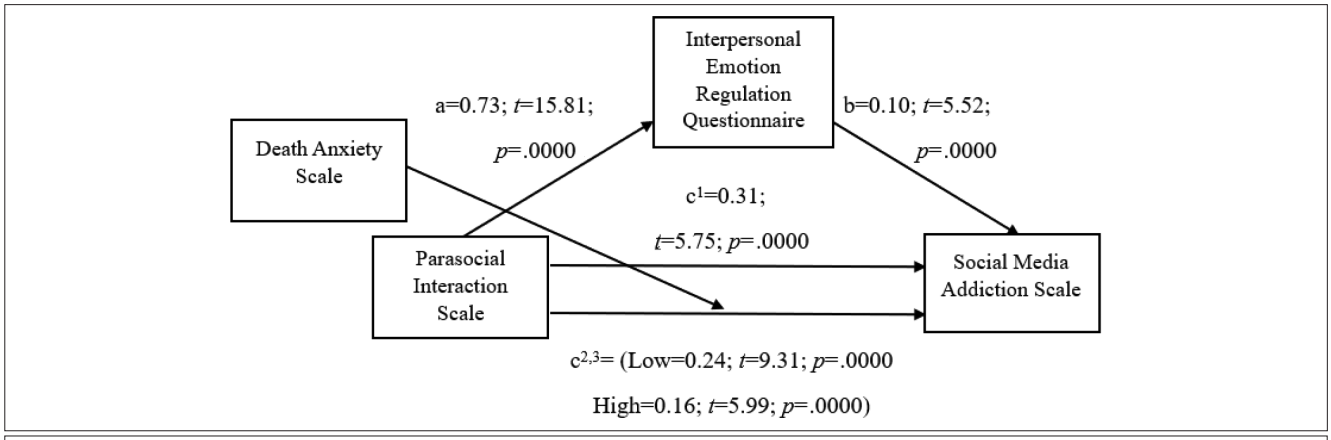


Figure 1. Representation of mediating and moderating roles in the relationship between parasocial interaction and social media addiction.

on social media addiction was significant (coefficient = 0.31, $p <$ .0000), with bootstrap confidence intervals (LLCI = 0.21, ULCI = 0.42) further supporting this relationship (Table 3, Figure 1).

The findings presented in Table 4 illustrate the effects of mediating and moderating variables on social media addiction. The indirect effect of parasocial interaction on social media addiction through interpersonal emotion regulation was significant (coefficient = 0.07, Bootstrap LLCI = 0.04, ULCI = 0.10). Among individuals with low death anxiety, the effect of parasocial interaction on social media addiction was high (coefficient = 0.24, $p <$ .0000, LLCI = 0.19, ULCI = 0.29), though this model explained only a small portion of the variance (R^2 change = 0.01). Conversely, among individuals with high death anxiety, the effect of parasocial interaction on social media addiction was weaker compared to those with low death anxiety (coefficient = 0.16, $p <$ .0000, LLCI = 0.11, ULCI = 0.22). The moderating effect of death anxiety significantly influenced the relationship between parasocial interaction and social media addiction (coefficient = −0.08, p = .0321, LLCI = −0.14, ULCI = −0.00) (Table 4).

Furthermore, the findings presented Table 4 indicate that interpersonal emotion regulation mediates the relationship between parasocial interaction and social media addiction. Additionally, death anxiety moderates this relationship. The interaction between parasocial interaction and death anxiety suggests that these two variables collectively have a significant impact on social media addiction. As death anxiety increases, the effect of parasocial interaction on social media addiction decreases. This finding provides key insights into how an individual's level of death anxiety may influence the relationship between parasocial interactions and social media addiction (Table 4, Figure 2).

Moreover, Figure 3 illustrates the distribution, interaction, and depth of the Parasocial Interaction Scale, the Bergen Social Media Addiction Scale, and the Interpersonal Emotion Regulation Questionnaire concerning the Thorson-Powell Death Anxiety Scale.

Discussion

This study examined the role of interpersonal emotion regulation in mediating the relationship between death anxiety, parasocial interaction, and social media addiction among university students. These findings were interpreted in light of the existing literature.

Table 4.
Analysis Results Demonstrating the Effects of Mediating and Moderating Variables on the Social Media Addiction Scale

	Coefficient	R^2	SE	*t*	*p*	LLCI	ULCI	Durbin-Watson	VIF
Interpersonal Emotion Regulation Questionnaire → Social Media Addiction Scale (Indirect Effect)	0.07	-	0.02	-	-	0.04 (bootstrap)	0.10 (bootstrap)	1.65	1.00
Parasocial Interaction Scale*Death Anxiety Scale (Low) → Social Media Addiction Scale	0.24	(R^2-change 0.01)	0.03	9.31	.0000	0.19 (bootstrap)	0.29 (bootstrap)	1.61	1.00
Parasocial Interaction Scale*Death Anxiety Scale (High) → Social Media Addiction Scale	0.16	(R^2-change 0.01)	0.03	5.99	.0000	0.11 (bootstrap)	0.22 (bootstrap)	1.61	1.56
Parasocial Interaction Scale* Death Anxiety Scale → Social Media Addiction Scale (Interaction)	-0.08	0.54	0.04	−2.15	.0321	−0.14	−0.00	1.68	1.56

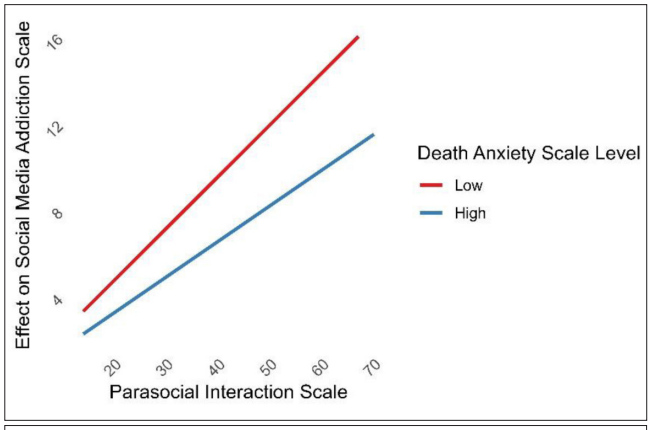


Figure 2. The effect of parasocial interaction on social media addiction according to death anxiety.

The results indicate a strong correlation between parasocial interaction and social media addiction. Social media addiction worsens as parasocial interaction increases. According to Baek et al. (2013), there is a positive correlation between trust in social networking sites and dependency on parasocial connections. Studies have De Bérail et al. (2019) found that the parasocial bond between university students and their preferred YouTubers exacerbates YouTube addiction. Similarly, Akhtar and Islam (2023) research indicates that parasocial relationships play a positive moderating role in the development of TikTok addiction among Chinese users. A meta-analysis conducted by researchers Tukachinsky et al. (2020) concluded that parasocial relationships are a significant predictor of media engagement. These findings align with the results of the present study. The existing literature does not provide evidence of a non-existent or negative relationship between parasocial interaction and social media addiction. This positive association may be due to parasocial interactions serving as an alternative mechanism for fulfilling individuals' emotional and social needs. The fulfillment of emotional and social needs may reinforce social media use and trigger addictive behaviors (Jarzyna, 2020; Tukachinsky et al., 2020).

These findings indicate a strong correlation between death anxiety and social media addiction. Social media addiction worsens as death anxiety increases. According to Feng et al. (2023), smartphone addiction was positively and directly associated with fear of death among university students. Partouche-Sebban (2016) found a positive relationship between death anxiety and Facebook use, as the platform serves as a means of constructing a valuable self-image and gaining social recognition. The existing literature does not provide evidence of a non-existent or negative relationship between death anxiety and social media addiction. Individuals may use social media more frequently to cope with death anxiety, attain a sense of digital immortality, and strengthen their online social connections (Kumpasoğlu et al., 2021).

The findings suggest a connection between social media addiction and interpersonal emotion regulation. Social media addiction increases as interpersonal emotion regulation intensifies. Previous research published in the international literature supports a significant relationship between social media addiction and interpersonal emotion regulation (Marino et al., 2020; Pontes et al., 2018). Peker and Yıldız (2022) found that adolescents who struggle with emotion regulation are more likely to exhibit problematic social media use. Liu and Ma (2019) demonstrated that

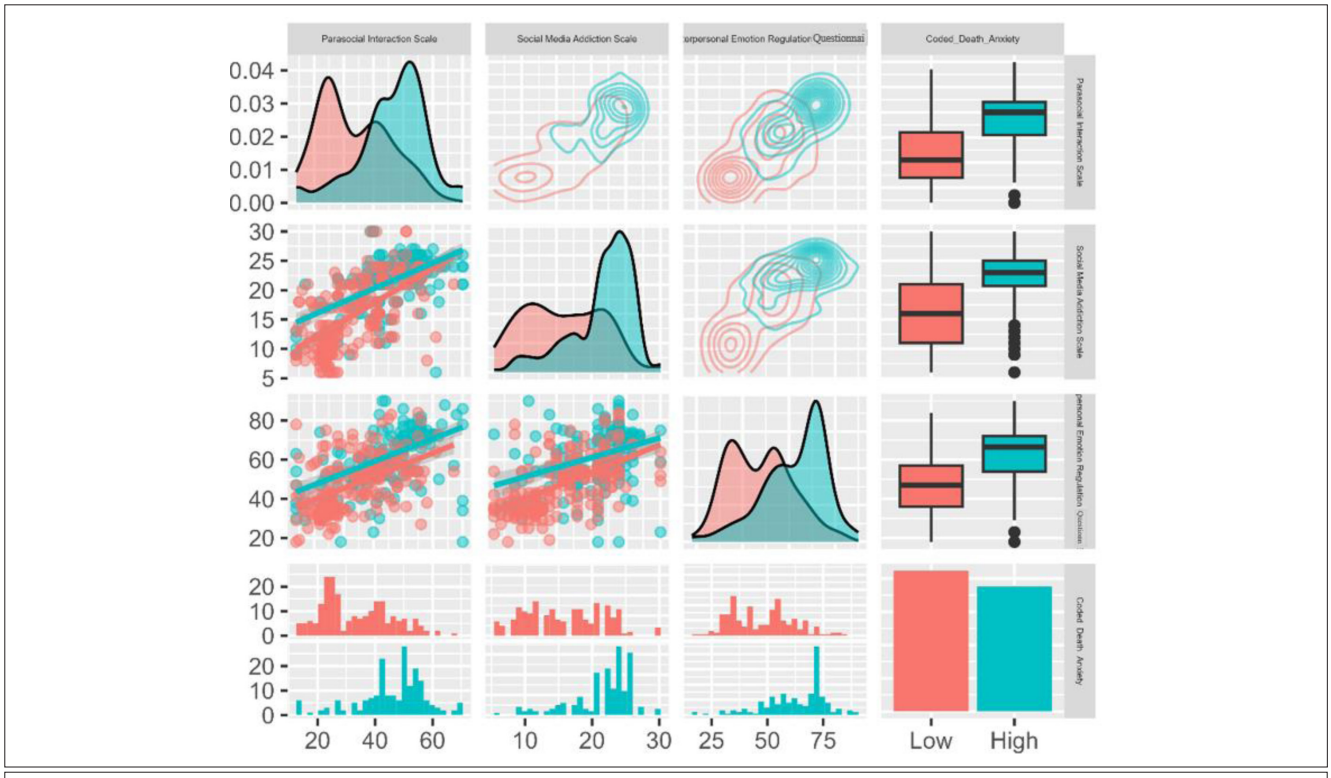


Figure 3. Distribution, interaction, and intensity of parasocial interaction scale, Bergen social media addiction scale, and interpersonal emotion regulation questionnaire according to categorical Thorson-Powell death anxiety scale variable.

attachment anxiety predicts difficulties in emotion regulation, which, in turn predicts social network addiction. Additionally, Hormes et al. (2014) observed significant difficulties in emotion regulation among individuals who reported problematic use of online social media platforms. These findings align with the results of the present study. Individuals who experience difficulties in emotion regulation may turn to social media platforms to avoid or regulate negative emotions, creating a reinforcing cycle that contributes to social media addiction (Drach et al., 2020).

The findings indicate that an increase in parasocial interaction leads to an increase in interpersonal emotion regulation. Parasocial interactions may serve as an effective mechanism for fulfilling individuals' emotional needs, positively impacting interpersonal emotion regulation skills. A meta-analysis conducted by Tukachinsky et al. (2020) demonstrated that parasocial interactions support interpersonal emotion regulation strategies, such as developing empathy and emotional sharing with media figures. Similarly, Schiappa et al. (2005) noted that parasocial interactions help alleviate loneliness and emotional burdens, assisting individuals in maintaining emotional balance. De Bérail et al. (2019) found that parasocial bonds function as a coping mechanism for university students facing stressful situations, providing emotional relief through engagement with media figures. Additionally, Rimé (2009) emphasized that sharing emotions in a social context can alleviate emotional burdens, suggesting that a similar process may occur through parasocial bonds. These findings support the results of this study. Parasocial interactions contribute to interpersonal emotion regulation through mechanisms such as emotional support, empathy, stress reduction, and modeling emotion regulation strategies via media figures (Peng et al., 2024; Shao et al., 2021).

