

## **The Religious Cognition: A Meta-Analysis Study of Indonesian Students' Religious Learning Achievement**

**Wiwin Mistiani**

**State Islamic University Datokarama, Palu, Indonesia**  
[wiwinm@uindatokarama.ac.id](mailto:wiwinm@uindatokarama.ac.id)

### **ARTICLE INFO**

#### **Article History:**

Received :

Revised :

Accepted :

#### **Keyword:**

Cognitive

Religion.

Meta-Analysis.

### **ABSTRACT**

The large number of published studies related to religious learning achievement in the cognitive domain certainly raises questions in the minds of research users, especially if the conclusions produced vary from one study to another. Therefore, to find out the average of students' religious learning achievement in Indonesia on the cognitive aspect, it is necessary to carry out a meta-analysis. The meta-analysis in this study aims to determine the average effect size of the aggregate Islamic learning achievement of students in Indonesia. This research uses a quantitative approach using meta-analysis. Research data was collected from various studies including journal articles, theses and student theses from 2009-2019 which were obtained through internet searches using the keyword Islamic learning achievement. The results of the research show that the average *Islamic learning achievement of Indonesian students* is 83.00 with a standard error of the weighted random model of 1.526 with a combined average score of 80.05 and an upper limit of 85.95. This shows that the ability/achievement in learning the Islamic religion of Indonesian students at the elementary to middle school levels has exceeded the minimum completeness, namely 75. Based on the Regression Method and Trim and Fill analysis, it was found that there was no publication bias. So the conclusions made based on *the random effect model* regarding the average cognitive abilities of students are valid.

### **ABSTRAK**

Banyaknya penelitian-penelitian yang telah dipublikasikan terkait dengan prestasi belajar Agama pada ranah kognitif tentunya menimbulkan pertanyaan dalam benak pengguna penelitian, terlebih jika kesimpulan yang dihasilkan berbeda-

#### **Kata Kunci:**

Kognitif

Agama  
Meta analisis

beda antara satu penelitian dengan penelitian lainya oleh karena itu, untuk mengetahui rata -rata prestasi belajar agama siswa Indonesia pada aspek kognitif maka perlu dilakukan analisis meta. Meta Analisis pada studi ini bertujuan untuk mengetahui rerata effect size agregat prestasi belajar Agama Islam peserta didik di Indonesia. Penelitian ini menggunakan pendekatan kuantitative dengan menggunakan analisis meta. Data penelitian dikumpulkan dari berbagai studi baik dari artikel jurnal, Skripsi dan Tesis mahasiswa dari tahun 2009-2023 yang diperoleh melalui penelusuran diinternet dengan menggunakan kata kunci prestasi belajar agama Islam. Hasil penelitian menunjukan rerata *prestasi belajar Agama Islam peserta didik Indonesia* sebesar 83,00 dengan kesalahan standar rerata terbobot model acak dengan sebesar 1,526 dengan rerata skor gabungan batas bawah 80,05 dan batas atasnya 85,95. Ini menunjukan bahwa kemampuan/prestasi belajar agama islam siswa Indonesia pada tingkat Sekolah dasar hingga sekolah menengah telah melebihi ketuntasan minimal yaitu 75. Berdasarkan analisis Regression Method, dan Trim and Fill ditemukan tidak adanya bias publikasi ter. Sehingga kesimpulan yang dibuat berdasarkan dari *random effect model* tentang rata -rata kemampuan kognitif peserta didik sudah valid.

### How to Cite:

Mistian, Wiwin. (2024). The Religious Cognition: A Meta-Analysis Study of Indonesian Students' Religious Learning Achievement. *Paedagogia: Jurnal Pendidikan*, 13(1), 179-194. <https://doi.org/10.24239/pdg.Vol13.Iss1.570>.



