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The Corellation Between Emotional Intelligence and Academic Achievement: A Meta Analysis Study

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Abstract: Meta-Analysis : The Correlation between Emotional Intelligence and Academic Achievement. Until now, there have been many studies related to the relationship between emotional intelligence and academic achievement; However, there are different representations or conclusions regarding the research results. Therefore, this study aims to thoroughly determine the effect of emotional intelligence and academic achievement using a meta-analysis approach. This study analyzed 20 Scupus indexed studies with a sample of 5737 people. To support the accuracy of the analysis results, JASP software is used. The results of the study found that the combined effect size values generated using the random-effect model estimation were (M=0.29) with a standard error (SEM=0.08). This effect size belongs to the small effect category. These findings provide a solid theoretical foundation to improve students' academic achievement in the future.

Keywords: Academic Achievement, Emotional Intelligence, Meta-Analisys.

Abstrak: Hubungan Antara Kecerdasan Emosional dan Prestasi Akademik. *Sampai saat ini telah banyak dilakukan penelitian terkait hubungan antara kecerdasan emosional dengan prestasi akedemik; Namun, ada representasi atau kesimpulan yang berbeda mengenai hasil penelitian. Oleh karena itu, penelitian ini bertujuan untuk mengetahui secara menyeluruh pengaruh kecerdasan emosional dan prestasi akademik menggunakan pendekatan meta-analisis. Studi ini menganalisis 20 studi yang terindeks Scupus dengan sampel 5737 orang. Untuk mendukung keakuratan hasil analisis digunakan software JASP. Hasil penelitian menemukan bahwa nilai nilai effect size gabungan yang dihasilkan menggunakan estimasi model random-effect adalah (M=0,29) dengan standar error (SEM=0,08). Ukuran efek ini termasuk dalam kategori efek kecil. Temuan ini memberikan landasan teoritis yang kuat untuk meningkatkan prestasi akademik siswa di masa depan.*

Kata kunci: *Prestasi Akademik, Kecerdasan Emosional, Meta-Analisis*

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INTRODUCTION

Academic achievement or performance by students in educational centers is a key goal in the development of all educational programs. Academic achievement has been commonly measured through continuous exams or evaluations, with a general consensus about the most important aspects to evaluate, such as skills, and declarative and procedural knowledge (Ward et al., 1996). Although there is no common agreement for the evaluation of Academic achievement, measures of cognitive skills or declarative knowledge are the main factors evaluated (Perera & DiGiacomo, 2013), and the most commonly used indicators to measure Academic achievement are usually: Grade Performance Academic, Achievement Test, Grade Average (Perera & DiGiacomo, 2013). Currently, there are several lines of research analyzing individual non-cognitive factors that enhance academic achievement, which requires a broader educational model that integrates personal and contextual factors (Gutman & Schoon, 2013). Other non-cognitive skills include attitudes, motivation, personality traits, self-regulation, resilience, and social and emotional skills, which are beyond the academic skills that determine successful performance (Bowles and Gintis, 2007). Similarly, personal factors such as motivation and emotional self-regulation in the classroom are associated with school performance. students who are more motivated and have greater skills to manage emotions to obtain higher academic qualifications (Pintrich and de Groot, 1990).

One of the factors considered to increase achievement is emotional intelligence (Costa & Faria, 2015; Dewi et al., 2016; Fallahzade, 2011; Ferrando et al., 2011; Joibari & Mohammadtaheri, 2011; Mohzan et al., 2013; Ramana & Devi, 2018; Stankovskaet al., 2018; Wijekoon et al., 2017). Emotional Intelligence (EI) generally has the same understanding from several experts, namely the ability or skill of a person to recognize and respond to emotions appropriately, motivate, empathize, and control oneself and others (Chinyere & Afeez, 2019; Mansir & Karim, 2020 ; Ngui & Lay, 2020; Pekaar et al., 2020; Perry et al., 2020; Wood, 2020). The concept of emotional intelligence has been an area of interest for a long time (Astetke, 2018; Fatum, 2008; Garg et al., 2016; James et al., 2012; Salovey & Grewal, 2005) among psychologists as well as educators. Although a relatively new concept, emotional intelligence dates back to the time of Darwin, who theorized that emotional expression is an indispensable form of survival and that emotions have a biological purpose when they alert the body when things go wrong and its needs are met. An outline of emotional intelligence was first built in the literature related to the work of Salovey and Mayer (1990), discussing a psychological framework that focuses on individual differences in emotional aptitude and they define the term as "the ability to monitor one's own and other's feelings and emotions, to discriminate between among them and use this information to guide one's thinking and actions" (Salovey & Mayer, 1990). Goleman (1995), who popularized the term, suggested that emotional intelligence can, in some ways, be much more powerful than intellectual intelligence (IQ).), and after reviewing related studies, he concluded that "the best IQ accounts for about 20 percent of the factors that determine life success, which leaves 80 percent for other forces" (Goleman, 1995).