Interpersonal emotion regulation was found to mediate the relationship between parasocial interaction and social media addiction. While direct evidence of this mediation role is scarce in the international literature, supporting findings exist. Research has Liu and Ma (2019) demonstrated that difficulties in emotion regulation influence social media addiction, highlighting how these processes may be reinforced through interpersonal relationships. Similarly, studies have Quaglieri et al. (2021) found a strong association between emotional dysfunction and social media addiction, suggesting that parasocial bonds may play a regulatory role in mitigating these dysfunctions. Additionally, Zsido et al. (2021) examined the relationship between social anxiety and social media addiction, concluding that maladaptive emotion regulation strategies could exacerbate addiction. Bond (2021) found that during the COVID-19 pandemic, social isolation amplified the role of parasocial interactions in interpersonal emotion regulation, contributing to social media addiction. These findings suggest that social and parasocial interactions influence individuals' emotional responses and regulation through interpersonal emotion regulation. Understanding the complex relationship between parasocial interactions, interpersonal emotion control, and addiction is critical to comprehending the mechanisms underlying social media addiction.

The role of parasocial interaction in social media addiction and the moderating function of death anxiety were confirmed. A study involving 1483 Chinese university students found a positive and direct relationship between fear of death and smartphone addiction (Feng et al., 2023). This result suggests that death anxiety may be a fundamental psychological factor shaping individuals' technology and social media usage patterns. Additionally, a study conducted during the COVID-19 pandemic with 400 participants identified a correlation between the degree of social media use and death anxiety (Sheck et al., 2022). These findings suggest that uncertainty and fear of death during the pandemic may have driven individuals to use social media more frequently. Taken together, these results indicate that parasocial interactions play a crucial role in how individuals cope with death anxiety and develop social media addiction.

This study presents several innovative contributions to the existing literature on the relationship between parasocial interaction and social media addiction (Baek et al., 2013; De Bérail et al., 2019; Tukachinsky et al., 2020). By identifying the mediating role of interpersonal emotion regulation in the effect of parasocial interactions on social media addiction, this study introduces a multi-step causal process that has not been previously tested experimentally, offering significant insights into addiction and media psychology.

Additionally, the study reveals that death anxiety serves as a moderating factor in the relationship between parasocial interaction and social media addiction. Individuals with higher levels of death anxiety were found to form stronger parasocial bonds and exhibit a greater tendency toward social media addiction, suggesting that social media consumption may function as a coping mechanism for existential fears.

Moreover, this study highlights the connection between social media addiction and the pursuit of digital immortality, demonstrating that individuals use social media not merely as a form of entertainment but also as a means to manage their fear of death. While prior research has largely focused on the coping functions of social media (Karim & Kwan, 2024; Tandoc & Takahashi, 2016), this study introduces a novel existential perspective on the direct relationship between parasocial interactions and addiction.

Limitations and Directions for Future Research

Given certain limitations, the findings of this study should be interpreted with caution. A significant limitation is the overrepresentation of female participants in the sample compared to males. Additionally, as this study is cross-sectional, causality should not be inferred. The study focuses exclusively on young adults, limiting its generalizability to other age groups. Furthermore, how individuals allocate their time online is an important factor that was not thoroughly addressed; incorporating this variable could have provided more robust findings.

In conclusion, death anxiety, interpersonal emotion regulation, and parasocial interactions are predictors of social media addiction among young individuals. This study has contributed to understanding how students use social media and the motivations underlying their usage. To raise awareness of the factors contributing to social media addiction among young people, digital awareness programs should be developed, promoting time management skills and healthy digital habits. To strengthen interpersonal emotion regulation strategies, interventions such as mindfulness and emotional intelligence training should be

encouraged to enhance psychological resilience. Expanding psychosocial support services is essential, particularly by offering individual and group therapy to address difficulties in emotional regulation and coping with death anxiety. Additionally, encouraging participation in meaningful offline activities such as sports, arts, and volunteer programs can help young individuals engage in alternative, fulfilling experiences beyond social media.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: This study was approved by the Ethics Committee of Sakarya University (Approval No: E-61923333-050.99-242836; Date: 03/05/2023).

Informed Consent: Written informed consent was obtained from the participants who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – S.K., M.Y., G.D.; Design – S.K.; Supervision – M.Y., G.D.; Resources – S.K., M.Y., G.D.; Materials – S.K.; Data Collection and/or Processing – S.K.; Analysis and/or Interpretation – M.Y.; Literature Search – S.K.; Writing – S.K., M.Y.; Critical Review – M.Y., G.D.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

References

Ahmadimajd, R. (2024). Emotion regulation mediates the associations of loneliness and empathy with death anxiety in the elderly. *Elderly Health Journal*, *10*(1), 27 – 34. [CrossRef]

Akhtar, A., & Islam, T. (2023). Unveiling the predictors and outcomes of TikTok addiction: The moderating role of parasocial relationships. *Kybernetes*, Vol. ahead-of-print No. ahead-of-print. [CrossRef]

Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports*, *110*(2), 501 – 517. [CrossRef]

Arda, S. (2006) [Orta doğu teknik üniversitesi sosyal bilimler enstitüsü, Ankara]. *Predictors of parasocial interaction with the favorite and the least desirable characters portrayed in TV serials* [Yüksek Lisans Tezi].

Astarini, D., & Sumardi, A. (2022). *Drivers and outcomes of credibility and parasocial interaction to purchase intentions*. [CrossRef]

Aw, E. C. X., & Labrecque, L. I. (2020). Celebrity endorsement in social media contexts: Understanding the role of parasocial interactions and the need to belong. *Journal of Consumer Marketing*, *37*(7), 895 – 908. [CrossRef]

Baek, Y. M., Bae, Y., & Jang, H. (2013). Social and parasocial relationships on social network sites and their differential relationships with users' psychological well-being. *Cyberpsychology, Behavior and Social Networking*, *16*(7), 512 – 517. [CrossRef]

Bintaş-Zörer, P., & Yorulmaz, O. (2022). Duygu düzenlemeye güncel bir bakış: Bağlamsal faktörler. *Psikiyatride Güncel Yaklaşımlar*, *14*(2), 195 – 206. [CrossRef]

Blanca, M. J., Arnau, J., López-Montiel, D., Bono, R., & Bendayan, R. (2013). Skewness and kurtosis in real data samples. *Methodology*, *9*(2), 78 – 84. [CrossRef]

Bond, B. J. (2022). Parasocial relationships as functional social alternatives during pandemic-induced social distancing. *Psychology of Popular Media*, *11*(3), 250 – 257. [CrossRef]

Cheng, C., Lau, Y. C., Chan, L., & Luk, J. W. (2021). Prevalence of social media addiction across 32 nations: Meta-analysis with subgroup analysis of classification schemes and cultural values. *Addictive Behaviors*, *117*, 106845. [CrossRef]

Chiu, C. M., & Huang, H. Y. (2015). Examining the antecedents of user gratification and its effects on individuals' social network services usage: The moderating role of habit. *European Journal of Information Systems*, *24*(4), 411 – 430. [CrossRef]

Chukwuorji, J. C., Uzuegbu, C. N., Chukwu, C. V., Ifeagwazi, C. M., & Ugwu, C. (2020). Social support serves emotion regulation function in death anxiety among people living with HIV/AIDS. *South African Journal of Psychology*, *50*(3), 395 – 410. [CrossRef]

Chung, S., & Cho, H. (2017). Fostering parasocial relationships with celebrities on social media: Implications for celebrity endorsement. *Psychology and Marketing*, *34*(4), 481 – 495. [CrossRef]

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Academic press. [CrossRef]

De Bérail, P., Guillon, M., & Bungener, C. (2019). The relations between YouTube addiction, social anxiety and parasocial relationships with YouTubers: A moderated-mediation model based on a cognitive-behavioral framework. *Computers in Human Behavior*, *99*, 190 – 204. [CrossRef]

Demirci, İ. (2019). Bergen sosyal medya bağımlılığı ölçeğinin Türkçeye uyarlanması, depresyon ve anksiyete belirtileriyle ilişkisinin değerlendirilmesi. *Anadolu Psikiyatri Dergisi*, *20*(1), 15 – 22. [CrossRef]

Drach, R. D., Orloff, N. C., & Hormes, J. M. (2021). The emotion regulatory function of online social networking: Preliminary experimental evidence. *Addictive Behaviors*, *112*, 106559. [CrossRef]

Feng, C., Wu, A. M. S., Yu, K., Zhao, W., & Xu, J. K. (2023). Associations of death anxiety, inclusion of smartphone in the self, and affiliation motivation with smartphone use and addiction: A multiple mediation study. *Omega* [Advance online publication], 302228231189634. [CrossRef]

Gökdağ, C., Sorias, O., Kıran, S., & Ger, S. (2019). Kişilerarası Duygu Düzenleme Ölçeği'nin Türkçeye uyarlanması ve psikometrik özelliklerinin incelenmesi. *Türk Psikiyarti Dergisi*, *30*(1), 57 – 66. [CrossRef]

Hasan, A., Rahman, E., Khan, A., & Abbas, M. (2022). *Parasocial relationships and repeated viewing of YouTube and TV channels: A mediated moderated framework*. [CrossRef]

Hofmann, S. G., Carpenter, J. K., & Curtiss, J. (2016). Interpersonal Emotion Regulation Questionnaire (IERQ): Scale development and psychometric characteristics. *Cognitive Therapy and Research*, *40*(3), 341 – 356. [CrossRef]

Hormes, J. M., Kearns, B., & Timko, C. A. (2014). Craving Facebook? Behavioral addiction to online social networking and its association with emotion regulation deficits. *Addiction*, *109*(12), 2079 – 2088. [CrossRef]

Jarzyna, C. L. (2021). Parasocial interaction, the COVID-19 quarantine, and digital age media. *Human Arenas*, *4*(3), 413 – 429. [CrossRef]

Karaca, F., & Yıldız, M. (2001). Thorson-Powell ölüm kaygısı ölçeğinin Türkçe çevirisinin normal populasyonda geçerlik ve güvenirlik çalışması. *Tabula-Rasa*, *1*(1), 43 – 55.

Karim, H. A., & Kwan, S. G. (2024). Women, stress and coping with TikTok. *Manu Jurnal Pusat Penataran Ilmu dan Bahasa*, *35*(1). [CrossRef]

Kim, J. H. (2019). Multicollinearity and misleading statistical results. *Korean Journal of Anesthesiology*, *72*(6), 558 – 569. [CrossRef]

Kumpasoğlu, G. B., Eltan, S., Merdan-Yıldız, E. D., & Batıgün, A. D. (2021). Mediating role of life satisfaction and death anxiety in the relationship between dark triad and social media addiction. *Personality and Individual Differences*, *172*. [CrossRef]

Liu, C., & Ma, J.-L. (2019). Adult attachment style, emotion regulation, and social networking sites addiction. *Frontiers in Psychology*, *10*, 2352. [CrossRef]

Lotun, S. (2022). *Social media for social good: Understanding, creating, and harnessing the strength of parasocial relationships* [PhD Thesis]. UK: University of Essex.

