

## Is Fear of Missing Out Related to Neuroticism? A Meta-Analysis Study

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**Abstract.** The observation of the progress made in studying “fear of missing out” is interesting, specifically with a focus on analyzing the possible existence of a strong correlation between the concept and the antecedents widely involved in most of these studies such as neuroticism. This meta-analysis was conducted to measure the correlation between neuroticism and fear of missing out by considering the size of the effect. The process involved using 13,685 participants from 23 eligible studies as samples. The results showed that neuroticism was positively correlated to fear of missing out at a moderate strength as indicated by  $r = .369$  and 95% CI (.29, .44). Similar results were also found for adolescents and emerging adulthood groups (95% CI [.272, .460]) as well as the common group and workers (95% CI [.249, .488]). Moreover, the heterogeneity test showed good significance, the distribution of scores was considered symmetrical except in adolescents and emerging adulthood, and no publication bias was detected. The moderate level of correlation reported showed the possibility of involving neuroticism as an antecedent of fear of missing out. However, the effect could become stronger when it was involved with other external antecedents.

**Keywords:** fear of missing out, neuroticism, meta-analysis

## Apakah *Fear of Missing Out* Benar Terkait dengan Neurotisisme? Sebuah Studi Metaanalisis

**Abstrak.** Perkembangan riset-riset *fear of missing out* menarik untuk dicermati, terutama untuk melihat apakah anteseden seperti neurotisisme yang telah banyak dilibatkan dalam berbagai riset *fear of missing out* benar-benar memiliki korelasi yang kuat. Tujuan dari riset meta-analisis ini adalah untuk mengukur korelasi neurotisisme dan *fear of missing out* dengan mempertimbangkan *effect size*. Sampel dalam penelitian ini memiliki total sebanyak 13,685 orang yang berasal dari 23 studi yang memenuhi persyaratan untuk diolah. Temuan studi ini menunjukkan bahwa neurotisisme secara positif berkorelasi dengan *fear of missing out* dengan kekuatan korelasi di level moderat sebesar  $r = .369$  dan 95% CI (.29, .44). Hasil yang sama juga ditemukan ketika meta-analisis dilakukan lebih kepada kelompok remaja dan *emerging adulthood* (95% CI [.272, .460]) serta pada kelompok umum dan pekerja (95% CI [.249, .488]). Tes heterogenitas memperlihatkan signifikansi yang baik. Sebaran skor juga dianggap simetris, kecuali pada kelompok remaja dan *emerging adulthood*, serta tidak ada bias publikasi. Dengan level korelasi yang moderat, neurotisisme bisa saja tetap dilibatkan sebagai salah satu anteseden *fear of missing out*. Namun demikian pengaruhnya mungkin menjadi lebih kuat saat disandingkan dengan anteseden lain yang sifatnya eksternal.

**Kata Kunci:** *fear of missing out*, metaanalisis, neurotisisme

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Fear of missing out is increasingly being investigated in different psychological and other social humanities studies due to its rapid growth in the field of cyberpsychology. It has been identified to be closely related to the existence of social media and the rapid development of current forms of communication (Barry & Wong, 2020a; Przybylski et al., 2013). Several studies already established that the concept was responsible for the increasing usage of social media, the emergence of internet and social media addiction, decreasing well-being, and several other psychological problems (Akbari et al., 2021; Fioravanti et al., 2021; Gioia et al., 2021; Hayran & Anik, 2021; Tandon, Dhir, Almgren, et al., 2021).

Fear of missing out was defined as the desire to continuously connect with the activities of others (Przybylski et al., 2013). It was observed to be existing among the groups of adolescents and emerging adulthood (Barry & Wong, 2020a) with a tendency to diminish with age (Przybylski et al., 2013). The concept has also been discovered to be a day-to-day phenomenon because it is related to the use of smartphones and social media to communicate with others (Barry & Wong, 2020a; Servidio et al., 2021; Wu-Ouyang, 2022).

Fear of missing out was connected to several social domains as its antecedent (Barry & Wong, 2020a; Przybylski et al., 2013). However, internal factors such as personality traits appear in several studies as one of the

crucial factors majorly influencing the concept. One of these personality traits was found to be neuroticism (Alt & Boniel-Nissim, 2018; Balta et al., 2020; Blackwell et al., 2017; Hadlington et al., 2020; Rozgonjuk et al., 2021).

