Associations Between HEXACO Personality Traits and Behavioral Addictions: A Systematic Review and Meta-analysis

Farangis Sharifibastan, Ståle Pallesen, Katharina Teresa Enehaug Morken, Petter Haave, Eilin Kristine Erevik

Norwegian Competence Center for Gambling and Gaming Research

UNIVERSITY OF BERGEN
Faculty of Psychology

BERGEN ADDICTION RESEARCH GROUP

Introduction

Global prevalence of behavioral addictions is estimated at 11% *(Alimoradi et al., 2022)*

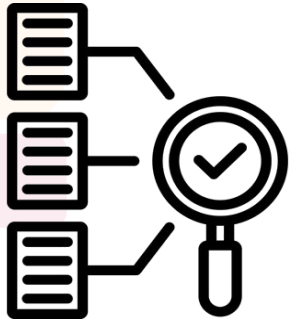
Smartphone addiction is the most common, with a prevalence of 30.7% *(Das & Pandey, 2023)*

Personality traits play a crucial role in addiction vulnerability *(Kircaburun et al., 2021)*

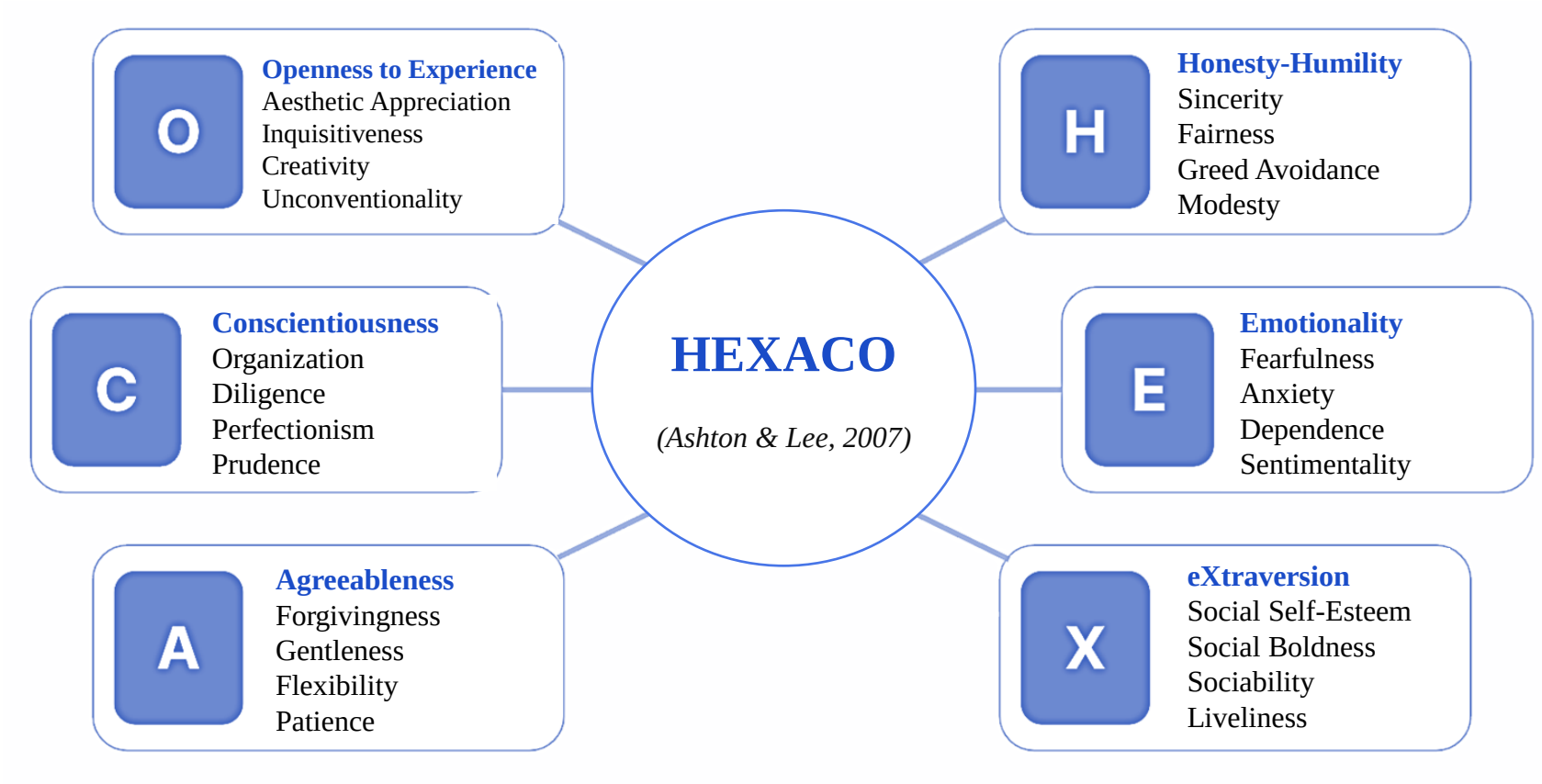
The HEXACO model is a newer personality taxonomy, which have gained considerable empirical support over the last decades *(Lee & Ashton, 2004; Zettler et al., 2020)*

(1) What are the associations between HEXACO personality traits and various behavioral addictions? (2) Are these associations moderated by gender and age?

First systematic review and meta-analysis on this topic



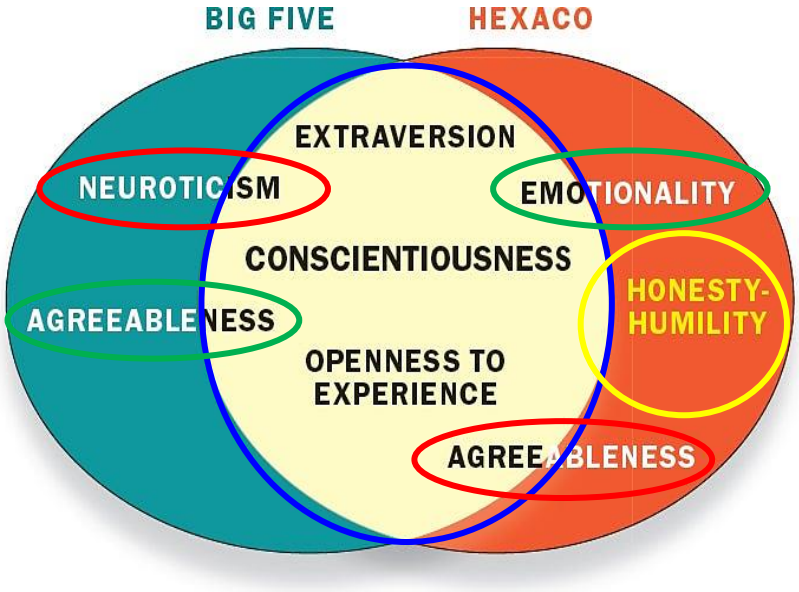
HEXACO Traits and Facets



Big Five Model and HEXACO Model

Extraversion & Openness

Show inconsistent associations across addictions *(Abbasi et al., 2014; Leslie et al., 2023; Rash, 2018; Horwood et al., 2018)*



Honesty-Humility

Negatively associated with risk-taking behavior and problem gambling severity *(Ashton et al., 2010; Kim et al., 2018; McGrath et al., 2018; Leslie et al., 2023)*

Alcohol, gambling, mobile phone addiction, Internet addiction, Facebook addiction have been found to be associated with lower agreeableness and conscientiousness scores and higher emotionality scores *(McGrath et al., 2018; Horwood et al., 2018; Abbasi et al., 2014; Zafar et al., 2018; Rash, 2018)*

Methods

Systematic review registration: PROSPERO CRD42023468153

Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 statement *(Page et al., 2021; Pan & Yeh, 2018)*

APA PsycINFO (Ovid), Medline (Ovid), ProQuest, Web of Science, PubMed, CINAHL, Wiley Online Library, and first 50 pages of Google Scholar

Search term “HEXACO”- From inception to October 15, 2024

Empirical studies published as full papers in peer-reviewed journals or as full dissertations, in English, other European languages, or Persian, investigating the association between HEXACO personality traits and behavioural addictions, and reporting information on zero-order correlations or sufficient data for such calculations are eligible

Newcastle–Ottawa Scale (NOS)

Random effects models for pooled effect sizes. Publication bias assessed via funnel plots, Egger's test, and trim-and-fill. Meta-regression to examine heterogeneity sources. Sensitivity analyses for result robustness. Analysis conducted using CMA v4.