Marino, C., Caselli, G., Lenzi, M., Monaci, M. G., Vieno, A., Nikčević, A. V., & Spada, M. M. (2019). Emotion regulation and desire thinking as predictors of problematic Facebook use. *Psychiatric Quarterly*, *90*(2), 405 – 411. [CrossRef]

Marino, C., Gini, G., Angelini, F., Vieno, A., & Spada, M. M. (2020). Social norms and e-motions in problematic social media use among adolescents. *Addictive Behaviors Reports*, *11*, 100250. [CrossRef]

Mitropoulou, E. M., Karagianni, M., & Thomadakis, C. (2022). Social media addiction, self-compassion, and psychological well-being: A structural equation model. *Alpha Psychiatry*, *23*(6), 298 – 304. [CrossRef]

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, *41*(5), 673 – 690. [CrossRef]

Parija, P. P., Tiwari, P., Sharma, P., & Saha, S. K. (2020). Determinants of online health information-seeking behavior: A cross-sectional survey among residents of an urban settlement in Delhi. *Journal of Education and Health Promotion*, *9*(1), 344. [CrossRef]

Partouche-Sebban, J. (2016). Online interactions as a terror management mechanism: How death anxiety affects Facebook use. *International Journal of Technology and Human Interaction*, *12*(4), 30 – 47. [CrossRef]

Peker, A., & Nebioğlu Yildiz, M. N. (2022). Examining the relationships between adolescents' emotion regulation levels and social media addiction. *Clinical and Experimental Health Sciences*, *12*(3), 564 – 569. [CrossRef]

Peng, L., Wang, J., Zheng, N., & Guo, X. (2024). Traversing emotional spaces: Social media affordances and emotion regulation in times of physical isolation. *Social Media + Society*, *10*(1). [CrossRef]

Pontes, H. M., Taylor, M., & Stavropoulos, V. (2018). Beyond "Facebook addiction": The role of cognitive-related factors and psychiatric distress in social networking site addiction. *Cyberpsychology, Behavior and Social Networking*, *21*(4), 240 – 247. [CrossRef]

Prybutok, G., & Ryan, S. (2015). Social media: The key to health information access for 18- to 30-year-old college students. *Computers, Informatics, Nursing: CIN*, *33*(4), 132 – 141. [CrossRef]

Pyszczynski, T., Lockett, M., Greenberg, J., & Solomon, S. (2021). Terror management theory and the COVID-19 pandemic. *Journal of Humanistic Psychology*, *61*(2), 173 – 189. [CrossRef]

Quaglieri, A., Biondi, S., Roma, P., Varchetta, M., Fraschetti, A., Burrai, J., Lausi, G., Martí-Vilar, M., González-Sala, F., Di Domenico, A., Giannini, A. M., & Mari, E. (2021). From emotional (dys)regulation to internet addiction: A mediation model of problematic social media use among Italian young adults. *Journal of Clinical Medicine*, *11*(1), 188. [CrossRef]

Rimé, B. (2009). Emotion elicits the social sharing of emotion: Theory and empirical review. *Emotion Review*, *1*(1), 60 – 85. [CrossRef]

Rubin, A. M., Perse, E. M., & Powell, R. A. (1985). Loneliness, parasocial interaction, and local television news viewing. *Human Communication Research*, *12*(2), 155 – 180. [CrossRef]

Schiappa, E., Gregg, P. B., & Hewes, D. E. (2005). The parasocial contact hypothesis. *Communication Monographs*, *72*(1), 92 – 115. [CrossRef]

Sertbaş, K., Çutuk, S., Soyer, F., Akkuş, Ç. A., & Aydoğan, R. (2020). Mediating role of emotion regulation difficulties in the relationship between social anxiety and problematic internet use. *Psihologija*, *53*(3), 291 – 305. [CrossRef]

Shao, R., Shi, Z., & Zhang, D. (2021). Social media and emotional burnout regulation during the Covid-19 pandemic: Multilevel approach. *Journal of Medical Internet Research*, *23*(3), e27015. [CrossRef]

Sheck, N., Rasul, V., Saeed, D., Abdullah, H., & Xalil, A. (2022). Relationship between death anxiety and using social media among chronic disease patients in the time of COVID 19. In *Erbil City the Capital of Iraqi Kurdistan region. Polytechnic Journal*, *12*(1) (pp. 171 – 176). [CrossRef]

Tandoc, E. C., & Takahashi, B. (2017). Log in if you survived: Collective coping on social media in the aftermath of typhoon Haiyan in the philippines. *New Media and Society*, *19*(11), 1778 – 1793. [CrossRef]

Tatem, C. P., & Ingram, J. (2022). Social media habits but not social interaction anxiety predict parasocial relationships. *Journal of Social Psychology Research*, *1*(2), 198 – 211. [CrossRef]

Thorson, J. A., & Powell, F. C. (1992). A revised death anxiety scale. *Death Studies*, *16*(6), 507 – 521. [CrossRef]

Tukachinsky, R., Walter, N., & Saucier, C. J. (2020). Antecedents and effects of parasocial relationships: A meta-analysis. *Journal of Communication*, *70*(6), 868 – 894. [CrossRef]

Web, G. (2024). Information and communication technologies authority. *Sosyal medya kullanım istatistikleri*. https://www.guvenliweb.org.tr/dosya/3degJ.pdf

White, K. J. (1992). The Durbin-Watson test for autocorrelation in nonlinear models. *Review of Economics and Statistics*, *74*(2), 370 – 373. [CrossRef]

Yang, J., Tang, J., & Zhang, L. (2022). How nostalgic taste on the screen stimulates the consumption of time-honoured restaurants: The mediation role of parasocial interaction. *Frontiers in Psychology*, *13*, 1062315. [CrossRef]

Zsido, A. N., Arató, N., Láng, A., Lábadi, B., Stecina, D. T., & Bandi, S. A. (2021). The role of maladaptive cognitive emotion regulation strategies and social anxiety in problematic smartphone and social media use. *Personality and Individual Differences*, *173*(2), 110647. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

ORIGINAL ARTICLE

Examining Compulsive Online Shopping Behavior, Posttraumatic Cognitions, and Death Anxiety in Young Adults*

Hikmet Beyza Yakıcı, Zeliha Traş

Department of Guidance and Psychological Counceling, Necmettin Erbakan Üniversity, Türkiye

ORCID iDs of the authors: H.B.Y. 0000-0001-6940-1185, Z.T. 0000-0003-2670-0868

Main Points

- Compulsive online buying behavior scores are significantly higher in female young adults than in male young adults.
- The scores of compulsive online buying behavior are significantly higher in individuals with 5 – 6 hours of daily internet use on weekdays and weekends.
- Compulsive online shopping behavior has a positive association with posttraumatic cognition.
- Compulsive online shopping behavior has a positive association with death anxiety.
- Death anxiety plays a partial mediating role between compulsive online purchasing behavior and posttraumatic cognitions.

Abstract

This study aims to examine the relationships between compulsive online shopping behavior (COSB), posttraumatic cognitions, and death anxiety in young adults. In this study, the relational research model, one of the quantitative research methods, was used. The study group was determined by the criterion sampling method. The study group consisted of 467 young adults ($\bar{x}$ = 28.09), 372 females, and 95 males. According to the results, compulsive online shopping behavior differs significantly in favor of female young adults according to the gender variable and in favor of single young adults according to the marital status variable. compulsive online shopping behavior shows a significant difference in favor of individuals with 5 – 6 hours of daily Internet use on weekdays and weekends according to the duration of internet use on weekdays and weekends. Results of correlation analysis show a significant positive relationship between young adults' COSB scores, posttraumatic cognition scores, and death anxiety scores. According to the hierarchical regression analysis, death anxiety and posttraumatic cognition scores significantly predicted COSB scores. As a result of the mediation analysis, death anxiety plays a mediating role in the relationship between posttraumatic cognitions and COSB. The findings suggest that psychological factors such as posttraumatic cognitions and death anxiety play an important role in shaping compulsive online shopping behavior.

Keywords: Compulsive online shopping behavior, death anxiety, posttraumatic cognitions, young adults

*This article is compiled from the master's thesis titled "Examination of compulsive shopping behavior and posttraumatic cognition and death anxiety in young adults" written by Hikmet Beyza Yakıcı under the supervision of Prof. Dr. Zeliha Traş at Necmettin Erbakan University Institute of Educational Sciences.

Corresponding author:
Hikmet Beyza Yakıcı,
E-mail:
hbeyzayakici@gmail.com

Received: September 17, 2024
Revision Requested: February 8, 2025
Last Revision Received: February 13, 2025
Accepted: April 25, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

Throughout history, people have had different sources of motivation to purchase a product (Heffernan et al., 2022). It is seen that online shopping behavior is preferred for reasons such as good product selection, price comparison options, and ease of use (Ernst & Young, 2000). In certain situations, purchasing behavior can be unplanned and sudden, and can be associated with a strong sense of impulse or excitement (Weinstein et al., 2016). In recent years, many individuals may prefer online shopping instead of store shopping (Müller et al., 2021). Online purchasing behavior or online shopping is defined as buying and selling products using the Internet (Shih, 2004). Online shopping behavior is expressed as a type of behavior that many individuals enjoy. However, when shopping behavior

Cite this article as: Yakıcı, H. B., & Traş, Z. (2025). Examining compulsive online shopping behavior, posttraumatic cognitions, and death anxiety in young adults. *Addicta: The Turkish Journal on Addictions*, 12(3), 348-354.

DOI: 10.5152/ADDICTA.2025.24192

becomes compulsive, it can lead to significant problems, especially in personal, professional, and economic areas (Heffernan et al., 2022). With the increasing use of the Internet, changes are occurring in the social lives of individuals. One of these changes is the increase in online shopping behavior. In recent years, many people prefer to shop online rather than in stores (Müller et al., 2021). It is understood that individuals who use the Internet (Sharif et al., 2021) and spend more time on social media applications (Pahlevansharif & Khanekharab, 2017) show more compulsive online shopping behaviors (COSB). Compulsive online shopping behavior is considered one of the behavioral addictions with technological aspects that cannot be controlled despite its negative social, emotional, and economic consequences (Rose & Dhandayudham, 2014; Müller et al., 2021).

Compulsive online shopping behaviors is considered one of the behavioral addictions with technological aspects that cannot be controlled despite its negative social, emotional, and economic consequences (Müller et al., 2021). This behavior is also a tendency to compulsive and problematic shopping based on Internet use, which leads to social, emotional, and economic problems like other behavioral addictions (Griffiths, 2005). Griffiths (2000) points out the importance of distinguishing between addiction to the Internet and the addictive behaviors that occur on the Internet. Many people who spend excessive time online are not addicted to the medium itself but use it to satisfy other addictions (Sharif et al., 2021).

Trauma is defined as the repeated exposure of individuals to traumatic events, such as witnessing negative events experienced by others, experiencing events involving death or death threats, and learning that a negative event has happened to someone in the family or close friends (APA, 2013). It is understood that behaviors with addictive potential observed in individuals are used as an avoidance method to cope with trauma-induced stressful situations (Lehinger et al., 2022). Emotions such as regret, stress, anxiety, and sadness are often observed after trauma (APA, 2013). While shopping, positive emotions such as relaxation, happiness, and pleasure may emerge in individuals with these emotions (Günüç & Doğan-Keskin, 2016). Compulsive online shopping behavior is considered a behavioral addiction. Therefore, it is believed that it causes addiction in individuals who have been exposed to trauma and may trigger COSB (Thege et al., 2017).

The underlying mechanism of PTSD is posttraumatic cognitions, which is one of the main factors contributing to the development and maintenance of PTSD (Foa et al., 1999). One of the changes in the diagnostic criteria for posttraumatic stress disorder in the fifth edition of the DSM-V is the inclusion of "persistent negative beliefs about oneself, others, or the world" as a symptom criterion (Friedman, 2013). Considering these changes, it is understood that negative posttraumatic cognitions are one of the important factors in the persistence of posttraumatic stress disorder symptoms (Kooistra et al., 2023). Losing a loved one and facing the death of a loved one is recognized as a traumatic experience (APA, 2013). As a result of death-related experiences, anxiety may arise in individuals. This is called death anxiety. Death anxiety is defined as the fear of extinction, the fear that one will no longer exist, that one will lose his/her existence in the world. The multidimensional anxiety that arises from thinking about the death of oneself or others and has an existential origin is referred to as death anxiety (Yalom, 2014). The multidimensional anxiety that arises from thinking about the death of oneself or others and has an existential origin is referred to as death anxiety (Nyatanga & Vocht, 2006).

Death anxiety is considered to be one of the fundamental issues of mental health. Since death is an anxiety-provoking situation in the eyes of modern people, the concept of death anxiety has gained greater importance today (Yalom, 2014). According to existentialist theory, death anxiety is defined as an anxiety that is in the depth of the individual's self, does not reach the level of the individual's consciousness, and is inevitable (Geçtan, 2016). Death anxiety is present in all living individuals, but in cases where the reality of mortality is revealed, death anxiety increases (Greenberg et al., 1990). An individual's level of death anxiety may increase according to the negative thoughts the individual has about death (Tanhan, 2007). Death anxiety is associated with death avoidance and death hostility. The way to deal with death anxiety is to face death and accept the reality of death (Yalom, 2014). In addition, it is stated that when individuals increase their death anxiety levels, they perform online shopping behavior more in order to cope with their anxiety and relax (Dülek, 2022). It is known that individuals make more online purchases during young adulthood (Müller et al., 2013). It is noteworthy that COSB has increased in recent years, especially among young adults. Based on all this information, this study aims to examine the relationships between young adults' COSB, posttraumatic cognitions, and death anxiety.

Material and Methods

Participants and Procedures

In this study, the relational research model, which is one of the quantitative research methods, was used. This study aims to examine the relationships between young adults' COSB and their posttraumatic cognitions and death anxiety. In addition, the mediating role of death anxiety in the relationship between posttraumatic cognitions and COSB was also examined.