Low emotional intelligence experiences stress levels with high acculturation and procrastination so that it can allow students to achieve their achievements, and cannot manage emotions at higher levels (Fteiha & Awwad, 2020; Prentice et al., 2020; Tam et al. , 2021). Emotional intelligence is not merely an innate trait

but can be improved and developed through coaching (Nayar et al., 2020). To achieve academic potential, students need to develop strong emotional or mental skills in facing challenges in order to become better (Jan & Anwar, 2019; MacCann et al., 2019). Therefore, someone's emotional intelligence, the better their academic achievement and the better the person is in recognizing and managing their emotions (Chinyere & Afeez, 2019). The interpretation of the body of literature suggests that emotional intelligence has been proposed as a significant factor for success in several respects. Thus, the educational systems necessarily should focus on the issues such as promoting the well-being and emotional skills of students. In this sense, additional training programs for teachers as well as policy makers should be integrated to the curricula so that the educators can instil into their students' mind how to feel empathy with someone, how to sustain positive attitudes, how to be motivated despite outer pressure, how to be aware of their own emotions and manage them, how to promote self-awareness, how to be social and how to create better relationships with others.

Many studies have examined the relationship between emotional intelligence and academic achievement. However, previous research based on these theoretical assumptions has yielded mixed results. Research conducted by (Fallahzadeh., 2011; Lotfi et al., 2012; Wurf & Croft., 2015; Zhoc et al., 2018; Ugwuanyi et al., 2020) shows that emotional intelligence has a positive and significant effect on academic achievement. Meanwhile, research conducted by Suleman et al (2019) in Pakistan and Ningsih (2020) in Indonesia found different results, namely there was no positive and significant relationship between emotional intelligence and academic achievement. The results of different studies on the same topic of course lead to conclusions on questions that can be subjective. Thus, it is necessary to conduct a meta-analysis study to integrate quantitative findings so that the analyzed sample becomes larger and the results of data analysis are accurate (Schmidt & Hunter, 2015; Retnawati et al., 2018). Meta-analyses calculate effect sizes and combine them in objective formulas, thereby increasing the likelihood that different readers will arrive at the same conclusion (Schmidt & Hunter, 2015). Meta-analyses can answer questions not offered in one study, such as whether sample size affects study results. Meta-analysis can also be other variables that can affect the main inter-relationship (Retnawati et al., 2018).

A meta-analysis that questioned the effect of emotional intelligence on students' academic achievement in general was conducted by Alvarez et al. (2020), Ganesan & Padmanaban (2018), Carolyn et al. (2020), and Manimozhi & Srinivasan (2018). They found that emotional intelligence affects students' academic achievement. However, these findings are tentative due to the limited inclusion criteria and scope of the search. Furthermore, in Indonesia, a meta-analysis study on the relationship between emotional intelligence and student academic achievement was conducted by Wullur & Maramis (2018). However, the results of statistical analysis in this study did not show a suitable estimation model based on the heterogeneity test. Therefore, this research will complement the previous research and will focus on more stringent inclusion criteria. Moreover, the current study is unique in that it provides a holistic view to academics and other stakeholders involved in the education system on the topic. Thus, it is estimated that this study will be helpful both in theory and application throughout the educational process. In this context, this study aims to find answers to the following questions: What is the effect of emotional intelligence on

academic achievement?