Neuroticism was discovered to be closely related to the use of social media (Bowden-Green et al., 2021), including the phenomena and problems existing in cyberspace. A previous study also showed that the concept promoted individuals to develop online social interactions using social media (Hughes et al., 2012). This was found to be in accordance with the argument of (Eysenck, 1991) that neuroticism was related to anxiety. The concept was further related to the fear of missing out as an expression of anxiety in the context of online interactions (Przybylski et al., 2013; Tandon, Dhir, Almgren, et al., 2021) as well as the fear of an individual from being socially excluded (Blackwell et al., 2017).

Neuroticism was also linked to the satisfaction of basic needs by several studies (Bratko et al., 2022; Sulea et al., 2015), specifically concerning the unique relationships between individuals in cyberspace (Roberts & David, 2019). The fundamental study on the fear of missing out by (Przybylski et al., 2013) showed that the concept was not only strongly related to social media but also the satisfaction of basic needs, individual mood, and life fulfillment. An example of the basic need satisfaction found to be the most sought-after by individuals and with the

potential to cause fear of missing out was the need for relatedness (Beyens et al., 2016; Przybylski et al., 2013). This is the reason it is unsurprising that when individuals are increasingly worried about being left behind by information related to the exciting experiences of colleagues on social media, these individuals feel left out and their needs of relatedness are not fulfilled, thereby becoming more intensely involved in the fear of missing out.

Fear of missing out is a common variable existing among social media users. The concept has also been identified as one of the main interesting issues to understand among the groups of adolescents that place great importance on social relations on social media (Dumas et al., 2023; Kostiaë et al., 2022). Technology users were initially observed to include individuals not familiar with the issue of fear of missing out but the increase in the intense use of technology and social media, even in the world of work, made workers vulnerable to the concept (Budnick et al., 2020). Therefore, it is pertinent to conduct a meta-analysis both from the perspective of the whole users and different groups of people.

There is a shift in the development of the fear of missing out on the concept as indicated by its exploration as an antecedent (Elhai et al., 2021). Several related studies targeted the fear of missing out as a result and consequence, and also associated with social media use and abuse (Fioravanti et al., 2021; Zhang et al., 2021), and internet use (Akbari et

al., 2021). Therefore, this meta-analysis study was conducted to provide new information on other causes of fear of missing out by involving internal variables such as personality, unlike the previous studies that focused on external variables. An attempt was made to fill the existing gap by examining neuroticism as an antecedent of fear of missing out.

This meta-analysis was used to evaluate the correlation between these concepts and determine the effect size. It also aimed to explore how the correlation persists while accounting for different sources of variance, assess the strength of the correlation, examine the heterogeneity, symmetry, or asymmetry in the distribution of scores, and identify any potential publication bias.

## Method

### Protocol design

This meta-analysis study focused on summarizing different studies conducted on neuroticism and fear of missing out up to 2022. The process involved identifying, screening, and determining the eligibility of relevant studies based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis or PRISMA 2020 from (Page et al., 2021).

### Search strategy

A comprehensive effort was made to search for relevant articles using electronic databases such as Elsevier, SAGE, Taylor and Francis, EBSCO, Springer, and Google Scholar.

The keywords used for the search include “fear of missing out”, “personality”, and “neuroticism” with a focus on the studies conducted from 2016 to 2022.

### **Inclusion criteria**

The search was based on the criteria that the studies (1) were quantitative, (2) used neuroticism as the independent variable and fear of missing out as the dependent variable, (3) participants used social media to increase the possibility of experiencing fear of missing out, (4) participants were both global and in Indonesian settings, and (5) the study was written in English and Indonesian languages.

### **Exclusion criteria**

Several articles were excluded from the meta-analysis because they were (1) letters to editors, (2) meta-analytical studies with the same theme and have been published, (3) undergraduate thesis studies, and (4) literature without clearly traceable sources of publication. Additional considerations such as unclear outcomes were also referred to in the final-level screening to determine the eligibility of the studies to be used.

### **Data collection and analysis**

A search and screening process was conducted starting from the modification of the keywords in source databases and registers. The studies found were independently selected, after which final decisions were made on those to be included based on the inclusion criteria

and other key conditions clearly stated such as the existence of a correlation coefficient or other statistical results that could be converted into correlation coefficients, and the number of participants in each study.

### **Data extraction**

Data were extracted independently based on pre-defined criteria, including those considered to be the core.