The study group was selected using the criterion sampling method within the purposive sampling method. In purposive sampling, the criteria that the study group should have are determined in advance (Faul et al., 2009). In this study, the criterion was defined as engaging in online shopping behavior. It is stated that COSB, the dependent variable of the study, is more common among young adults (Müller et al., 2013). For this reason, the study group of the research consists of young adults who make online purchases. The number of the study group was obtained using the G*Power 3.1.9.6 program (Faul et al., 2009). In the analysis using G*Power, $\alpha = 0.05$, $\beta = 0.80$, and $f^2 = 0.02$ were accepted (Faul et al., 2009), and the number of the study group was determined to be 465. Participants who volunteered to participate were ensured to participate and were provided with an informed consent form. This study was approved by the Ethics Committee of Necmettin Erbakan University (Approval No: 220-121; Date: 18.12.2020). The study group consisted of 467 young adults, 372 females (79.7%), and 95 males (20.3%). The mean age was calculated as 28.09 ($\bar{x} = 28.09$, ss = 9.70). When the frequency of online shopping of the participants is analyzed, 184 people (39.8%) shop monthly, 134 people (28.5%) shop every few months, 101 people

(21.5%) shop weekly, 43 people (9.2%) shop several times a year, and 5 people (1.1%) shop daily.

For this study, per the tenets of the Declaration of Helsinki, Necmettin ErbakanUniversity was approved by the decision dated 18.12.2020 and numbered 2020-121;

Measures

Compulsive Online Shopping Behavior Scale

The COSB Scale is a scale that was adapted to Turkish culture by Bozdağ and Yalçınkaya-Alkar (2018) to adapt the Bergen Shopping Addiction Scale developed by Andreassen et al. (2015) to online purchase behavior, and a validity and reliability study was conducted. The scale consists of 27 items. An increase in the score obtained from the scale indicates an increase in an individual's COSB. The Cronbach's α internal consistency coefficient of the total score was calculated to be 0.95. The factor loadings of the items ranged from 0.41 to 0.88. The results obtained indicate that the CSCS is highly reliable. For this study, the Cronbach's α internal consistency coefficient was calculated to be 0.92.

Posttraumatic Cognitions Scale

The Posttraumatic Cognitions Scale developed by Foa et al. (1999) was adapted to Turkish culture by Yağcı-Yetkiner (2010). The scale was designed to assess trauma-related cognitions. The scale consists of 36 items. The high scores obtained from the scale indicate that individuals have intense erroneous cognitions related to the traumatic experiences they have experienced. The Cronbach's α internal consistency coefficient was calculated to be 0.95. The item-total correlation values of the scale ranged from 0.34 to 0.73. For this study, the Cronbach's α internal consistency coefficient was calculated to be 0.95.

Death Anxiety Scale

The Death Anxiety Scale was developed by Sarıkaya and Baloğlu (2016). An increase in the score obtained from the scale indicates an increase in the individual's death anxiety level. The scale consists of 20 items. The Cronbach's α internal consistency coefficient of the total score of the scale was calculated as 0.95. The factor loading values of the scale vary between 0.52 and 0.83. For this study, the Cronbach's α internal consistency coefficient was calculated to be 0.96.

Data Analysis

The SPSS program was used for data analysis. Descriptive statistics, one-way analysis of variance, independent sample *t*-test, Pearson correlation coefficient, hierarchical regression analysis, and mediation analysis with the bootstrap method were conducted. Skewness and Kurtosis values of the data were between −1 and +1 (Hair Jr. et al., 2021), indicating a normal distribution.

Results

This section presents the results related to the sub-problems.

Table 1 shows the findings of *t*-test results of COSB according to gender, marital status, and employment status variables. According to Table 1, the COSB of young adults differs significantly by gender variable ($t_{465} = 2.480$, $p < .05$). The COSB scores of female young adults ($\bar{x} = 18.64$) are statistically significantly higher than the scores of male young adults ($\bar{x} = 14.38$). The COSB of young adults differs significantly by marital status variable ($t_{465} = 2.732$, $p < .05$). The COSB scores of single young adults ($\bar{x} = 19.47$) are statistically significantly higher than the scores of married young adults ($\bar{x} = 15.67$). The COSB of young adults does not differ significantly according to whether they are employed or not ($t_{465} = 0.055$, $p > .05$).

Table 2 shows the findings of ANOVA results of COSB according to income level, weekday and weekend daily internet usage time variables. According to Table 2, young adults' COSB does not differ significantly by perceived income level variable ($F_{2\text{-}464} = 0.699$, $p < .05$). The COSB of young adults differs significantly according to the variable of time spent on the Internet during the week ($F_{3\text{-}463} = 2.897$, $p < .05$). The Scheffe test was used because the variances were homogeneously distributed when looking at the source of differentiation. According to the results of the Scheffe test, the COSB scores of COSB of young adults with 5 – 6 hours of daily Internet use on weekdays ($\bar{x} = 19.91$) are statistically significantly higher than the scores of young adults with 1 – 2 hours of daily Internet use ($\bar{x} = 13.65$).

The COSB of young adults differs significantly according to the variable of daily Internet usage time during the weekend ($F_{3\text{-}463} = 3.129$, $p < .05$). Scheffe's test was used because the variances were homogeneously distributed when looking at the source of differentiation. According to the results of the Scheffe test, the values

Table 1.
Independent Sample t-Test Results of COSB by Gender, Marital Status, and Employment Status Variables

	Gender	***n***	$\bar{x}$	**SD**	**t**	***p***	***d***
Compulsive Online Shopping Behavior	Female	372	18.64	15.03	2.480	.013*	.028
	Male	95	14.38	14.54			
	Marital Status	***n***	$\bar{x}$	**SD**	**t**	***p***	***d***
Compulsive Online Shopping Behavior	Single	259	19.47	15.03	2.732	.007*	.025
	Married	208	15.67	14.76			
	Employment Status	***n***	$\bar{x}$	**SD**	**t**	***p***	
Compulsive Online Shopping Behavior	Employed	256	17.81	15.41	.055	.956	
	Unemployed	211	17.73	14.55			

*$p < .05$.
**$p < .01$.

Table 2.
ANOVA Test Results of COSB According to Perceived Income Level, Weekday and Weekend Daily Internet Usage Time Variables

	Income Level	*n*	$\bar{x}$	SD	F	*p*		
Compulsive Online Shopping Behavior	Low	108	17.49	13.91	.699	.488		
	Middle	307	18.24	15.56				
	High	52	15.63	13.93				
	Daily Internet Usage on Weekdays	***n***	$\bar{x}$	**SD**	F	***p***	**η2**	**Significant Difference (Scheffe)**
Compulsive Online Shopping Behavior	1-2 Hours	70	13.65	14.91	2.897	.035*	.018	3 > 1
	3-4 Hours	128	17.26	15.19				
	5-6 Hours	156	19.91	13.98				
	7 Hours and above	113	17.98	15.85				
	Daily Internet Usage on Weekends	***n***	$\bar{x}$	**SD**	F	***p***	**η2**	**Significant Difference (Scheffe)**
Compulsive Online Shopping Behavior	1-2 Hours	75	18.12	17.18	3.129	.026*	.020	3 > 2
	3-4 Hours	121	14.94	14.14				
	5-6 Hours	162	20.30	14.17				
	7 Hours and above	109	16.95	15.15				

*$p < .05$, 1 = 1 – 2 hours, 2 = 3 – 4 hours, 3 = 5 – 6 hours, 4 = 7 hours and above.

of COSB of young adults with 5 – 6 hours of daily Internet use on the weekend ($\bar{x}$ = 20.30) are statistically significantly higher than the values of young adults with 3 – 4 hours of daily Internet use ($\bar{x}$ = 14.94).

Table 3 shows the results of the correlation analyses between the variables. According to Table 3, a positive low-level (r = 0.291, p < .01) significant relationship was obtained between COSB scores and posttraumatic cognition scores, and a positive low-level (r = 0.277, p < .05) significant relationship was obtained with death anxiety scores.

In the hierarchical regression analysis in Table 4, the theoretical rationale was considered in determining the order in which the independent variables were added to the model (Jeong & Jung, 2016). In Model 1, the total score of the Death Anxiety Scale was added, and in Model 2, the total score of the Posttraumatic Cognitions Scale was added. When considering COSB, the contribution of the death anxiety variable entered in Model 1 to the model was significant (R^2 = 0.077, p < .001). In the second model, with the addition of the posttraumatic cognitions variable, R^2 = 0.115 with an increase of 0.038. In step 2, COSB was significantly predicted (R = 0.339, R^2 = 0.115, ΔR^2 = 0.111, $F_{2\text{-}464}$ = 30.042, p < .001). When the corresponding beta values were examined, the strongest predictor was posttraumatic cognitions (β = 0.214, p < .001), followed by death anxiety (β = 0.189, p < .001). Death anxiety and posttraumatic cognition scores explained 11% of the total variance in COSB scores (R^2 = 0.11).

Table 3.
Pearson Correlation Coefficient Results

	Compulsive Online Shopping Behavior
Posttraumatic Cognitions	0.291**
Death Anxiety	0.277**

*$p < .05$.
**$p < .01$.

In the mediation model tested in Table 5, posttraumatic cognitions were taken as the independent variable, death anxiety as the mediating variable, and COSB as the dependent variable. In testing the analyses, the fourth model in the Process macro extension Preacher and Hayes (2008) was used. The bootstrapping technique was employed to calculate the significance of the mediating variable. In the mediation analyses, the confidence interval obtained by bootstrapping 5000 repeated hypothetical samples was used to test the significance of the mediating effect. Posttraumatic cognitions significantly predicted death anxiety (β = 0.41, p < .001), death anxiety significantly predicted COSB (β = 0.27, p < .001), and posttraumatic cognitions significantly predicted COSB. Posttraumatic cognitions and death anxiety significantly predicted COSB with an indirect effect (β = 0.19, p < .001) and explained 34% of the total variance (R^2 = 0.34).

The bootstrap coefficient and CI (95%) of these coefficients are examined to determine whether the indirect effects related to mediation are significant. It was found that death anxiety has a partial mediating role in the relationship between posttraumatic cognitions and COSB (β = 0.19, SE = 0.03, 95% CI [0.01, 0.04], p < .001). A partial mediator variable refers to the cases where direct and indirect effects are significant. In other words, a partial mediation variable is defined as the relationship between the dependent and independent variables that do not completely disappear when the mediator variable enters between the dependent and independent variables (Preacher and Hayes, 2008).

Discussion

In this study, the compulsive online shopping scores of female young adults were found to be statistically significantly higher than the scores of male young adults. Female young adults exhibit more COSB than male young adults (Puiras et al., 2022; Grazhda et al., 2022; Adamczyk et al., 2020; Zhang et al., 2019). There is a general judgment that COSB is mostly performed by female individuals (Bal & Okkay, 2022). In general, there is a common belief that women shop more. Women attach importance to their

Table 4.
Hierarchical Regression Analysis on the Prediction of Compulsive Online Shopping Behavior

Model		B	SE	β	t	p	Tolerance	VIF
1	Constant	10.537	1.343		7.844	.000		
	Death Anxiety	0.196	0.031	0.277	6.218	.000***	1.000	1.000
Model 1: R^2=.077								
2	Constant	3.624	2.035		1.781	.076		
	Death Anxiety	0.134	0.034	0.189	3.949	.000***	0.831	1.204
	Posttraumatic Cognitions	0.085	0.019	0.214	4.456	.000***	0.831	1.204
Model 2: R^2 = 0.115, R^2 change = 0.038								

Durbin-Watson: 1.921, ***$p < .001$, **$p < .01$, *$p < .05$.
Model 1: R = 0.277, R^2 = 0.077, ΔR^2 = 0.075, $F_{1\text{-}465}$ = 38.662, $p < .001$.
Model 2: R = 0.339, R^2 = 0.115, ΔR^2 = 0.111, $F_{2\text{-}464}$ = 30.042, $p < .001$.

appearance and show more shopping behavior because they have more shopping opportunities than men. With the development of technology, shopping behavior has started to be done online. There is also an increase in women's shopping behavior.

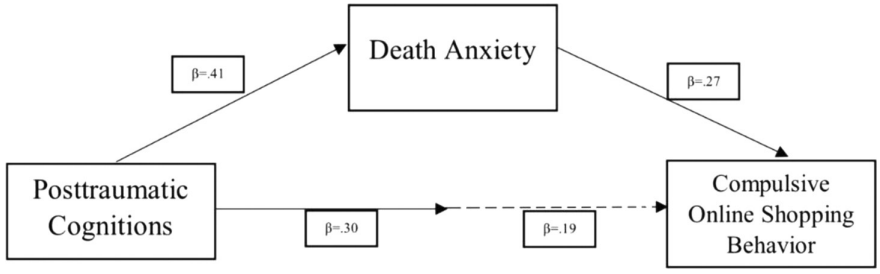
In this study, it was found that the COSB scores of unmarried young adults were statistically significantly higher than the scores of married young adults. Some studies have obtained results similar to this result (Yakın & Aytekin, 2019). It can be seen that there are different results regarding the effect of marital status on COSB. According to another result of the study, it was found that the scores of COSB were not significantly different according to the variable of employment status. There are studies with similar results to this research result (Demirel & Tapan, 2023).