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Systematic Reviews

PROTOCOL Open Access

Associations between HEXACO personality traits, substance use disorders, and behavioral addictions: a protocol for a comprehensive systematic review and meta-analysis

Farangis Sharifibastan[1,2*], Eilin Kristine Erevik[1,2], Katharina Teresa Enehaug Morken[3,4] and Ståle Pallesen[1,2]

Abstract

Background While research has explored the connection between addiction and personality, no systematic study has examined how substance use disorders (SUD) and behavioral addictions specifically relate to the HEXACO model of personality. This systematic review and meta-analysis aim to fill this gap by investigating the association between HEXACO personality traits and various addictions, including illegal substances (e.g., narcotics and cannabis) and behavioral addictions (e.g., gambling, gaming, social media addiction, and compulsive sexual behavior disorder) across different populations.

Methods The protocol is in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) statement. Searches will be conducted in databases including APA PsycINFO (Ovid), MEDLINE (Ovid), ProQuest, Web of Science, CINAHL, Wiley Online Library, and Google Scholar. Empirical studies published as full papers in peer-reviewed journals or as full dissertations, in English, other European languages, or Persian, investigating the association between HEXACO personality traits and addictive disorders are eligible. Two reviewers will independently screen all citations and full-text articles, and extract data using the Covidence software. They will further assess the risk of bias and quality of the studies using the Newcastle–Ottawa Scale (NOS) for longitudinal and cohort studies, an adapted version of the NOS for cross-sectional studies. Publication bias will be evaluated using funnel plots, Egger's test, and trim and fill analysis. In addition to a narrative summary, meta-analyses will be conducted if data are sufficient. Random effects models will be used to pool effect sizes. Subgroup analyses and meta-regression will be performed to investigate potential sources of heterogeneity. Sensitivity analyses will examine the robustness of the results. Data analysis will be conducted using Comprehensive Meta-Analysis (CMA), version 4.

Discussion This review and meta-analysis will be the first to systematically explore and integrate the evidence available on the association between the HEXACO personality traits and SUD and behavioral addictions. By consolidating information, the study will enhance our understanding of the role of personality traits in the development, maintenance, and treatment of SUD and behavioral addictions.

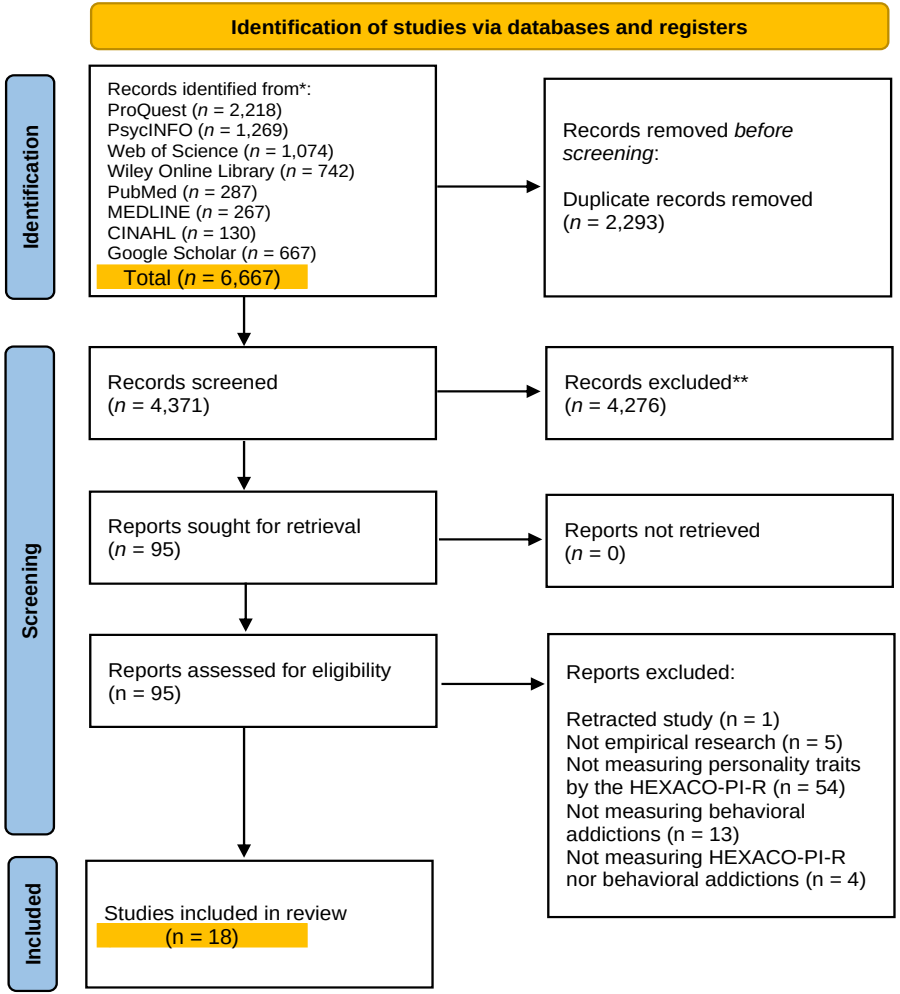
Systematic review registration PROSPERO CRD42023468153.

Keywords HEXACO model, Personality traits, Substance use disorders, Behavioral addictions

*Correspondence:
Farangis Sharifibastan
farangis.sharifibastan@uib.no
Full list of author information is available at the end of the article

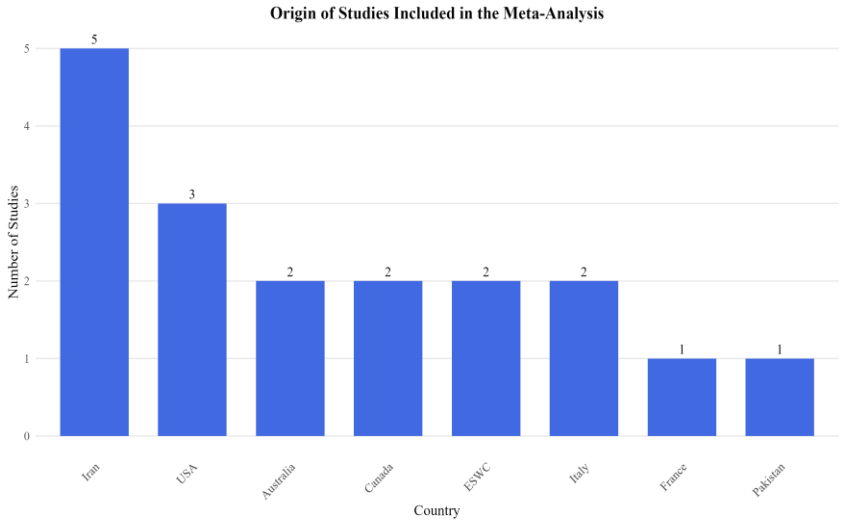
A study protocol *(Sharifibastan et al., 2025)* was designed prior to the formal search process based on the PRISMA-P checklist for systematic reviews and meta-analysis protocols.

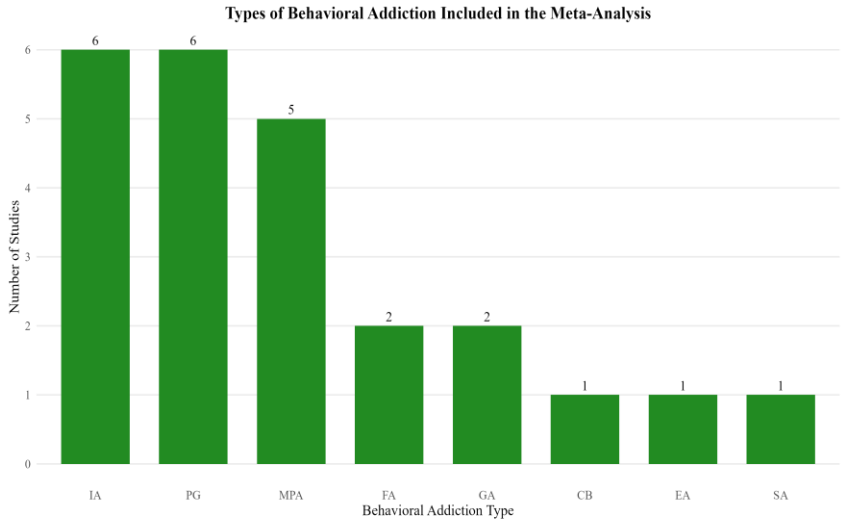
Fig. 1. PRISMA 2020 Flow Diagram of the Study Selection Process