METHODS

Research design

This study uses a meta-analysis method by reviewing several articles in national and international journals. The aim of this study is to statistically evaluate the findings of a primary study that examines the relationship between emotional intelligence and Mathematics achievement of students in Indonesia from 2011 to 2021. The meta-analysis provides an overall evaluation with statistical analysis of quantitative data obtained in independent studies on the subject. (Cleophas & Zwinderman, 2017; GLASS, 1976; & Schwarzer et al., 2015). In general, the stages of meta-analysis in this study followed Borenstein et al. (2009) namely; 1) Determine the inclusion criteria for the research being analyzed. 2) The procedure for collecting empirical data and coding the research variables. 3) Statistical techniques.

Inclusion criteria

All research articles in the initial search were examined and assessed for further meta-analysis. The inclusion criteria used to screen publications of research results are:

1. The year of publication ranges from 2011 to 2021.
2. Main article must be Scopus indexed
3. Associated with emotional intelligence and Academic achievement.
4. Each article has a minimum sample of 50 students.
5. Articles are required to report data on the value of the correlation coefficient (r) or the coefficient of determination which shows the magnitude of the influence of the emotional intelligence variable on academic achievement.

Data Collection and Coding

The primary data in this study is in the form of research on the relationship between emotional intelligence and learning achievement. Data can be obtained from online databases such as Google Scholar, SCOPUS, Education Resources Information Center (ERIC), Elsevier. Keywords used in searching the research literature such as "the relationship between emotional intelligence and learning achievement. Coding in this study is needed to facilitate the author in conducting data analysis. The components in the coding are information on the year of research, author, sample size (N), correlation coefficient (r), coefficient of determination, country, and type of scopus.

Statistic analysis

The meta-analysis in this study is a meta-correlation analysis. The analysis used is statistical analysis. In simple terms, data analysis is carried out in several stages, namely: First, is to do a study selection, this is about finding articles that are relevant to the objectives of the meta-analysis. Second, is to convert data that still has a value of F or t to the value of r. Third, heterogeneity testing, this is done to determine whether the analysis uses a random effect model or fix model. If it is heterogeneous, then the analysis uses random effect models. Analysis through the forest plot is also done to clarify conclusions. Fourth is by conducting publication analysis bias. The analysis is carried out with the help of JASP software. The meta-statistical correlation analysis schema used in this article consists of several steps, namely: (1) correlation coefficient; (2) transformation r to z; (3) heterogeneity test; (4) count of summary effects; (5) conversion of results to r; (6) interpretation; (7) reporting.

In order to interpret effect sizes, the scale which was suggested by Thalheimar and Cook (2002). According to the scale, the classification of the effect sizes are as follows: Effect size between -0.15 and 0.15 (no effect), Effect size between 0.15 and 0.40 (low effect), Effect size

between 0.40 and 0.75 (medium effect), Effect size between 0.75 and 1.10 (high effect), Effect size between 1.10 and 1.45 (very high effect), Effect size 1.45 or more (amazing effect).

■ RESULT AND DISCUSSIONS

Overview of Primary Studies

After filtering the literature based on the inclusion criteria set by the researcher, 20 independent samples were obtained from 18 main studies indexed by Scopus. according to Hunter & Schmidt (2004) articles that can be carried out for a meta-analysis of at least ten primary studies. Table 1 presents a summary of studies included in the meta-analysis consisting of year of study, author, effect size (r), sample size (N), country, and type of scope. the correlation value of each study ranged from -0.13 to 0.88. there were five one (n=1) in 201, two studies (n=2) in 2012, two studies (n=2) in 2013, five studies (n=5) in 2015, two studies (n= 2) in 2016, two studies (n=2) in 2017, one study (n=1) in 2018, three studies (n=3) in 2019, and two studies (n=2) in 2020 The articles that meet the criteria in this study are found in Iran (n=4) study, Malaysia (n=1) study, England (n=2) study, Italy (n=1) study, Australia (n=1) study, Indonesia (n=1) study, India (n=1) study, America (n=1) study, Ireland (n=1) study, Hong Kong (n=1) study, Canada (n=1) study, South Africa(n=1) study, China (n=1) study, Pakistan(n=2) study. by type of scopus, there are five (n=5) Scopus not quartile, one (n=1) Scopus Q4, one (n=1) Scopus Q3, four (n=4) Scopus Q2, and nine (n=9) Scopus Q1.