According to another result, the COSB scores of young adult individuals did not differ significantly according to the perceived income level variable. Similarly, there are studies that did not find a relationship between COSB and perceived income level (Traş & Yakıcı, 2023). The COSB is considered a behavior that can lead to addiction in individuals (Griffiths, 2005). Individuals who engage in COSB may not consider their perceived income level while engaging in this behavior due to their focus on the purchasing behavior.

When examining the results regarding Internet use, it was found that the COSB scores of young adult individuals differed significantly according to the variables of weekday-weekend daily Internet use, and individuals with 5 – 6 hours of daily Internet use on weekdays-weekends had higher COSB scores. This result of the study is consistent with the results of the studies available in the literature (Sarıgedik & Ölmez, 2021). Therefore, it is likely that the rate of individuals' online purchasing behavior increases with increased Internet use, which may be related to COSB. Increased Internet use has been highlighted as a risk factor for the emergence of COSB. According to the results of this study, the increase in daily Internet usage time of individuals leads to the emergence of COSB. According to Griffiths (2000), individuals with high Internet use may use the Internet environment as a means to realize their other addictions. For this reason, individuals who spend more time on the Internet increase the amount of time they spend on the Internet and use the Internet as a tool for online shopping.

According to the correlation analysis results of the study, a significant positive relationship was found between young adult

Table 5.
Mediation Analysis Model Results of Death Anxiety on Posttraumatic Cognitions and Compulsive Online Shopping Behavior



Predictor Variable	Dependent Variable	R^2	β	SE	t	p
Posttraumatic Cognitions	Death Anxiety	0.17	0.41	0.02	4.359	.000***
Death Anxiety	Compulsive Online Shopping Behavior	0.27	0.27	0.03	6.218	.000***
Posttraumatic Cognitions	Compulsive Online Shopping Behavior	0.30	0.30	0.01	2.555	.000***
Posttraumatic Cognitions + Death Anxiety	Compulsive Online Shopping Behavior	0.34	0.19	0.03	3.949	.000**

individuals' COSB and posttraumatic cognitions. It is stated that individuals' exposure to epidemics and pandemics and traumatic experiences leads to an increase in daily Internet use, so there may be an increase in behavioral addictions such as gambling addiction and online shopping addiction (Sarıgedik & Ölmez, 2021). It is understood that the pandemic increases COSB (Grazhda et al., 2022). According to the results of this study, it is concluded that as the level of posttraumatic cognitions of individuals increases, COSB will also increase. It is believed that the traumatic experience of individuals, and the formation of posttraumatic cognitions because of this traumatic experience, cause individuals to engage in COSB as a coping strategy.

According to this study, a significant positive relationship was found between young adults' COSB and death anxiety. A review of the literature shows that the studies that have examined the relationship between COSB and death anxiety are limited. The results of the existing studies are consistent with this result of the study (Dülek, 2022). In situations that cause uncertainty, such as epidemics, individuals' death anxiety may increase, and it is believed that individuals' COSB has increased over time with the spread of online purchasing behavior to cope with this anxiety.

According to the results of the mediation analyses conducted to examine whether death anxiety plays a mediating role between COSB and posttraumatic cognitions, it was found that death anxiety plays a partial mediating role in the relationship between COSB and posttraumatic cognitions. In the literature review, no study was found on the mediating role of death anxiety between COSB and posttraumatic cognitions. The obtained result states that the death anxiety levels of individuals whose posttraumatic cognitions develop negatively increase, and the increase in death anxiety increases the COSB of individuals.

Dülek (2022) states that individuals shop online in order to cope with death anxiety and that this purchasing behavior causes compulsive online purchasing behavior and becomes addictive over time. Cognitive processes related to the evaluation of traumatic experiences play a crucial role in the impact of traumatic experiences on an individual's life (Kooistra et al., 2023). When an individual creates a negative cognitive schema about the traumatic experience to which he/she has been exposed, posttraumatic cognitions occur in the individual. These cognitions are negative cognitions about oneself and the world (Barton et al., 2013). In addition, individuals who have been exposed to traumatic experiences may experience an increase in death anxiety (Yalom, 2014). It is understood that individuals make online purchases to cope with death anxiety and that this purchasing behavior leads to COSB and eventually reaches the level of addiction (Dülek, 2022).

Limitations and Suggestions for Future Research

As a result, the increase in the level of posttraumatic cognitions that occur because of the traumatic event experienced by individuals increases death anxiety, which leads to an increase in COSB. Today, it is believed that COSB has an important place in people's lives, and there is an increase in COSB, and this behavior is believed to develop into addiction over time. In other words, the traumatic experience can harm the individual and increase death anxiety. To cope with the negative cognitions and death anxiety caused by the traumatic effect on the individual, they may engage in online purchasing behavior. With the sense of relief and pleasure that this behavior creates in the individual, this behavior can become compulsive and create an addiction (Griffiths, 2005). It is seen that being exposed to a traumatic experience and forming negative cognitions about that experience is a risk factor for COSB.

In future studies, it is recommended to examine the relationships between COSB, posttraumatic cognitions, and death anxiety in study groups consisting of adolescents, middle-aged adults, and older adults. In addition, the relationships between behavioral addictions such as Internet addiction, online gaming addiction, online gambling addiction, and posttraumatic cognitions and death anxiety can be examined. Experimental, qualitative, and quantitative studies of COSB can contribute to the literature and allow for a more detailed examination of the variable of COSB.

Data Availability Statement: The data that support the findings of this study are available upon request from the corresponding author.

Ethics Committee Approval: This study was approved by the Ethics Committee of Necmettin Erbakan University (Approval No: 220-121; Date: 18.12.2020).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – H.B.Y., Z.T.; Design – H.B.Y., Z.T.; Supervision – Z.T.; Resources – H.B.Y.; Materials – H.B.Y.; Data Collection and/or Processing – H.B.Y.; Analysis and/or Interpretation – H.B.Y.; Literature Search – H.B.Y.; Writing Manuscript – H.B.Y.; Critical Review – H.B.Y., Z.T.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

References

Adamczyk, G., Capetillo-Ponce, J., & Szczygielski, D. (2020). Compulsive buying in Poland. An empirical study of people married or in a stable relationship. *Journal of Consumer Policy*, *43*(3), 593 – 610. [CrossRef]

Andreassen, C. S., Griffiths, M. D., Pallesen, S., Bilder, R. M., Torsheim, T., & Aboujaoude, E. (2015). The Bergen Shopping Addiction Scale: Reliability and validity of a brief screening test. *Frontiers in Psychology*, *6*, 1374. [CrossRef]

Bal, F., & Okkay, İ. (2022). Internet-Based problem shopping behavior: Online shopping addiction. *Journal of Dependence*, *23*(1), 111 – 120. [CrossRef]

Baron, R. M., & Kenny, D. A. (1986). The moderator – mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173 – 1182. [CrossRef]

Barton, S., Boals, A., & Knowles, L. (2013). Thinking about trauma: The unique contributions of event centrality and posttraumatic cognitions in predicting PTSD and posttraumatic growth. *Journal of Traumatic Stress*, *26*(6), 718 – 726. [CrossRef]

Birliği, A. P. [APA] (2013). *Diagnostic and statistical Manuel of mental disorders DSM-5 (fifth)*. American Psychiatry Association.

Bozdağ, Y., & Yalçınkaya Alkar, Ö. (2018). Adaptation of bergen shopping addiction scale to the compulsive online shopping behavior. *Journal of Dependence*, *19*(2), 23 – 34.

Demirel, A. C., & Tapan, M. G. (2023). Examining the relationship between social media and compulsive online shopping addiction of university students. *Journal of the Human Anda Social Science Researches*, *12*(1), 60 – 78.

Dülek, B. (2022). The mediating role of death anxiety in the effect of Covid-19 fear on online shopping attitude and purchase ıntention. *Equinox Journal of Economics Business and Political Studies*, *9*(2), 141 – 157. [CrossRef]

Ernst and Young (2000). *Evolution: Ernst & young seventh annual European life science report 2000.* London, UK: Ernst Young International.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149 – 1160. [CrossRef]

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The posttraumatic cognitions inventory (PTCI): Development and validation. *Psychological Assessment*, *11*(3), 303 – 314. [CrossRef]

Friedman, M. J. (2013). Finalizing PTSD in DSM - 5: Getting here from there and where to go next. *Journal of Traumatic Stress*, *26*(5), 548 – 556. [CrossRef]

Geçtan, E. (2016). *Varoluş ve psikiyatri.* İstanbul: Metis Publications.

Grazhda, G., Basha, E., Kada, Y., Gashı, R., Ibrahımı, E., Mujı, N., & Isufı, A. (2022). Examination of Internet and shopping online addiction on Kosovo students during the covid period. *Prizren Social Science Journal*, *6*(2), 43 – 51. [CrossRef]

Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., Kirkland, S., & Lyon, D. (1990). Evidence for terror management II: The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal of Personality and Social Psychology*, *58*(2), 308 – 318. [CrossRef]

Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance Use*, *10*(4), 191 – 197. [CrossRef]

Griffiths, M. D. (2000). Internet addiction - Time to be taken seriously? *Addiction Research*, *8*(5), 413 – 418. [CrossRef]

Günüç, S., & Doğan Keskin, A. (2017). Online shopping addiction: Symptoms, causes and effects. *Addicta: The Turkish Journal on Addictions*, *3*(3), 353 – 364. [CrossRef]

Hair Jr., J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM).* Sage publications.

Heffernan, T., Hamilton, C., & Neave, N. (2022). Compulsive shopping behaviour and executive dysfunction in young adults. *Applied Neuropsychology: Adult*, 1 – 8.

Jeong, Y., & Jung, M. J. (2016). Application and interpretation of hierarchical multiple regression. *Orthopedic Nursing*, *35*(5), 338 – 341. [CrossRef]

Kooistra, M. J., Hoeboer, C. M., Oprel, D. A. C., Schoorl, M., van der Does, W., Ter Heide, J. J., van Minnen, A., & de Kleine, R. A. (2023). Changes in trauma-related cognitions predict subsequent symptom improvement during prolonged exposure in patients with childhood abuse-related PTSD. *Behaviour Research and Therapy*, *163*, 104284. [CrossRef]

Lehinger, E., Bedard - Gilligan, M., Holloway, A., & Kaysen, D. (2022). Posttraumatic cognitions and sexual assault: Understanding the role of cognition type in posttraumatic stress symptoms and problematic alcohol use. *Journal of Traumatic Stress*, *35*(6), 1672 – 1683. [CrossRef]

Müller, A., Arikian, A., de Zwaan, M., & Mitchell, J. E. (2013). Cognitive behavioural group therapy versus guided self - help for compulsive buying disorder: A preliminary study. *Clinical Psychology and Psychotherapy*, *20*(1), 28 – 35. [CrossRef]

Müller, A., Laskowski, N. M., Wegmann, E., Steins-Loeber, S., & Brand, M. (2021). Problematic online buying-shopping: Is it time to considering the concept of an online subtype of compulsive buying shopping disorder or a specific internet-use disorder? *Current Addiction Reports*, *8*(4), 494 – 499. [CrossRef]

Nyatanga, B., & de Vocht, H. (2006). Towards a definition of death anxiety. *International Journal of Palliative Nursing*, *12*(9), 410 – 413. [CrossRef]

Pahlevansharif, S., & Khanekharab, J. (2017). Identity confusion and materialism mediate the relationship between excessive social network site usage and online compulsive buying. *Cyberpsychology, Behavior, and Social Networking*, *2017*(8), 494 – 500. [CrossRef]

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879 – 891. [CrossRef]

Puiras, E. M. A., Cummings, S. M. S., Oliver, C. M. A., & Mazmanian, D. PhD (2022). Add to cart: Problematic shopping and behavioral addictions in a Canadian sample during the COVID-19 Pandemic. *Canadian Journal of Addiction*, *13*(3), 26 – 35. [CrossRef]

Rose, S., & Dhandayudham, A. (2014). Towards an understanding of Internet-based problem shopping behaviour: The concept of online shopping addiction and its proposed predictors. *Journal of Behavioral Addictions.* PubMed, *3*(2), 83 – 89. [CrossRef]

Sarıgedik, E., & Ölmez, S. B. (2021). The investigation of the relationships among coronavirus anxiety, cyberchondria, and online shopping. *Konuralp Tıp Dergisi*, *13*(Suppl. 1), 446 – 454. [CrossRef]

Sarıkaya, Y., & Baloğlu, M. (2016). The development and psychometric properties of the Turkish death anxiety scale (TDAS). *Death Studies*, *40*(7), 419 – 431. [CrossRef]

Sharif, S. P., She, L., Yeoh, K. K., & Naghavi, N. (2021). Heavy social networking and online compulsive buying: The mediating role of financial social comparison and materialism. *Journal of Marketing Theory and Practice*, 1 – 13.