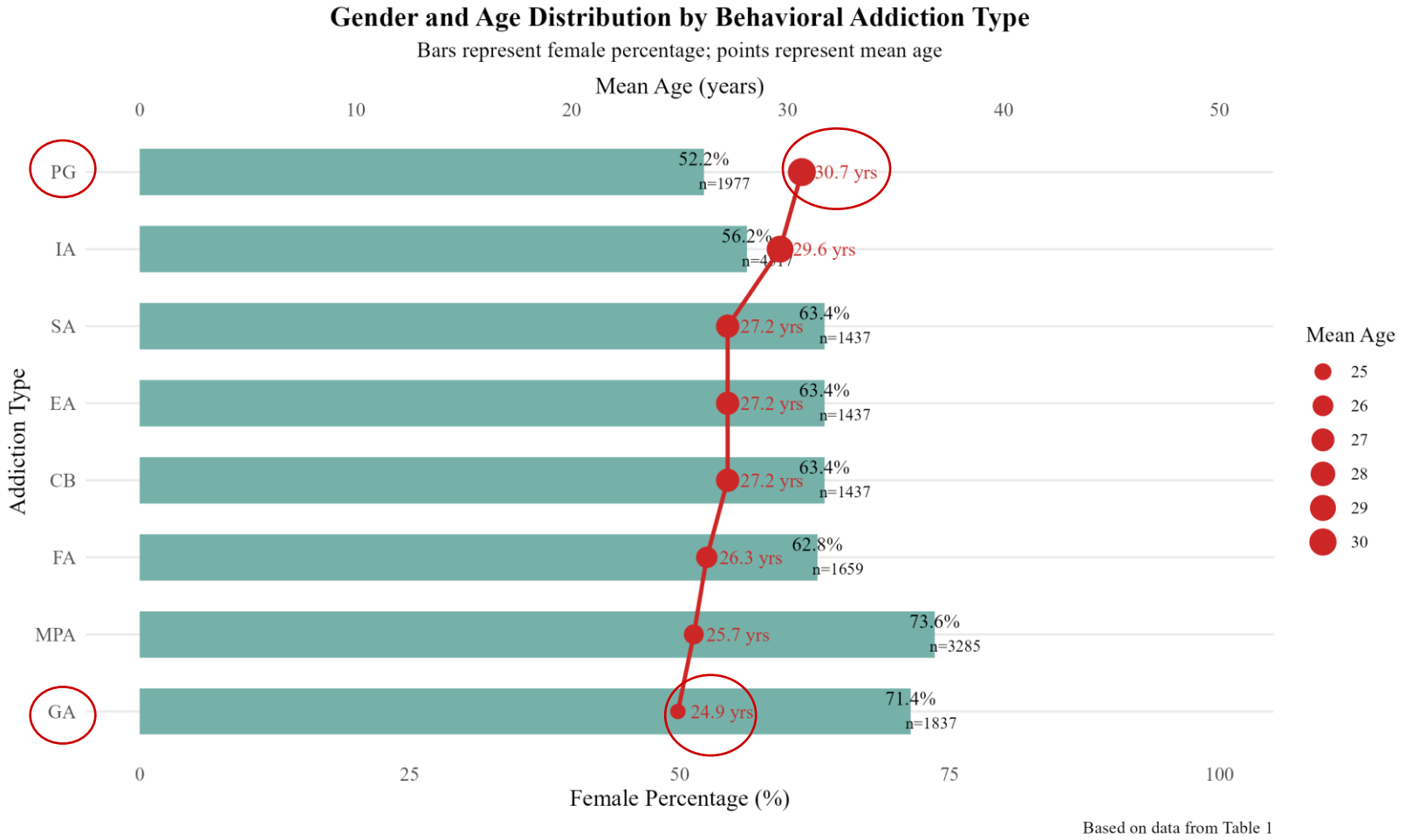


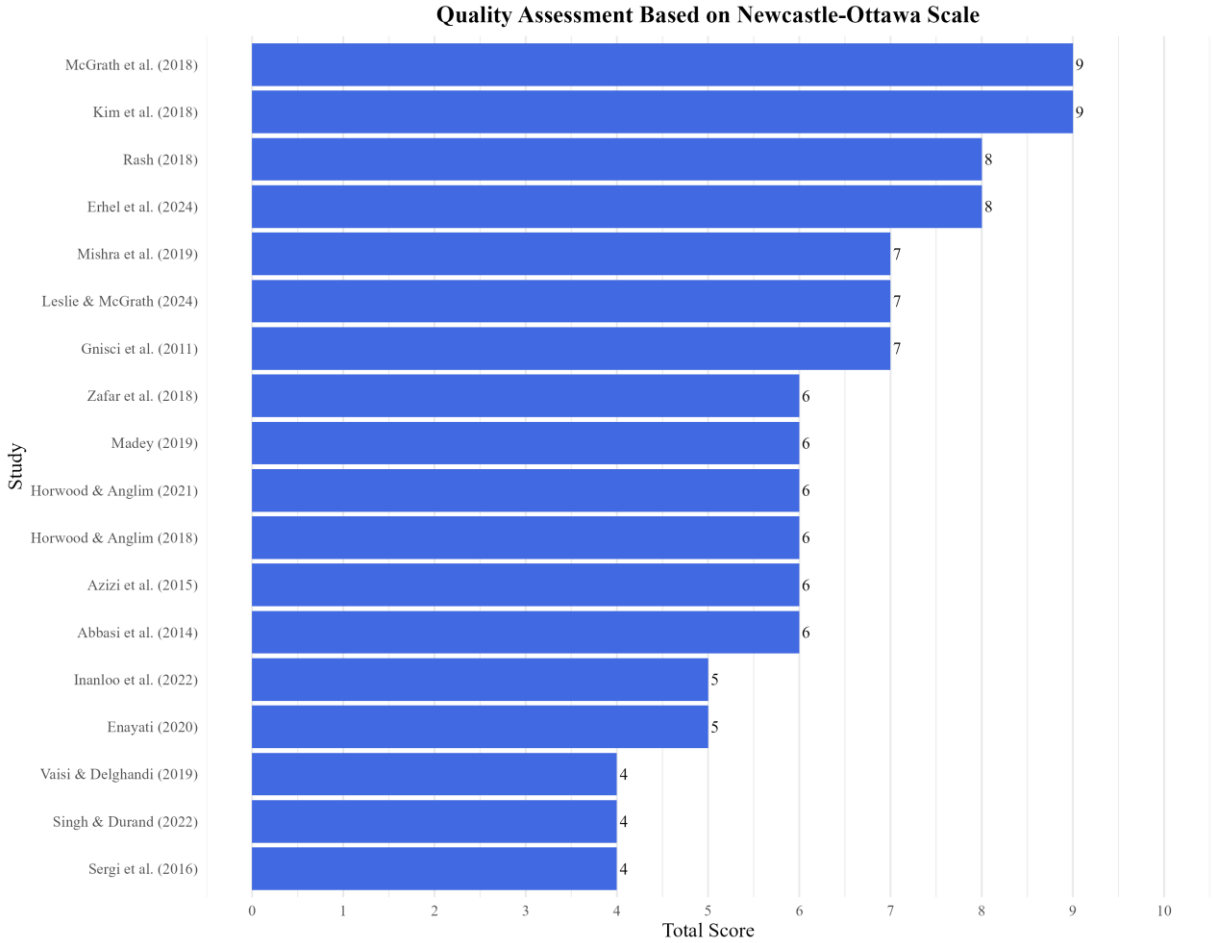
Sample Characteristics of Studies Included in the Meta-Analysis

Total studies: 18	Total partisipants: 8,965	Years: 2011-2024
Sample size: 60 to 1,504	Female%: 63.9%	Mean age: 25.04






Gender and Age Distribution by Behavioral Addiction Type
Bars represent female percentage; points represent mean age
Mean Age (years)
0
10
20
30
40
50
PG
IA
SA
EA
CB
FA
MPA
GA
52.2%
n=1977
30.7 yrs
56.2%
29.6 yrs
63.4%
27.2 yrs
n=1437
63.4%
27.2 yrs
n=1437
63.4%
27.2 yrs
n=1437
62.8%
26.3 yrs
n=1659
73.6%
25.7 yrs
n=3285
71.4%
24.9 yrs
n=1837
Addiction Type
0
25
50
75
100
Female Percentage (%)
Mean Age
25
26
27
28
29
30
Based on data from Table 1