Effect size of each study

In the meta-correlation analysis, after all studies get an "r" value, the r value is then transformed into an effect size (Retnawati et al,

Table 1. Characteristics of Research Samples that Meet Inclusion Criteria

No	Tahun	Author	Sample Size	r	Country	Scopus
1	2011	Fallahzadeh, H	272	0,06	Iran	Not Quartile
2	2012	Lotfi, K. L et al studi a	400	0,53	Iran	Not Quartile
3	2012	Lotfi, K. L et al studi b	93	0,10	Iran	Not Quartile
4	2013	Mohzan, M. A. M et al	82	0,07	Malaysia	Not Quartile
5	2013	Chew, B. H et al	265	0,08	Malaysia	Q1
6	2015	Tariq, V. N et al studi a	100	0,73	Inggris	Q2
7	2015	Tariq, V. N et al studi b	100	0,07	Inggris	Q2
8	2015	Zirak, M & Ahmadian, E	223	0,14	Iran	Q4
9	2015	Fabio, A. D & Palazzeschi	337	0,11	Italia	Q1
10	2015	Wurf & Croft	186	0,88	Australia	Q1
11	2016	Noor et al	162	0,24	Indonesia	Q2
12	2016	Aithal, A. P et al	200	0,51	India	Q1
13	2017	Maguire et al	133	0,53	Ireland	Q1
14	2017	Thomas et al	725	0,29	America	Q1
15	2018	Zhoc et al	1307	0,21	Hongkong	Q1
16	2019	Suleman, Q et al	91	-0,13	Pakistan	Q1
17	2019	Jan, S. U & Anwar	141	0,18	Pakistan	Q2
18	2019	Wilson et al	277	0,01	Canada	Not Quartile
19	2020	Ugwuanyi, C. S et al	83	0,23	South Africa	Q3
20	2020	Li	560	0,02	China	Q1

2018). The calculation results show that the effect size ranges from 0.15 to 1.98. Table 2 presents the results of the recapitulation of the r value of each study that has been transformed into effect size. based on the effect size criteria according to Thalheimar and Cook (2002), there is one effect size (n=1) included in the very high effect category, one effect size (n=1) included in the high effect category, three effect sizes (n=3) included in the medium effect category, five effect sizes (n=5) were included in the low effect category, and there were ten studies (n=10) included in the negligible category (numbers 1, 3, 4, 6, 7, 8, 11, 13, 15, 18) which means that there is no significant relationship between emotional intelligence and academic achievement. The findings against these different representations will then be calculated the average value of the weighted effects of the entire study. a summary of the results of the calculation of the effect size of each study is presented in table 2 below.

Heterogeneity Test

The heterogeneity test was conducted to prove whether the effect sizes of each study were different. In addition, heterogeneity test results were carried out to determine the model to be used in calculating the summary effect. The heterogeneity test can be carried out by various methods, in this article the heterogeneity test is carried out with the parameter Q with degrees of freedom (df): 20-1 = 19. The results of the analysis show that the value of Q is 12.811 and $p < 0.001$. So it can be concluded, the distribution of effect size in the research analyzed is heterogeneous. The degree of variation in effect size between

Table 2. Effect size and standard error of each study

No Studi	N	r	Effect Size	Varians	Standard error
1	272	0,06	0,14	0,004	0,061
2	400	0,53	0,93	0,003	0,050
3	93	0,10	0,07	0,011	0,105
4	82	0,07	0,08	0,013	0,113
5	265	0,08	0,24	0,004	0,062
6	100	0,73	0,10	0,010	0,102
7	100	0,07	0,07	0,010	0,102
8	223	0,14	0,11	0,005	0,067
9	337	0,11	0,59	0,003	0,055
10	186	0,88	0,23	0,005	0,074
11	162	0,24	0,06	0,006	0,079
12	200	0,51	0,56	0,005	0,071
13	133	0,53	-0,13	0,008	0,088
14	725	0,29	0,18	0,001	0,037
15	1307	0,21	0,02	0,001	0,028
16	91	-0,13	1,38	0,011	0,107
17	141	0,18	0,30	0,007	0,085
18	277	0,01	0,01	0,004	0,060
19	83	0,23	0,58	0,013	0,112
20	560	0,02	0,21	0,002	0,042

studies is reflected in the I-Squared value (I^2 = 97.063) which indicates that 92% of the observed effect size reflects the percentage variability due to true heterogeneity. Thus, this study has a high heterogeneity value due to I^2 e" 75% (Mullen et al., 2001). Therefore, a random effects model was used to calculate the combined effect size. Table 3 presents a summary of heterogeneity tests.