### **Statistical analysis**

Each article selected was reviewed to determine the correlation coefficient and the number of participants. The articles that used statistical findings in the form of a score such as  $F$ ,  $d$ ,  $t$ , or  $R^2$  were converted to an  $r$  score. This was followed by the calculation of the effect size ( $z$ ), variance ( $Vz$ ), and standard error ( $SEz$ ) using JASP. Moreover, the heterogeneity test, summary effect size, forest plot, funnel plot, Egger’s test, and fail-safe  $N$  test were conducted.

## **Results**

This meta-analysis study was conducted to evaluate the correlation between neuroticism and fear of missing out with due consideration for the size of the effect. The screening results in Table 1 showed that all the groups of participants in the studies analyzed were basically social media users. However, these groups include all age ranges except children, the youths, emerging adulthood, as well as those based on professions such as

students and workers. The results also showed some studies did not indicate the mean age of the participants but this was not a problem as it was not required in the statistical meta-analysis. Most studies were observed to use the scale designed by (Przybylski et al., 2013) to measure the fear of missing out while different methods were applied to evaluate neuroticism due to the availability of Big Five measurement instruments. Moreover, the studies were discovered to be conducted in several countries and almost all continents were represented.

The keyword searches and other criteria used in the meta-analysis were observed to have led to the discovery of 29 articles. The removal of the duplicates and the consideration of the inclusion and exclusion criteria reduced the number to 23 from 17 journals and these were found to be eligible for review. The total number of participants in these studies was 13,685 people, including 3,507

for teenagers and emerging adults as well as 10,178 for common group and workers, as indicated in Figure 1.

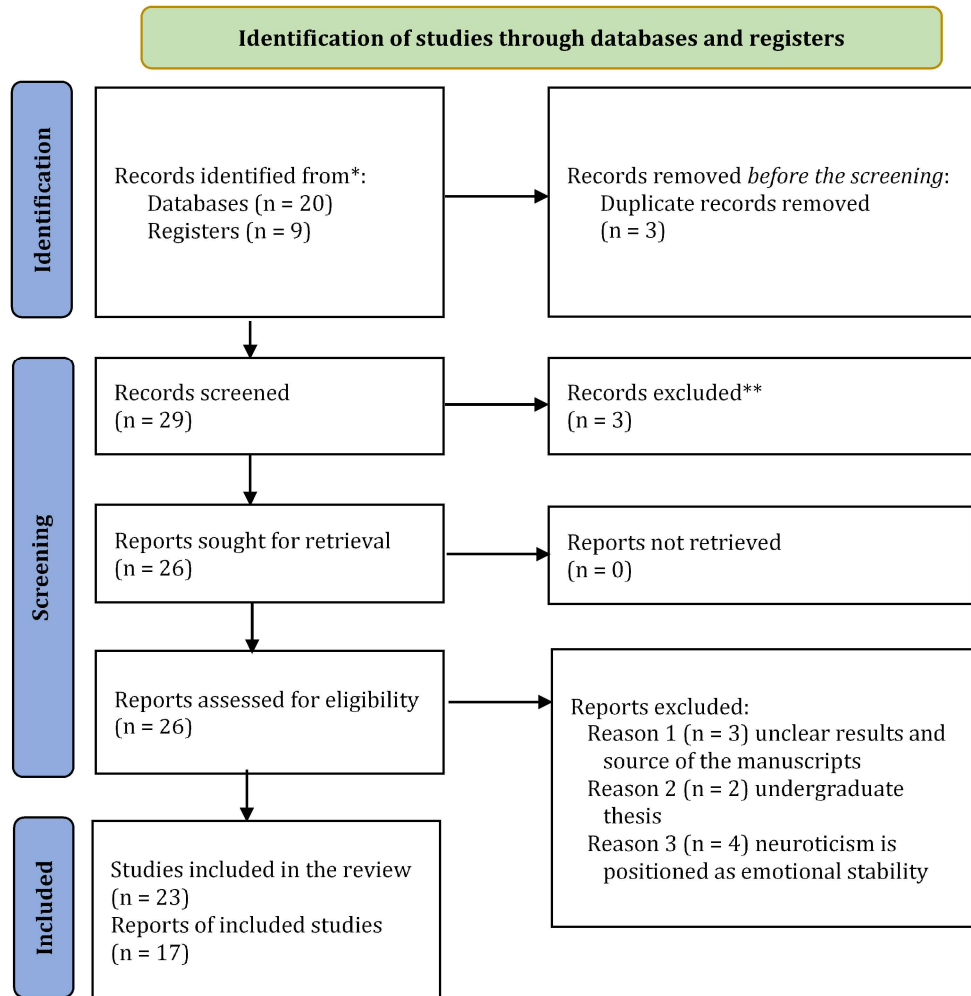
The *Q* statistics were used to test the heterogeneity and the results are presented in the following Table 2. Moreover, the studies analyzed included those conducted on adolescents and emerging adulthood participants as the vulnerable group as well as those focused on the general group with a much wider age range such as workers as indicated in Table 1. For the entire sample, it was discovered that all 23 studies were heterogeneous ( $Q = 240.432, p < .01$ ) and this means the random effects model was more suitable to estimate the mean effect size. The 12 studies analyzed for the group of adolescents and emerging adulthood were also found to be heterogeneous ( $Q = 66.534, p < .01$ ) and the same trend was recorded for the 11 studies on the general group and workers ( $Q = 167.567, p < .01$ ).