Quality Assessment Based on Newcastle-Ottawa Scale
McGrath et al. (2018)
Kim et al. (2018)
Rash (2018)
Erhel et al. (2024)
Mishra et al. (2019)
Leslie & McGrath (2024)
Gnisci et al. (2011)
Zafar et al. (2018)
Madey (2019)
Horwood & Anglim (2021)
Horwood & Anglim (2018)
Azizi et al. (2015)
Abbasi et al. (2014)
Inanloo et al. (2022)
Enayati (2020)
Vaisi & Delghandi (2019)
Singh & Durand (2022)
Sergi et al. (2016)
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Study
0
1
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3
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5
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7
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9
10
Total Score

Honesty-Humility

Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value
Abbasi et al. (2014)	-0,090	-0,232	0,056	-1,207	0,227
Azizi et al. (2014)	-0,097	-0,253	0,064	-1,180	0,238
Enayati (2020)	-0,886	-0,913	-0,852	-19,692	0,000
Gnisci et al. (2011)	-0,216	-0,273	-0,158	-7,121	0,000
Horwood & Anglim (2018)	-0,280	-0,369	-0,186	-5,681	0,000
Horwood & Anglim (2021)	-0,320	-0,373	-0,265	-10,848	0,000
Inanloo et al. (2022)	-0,544	-0,610	-0,471	-12,151	0,000
Kim et al. (2018)	-0,284	-0,369	-0,194	-6,013	0,000
Leslie & McGrath (2024)	-0,155	-0,238	-0,070	-3,543	0,000
Madey (2019)	-0,234	-0,346	-0,115	-3,800	0,000
McGrath et al. (2018)	-0,290	-0,386	-0,187	-5,366	0,000
Mishra et al. (2019)	-0,350	-0,442	-0,251	-6,578	0,000
Rash (2018)	-0,406	-0,544	-0,247	-4,719	0,000
Sergi et al. (2016)	-0,124	-0,232	-0,013	-2,184	0,029
Singh & Durand (2022)	-0,179	-0,229	-0,128	-6,852	0,000
Vaisi & Delghandi (2019)	-0,606	-0,745	-0,416	-5,304	0,000
Zafar et al. (2018)	-0,262	-0,381	-0,135	-3,970	0,000
Pooled	**-0,339**	**-0,433**	**-0,237**	**-6,210**	**0,000**
Prediction Interval	-0,339	-0,690	0,142		

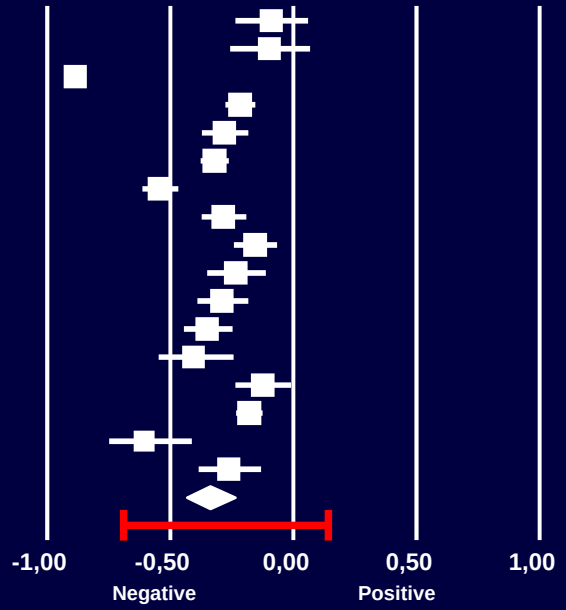


Fig. 2. Forest Plot of the Association Between Honesty-Humility and Behavioral Addictions

Emotionality

Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value
Abbasi et al. (2014)	0,310	0,172	0,436	4,289	0,000
Azizi et al. (2014)	-0,446	-0,566	-0,308	-5,816	0,000
Enayati (2020)	0,848	0,804	0,883	17,530	0,000
Erhel et al. (2024)	0,170	0,120	0,219	6,651	0,000
Gnisci et al. (2011)	-0,011	-0,071	0,049	-0,357	0,721
Horwood & Anglim (2018)	0,330	0,239	0,415	6,770	0,000
Horwood & Anglim (2021)	0,310	0,255	0,363	10,485	0,000
Inanloo et al. (2022)	0,499	0,422	0,569	10,918	0,000
Kim et al. (2018)	0,076	-0,019	0,170	1,568	0,117
Leslie & McGrath (2024)	0,020	-0,066	0,106	0,453	0,650
Madey (2019)	-0,144	-0,262	-0,022	-2,311	0,021
McGrath et al. (2018)	-0,050	-0,158	0,059	-0,899	0,368
Mishra et al. (2019)	-0,001	-0,109	0,107	-0,018	0,986
Rash (2018)	0,233	0,058	0,394	2,600	0,009
Sergi et al. (2016)	-0,004	-0,115	0,107	-0,070	0,944
Singh & Durand (2022)	0,233	0,183	0,281	8,988	0,000
Vaisi & Delghandi (2019)	0,673	0,505	0,792	6,162	0,000
Zafar et al. (2018)	0,321	0,198	0,434	4,924	0,000
Pooled	**0,212**	**0,094**	**0,324**	**3,499**	**0,000**
Prediction Interval	0,212	-0,325	0,646		

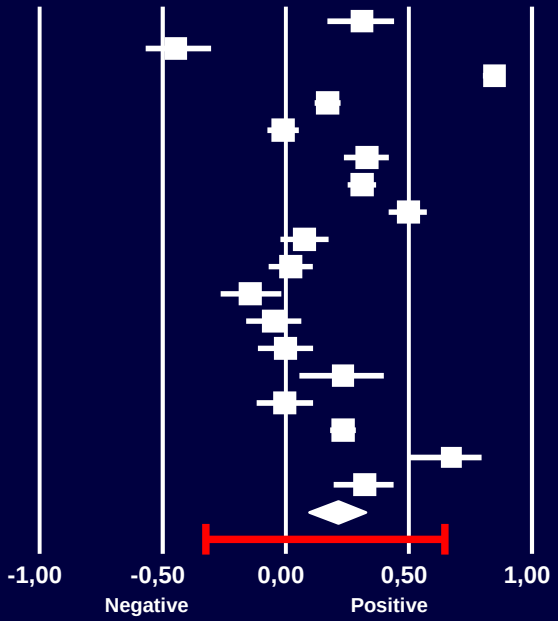


Fig. 3. Forest Plot of the Association Between Emotionality and Behavioral Addictions

eXtraversion

Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value
Abbasi et al. (2014)	-0,330	-0,454	-0,194	-4,587	0,000
Azizi et al. (2014)	0,199	0,040	0,348	2,445	0,014
Enayati (2020)	-0,639	-0,714	-0,549	-10,618	0,000
Gnisci et al. (2011)	-0,147	-0,206	-0,087	-4,805	0,000
Horwood & Anglim (2018)	-0,110	-0,207	-0,011	-2,181	0,029
Horwood & Anglim (2021)	-0,250	-0,305	-0,193	-8,355	0,000
Inanloo et al. (2022)	-0,782	-0,817	-0,741	-20,931	0,000
Kim et al. (2018)	-0,011	-0,106	0,084	-0,227	0,821
Leslie & McGrath (2024)-Category 1	-0,067	-0,152	0,019	-1,521	0,128
Madey (2019)	-0,044	-0,165	0,079	-0,702	0,483
McGrath et al. (2018)	-0,036	-0,144	0,073	-0,647	0,517
Mishra et al. (2019)	-0,130	-0,235	-0,022	-2,353	0,019
Rash (2018)-Category 1	-0,065	-0,239	0,113	-0,713	0,476
Sergi et al. (2016)	-0,159	-0,266	-0,048	-2,810	0,005
Singh & Durand (2022)- Category 1	-0,080	-0,131	-0,028	-3,036	0,002
Vaisi & Delghandi (2019)	-0,592	-0,735	-0,398	-5,139	0,000
Zafar et al. (2018)	0,278	0,152	0,395	4,225	0,000
Pooled	**-0,197**	**-0,321**	**-0,066**	**-2,940**	**0,003**
Prediction Interval	-0,197	-0,663	0,379		