Table 3. Fixed and Random Effects

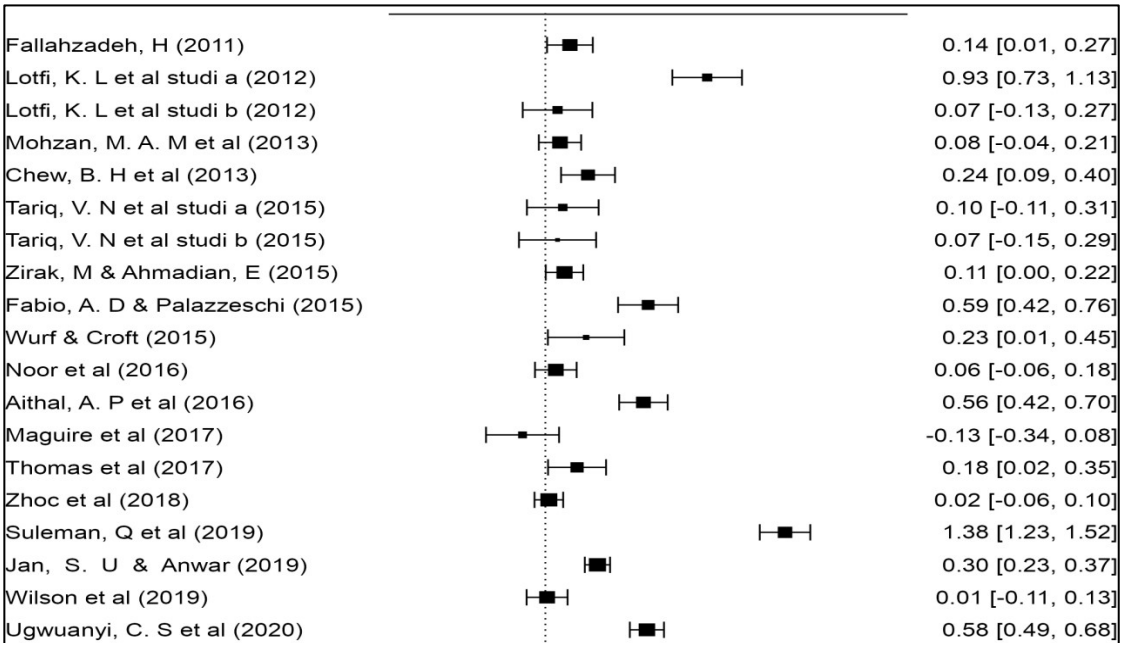
	Q	Df	P	I^2
Omnibus test of Model Coefficients	12.811	1	< 0.001	97.063
Test of Residual Heterogeneity	450.695	19	< 0.001	

Summary Effect-Size With Random Effect Model

To calculate summary effects with the random effects model, the effect average (M) must be determined. Table 4 presents the results of the calculation of the average weighted effect (M) = 0.288. This effect size belongs to the small effect category (Thalheimar and Cook, 2002), while the confidence interval values for M are as follows: lower limit value (LLM) = 0.130 while upper limit value (ULM) = 0.455. So the confidence interval value for M ranges from 0.130 to 0.455. While Figure 2 presents the average value of effect sizes, both for each study and as a whole. To find out whether the hypothesis is accepted or not, the p value of the output coefficient can be seen. Here is a plot of the summary effect and output coefficient count:

Tabel 4. Coefficient Estimation Using Random-Effect Model

	M	SE_M	Z	P	95 % Confidence Interval	
					Lower Limit	Upper Limit
Estimasi	0.65	0.08	3.579	< 0.001	0.130	0.455