<https://doi.org/10.24239/pdg.Vol13.Iss1.505>

This is an open access article under the CC-BY-NC license



## INTRODUCTION

Education is an integral part of development which aims to prepare students to become democratic and responsible citizens. Education also has a very important role in improving the quality of human life.<sup>1</sup> Likewise, Islamic religious education in schools, also has the aim of growing and developing faith through providing and cultivating students' knowledge, appreciation, practice and experience of the Islamic religion so that they become Muslim human beings who continue to develop in terms of faith, piety and noble morals and have noble

---

<sup>1</sup> Tsani, I "Model Evaluasi Aspek Afektif Pada Pendidikan Agama Islam Di Madrasah Aliyah Dan Pondok Pesantren". *Thesis*, UNY 2018. <https://Eprints.Uny.Ac.Id/57781/>

character.<sup>2</sup> This goal of Islamic Religious Education then becomes a benchmark for the success of religious learning<sup>3</sup>.

There are several domains or domains involved in learning achievement according to Blom's taxonomy, including the cognitive, affective and psychomotor domains.<sup>4</sup> The cognitive domain is a domain related to intellectual learning outcomes which includes six aspects, namely: knowledge or memory, understanding, application, analysis, synthesis and evaluation. The first two aspects are called low-level cognitive and the next four aspects are considered high-level cognitive.<sup>5</sup> In addition, the cognitive domain is one of the psychological domains or domains which includes every mental behaviour related to understanding, consideration, information processing, problem-solving, intentionality, and belief.<sup>6</sup>

The affective domain is an aspect of attitude which according to Krathwohl divides affective learning outcomes into five levels, namely: acceptance, participation, assessment, organization and internalization.<sup>7</sup> Hierarchically, affective learning outcomes range from the lowest and simplest level to the highest and most complex level. The domain of assessing affective learning outcomes is abilities relating to feelings, emotions, attitudes/degree of acceptance or assessment of an object. The procedure is determining the conceptual definition and operational definition. Assessing affective learning outcomes using a scale. A scale is a tool for measuring attitude, interest attention values, etc. In contrast to the affective domain, the psychomotor domain appears in the form of individual skills and ability to act. According to Sudjana, there are six levels of skills, namely: (1) reflex movements or unconscious movements, (2) basic movement skills, (3) perceptual abilities to differentiate auditory and motoric, (4) physical abilities (strength, harmony and accuracy), (5) move skills from simple to complex Islamic Religious Education and (6) abilities related to expressive and interpretive movement communication<sup>8</sup>.

According to Merdinger et. al. the cognitive domain also has a close relationship with conation (will) and affection (feelings). Because the cognitive domain is the source and controller of other domains, namely affective (attitudes)

---

<sup>2</sup> Majid, A. & Dian A. "Pendidikan Agama Islam Berbasis Kompetensi Konsep Dan Implementasi Kurikulum 2004". Bandung: PT Remaja Rosdakarya, 2004.

<sup>3</sup> El-Anzi, F.O. (2005). Academic Achievement And Its Relationship With Anxiety, Self Esteem, Optimism, And Pessimism In Kuwaiti Students. *Social Behavior And Personality* 33, No. 1 (2005): 95-104.

<sup>4</sup> Sabornie, E.J., Cullinan, D., Osborne, S.S., & Brock, L.B. "Intellectual Academic And Behavioral Functioning Of Students With High-Incidence Disabilities: A Cross-Categorical Meta-Analysis". *Council For Exceptional Children* 72, No. 1 (2005):47-63.

<sup>5</sup> Sujana, N. "Proses dan Hasil Belajar". Jakarta: Bumi Aksara. 2010.

<sup>6</sup> Trainin, G., & Swanson, H. Lee. "Cognition, Metacognition, And Achievement Of College Student With Learning Disabilities". *Learning Disability Quarterly* 28, (2005): 261-272.

<sup>7</sup> Purwanto "Evaluasi Hasil Belajar". Yogyakarta: Pustaka Pelajar. 2010.

<sup>8</sup> Sujana, N. "Proses dan Hasil Belajar" Jakarta: Bumi Aksara. 2010

and psychomotor (skills).<sup>9</sup> So it can be said that the results of learning about religion in the cognitive aspect indirectly provide an overview of Islamic religious education learning in general. Because based on previous findings, it shows that in learning, intellectual abilities play a very large role in understanding the content of the subject matter, and its application as well as absorbing the values contained in the subject matter.<sup>10</sup>

Learning achievement in the cognitive domain, at all levels, both primary and secondary education, is an interesting issue to discuss and research because it can be used as a benchmark for general learning success. So that current research, such as theses, dissertations and scientific journals, often discusses learning achievement both specifically and by linking achievement to student psychology, such as anxiety, self-esteem and optimism<sup>11</sup> and some research on the impact of using learning methods, strategies and media on increasing student learning achievement.