**Table 1***Characteristics of the Studies Included*

Study	Sample Size	Age (M)	Participants	Neuroticism scale	Fear of missing out scale	National setting
(Alt & Boniel-Nissim, 2018)	359	48.38	Social media users	Maraun (1997)	Przybylski et al. (2013)	Israel
(Angesti & Oriza, 2018).	182	23.05	Emerging adulthood	Ramdhani (2012)	Przybylski et al. (2013)	Indonesia
(Ashiru et al., 2022)	375	-	Social media users	Moore and Craciun (2020)	Good and Hyman (2020)	Nigeria
(Astuti, 2021)	65	-	Adolescents	Ramdhani (2012)	Przybylski et al. (2013)	Indonesia
(Balta et al., 2020) - study 1	423	17.15	Adolescents	Bacanli et al. (2009)	Wegmann et al. (2017)	Turkey
(Balta et al., 2020) - study 2	423	17.5	Adolescents	Bacanli et al. (2009)	Wegmann et al. (2017)	Turkey
(Blackwell et al., 2017)	207	22.15	College students	John and Srivastava (1999)	Przybylski et al. (2013)	USA
(Budnick et al., 2020)	324	34.55	Workers	Ramdhani (2012)	Przybylski et al. (2013)	USA
(Christina et al., 2019)	110	-	Adolescents	Ramdhani (2012)	Przybylski et al. (2013)	Indonesia
(Fauzi et al., 2021) - study 1	210	21.60	Adolescents	Donellan et al. (2006)	Przybylski et al. (2013)	Malaysia
(Fauzi et al., 2021) - study 2	210	21.60	Adolescents	Donellan et al. (2006)	Przybylski et al. (2013)	Malaysia
(Hadlington & Scase, 2018)	630	41.41	Common group	John and Srivastava (1999)	Przybylski et al. (2013)	United Kingdom
(Hadlington et al., 2020)	718	38.87	Common group	John and Srivastava (1999)	Przybylski et al. (2013)	United Kingdom
(Hidayati et al., 2021)	204	-	Social media users	Ramdhani (2012)	Przybylski et al. (2013)	Indonesia
(Liftiah et al., 2016) - study 1	643	-	College students	John et al. (1991)	Przybylski et al. (2013)	Indonesia
(Liftiah et al., 2016) - study 2	14	-	College students	John et al. (1991)	Przybylski et al. (2013)	Indonesia
(Müller et al., 2021) - study 1	414	33.60	Common group	Rammstedt and Danner (2017)	Przybylski et al. (2013)	Germany, Austria, Switzerland
(Müller et al., 2021) - study 2	414	33.60	Common group	Rammstedt and Danner (2017)	Przybylski et al. (2013)	Germany, Austria, Switzerland
(Rozgonjuk et al., 2021) - study 1	3370	32.50	Common group	Rammstedt and Danner (2017)	Spitzer (2015)	Germany
(Rozgonjuk et al., 2021) - study 2	2120	-	Common group	Rammstedt and Danner (2017)	Spitzer (2015)	Germany
(Rozgonjuk et al., 2021) - study 3	1250	-	Common group	Rammstedt and Danner (2017)	Spitzer (2015)	Germany
(Sindermann et al., 2021)	377	21.64	Social media users	Sindermann et al. (2018)	Xie et al. (2013)	China
(Tresnawati, 2016)	643	-	College students	Ramdhani (2012)	Przybylski et al. (2013)	Indonesia