Shih, H. P. (2004). An empirical study on predicting user acceptance of e-shopping on the Web. *Information and Management*, *41*(3), 351 – 368. [CrossRef]

Startup, M., Makgekgenene, L., & Webster, R. (2007). The role of self-blame for trauma as assessed by the posttraumatic cognitions inventory (PTCI): A self-protective cognition? *Behaviour Research and Therapy*, *45*(2), 395 – 403. [CrossRef]

Tanhan, F. (2007). *The effect of death anxiety coping training on death anxiety and psychological well-being levels* [Doctoral Dissertation]. Ankara University.

Thege, B. K., Horwood, L., Slater, L., Tan, M. C., Hodgins, D. C., & Wild, T. C. (2017). Relationship between interpersonal trauma exposure and addictive behaviors: A systematic review. *BMC Psychiatry*, *17*, 1.

Traş, Z., & Yakıcı, H. B. (2023). Examination of the relationship between compulsive online shopping behavior and depression, anxiety, and stress. *Journal of Dependence*, *24*(3), 316 – 324.

Weinstein, A., Maraz, A., Griffiths, M. D., Lejoyeux, M., & Demetrovics, Z. (2016). Compulsive buying—Features and characteristics of addiction. *Neuropathology of Drug Addictions and Substance Misuse*, *3*, 993 – 1007.

Yağcı-Yetkiner, D. (2010). *Turkish adaptation of the Posttraumatic Cognitions Inventory and a validity-reliability study on university students* [Master's Thesis]. Kocaeli University, Institute of Health Sciences.

Yakın, V., & Aytekin, P. (2019). The effect of internet addiction on online compulsive and online impulsive purchase behavior. *Dokuz Eylül University Journal of Faculty of Business*, *20*(1), 199 – 222.

Yalom, I. (2014). *Varoluşçu psikoterapi* Z. İ. Babayiğit (Trans.). Kabalcı Publishing.

Zhang, J., Bai, Z., Wei, J., Yang, M., & Fu, G. (2019). The status quo of college students' online shopping addiction and its coping strategies. *International Journal of Psychological Studies*, *11*(2), 88 – 93. [CrossRef]

THE TURKISH JOURNAL ON ADDICTIONS
www.addicta.com.tr

CASE-BASED REVIEW

Analysis of Cognitive Schemas and Work-Related Stress Dynamics in Addictive Behaviors: Case Study

Laila Essfioui

Department of Psychopathology and Clinical Psychology, Royal Institute for Training Youth and Sport Managers, Salé, Morocco

ORCID iDs of the author: L.E. 0009-0009-0068-6560

Main Points

- The case study highlights psychological traits such as low assertiveness, self-esteem issues, and anxiety, which interact with a stressful work environment characterized by work overload and poor communication, leading to emotional distress.
- The individual's coping strategy involves emotional avoidance and inhibition, which, combined with heightened stress and anxiety, increases the likelihood of cannabis use as a maladaptive coping mechanism.
- Dysfunctional cognitive schemas, including negative self-perceptions and pessimistic thoughts about the future, were identified as central to maintaining addictive behaviors.
- According to Beck's cognitive-behavioral model, the individual's addictive behavior is reinforced by anticipatory and permissive beliefs about cannabis use, which are perpetuated by automatic thoughts justifying consumption as a way to alleviate work-related stress. Anticipatory, relieving, and permissive beliefs are key components in sustaining the addiction cycle.

Abstract

Occupational stress in Morocco has become a concerning reality, steadily increasing due to its impact on workers' psychological functioning, necessitating the use of adjustment strategies and defense mechanisms to cope. This clinical study explored the links between work-related stress factors, cognitive patterns, and psychoactive substances as an adjustment and defense strategy, as illustrated in a clinical case. The study aims to identify the psychological mechanisms underlying addictive behaviors, focusing on modifying cognitive schemas related to psychoactive substance consumption and examining anticipatory, relieving, and permissive beliefs associated with addiction. An in-depth clinical study was conducted on a Moroccan employee suffering from both work-related stress and cannabis addiction. The study employed Beck's cognitive model for analysis and used clinical interviews, clinical observations, and evaluation scales. The analysis reveals that work-related stress factors can lead to excessive and dependent consumption of psychoactive substances, highlighting the crucial role of cognitive schemas in addiction. Anticipatory beliefs reinforce addictive behavior by creating expectations of well-being. Relieving beliefs trigger an urgent need for substance use, while permissive beliefs dismiss the consequences, strengthening the persistence of addictive behavior despite associated risks. Occupational stress weakens the individual's psychological resources, leading to resorting to substances as a defense, soothing, and avoidance strategy for psychological distress in the form of self-medication.

Keywords Addiction, cognitive schemas, occupational stress, psychoactive substance consumption

Corresponding author:
Laila ESSFIOUI
E-mail:
laila_essfioui@um5.ac.ma

Received: July 19, 2024
Revision Requested: January 20, 2025
Last Revision Received: April 20, 2025
Accepted: May 14, 2025
Publication Date: September 15, 2025

Copyright @ Author(s) – Available online at https://www.addicta.com.tr/EN.

Content of this journal is licensed under a Creative Commons Attribution (CC BY) 4.0 International License.

Introduction

Occupational stress in Morocco has emerged as a pressing concern, escalating steadily due to its profound impact on workers' psychological well-being. This phenomenon stems from a significant imbalance between an individual's available resources to meet professional demands and those required to fulfill organizational expectations (Lazarus & Folkman, 1984). This disparity triggers a cascade of physiological, cognitive, psychological, and social mechanisms, resulting in

Cite this article as: Essfioui, L. (2025). Analysis of cognitive schemas and work-related stress dynamics in addictive behaviors: Case study. *Addicta: The Turkish Journal on Addictions*, 12(3), 355-361.

distress and altering employees' relationships with their work environments.

Among the strategies employed to manage occupational stress, the consumption of psychoactive substances (PASs) often serves as a defense and adjustment mechanism. This behavior helps individuals escape, alleviate, or cope with distress, as well as mitigate the unpleasant realities induced by escalating performance demands in the workplace. Psychoactive substance use, in this context, is viewed as a coping strategy aimed at protecting the individual's psychological well-being, potentially serving a protective function for the individual's psychological economy when faced with a distressing work environment.

This clinical study explores the intricate links between professional stress, cognitive schemas, and psychoactive substance consumption as an adjustment and defense strategy. By examining a detailed clinical case, the research aims to identify the psychological mechanisms underlying addictive behaviors. Particular focus is given to modifying cognitive schemas related to PAS consumption, including the examination of anticipatory, relieving, and permissive beliefs associated with these addictive behaviors.

Employing a rigorous scientific methodology, this study conducts an in-depth analysis of a clinical case involving an individual working in a private wiring factory in Morocco. The investigation encompasses various aspects of the subject's experience, including their subjective work experience, perceived stress levels, psychological suffering, defense and adjustment strategies employed against this suffering, and the use of various psychoactive substances. This comprehensive approach allows for a nuanced understanding of the complex interplay between occupational stress and substance use in a real-world industrial setting.

Theoretical Framework

Work and its Psychological Function

Work is a subject that cannot be fully covered by a single discipline and encompasses multiple dimensions (economic, psychological, and social). It stands as a cornerstone of social life and a fundamental condition of human existence (Belhaj & Haddiya, 2007). As a complex and quotidian human and social activity, work engages individuals across their various biopsychosocial functions, necessitating the mobilization of psychological processes in continuous interaction with the professional environment.

Work is a domain where psychological dimensions play a key role, affecting individuals' perceptions, emotions, motivations, behaviors, and well-being. It can be a source of fulfillment and general satisfaction, "an instrument of pleasure and psychic, even somatic, balance" (Dejours, 2016), but also of stress, imbalance, and exhaustion. This duality underscores the complex nature of work's impact on the human psyche.

Moreover, work significantly contributes to an individual's psychological maturation, encompassing both manifest and latent functions integral to psychological constitution. Its profound influence on mental health, including the intricate workings of the psychic apparatus, cannot be overstated. The workplace serves as a crucible for personal growth, identity formation, and social integration, while simultaneously posing potential risks to psychological well-being.

Professional Stress

The phenomenon of stress has garnered significant attention within the scientific community, particularly in psychological circles. This interest has led to a concerted effort among psychologists to define and conceptualize psychological stress. Lazarus, a preeminent figure in this research domain in North America, posits stress as the outcome of a transaction between an individual and their environment. His collaborative work with Lazarus and Folkman (1984) advances the notion that "stress is the product of a transaction between the individual and the environment, which is assessed as exceeding resources and threatening the individual's well-being" (Lazarus & Folkman, 1984). This transactional perspective emphasizes that stress is not merely about the interaction or adjustments between an individual and external stressors. Rather, it encompasses the individual's perception, analysis, and evaluation of encountered situations. The cognitive appraisal process plays a crucial role in determining the stress response, highlighting the subjective nature of stress experiences.

The transactional model proposed by Lazarus and Folkman provides a comprehensive framework for studying the complex interplay of biopsychosocial factors and professional elements in the stress process (Grebot & Dovero, 2005). This model recognizes the dynamic and reciprocal nature of the stress experience, acknowledging that individuals are not passive recipients of environmental demands but active participants in the stress process. By focusing on the transaction between the person and the environment, this approach allows for a nuanced understanding of why similar external circumstances may lead to different stress responses among individuals. It emphasizes the importance of cognitive processes, coping strategies, and personal resources in mediating the relationship between potential stressors and the resulting stress experience.

Psychoactive Substance Consumption as a Defensive and Adjustment Strategy

Professional factors perceived as stressful generate psychological distress, necessitating the deployment of defensive and coping strategies. While often conflated, defensive strategies and coping strategies are distinct psychological mechanisms. Defense mechanisms are characterized by their rigidity, unconscious nature, and primary function of maintaining anxiety at a tolerable level (Ponnelle et al., 2012). These mechanisms often defy logic and causality (Ionescu et al., 2003). Conversely, a coping strategy is flexible, conscious, and oriented toward reality (internal and external).

Defensive mechanisms are supposed to protect the ego from anxieties and play a protective role in rebalancing the psyche. However, when the psyche is weakened and defense mechanisms no longer fulfill their protective functions, they can become pathogenic, manifesting as symptoms and potentially leading to psychological illness.

In a professional context, the consumption of PAS can serve as both a coping strategy and a defensive mechanism. It may be employed as an anti-stress measure, an anxiolytic, or a defensive means to alleviate internal tension or underlying anxiety caused

by the ever-increasing demands for performance and personal investment in the workplace (Chabrol & Callahan, 2003; Rivolier, 1992). Furthermore, PAS use is sometimes associated with expectations of improved intellectual functioning and enhanced physical and mental performance, a phenomenon known as "doping behavior."

This complex interplay between occupational stress and PAS consumption underscores the multifaceted nature of defensive and adjustment strategies in the workplace. The use of PAS as a coping mechanism highlights the potential for maladaptive responses to professional stress, where short-term relief may come at the cost of long-term health and well-being. Understanding this dynamic is crucial for developing effective interventions and support systems in occupational health contexts.

Cannabis Addiction and Occupational Stress: Dysfunctional Cognitive Schemas

Cognitive schemas represent unconscious mental structures stored in long-term memory. They consist of organized elements derived from previous reactions and experiences, forming a relatively stable and coherent set of knowledge. These cognitive schemas guide future perceptions and evaluations (Grebot et al., 2015), acting as filters that allow to select, structure, analyze, and interpret new information.

In the context of addictive behaviors, a cognitive-behavioral loop is triggered by a stimulus, whether internal or external. This stimulus activates a cognitive schema, generating anticipation and belief. This schema activates automatic thoughts that reinforce compulsive cravings and an irresistible urge to consume (Reynaud et al., 2016).

According to Beck's cognitive approach, central dysfunctional cognitive schemas can contribute to the emergence and maintenance of addictive behaviors. These schemas interact with risk situations of PAS consumption, activating various addictive beliefs (Grebot & et al., 2015). Beck's model is based on the assumption of a cognitive dysfunction leading to inappropriate information processing, resulting in thinking errors and specific beliefs that Beck identified as anticipatory, relieving, and permissive beliefs (Lejoyeux, 2017):

1. Anticipatory Beliefs: They are characterized by developing predictive beliefs of well-being, increased efficiency, help in social relations, etc., for example, expectations of positive effects of alcohol (Hautekeete et al., 1999);
2. Relieving Beliefs: They correspond to expectations of reducing lack, discomfort, or physical and/or psychological malaise, generating an urgent need and excessive desire to consume the substance (craving) and triggering permissive beliefs (Hautekeete & al., 1999);
3. Permissive Beliefs: They consist of thoughts facilitating SPA seeking and allowing the consumer to ignore the consequences of usage (Grebot et al., 2015).

The cognitive model of addiction maintenance by Beck and colleagues suggests that thoughts, beliefs, and emotions play a central role in maintaining addictions. According to this model, individuals suffering from dependency tend to have negative automatic thoughts and cognitive distortions that reinforce their addictive behavior.