The large number of studies that have been published related to learning achievement in the cognitive domain of religion certainly raises questions in the minds of research users, especially if the conclusions produced vary from one study to another. Therefore, to find out the final results in the form of aggregation. From existing research, one way is to analyze the research results using meta-analysis. According to Lyons meta-analysis is a statistical procedure designed to combine the results of experimental studies and correlation results from independent studies related to a set of studies<sup>12</sup>. Apart from that, according to Retnawati, et al. Meta-analysis is used to analyze empirical research that has been carried out by previous researchers, and quantitative research results in quantitative form that can be compared, for example, mean, correlation and odd ratio. Meta-analysis needs to be carried out because of the reality that no research is free from errors, even though researchers have minimized errors in the research, for this reason, it is necessary to correct research imperfections called artefacts<sup>13</sup>. According to Hunter and Schmidt, several artefacts can be corrected in meta-analysis, including 1) sampling error, 2) measurement error in the dependent and independent variables, 3) the dichotomous nature of the dependent and independent variables, 4) range variation in dependent and independent variables; imperfect construct validity of the dependent and

---

<sup>9</sup> Merdinger, Joan, M., Hines, A.M., Osterling, K.L., & Wyatt, P. "Pathways To College For Former Foster Youth: Understanding Factors That Contribute To Educational Success". *Child Welfare League Of America* 84, (2005). 867-898

<sup>10</sup> Love, A., & Kruger, A.C. "Teacher Beliefs And Student Achievement In Urban Schools Serving African American Students". *The Journal Of Educational Research* 99, No.2 (2005): 87-98

<sup>11</sup> El-Anzi, FO, 2005

<sup>12</sup> Lyons, L.C. 'Meta-Analysis: Methods Of Accumulating Result Across Research Domains Manassas, Virginia: Portions, 2003.

<sup>13</sup> Retnawati, H., Apino, E., Kartianom, Djidu, H., & Anazifa, R. D. "Pengantar Analisis Meta". Yogyakarta, Parama Publishing, 2018

independent variables; reporting or transcription errors and variances caused by external factors.<sup>14</sup>

In meta-analysis, relevant research data is collected and then the data is converted into an effect size as a requirement for meta-analysis. The effect size is used to measure the strength of a study<sup>15</sup>. According to Borenstein, et. al (2009) effect size is a value that reflects the relationship between two variables and the size of the meta-analysis measurement unit.<sup>16</sup> Several other opinions also state that effect size is a measure of the practical meaning of research, namely the size of the relationship or difference between the independent variable and the dependent variable<sup>17 18</sup>. Effect size is also used to summarize study results in meta-analysis.

The meta-analysis used in this research is a study parameter that uses the average Islamic religious learning achievement. This is because many studies discuss meta-analysis studies that link learning achievement with other variables and only a few studies focus on analyzing the average religious learning achievement. Such as research conducted by Imam Subarkah which examined the influence of the scientific approach and Islamic learning outcomes. Therefore, the research aims to identify the average aggregate effect size of Islamic religious education learning achievement in the cognitive domain.<sup>19</sup>

### Research Methods

The approach used in this research is quantitative, namely a research approach that utilizes data in the form of numbers and is analyzed using statistical analysis<sup>20</sup>. The statistical analysis technique used in this research is meta-analysis. This meta-analysis is a special research method for combining studies whose *effect size can be measured*. The *effect size* value is used to determine Islamic Religious Education standard values in evaluating the results of independent studies with meta-analysis<sup>21</sup>. The *effect size* value also provides standardized independent study results and is evaluated based on the same criteria. The collected studies are then coded based on certain criteria. Coding is the process of extracting data from

<sup>14</sup> Hunter, J. E. & Schmidt, F.L. "Methods Of Meta-Analysis: Correcting Error And Bias In Research Findings" Newbury Park: Sage Publications. Inc. 2004.