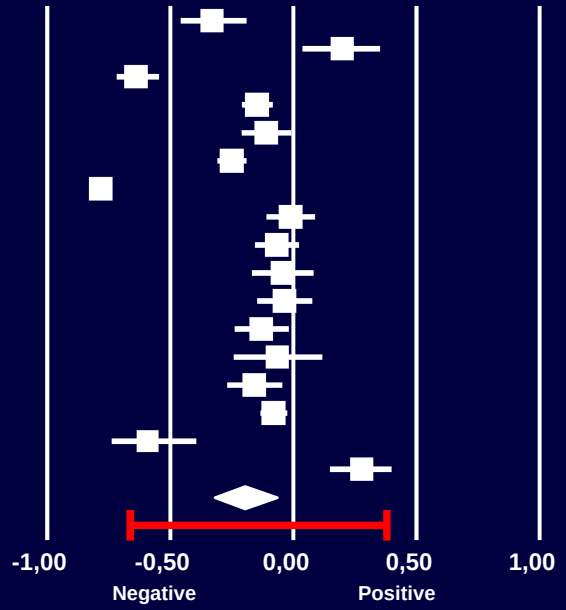


Fig. 4. Forest Plot of the Association Between eXtraversion and Behavioral Addictions

Agreeableness

Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value
Abbasi et al. (2014)	0,050	-0,096	0,194	0,670	0,503
Azizi et al. (2014)	0,011	-0,150	0,171	0,133	0,894
Enayati (2020)	-0,666	-0,737	-0,581	-11,278	0,000
Gnisci et al. (2011)	-0,012	-0,072	0,048	-0,389	0,697
Horwood & Anglim (2018)	-0,210	-0,303	-0,113	-4,210	0,000
Horwood & Anglim (2021)	-0,230	-0,286	-0,173	-7,661	0,000
Inanloo et al. (2022)	-0,756	-0,795	-0,711	-19,662	0,000
Kim et al. (2018)	-0,195	-0,285	-0,102	-4,067	0,000
Leslie & McGrath (2024)-Category 1	0,081	-0,005	0,166	1,840	0,066
Madey (2019)	-0,057	-0,178	0,066	-0,909	0,363
McGrath et al. (2018)	-0,248	-0,347	-0,143	-4,552	0,000
Mishra et al. (2019)	0,003	-0,105	0,111	0,054	0,957
Rash (2018)-Category 1	-0,123	-0,294	0,055	-1,354	0,176
Sergi et al. (2016)	-0,274	-0,374	-0,168	-4,927	0,000
Singh & Durand (2022)- Category 1	-0,096	-0,147	-0,045	-3,647	0,000
Vaisi & Delghandi (2019)	-0,993	-0,996	-0,988	-21,334	0,000
Zafar et al. (2018)	-0,246	-0,366	-0,118	-3,717	0,000
Pooled	**-0,336**	**-0,478**	**-0,177**	**-4,018**	**0,000**
Prediction Interval	-0,336	-0,809	0,401		

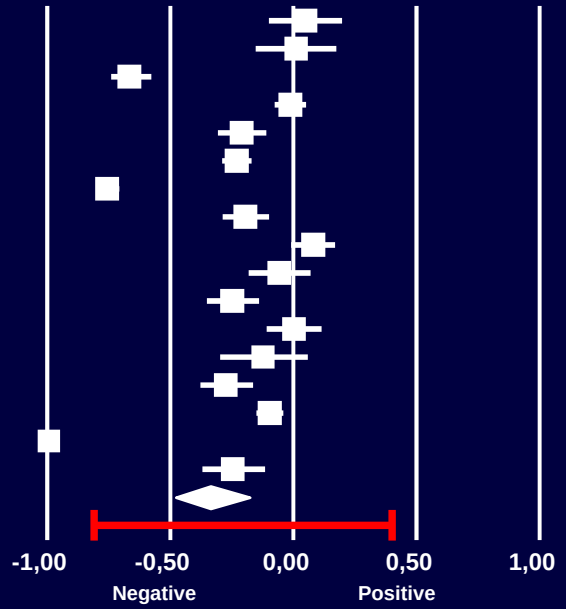


Fig. 5. Forest Plot of the Association Between Agreeableness and Behavioral Addictions

Conscientiousness

Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value
Abbasi et al. (2014)	-0,250	-0,382	-0,108	-3,417	0,001
Azizi et al. (2014)	-0,043	-0,202	0,118	-0,522	0,602
Enayati (2020)	-0,591	-0,674	-0,493	-9,533	0,000
Gnisci et al. (2011)	-0,143	-0,202	-0,083	-4,672	0,000
Horwood & Anglim (2018)	-0,270	-0,359	-0,176	-5,468	0,000
Horwood & Anglim (2021)	-0,280	-0,334	-0,224	-9,410	0,000
Inanloo et al. (2022)	-0,761	-0,799	-0,716	-19,897	0,000
Kim et al. (2018)	-0,507	-0,574	-0,433	-11,504	0,000
Leslie & McGrath (2024)-Category 1	-0,173	-0,255	-0,088	-3,962	0,000
Madey (2019)	-0,247	-0,359	-0,129	-4,020	0,000
McGrath et al. (2018)	-0,161	-0,265	-0,053	-2,919	0,004
Mishra et al. (2019)	-0,200	-0,302	-0,094	-3,649	0,000
Rash (2018)-Category 1	-0,408	-0,546	-0,249	-4,746	0,000
Sergi et al. (2016)	-0,274	-0,374	-0,168	-4,927	0,000
Singh & Durand (2022)- Category 1	-0,182	-0,232	-0,132	-6,970	0,000
Vaisi & Delghandi (2019)	-0,394	-0,589	-0,156	-3,145	0,002
Zafar et al. (2018)	-0,260	-0,379	-0,133	-3,938	0,000
Pooled	**-0,317**	**-0,410**	**-0,218**	**-6,024**	**0,000**
Prediction Interval	-0,317	-0,666	0,145		

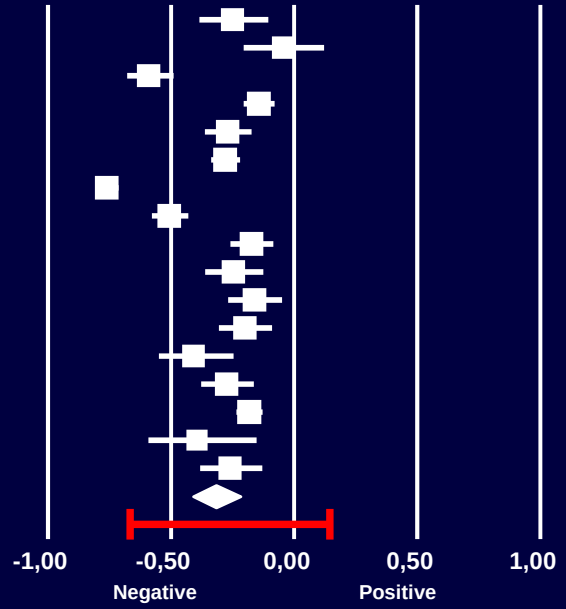


Fig. 6. Forest Plot of the Association Between Conscientiousness and Behavioral Addictions

Openness to Experience

Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value
Abbasi et al. (2014)	0,040	-0,106	0,184	0,535	0,592
Azizi et al. (2014)	-0,343	-0,477	-0,193	-4,334	0,000
Enayati (2020)	-0,549	-0,639	-0,444	-8,659	0,000
Gnisci et al. (2011)	-0,037	-0,097	0,023	-1,201	0,230
Horwood & Anglim (2018)	-0,240	-0,331	-0,145	-4,834	0,000
Horwood & Anglim (2021)	-0,160	-0,218	-0,101	-5,279	0,000
Inanloo et al. (2022)	-0,762	-0,800	-0,718	-19,944	0,000
Kim et al. (2018)	-0,350	-0,431	-0,264	-7,525	0,000
Leslie & McGrath (2024)-Category 1	-0,029	-0,115	0,057	-0,658	0,511
Madey (2019)	-0,078	-0,198	0,045	-1,246	0,213
McGrath et al. (2018)	-0,099	-0,205	0,010	-1,785	0,074
Mishra et al. (2019)	-0,130	-0,235	-0,022	-2,353	0,019
Rash (2018)-Category 1	-0,153	-0,321	0,025	-1,689	0,091
Sergi et al. (2016)	0,060	-0,052	0,170	1,053	0,293
Singh & Durand (2022)- Category 1	-0,009	-0,061	0,043	-0,341	0,733
Vaisi & Delghandi (2019)	-0,563	-0,715	-0,361	-4,811	0,000
Zafar et al. (2018)	0,280	0,154	0,397	4,257	0,000
Pooled	**-0,201**	**-0,322**	**-0,073**	**-3,065**	**0,002**
Prediction Interval	-0,201	-0,657	0,364		