Figure 1 is an example of the application of this model to the functioning of dysfunctional schemas in maintaining cannabis consumption:

An external stimulus such as work-related stress triggers psychological and physiological reactions (anxiety, asthenia, sadness, negative affect, demotivation). These manifestations of stress often trigger negative automatic thoughts that become a central component of the vicious cycle. Thoughts such as "I'm not good enough," "I'm weak," and other self-negative judgments fuel and reinforce the initial stress, creating a downward spiral that becomes increasingly difficult to break.

In response to this emotional distress, the individual develops a relieving and soothing belief associated with the consumption of psychoactive substances, particularly cannabis. They anticipate relief from negative affects and a positive outlook on well-being and pleasure after consuming a few joints of hashish, expressing

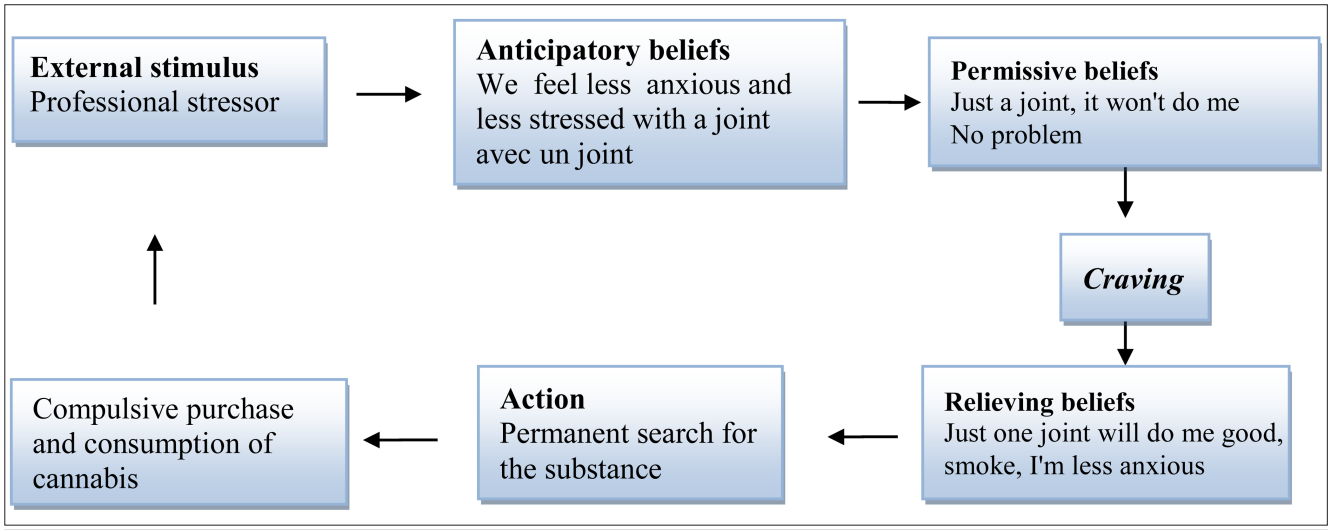


Figure 1. Cognitive and Behavioral Model of Maintaining Cannabis Consumption, Inspired by the Model of Beck et al. (1993).

thoughts such as "a joint will make me feel better." This thought provokes a compelling urge and an irresistible need to consume the cannabis substance, known as a "craving." This urge is justified by permissive thoughts such as "Just one, it won't hurt me." This permissive thought facilitates the quest for the substance and motivates the resumption of consumption, often by deliberately disregarding the associated negative consequences. Consequently, the cognitive schema, ranging from initial stress and distress to permissive justification, contributes to the compulsive pursuit of the substance and the persistence of addictive behavior despite potential risks.

Material and Methods

Addressing the research problem from a clinical perspective allows to highlight the individual's psychological dysfunction, which is always the result of numerous interwoven variables: personal history, psychological vulnerability, psychic predisposition, pathogenic environment, and factors that trigger imbalance and psychological distress. The clinical method aims at an in-depth study of a clinical case, weakened by frustrating professional living conditions, who resorted to PAS as a solution and adjustment strategy.

This clinical study employs a range of tools, including semi-structured interviews, clinical observations, and evaluation scales, to analyze the case of a Moroccan worker who developed cannabis addiction in response to occupational stress. Beck's cognitive model was used as a framework for analysis and administered three evaluation scales: the Cungi Stress Reaction Scale (1997), the Substance Use Disorder Assessment in Diagnostic and Statistical Manual of Mental Disorders5 (DSM-5, 2013), the Hamilton Anxiety Scale (1959) and Raymond Bernard Cattell's 16 Personality Factor Test (1949).

Clinical Vignette

The case involves a 29-year-old male, the second of four siblings, from a middle socioeconomic level. His school performance was quite average, and his educational level is limited to high school (baccalauréat). He got married in 2018 in a traditional marriage, and his wife is a homemaker. A few months after his marriage, he had his first child.

In 2017, he joined a wiring factory in Morocco as an operator. The history of his illness reveals that he began consuming cannabis (in the form of joints) at the age of 27, primarily to alleviate anxiety related to work stress, particularly when he started his job. Initially, he sought the anxiolytic and calming effects of cannabis, but gradually, his use became intense and compulsive, leading to a loss of control over his consumption. He exhibits symptoms of addiction such as craving (an irresistible urge to consume), unsuccessful efforts to reduce or control his use, and withdrawal symptoms when he tries to abstain. These symptoms have a significant impact on his physical and mental health.

The history of the illness also reveals that the subject experienced intense stress upon being hired, which triggered excessive anxiety. This new work experience was a source of anxiety for the subject, causing him to experience severe palpitations, chest tightness, breathing difficulties, trouble falling asleep, interrupted sleep, concentration difficulties, hypervigilance, intense fear, and a feeling of helplessness. This excessive anxiety disrupted his balance and led him to consult a pulmonologist, who prescribed him an anxiolytic and magnesium.

The subject's initial cannabis use aimed to relieve his anxiety. At first, he consumed cannabis alone, mainly in the evening, in small quantities (2 to 3 joints per day). However, over time, he developed a tolerance and dependence, losing control over his consumption.

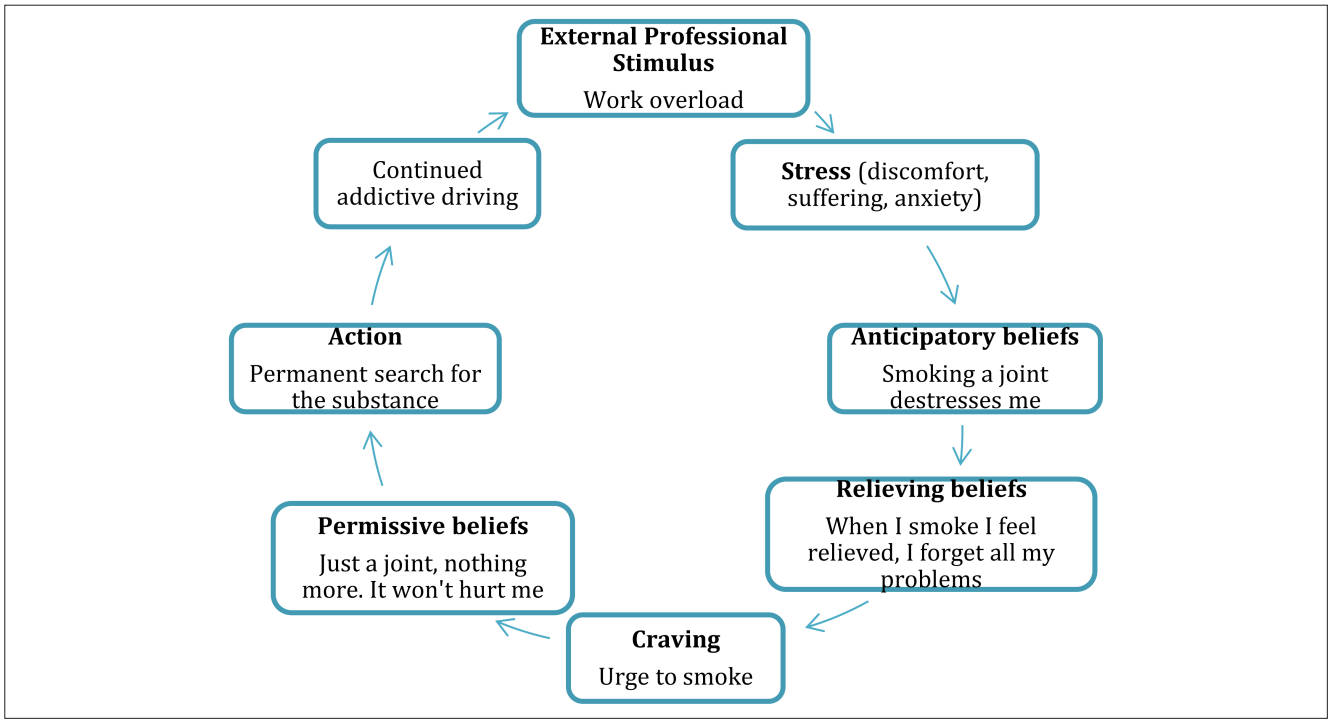


Figure 2. Cognitive Model of Addictive Cannabis Consumption in Relation to Work Stressors, Inspired by Beck's Cognitive Model (1993).

When he tried to reduce or control his use, he experienced withdrawal symptoms such as headaches, irritability, nervousness, insomnia, loss of appetite and weight, depression, and fatigue. Over time, his consumption became daily, intense, and compulsive, exceeding 15 joints per day, to alleviate not only the anxiety but also the withdrawal effects. Informed consent was obtained from the participant who agreed to take part in the study.

Results

Functional Analysis

Our clinical case exhibits psychological characteristics such as low assertiveness, low self-esteem, emotional inhibition, shyness, anxiety, introversion, and self-deprecation.

The significance attributed to work is seen as a source of moral and material satisfaction, as well as a path to self-fulfillment. However, the objective characteristics of the professional environment, marked by work overload, a tense atmosphere, low hierarchical support, and poor communication, contribute to the emotional experience, characterized by fear, low self-esteem, and significant anxiety.

His emotion management is manifested through inhibition, while predictive factors such as psychological stress and excessive anxiety increase the likelihood of experimenting with cannabis and other substances. The factors maintaining this consumption include difficulties in organizing daily life and resorting to coping strategies focused on emotion and avoidance. The coping strategy adopted by the subject involves a cognitive reevaluation of his stressors, marked by distancing himself from problems and emotional inhibition to mitigate psychological distress. However, this strategy leads to psychological suffering and a decline in professional performance, characterized by passivity and decreased productivity.

Consumption Modality

The recreational use of cannabis, which was initially voluntary, gradually transformed from a consumptive behavior into a compulsive, tyrannical, and inexorable behavior, resulting in a loss of control subordinated to psychological suffering. In this sense, Pedinielli and Bonnet described how addictive behavior becomes an automatic response to any difficulty, occupying the entire psychological spectrum, as "it takes the form of a compulsion leading to repetition, transforming into a unique and exclusive solution: 'the passion of the need' occupying the entire psychic sphere" (Pedinielli & Agnès, 2008).

The presence of individual risk factors at the psychopathological level, such as anxiety, stress, social withdrawal, low self-esteem, and problems with assertiveness, contributed to substance abuse. This pathological habit developed with an uncontrollable desire to consume (craving) and a repeated impulse, despite the invasive impacts of this consumption on the subject's mental, social, and professional life.

Evaluation Scale Results

- Cungi Stress Reaction Scale: 55 (high stress)
- Hamilton Anxiety Rating Scale: 34 (major anxiety)
- DSM-5 Substance Use Disorder Assessment: 10 (severe addiction)
- The subject's personality traits, such as introversion, low assertiveness, and social inhibition, contributed to his susceptibility to cannabis addiction.

Coping Strategies Adopted

The professional stress experienced by the subject triggered a series of physiological, emotional, cognitive, and behavioral manifestations, including symptoms such as palpitations, chest tightness, sleep disturbances, loss of appetite, asthenia, negative self-image, loss of self-esteem and confidence, low professional performance, and the adoption of substance use behaviors. These disturbances have resulted in significant suffering with notable repercussions on physical and mental health and professional life.

This clinical case developed coping strategies to confront the demands of the work environment, reduce perceived tension, and maintain internal homeostasis. He opted to avoid work-related stressors rather than confronting and resolving them. Among the defense mechanisms mobilized in response to suffering is activism or substitution activity. This is an immature mechanism defined by the resort to action to manage psychic conflicts or traumatic situations instead of reflection (Ionescu et al., 2003). He turned to psychoactive substances to manage psychic conflicts, seeking to "master, control, and channel internal and external dangers" (Ionescu et al., 2003). This activism specifically aims to avoid very violent anxiety for the subject, an anxiety that attacks and alters internally and undermines the sense of accomplishment. By seeking an external substitute such as cannabis joints to overcome obstacles, endure difficulties, and regain a sense of satisfaction and accomplishment at work, this solution or strategy initially conceived to alleviate discomfort itself becomes a source of displeasure and discomfort.