<sup>15</sup> Kadir. "Meta-Analysis of the Effect of Learning Intervention Toward Mathematical Thinking on Research and Publication of Student". *TARBIYA: Journal of Education in Muslim Society* 4. No. 2 (2017):162-175. <https://doi.org/10.15408/tjems.v4i2.8010>.

<sup>16</sup> Borenstein, M., Hedges, L.V Higgins, J.P.T & Rothstein, Hr., "Introduction To Meta Analysis", Wiley, 2009.

<sup>17</sup> Olejnik, S., & Algina, J. (2003). "Generalized Eta And Omega Squared Statististik Measures Of Effect Size For Some Psychological Methods "8, No.4 (2003): 434-447.

<sup>18</sup> Moore, D. S "The Basic Practice Of Statistics (4 Th Ed)". New York: W.H Fereman And Co. 2007.

<sup>19</sup> Subarkah, I. "Studi Meta Analisis Pengaruh Scientific Approach dalam Meningkatkan Hasil Belajar Pendidikan Agama Islam" *Jurnal Cakrawala Kebumen, Manajemen Pendidikan Islam (MPI)* 2, No. 2 .(2018)

<sup>20</sup> Sugiyono "Metode Penelitian Pendidikan." Alfabeta, Bandung, 2011

<sup>21</sup> Mertens, D. M. "Research And Evaluation In Education And Psychology: Integrating Diversity With Quantitative, Qualitative, And Mixed Methods" Sage publications. 2014.

individual studies to obtain data that corresponds to the data being analyzed<sup>22 23</sup>. Furthermore, in meta-analysis, research uses statistical analysis in the research conducted and interpreting the findings<sup>24</sup> In this research, the meta-analysis used is a meta-analysis with averages. So *the effect size determination* is analyzed using the average and requires a mean value and standard deviation.

The data in this research is secondary data. This secondary data is in the form of relevant studies or research results as material for meta-analysis. Research data collection was carried out by searching for articles in national journals that were available online, the results of thesis research, and theses using the keywords Islamic religious learning achievement/Islamic religious cognitive abilities. The priority of the search focuses on research published in reputable national/international journals, but there is very little research on Islamic cognitive/religious learning achievement, so another search is carried out by searching through university *repositories* or *libraries* that provide theses and student theses. Even though some students' final assignments do not include the mean and standard deviation, these values can be determined using the original scores attached, but the publication year is limited to 2009-2023.

Based on the results of the data search, 40 research results were obtained relating to Islamic learning achievement. The coding criteria consist of sample information (research subject, year, type of education level publication ), then quantitative images (sample size, average Islamic religious education attainment, and standard deviation). This stage is carried out before the statistical analysis process.

After obtaining the mean and standard deviation data for each study, the next step is to transform the mean into the same scale, the result of which is *the effect size*. Due to the tendency for the range of scores in studies on religious cognitive abilities to use a scale of 1 to 100, researchers do not need to equate the scales used in each study. So the average value in each study is *the effect size*. After calculating *the effect size*, what needs to be done is to calculate *the summary effect*. In calculating aggregation, two models can be selected, namely the fixed *effect model* and the random *effect model*. To determine which model to use, a heterogeneity test is carried out. The heterogeneity test was carried out using the following equation

$$Q = \sum w_i ES_i^2 - \frac{(\sum w_i ES_i)^2}{\sum w_i}; \text{ with statistical decision-making criteria, } H_0 \text{ is}$$

---

<sup>22</sup> Çiftçi, S. K., & Yildiz, P. "The Effect of Self-Confidence on Mathematics Achievement: The Metaanalysis of Trends in International Mathematics and Science Study (TIMSS)". *International Journal of Instruction* 12, No.2, (2019): 683-694.