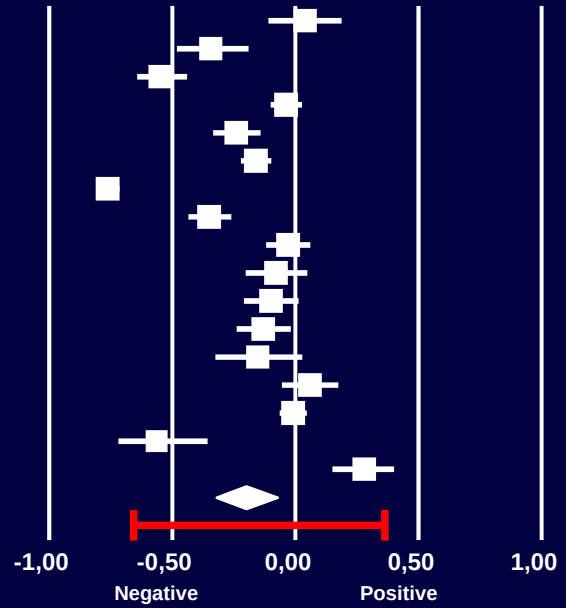
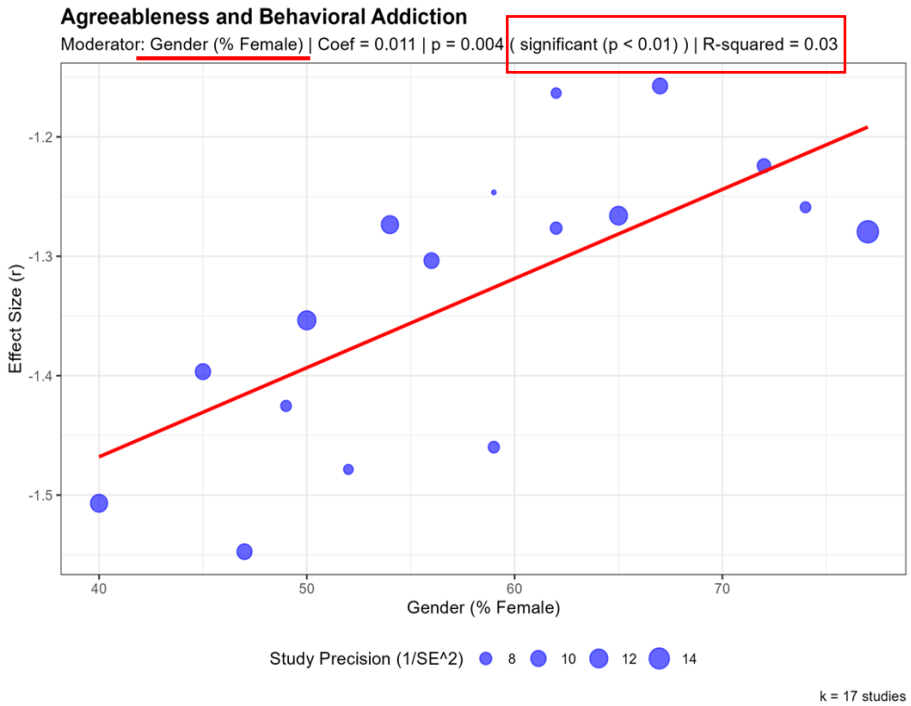
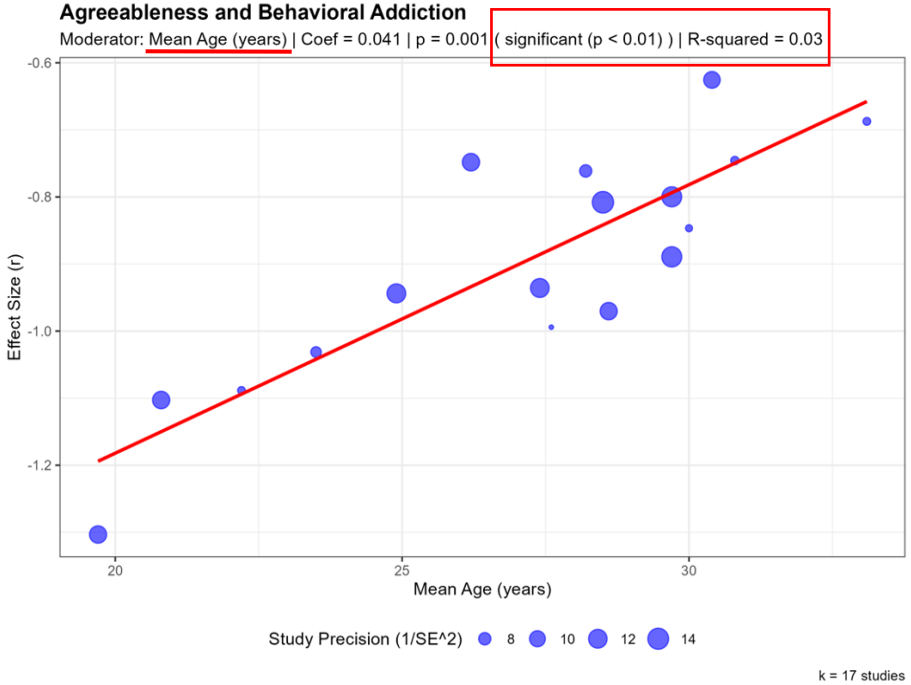


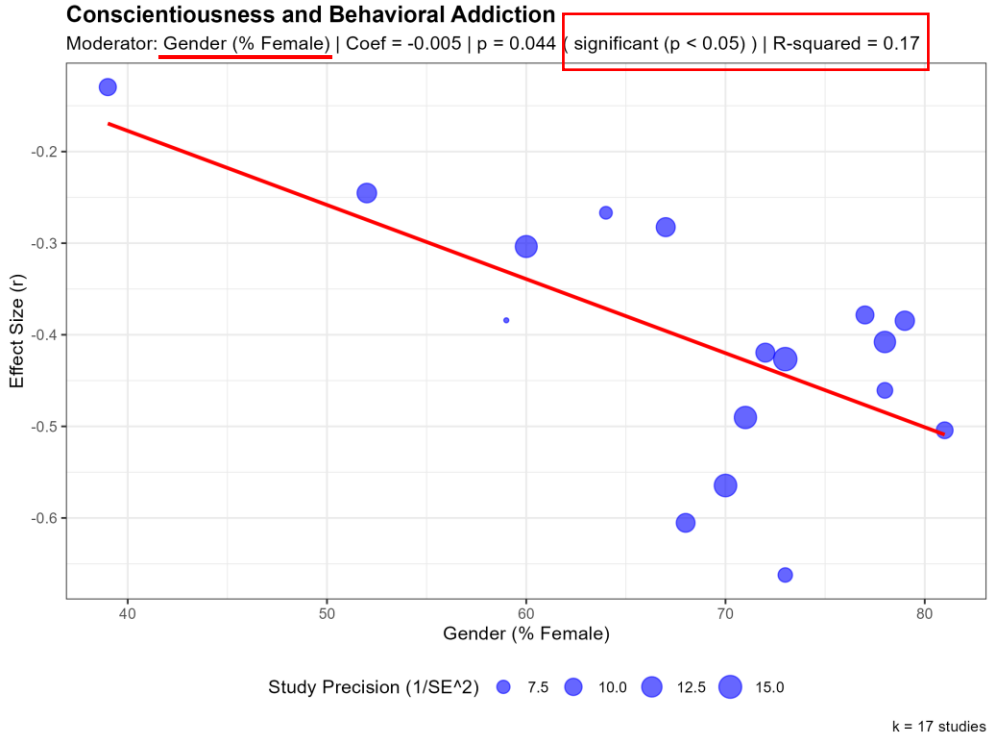
Fig. 7. Forest Plot of the Association Between Openness to Experience and Behavioral Addictions

Meta-Regression results





Meta-Regression results



Key Findings

- The strongest inverse correlations were found for honesty-humility (r = -0.339), agreeableness (r = -0.336), and conscientiousness (r = -0.317)
- Both gender (% Female; β = 0.011, p = 0.004) and mean age (β = 0.041, p = 0.001) significantly moderated agreeableness-addiction relationships (Q = 17.84, R^2 = 3%)
- Gender (% Female; β = -0.005, p = 0.044) significantly moderated conscientiousness-addiction relationships (Q = 326.015, R^2 = 17%)
- These results support incorporating personality assessment into clinical practice for screening, prevention, and treatment planning for behavioral addictions
- Future studies should examine the directionality between addictive behaviors and personality traits, preferably with multi-wave longitudinal studies.