**Figur 1**

*PRISMA for the Screening Process*



**Table 2**

*Fixed and Random Effects*

Categories	Test	Q	df
All sample	Omnibus test of Model Coefficients	94.655	1
	Test of Residual Heterogeneity	240.432	22
Adolescents & emerging adulthood	Omnibus test of Model Coefficients	58.452	1
	Test of Residual Heterogeneity	66.534	11
Common group & workers	Omnibus test of Model Coefficients	36.690	1
	Test of Residual Heterogeneity	167.567	10

*Note.*  $p < .001$

The random effects analysis conducted was observed to have shown a significant positive correlation between neuroticism and fear of missing out ( $z = 9.729$ ;  $p < .01$ ; 95% CI [.295, .444]) as presented in Table 3. The relationship between the two concepts was found to be at a  $r$  of .369. Similarly, adolescents and emerging adulthood ( $z = 7.645$ ;  $p < .01$ ; 95% CI [.272, .469]) had an  $r$  of .366 and the general group and workers ( $z = 6.057$ ;  $p < .01$ ; 95% CI

[.249, .488]) had .368. These scores were classified as moderate (Cohen, 1988).

The forest plot in Figure 2 showed different magnitudes of effect sizes. Most studies were discovered to have an effect size with strong significance and the smallest score was recorded to be  $z = 0.05$  at 95% CI (-.05, .15) while the largest was  $z = 0.82$  at 95% CI (.72, .91). Meanwhile, the summary effect size was found to be 0.37 at 95% CI (.29, .44).