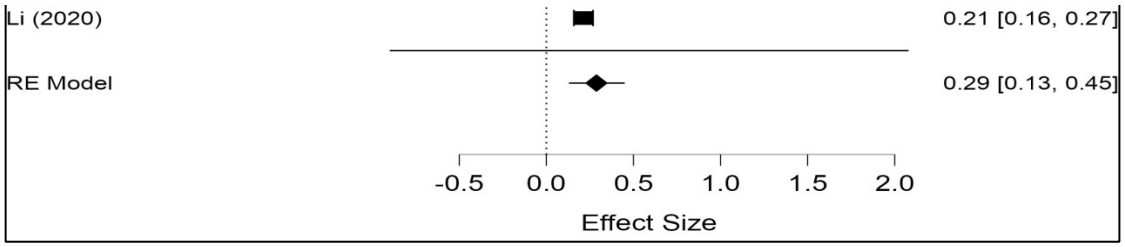


Figure 1. Forest Plot Random Effect Model

Based on the output coefficient above, it can be seen that the p value < 0.01. Because p value < 0.01, it can be concluded that there is a significant relationship between emotional intelligence and academic achievement. The effect size correlation value based on the output above is 0.29 with a confidence interval of 0.13 to 0.46. This shows that the relationship between emotional intelligence and academic achievement. these findings are in line with a meta-analysis study conducted by MacCann et al. (2020) also provide supporting and strong evidence for this assumption. In their study, MacCann et al. (2020) and colleagues examined 158 studies with 42,529 participants from different cultures and found that, regardless of age, individuals with higher emotional intelligence had higher scores and test scores than others. The researchers concluded that students who developed high levels of emotional intelligence could handle unexpected and adverse situations and emotions, which could trigger failure, better than students with lower emotional intelligence scores. This connotes that those with higher emotional intelligence are generally good at adapting to their environment, coping with social pressures around them, releasing themselves from frustration, anxiety, excitement etc, and creating healthy relationships with others, all of which provide far-reaching opportunities. better to be successful in life. Similarly, there are many other studies that verify the positive and significant correlation between emotional intelligence and academic achievement (Chew et al, 2013; Lotfi et al., 2012; Fallahzade, 2011; Fabio & Palazzeschi, 2015; Aithal et, 2016; Mohzan et al., 2013; Ramana & Devi, 2018; Stankovskaet al., 2018; Ugwuanyi, et al., 2020).

On the other hand, a meta-analysis that examines the relationship between emotional intelligence and academic achievement by Ranjbar et al. (2017) in their meta-analysis reported weak correlations between variables among Iranian university students. The researchers state that the education system in the country focuses more on memorization and learning skills than on personal abilities such as emotional intelligence and this could be a point for reverse findings. Similarly, Meshkat's (2011) study, which was conducted among college students, also revealed a non-significant relationship between emotional intelligence and academic success. Overall, although some studies have revealed a non-significant relationship between these two variables, common assumptions and important findings in the literature emphasize the idea that individuals who manage to understand and direct their emotions efficiently are much more successful both in school and in their social environment. Although the role of intelligence and learning ability cannot be ignored and ignored, the role played by emotional intelligence has a great influence on success in life. As MacCann (2019) emphasizes, being smart and working hard, alone, is not enough for success, students still need the ability to recognize and manage their own emotions and those of others.

These findings have several implications for research and application contexts. The school setting is one of the most important contexts for

learning emotional skills and competencies (Zeidner and Matthews, 2016). EI training improves other related issues, as well as improves performance. Developing emotional skills in the early stages of adolescence (Herrera et al., 2020), will enable them to become a consolidated personal resource to deal with risk and promote success-oriented motivation and academic well-being. To that end, this review review provides relevant information for the development of programs focused on improving emotional skills in students, as well as providing tools for teachers and counselors, providing an empirical basis for the development of a theoretical achievement-oriented educational model. In the research area, this meta-analysis provides information about which future studies should be conducted, helping to clarify the different EI concepts and evaluation steps. Future studies need to replicate these findings with a larger sample and more different measures of EI, including variables that may affect academic achievement.