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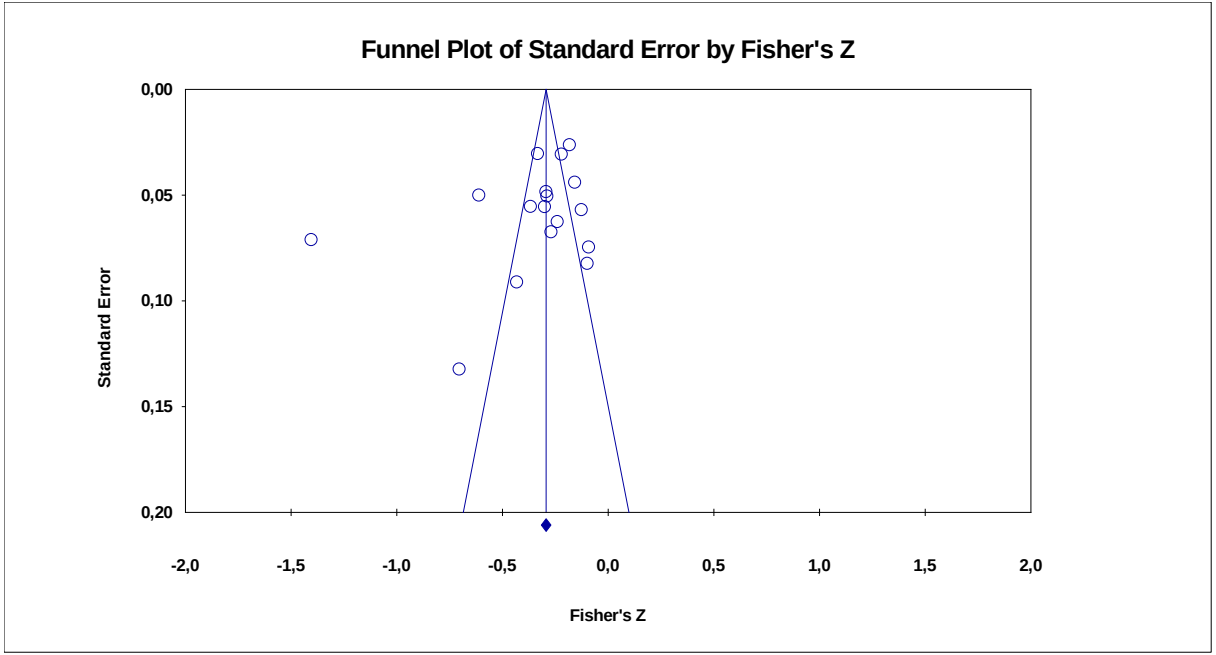
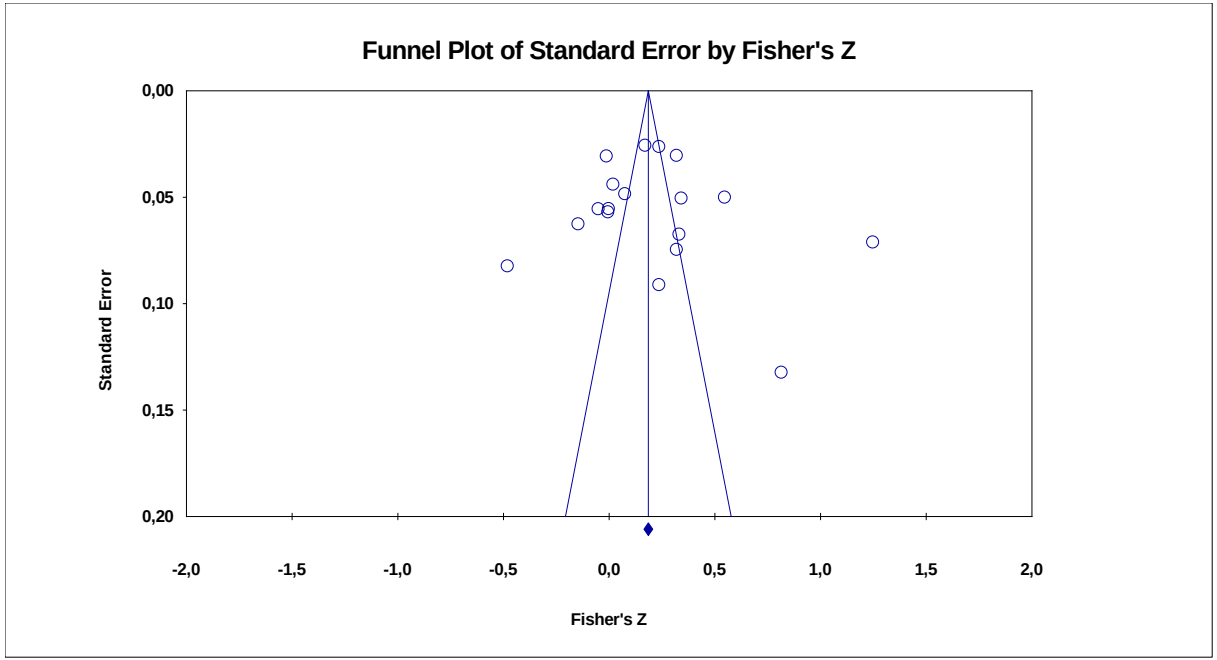
Thank You
For Your Attention!

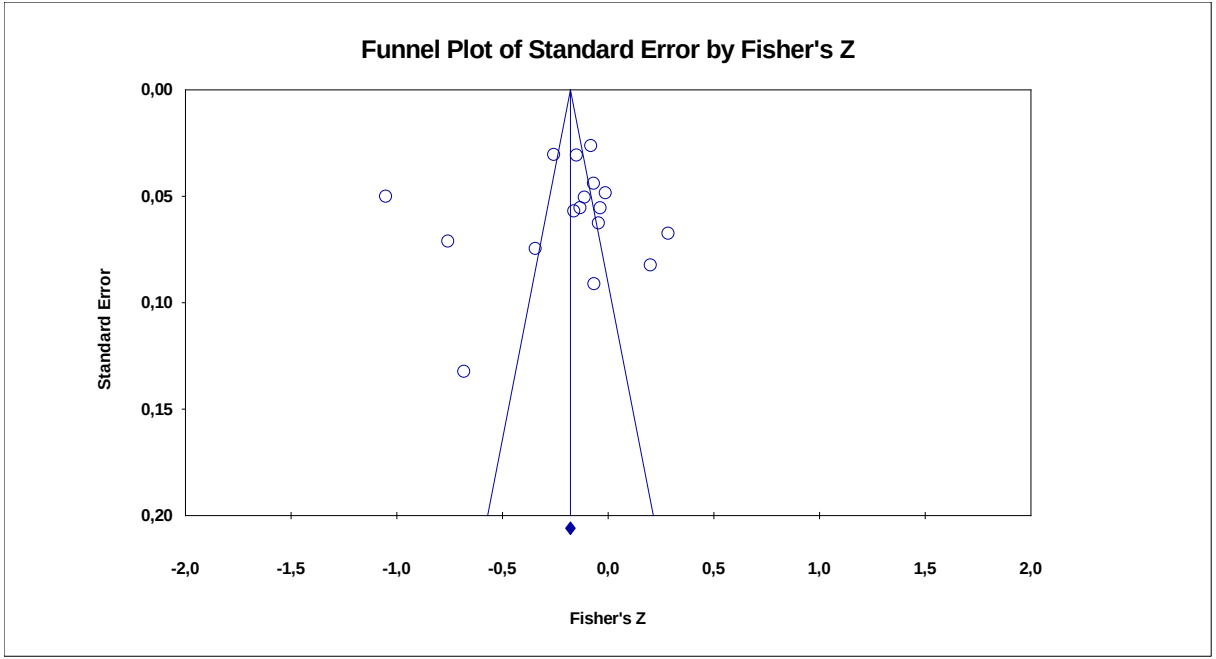
Questions?
Farangis.Sharifibastan@uib.no