**Table 3**

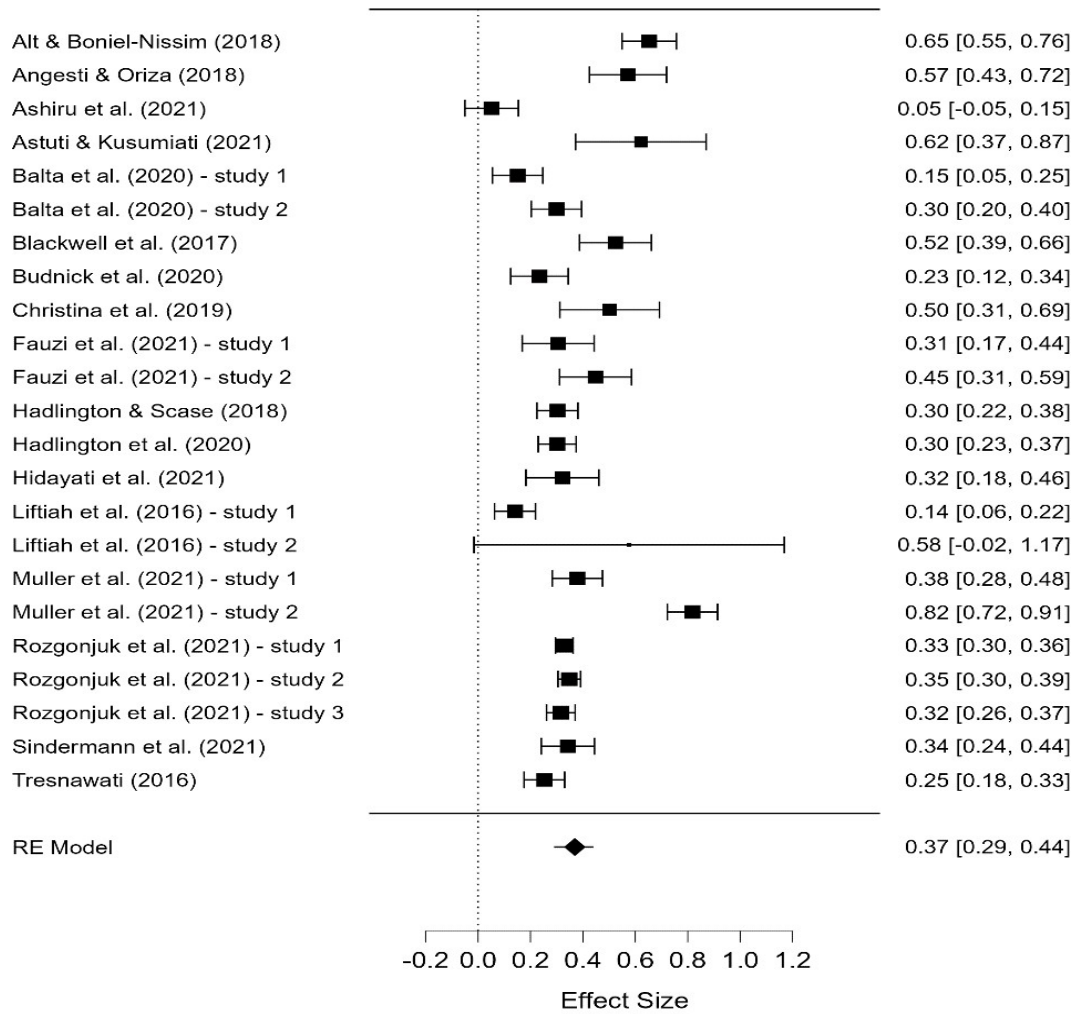
*Coefficients*

	Estimate	SE	z	p	95% CI	
					LL	UL
All sample	.369	.038	9.729	< .001	.295	.444
Adolescents & emerging adulthood	.366	.048	7.645	< .001	.272	.460
Common group & workers	.368	.061	6.057	< .001	.249	.488