The current meta-analysis is subject to some limitations. First of all, during the selection process of articles, the correlation coefficient was setas a criterion index for the effect size and accordingly several of the studies were eliminated as they did not pose the required data. Extending the research criteria, and thus increasing the number of studies involved in the analysis would yield to present a far more reliable holistic view and a confident generalization regarding the link in question. Further, in order to hold a view of the association in terms of cultural and regional differences, future research could emphasize on the comparison of thefindings that gathered from multiple settings.

Evaluation of Publication Bias

The last step is to detect publication bias. Examine the issue of publication bias in this study using the funnel plot and File-Safe N method. Based on the investigation using JASP software, the funnel plot presented in Figure 3 below was obtained.

The results of the analysis show that the effect size distribution is not completely symmetrical around the vertical line, so it is

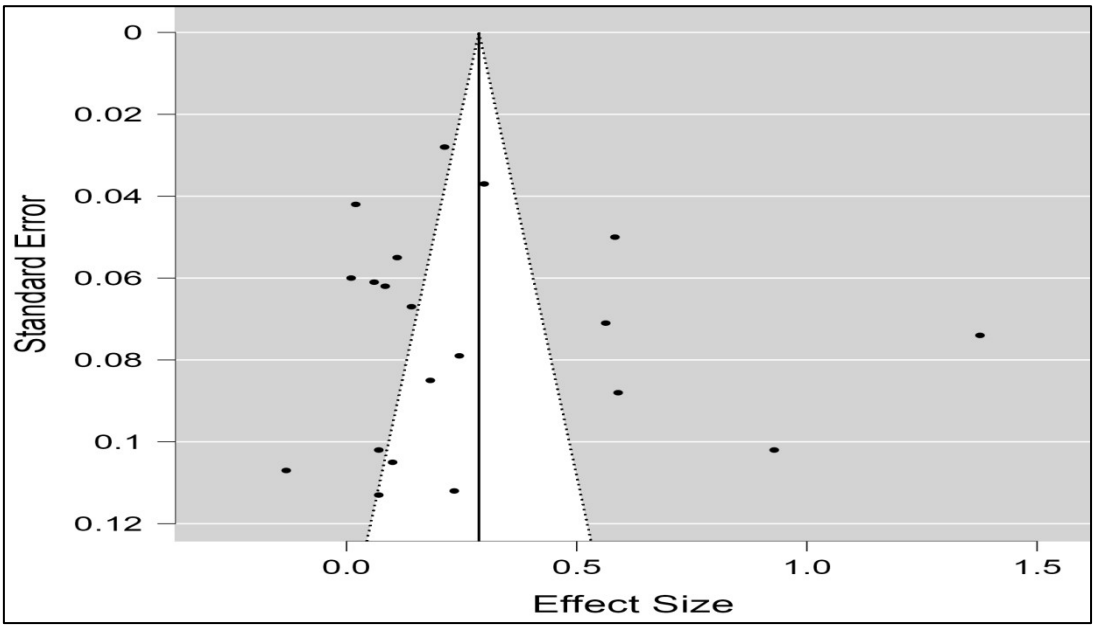


Figure 2. Funnel Plot Random Effect Model

continued by using Rosenthal's fail-safe N (FSN) approach. The following is a diagnosis of Rosenthal's fail-safe N values using JASP software which is shown in Table 5 below.

Table 5. Fail-Safe N

File Drawer Analysis			
	Fail-safe N	Target Significance	Observed Significance
Rosenthal	2660	0.05	< 0.001

Based on table 4, because the value of K = 20 then 5K + 10 = 110. The Fail-Safe N value obtained is (FSN = 2660) with a target significance (á = 0.05) and p < 0.001. As the File-Safe N value > (5K + 10), this indicates that the meta-analysis conducted has no problem of publication bias and is scientifically justified.

CONCLUSIONS

Based on the results of the research above, it can be concluded that emotional intelligence has a positive effect on academic achievement with an effect size of 0.29 (Small Effect). This shows that the higher the increase in emotional intelligence variables will have an impact on increasing academic achievement. In addition, problems related to the confusing strength of the correlation between emotional intelligence and academic achievement intelligence variables based on various literatures (some are in the low to high category) become clear after a meta-analysis is carried out, namely the small category.

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