Discussion

Cognitive Evaluation Process

We will dissect the cognitive processes, which are the biases through which cognitive events are constructed from information derived from schemas.

In this clinical case, the following dysfunctional cognitive schemas and maladaptive early schemas were identified:

1. Thoughts about oneself:

- I am excessively shy.
- Others are more competent than I.
- I lack experience.
- I am very sensitive to others' remarks.
- I perceive myself as submissive, which hurts me.

2. Thoughts about others and the future:

- Likelihood of failure.
- Tendency to anticipate the worst.

Low self-esteem associated with a negative perception of the future was observed, accompanied by a lack of motivation, difficulty flourishing, and a lack of hope. These manifestations are considered cognitive distortions or logical errors.

The dysfunctional cognitive schemas identified in the cognitive evaluation process of the clinical case are closely related to the previously mentioned personality traits. Indeed, low self-esteem and negative thoughts about oneself are linked to Factor A, which characterizes a reserved, detached, and rigid person. This subject is not very expressive and has difficulties expressing and asserting

himself. This can lead to a negative self-perception, a fear of not being up to the task, and submission to others' remarks.

Similarly, negative thoughts about the future and the tendency to anticipate the worst are correlated with Factor N, which characterizes people who tend to experience anxiety, rumination, and worry. This case may encounter obstacles in managing anxiety and maintaining a positive outlook on the future, leading to negative anticipation of events.

In summary, the dysfunctional cognitive schemas identified in the clinical case are linked to his personality traits according to the 16 PF, which can reinforce his tendency to ruminate, worry, and fear failure. This can also affect his ability to assert himself and manage conflicts.

Cognitive-Behavioral Model of Addictive Behaviors Related to Work Stressors

We adopted the cognitive-behavioral model of addictive behaviors developed by Beck (1993) to identify the dysfunctional cognitive schemas contributing to the maintenance of cannabis use in the clinical case (Figure 2). It is essential to emphasize that highlighting these schemas requires quantifying the associated automatic thoughts. This measurement allows for a better understanding of the underlying cognitive processes involved in the relationship between cognitive schemas and addictive behaviors.

"Work overload" with low control over the professional environment are external stimuli. In response to these stimuli, the subject may adopt a submissive attitude that triggers psychological and physiological manifestations of stress (anxiety, insomnia, irritability, fatigue, feelings of anger and helplessness, etc.). Simultaneously, automatic thoughts reappear, such as "I lack assertiveness, I am not brave enough to say no, I am weak, no one respects me, etc." Cognitive work on the representation of assertiveness or self-assertion is biased; that is, there is a cognitive confusion between asserting oneself and saying "No," which is mentally represented as aggressive behavior. Anticipatory beliefs related to cannabis consumption for its anxiolytic effects are reinforced by automatic thoughts like "When I smoke a joint, I feel relieved, I forget all my worries," and are justified by permissive thoughts such as "I will only smoke a few joints." These schemas precipitate compulsive seeking and intensive use of cannabis, often motivated by the need to alleviate withdrawal effects.

This cognitive-behavioral analysis emphasizes the importance of cognitive schemas and their possible correlation with consumption behavior. These patterns of thought and behavior develop in response to past experiences that have influenced how the person interacts with the world around them.

The professional stress experienced by the clinical case, resulting from factors such as work overload, lack of communication with colleagues, lack of support from superiors, monotony of tasks, and inability to develop new skills, is a potential source of stress, frustration, boredom, and distress. These elements can also be linked to unconscious fears, unresolved internal conflicts, feelings of low self-esteem, and a lack of control over one's life.

These various factors can lead to unhealthy compensatory behaviors, such as cannabis consumption, to maintain a certain harmony in the face of multiple professional conflicts and worries that can arise at any time.

The consumption behavior of the clinical case can be understood as a defensive mechanism aimed at protecting oneself from pain, psychological distress, and psychic failures. Indeed, the cannabis substance could serve as an external substitute, allowing the case to overcome obstacles, endure difficulties, and regain a sense of satisfaction and achievement.

Adult-Onset Addiction and Earlier Vulnerabilities

Although the present clinical vignette highlights the emergence of cannabis addiction in adulthood, it is important to consider that substance addiction rarely develops in isolation. Several studies suggest that adult-onset substance use disorders are often rooted in earlier psychological vulnerabilities, such as prior dependencies (e.g., nicotine, alcohol) or psychiatric disorders like anxiety and depressive disorders (Sinha, 2008; Volkow et al., 2016). Early adverse experiences, personality traits such as emotional dysregulation, alexithymia, and unresolved psychological trauma are known to create a fertile ground for later substance use as a maladaptive coping strategy (Khantzian, 1997). Incorporating a systematic exploration of earlier vulnerabilities—such as prior substance experimentation during adolescence or undiagnosed psychiatric conditions—could deepen the understanding of the trajectory that led to addiction in adulthood in this clinical case.

Cultural Acceptance and Rejection of Substance Use in Morocco

Furthermore, cultural context plays a critical role in shaping attitudes toward substance use. In Morocco, the use of substances like cannabis has historically been normalized in certain regions (e.g., the Rif area), where it is sometimes perceived as a traditional, even medicinal, product (UNODC, 2019; Benyamina et al., 2022). Conversely, broader Moroccan society—especially in urban and religiously conservative areas—tends to strongly reject substance use, associating it with moral decline and social deviance (Elghazouani, 2014). This ambivalence between localized acceptance and widespread social condemnation creates complex social dynamics that can influence individual patterns of use, feelings of guilt, stigma, and ultimately, the clinical course of addiction. Understanding these cultural representations is essential for interpreting both the motivations behind cannabis use and the obstacles to seeking help, which could be incorporated into tailored therapeutic approaches (Room et al., 2001).

Consequently, this use could be interpreted as an impulsive act of activism or "acting out" to escape into a personal world that preserves psychic integrity. This addictive quest would respond to "an attempt to escape a fundamental psychic suffering unbearable to the subject" (Cuynet, 2001), with the hope of making the difficulties of professional life bearable. Indeed, clinging to the object that is the cannabis substance and the inability to break the link with the substance are significant symptoms of an unresolved internal failure.

Work represents a complex dimension of social life and human existence, exerting a significant impact on mental health. Professional pressures, organizational demands, and relational difficulties can lead to stress, imbalances, and exhaustion.

Indeed, the emergence of psychological or pathological problems in the workplace does not solely result from objective constraints

but mainly from the exhaustion and weakening of the defensive resources mobilized by the subject to remain in the work situation (Dejours & Gernet, 2012).

This clinical vignette demonstrates that the substance is used as a solution to protect against pain, psychological distress, and psychic failure when other suitable solutions are not found. However, this solution, in the acted-out behavior, also becomes the core of the problem and a reinforcer of psychic distress.

The analysis reveals that work-related stress factors can lead to the consumption of psychoactive substances as a defensive and adjustment mechanism aimed at rebalancing the psyche. This stress can be amplified in a psychologically fragile terrain and by failing internal resources, such as lack of self-confidence, lack of trust in one's abilities, low self-esteem, emotional deficiency, instability of the underlying psychic organization, and personality vulnerability.

The impact of occupational stress therefore has a pathogenic effect on both mental and physical health. It does not affect all individuals in the same way, impacting the more vulnerable and less resilient individuals, who end up feeling stressed more acutely.

In conclusion, this study contributes to the understanding of the complex link between occupational stress and the consumption of psychoactive substances. The results highlight the importance of considering psychological aspects in the management of occupational stress and underscore the need for appropriate interventions to support the mental health of individuals facing these challenges.

This study contributes to understanding the complex link between occupational stress and the consumption of psychoactive substances, underscoring the importance of addressing psychological aspects in managing occupational stress and the need for appropriate interventions to support mental health.

Data Availability Statement: The data that support the findings of this study are available upon request from the corresponding author.

Informed Consent: Informed consent was obtained from the participant who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Declaration of Interests: The author has no conflict of interest to declare.

Funding: The author declared that this study has received no financial support.

References

Beck, A. T., Wright, F. D., Newman, C. F., & Liese, B. S. (1993). *Cognitive therapy of substance abuse*. New York: Guilford Press.

Belhaj, A., & Haddiya, M. (2007). Psychologie et monde du travail. Publication de la Faculté des Lettres et des Sciences Humaines- Rabat. *Colloques et Séminaires*.

Benyamina, A., Reynaud, M., & Karila, L. (2022). Cannabis and psychiatric disorders: Updated review. *Encéphale*.

Chabrol, H., & Callahan, S. (2003). La consommation de cannabis chez les adolescents et les jeunes adultes: Un phénomène en augmentation. *Encéphale*, *29*(4), 362 – 366.

Cuynet, P. (2001). Qu'est-ce qui fait courir le généalogiste ? La passion de l'ancestral. *Divan Familial*, 157 – 165

Dejours, C. (2017). Souffrance et plaisir au travail. L'approche par la psychopathologie du travail. Retrieved from www.cairn.info/revue-travailler-2016-1-page-17.htm. *Travailler*, *n°*(1), 17 – 30. [CrossRef]

Dejours, C., & Gernet, I. (2012). *Psychopathologie du travail*. Elsevier Masson SAS.

Elghazouani, A. (2014). *Représentations sociales et pratiques des drogues au Maroc. Revue marocaine des sciences sociales*.

Flammarion, & Lavoisier. *Médecine – Sciences. Paris, ISBN° 978-2-257-20650-3, 900 pages*

Grebot, E., et al. (2015). Schémas précoces inadaptés, croyances addictives et styles défensifs chez des étudiants consommateurs de cannabis. *Annales Médico- Psychologiques (Paris)*, *173*(4), 281 – 286. [CrossRef]

Grebot, E., & Dovero, M. (2005). *Le stress professionnel Comment faire face, Axiome édition*.

Grebot, E., Paty, N., & Dephanix, G. (2006). Styles défensifs et stratégies d'ajustement ou coping en situation stressante. *Encéphale*, *32*, 315 – 324.

Guelf, J. D., & Croc, M. A. (2015). *American Psychiatric Association DSM-5, Manuel diagnostique et statistique des troubles mentaux, Elsevier Masson*.

Hautekeete, M., Cousin, I., & Graziani, P. (1999). Pensées dysfonctionnelles de l'alcool-dépendance, un test du modèle de Beck : Schémas anticipatoire, soulageant et permissif. Communication présentée aux 26es Journées de Thérapie Comportementale et Cognitive, Paris. *Journal de Thérapie Comportementale et Cognitive*. Paris: Masson. https://www.researchgate.net/...modele...Beck.../Pensees-dysfonctionnelles-de-lalcoolo-d...

Ionescu, S., Jacquet, M. M., & Lhote, C. (2003). *Les mécanismes de défense : Théorie et clinique. Nathan/VUEF*.

Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard Review of Psychiatry*, *4*(5), 231 – 244. [CrossRef]

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer Publishing Company.

Lejoyeux, M. (2017). *MINI TRAITE, Addictologie. 3éme édition, Elsevier Masson, ISBN : 978-2-294-75125-7,442 pages*.

Paty, B., & Grebot, E. (2010). Les dérivés conscients des mécanismes de défense au questionnaire de Bond (DSQ 40) : Stabilité ou variabilité entre une situation non anxiogène et une situation anxiogène. *Annales Médico-Psychologiques, Revue Psychiatrique*. https://www.researchgate.net/publication/246565081

Pedinielli, J. L., & Bonnet, A. (2008). Apport de la psychanalyse à la question de l'addiction. De Boeck Supérieur. *Psychotropes*, *14*.

Ponnelle, S., Vaxevanoglou , X. & Garcia, F. (2012). *L'usage des outils d'évaluation du stress au travail : perspectives théoriques et méthodologiques. Le travail humain*, *75*, 179 – 213. [CrossRef]

Reynaud, M., Karila, L., Aubin, H. J., & Benyamina, A. (2016). *Traité d'addictologie* (2ème édition).

Rivolier, J. (1992). *Psychiatrie du travail*. Paris: Masson.

Room, R., Fischer, B., Hall, W., Lenton, S., & Reuter, P. (2001). *Cannabis policy: Moving beyond stalemate*. The Beckley Foundation.

Sinha, R. (2008). Chronic stress, drug use, and vulnerability to addiction. *Annals of the New York Academy of Sciences*, *1141*(1), 105 – 130. [CrossRef]

UNODC (2019). *World drug report 2019*. United Nations Office on Drugs and Crime.

Volkow, N. D., Koob, G. F., & McLellan, A. T. (2016). Neurobiologic advances from the brain disease model of addiction. *New England Journal of Medicine*, *374*(4), 363 – 371. [CrossRef]