Note. Wald test

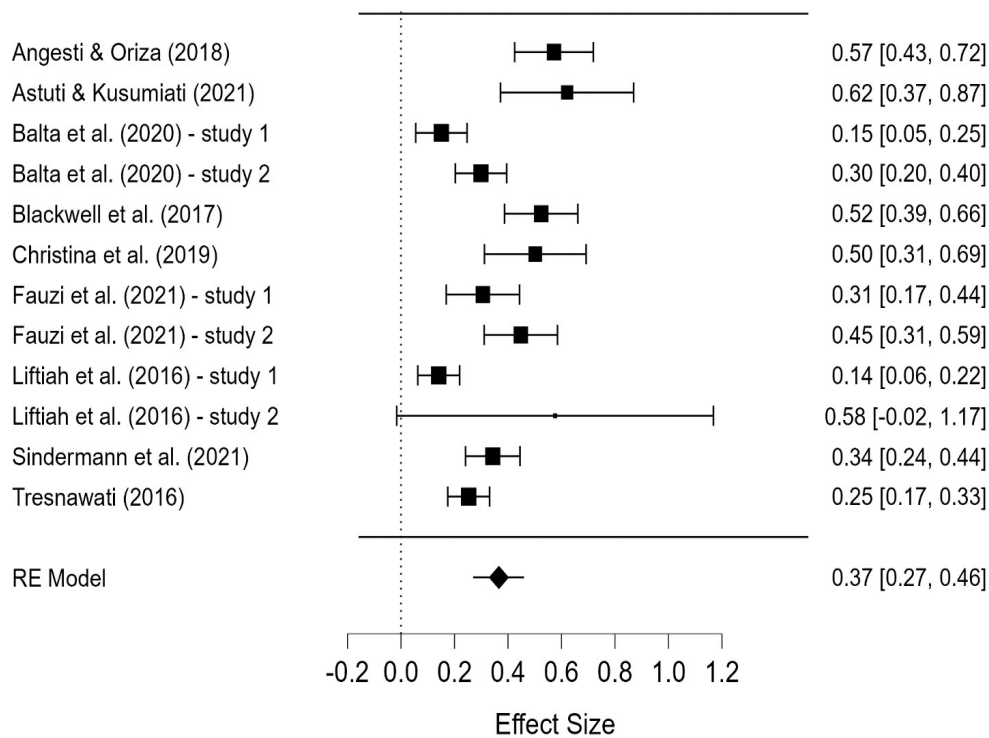


**Figure 2**  
*Forest Plot for All Samples*



**Figure 3**

*Forest Plot for Adolescents and Emerging Adulthood*

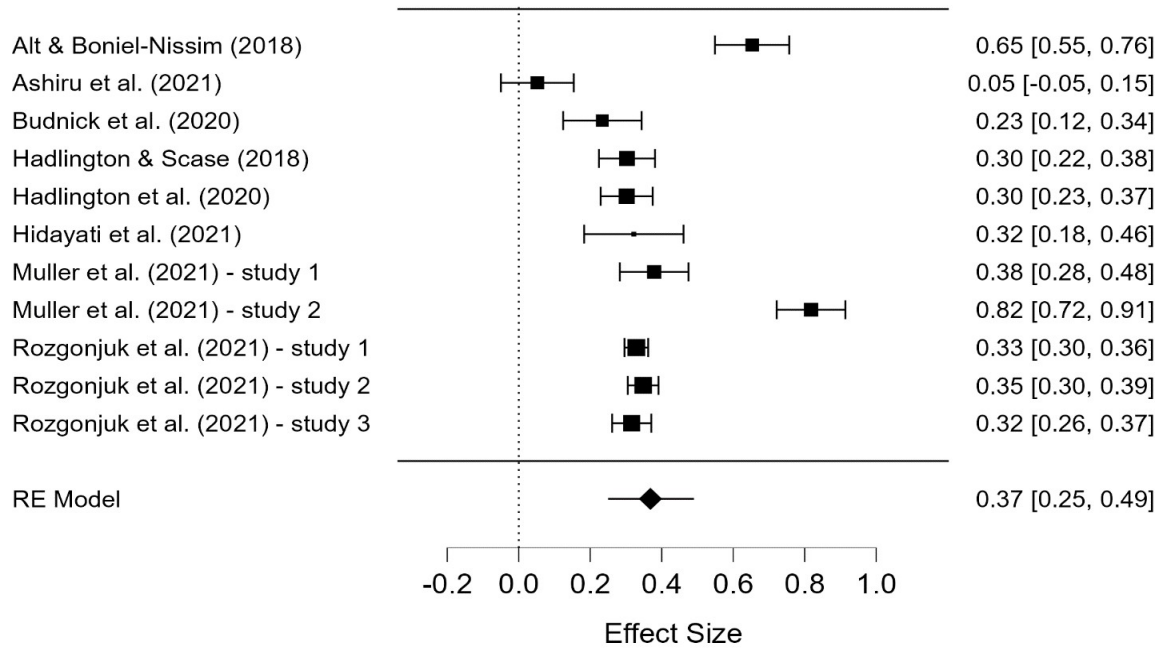


The forest plot in Figure 3 was observed to show a strong significance of effect size for adolescents and emerging adulthood groups with the smallest score recorded to be  $z = 0.15$  at 95% CI (.05, .35) while the largest was  $z = 0.62$  at 95% CI (.37, .87). The summary effect size was 0.37 at 95% CI (.27, .46). Moreover,

the forest plot in Figure 4 showed a strong significant effect size for the general and worker groups with the smallest score found to be  $z = 0.05$  at 95% CI (-.05, .15) and the largest was  $z = 0.82$  at 95% CI (.72, .91). The summary effect size was 0.37 at 95% CI (.25, .49).

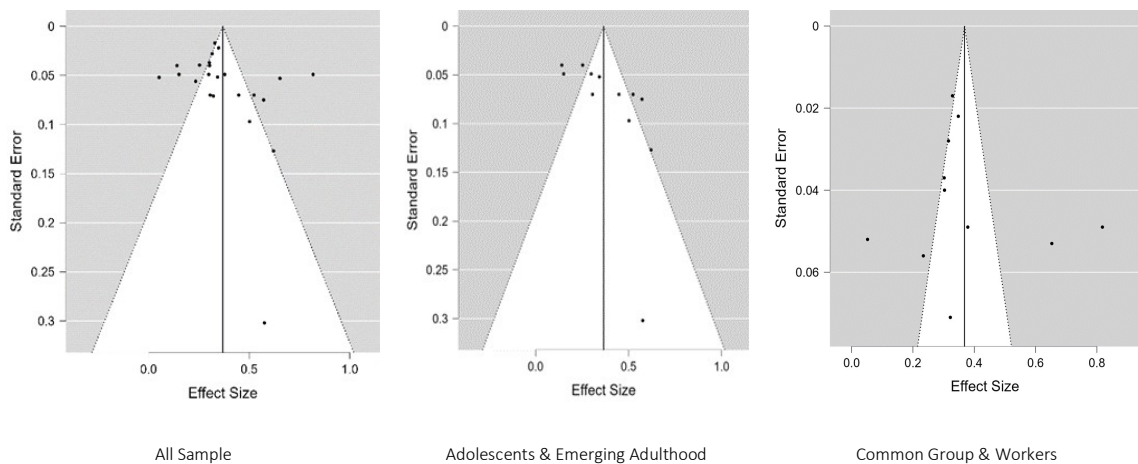
**Figure 4**

*Forest Plot for Common Group and Workers*



**Figure 5**

*Funnel Plot*



The publication bias was evaluated next and the first aspect involved using the funnel plot in Figure 5 to determine the symmetry of the scores' distribution. This was necessary because symmetrical distribution indicated a lack of publication bias. However, the inability to determine the condition of some scores'

distribution led to the introduction of other techniques to evaluate the publication bias.

The Egger's test was conducted and the results presented in Table 4 showed that  $z = 1.677$  ( $p > .05$ ). This means the distribution of scores for all samples concerning the relationship between neuroticism and fear of

missing out was symmetrical. A similar trend was also recorded for common group and workers as indicated by  $z = 0.253$  ( $p > .05$ ) while

the distribution of scores for adolescents and emerging adulthood group was considered asymmetric ( $z = 2.752$ ,  $p < .05$ ).