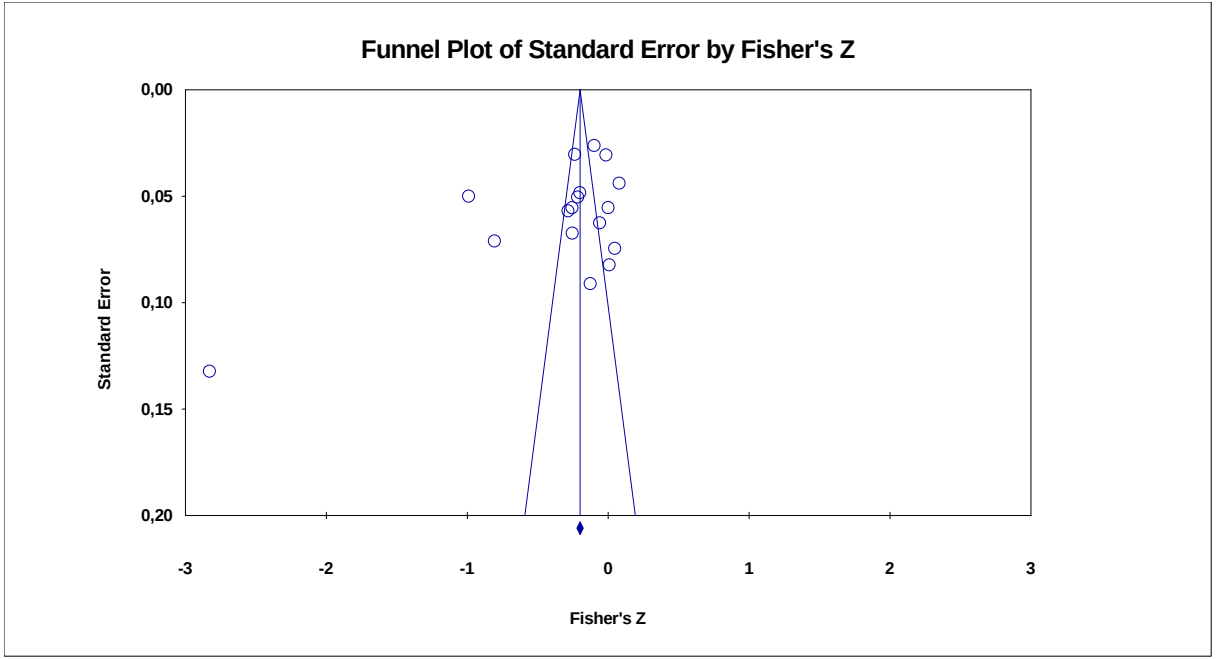
Appendix 1. Funnel Plot of Honesty-Humility and Behavioral Addictions



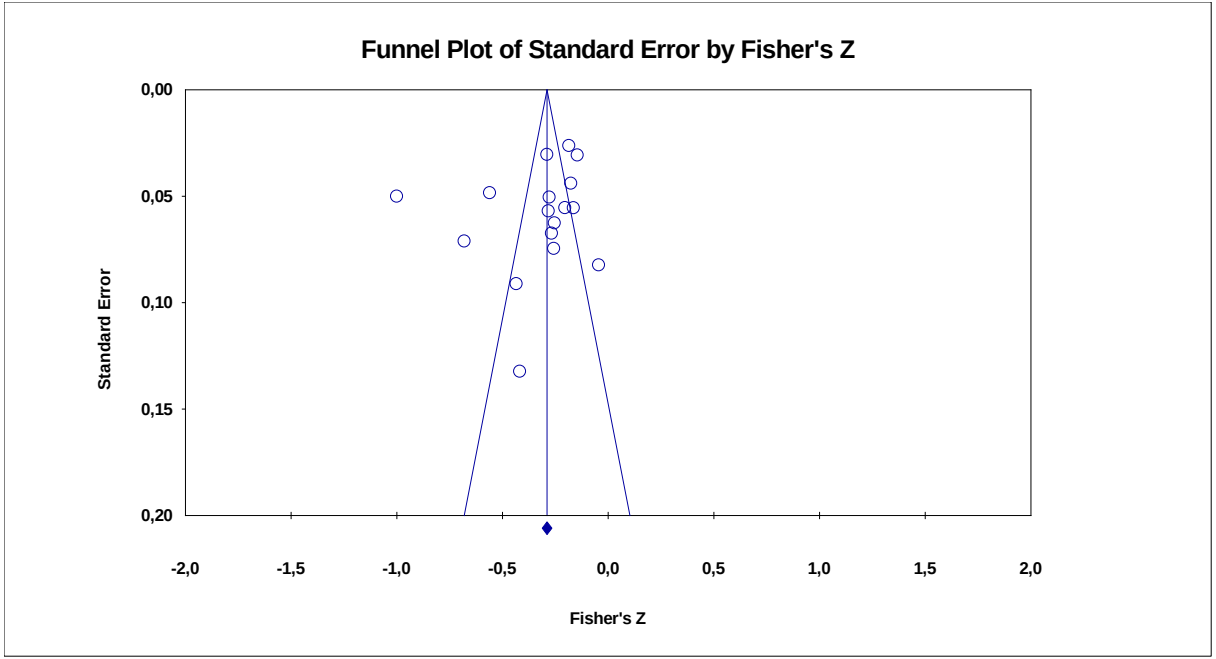
Appendix 2. Funnel Plot of Emotionality and Behavioral Addictions



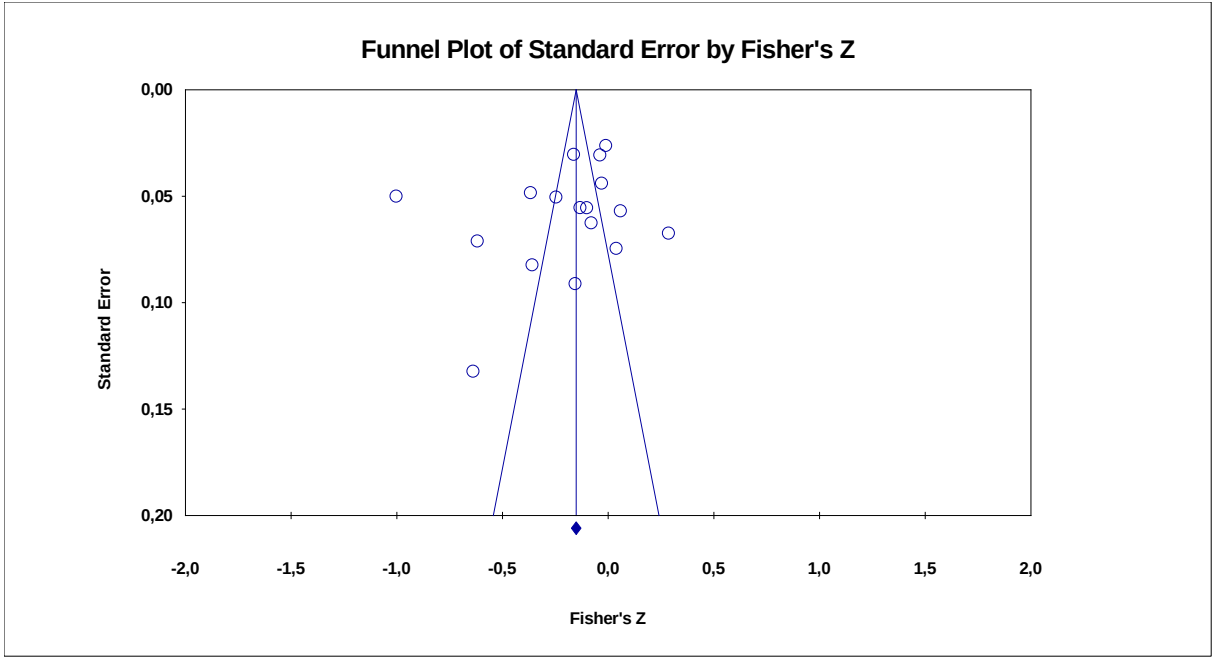
Appendix 3. Funnel Plot of eXtraversion and Behavioral Addictions



Appendix 4. Funnel Plot of Agreeableness and Behavioral Addictions



Appendix 5. Funnel Plot of Conscientiousness and Behavioral Addictions



Appendix 6. Funnel Plot of Openness to Experience and Behavioral Addictions