**Table 4**

*Regression test for Funnel plot asymmetry ("Egger's test")*

	z	p
All sample	1.677	.093
Adolescents & emerging adulthood	2.752	.006
Common group & workers	0.253	.800

**Table 5**

*File Drawer Analysis for Rosenthal's Formula*

	Fail-safe N	Target Significance
All sample	10,946	.050
Adolescents & emerging adulthood	1,478	.050
Common group & workers	4,353	.050

*Note.  $p < .001$*

Fail-safe N was conducted to ensure further certainty on publication bias and the results showed a score of 10,949 ( $p < .01$ ) in Table 5 which was greater than  $5K + 10 = 240$ . Meanwhile, the score for the group of adolescents and emerging adults was found to be 1,478 ( $p < .01$ ) which was greater than  $5K + 10 = 70$ . The common group and workers were recorded to have 4,353 ( $p < .01$ ) which was also greater than  $5K + 10 = 65$ . This means that there was no publication bias in the meta-analysis of the studies on the relationship between neuroticism and fear of missing out for all the sample groups.

## Discussion

The meta-analysis showed that there was a relationship between neuroticism and fear of missing out in all sample groups with moderate

levels of closeness. Another intriguing discovery was that the effect size for adolescents and emerging adulthood group was higher compared to the common group and workers, even though they were all at the same level. ON the contrary, the estimated correlation showed an opposite trend and this means the fear of missing out concept was not solely limited to teenagers and college students but could be experienced by individuals of all age groups and from diverse backgrounds (Barry & Wong, 2020b).

The intense use of social media by all age groups and professions was observed to have the potential to promote individuals to engage in fear of missing out (Barry & Wong, 2020b; Budnick et al, 2020; Fridchay & Reizer, 2022). This assumption certainly needs to be studied further because the difference

recorded during the comparison of the effect sizes was linked to the variation in the number of samples in the two groups. Moreover, the fear of missing out concept was proved to be quite strong due to internal factors such as neuroticism. This was due to the ability of the personality type to promote intense involvement of individuals in the usage of social media, specifically to satisfy their curiosity about the activities of others and to gather information related to exciting experiences (Milyavskaya et al, 2018; Roberts & David, 2019).

The relationship between neuroticism and fear of missing out was found to be moderate after calculating the effect size. This further confirmed the findings of previous studies that neuroticism was the antecedent most frequently involved in the process of analyzing the fear of missing out. The trend showed that the concept was not only the most popular but also the antecedents with the strongest relationship.

The meta-analysis applied to the overall group was observed to have shown similar results for both adolescents and emerging adulthood as well as the common people and workers group. This was indicated by the moderate influence of neuroticism on the fear of missing out. The trend showed that neuroticism played a significant role in influencing the fear of missing out among social media users, even though there were shifts in context and behavioral background related to

social relations in general or the field of work (Tandon, Dhir, Talwar, et al., 2021).

This meta-analysis study was observed to have certain limitations such as the inability to include some studies considered to have good characteristics because neuroticism was positioned in its positive form of emotional stability. These studies were discovered to involve a large sample and also targeted vulnerable groups such as college students and emerging adulthood (Chi et al, 2022; Moore & Craciun, 2021; Stead & Bibby, 2017). This change led to negative correlations with subsequent effects on the meta-analysis calculations, specifically in determining the summary size effect and confidence interval.

## **Conclusion**

In conclusion, neuroticism was correlated with the fear of missing out at a moderate level. This result confirmed neuroticism as a positive antecedent to the fear of missing out and also served as an argument for further study on neuroticism and the fear of missing out in a constellation of study models. Moreover, neuroticism was found to be the psychological trait highly correlated with the fear of missing out compared to other traits in the Big Five concepts. This indicated future study should not solely depend on personality as a determining factor for the development of specific behaviors in relation to human-computer interactions, such as the fear of missing out

## Suggestion

The scope of study on the fear of missing out can be broadened by including participants beyond just teenagers and students, which typically represent the general perception of this phenomenon. It is crucial to consider workers for more extensive and comprehensive investigations, specifically within industrial and organizational contexts, to gain a deeper understanding of the fear of missing out from this perspective.

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- \* Articles used for meta-analysis



Received 6 November 2022  
Revised 31 May 2023  
Accepted 28 July 2023