<sup>23</sup> Çoğaltay, N., & Karadağ, E. "Introduction to meta-analysis". In *Leadership and Organizational Outcomes* Springer, Cham. (2015): 19-28

<sup>24</sup> Pigott, T." *Advances in meta-analysis* "Springer Science & Business Media. 2012.

rejected if  $Q >$  the chi-square table. The next data analysis is to calculate *the summary effect, forest plot, funnel plot* and *publication bias values*. Either manually or using a computer program. The computer program that researchers used was the JASP 0.11.1.0 program (*freely* obtained from the page: <https://jasp-stats.org/previous-versions/>). With the help of JASP, *summary effects, forest plots* and *funnel plots will be obtained*. To detect *publication bias*, researchers used *analysis, Regression Method*, and *Trim and Fill*.

## RESULTS

Based on research results that were relevant to the study conducted by the researchers, 40 studies were obtained regarding the Islamic learning achievement of students from elementary school to middle school. From the results of this study, information was obtained about the research subject, year of publication, level of education, type of research, number of samples, and average and standard deviation of Islamic religious cognitive learning achievement. The average and standard deviation are then converted into effect size and summary effect. Due to the tendency for the average range of scores in studies on religious cognitive abilities to use a scale of 1 to 100, researchers do not need to equate the scales used in each study. So the average value in each study is *the effect size*. Meanwhile, the *Summary effect is calculated using the formula*  $SE_x = \frac{Sx}{\sqrt{N}}$ . SE search and analysis results can be seen in Table 1.

Table 1 Search for Research Results

| No | Researcher | Year | N   | Mean (ES) | elementary school | S.E  |
|----|------------|------|-----|-----------|-------------------|------|
| 1  | Study1     | 2015 | 61  | 80.13     | 3.1               | 0.40 |
| 2  | study2     | 2014 | 40  | 85.58     | 6.19              | 0.98 |
| 3  | Study3     | 2013 | 44  | 82.9      | 3.79              | 0.57 |
| 4  | Study4     | 2009 | 40  | 83.33     | 2.69              | 0.43 |
| 5  | Study5     | 2017 | 58  | 86.9      | 4.55              | 0.60 |
| 6  | Study6     | 2012 | 30  | 82.63     | 5.95              | 1.09 |
| 7  | Study7     | 2018 | 68  | 84.13     | 4.2               | 0.51 |
| 8  | Study8     | 2018 | 49  | 84.49     | 2.03              | 0.29 |
| 9  | Study9     | 2012 | 41  | 81.53     | 5.17              | 0.81 |
| 10 | Study10    | 2014 | 47  | 84.53     | 5.04              | 0.74 |
| 11 | Study11    | 2016 | 85  | 83.49     | 8.83              | 0.96 |
| 12 | Study12    | 2013 | 70  | 80.7      | 2.69              | 0.32 |
| 13 | Study13    | 2016 | 40  | 80.43     | 2.58              | 0.41 |
| 14 | Study14    | 2017 | 238 | 80.23     | 4.63              | 0.30 |
| 15 | Study15    | 2018 | 75  | 83.5      | 8.08              | 0.93 |
| 16 | Study16    | 2017 | 36  | 85.64     | 7.07              | 1.18 |
| 17 | Study17    | 2019 | 33  | 79.66     | 7.59              | 1.32 |
| 18 | Study18    | 2017 | 99  | 79.6      | 5.3               | 0.53 |
| 19 | Study19    | 2014 | 90  | 80.42     | 6.14              | 0.65 |
| 20 | Study20    | 2015 | 45  | 81.84     | 9.14              | 1.36 |
| 21 | Study21    | 2017 | 135 | 83.16     | 3.98              | 0.34 |

| No | Researcher | Year | N   | Mean<br>(ES) | elementary<br>school | S.E  |
|----|------------|------|-----|--------------|----------------------|------|
| 22 | Study22    | 2017 | 60  | 83.85        | 4.89                 | 0.63 |
| 23 | Study23    | 2017 | 88  | 80.39        | 1.8                  | 0.19 |
| 24 | Study24    | 2017 | 99  | 79.72        | 5.94                 | 0.60 |
| 25 | Study25    | 2017 | 238 | 80.23        | 4.59                 | 0.30 |
| 26 | Study26    | 2017 | 64  | 86.11        | 4.78                 | 0.60 |
| 27 | Study27    | 2018 | 270 | 87.96        | 3.07                 | 0.19 |
| 28 | Study28    | 2018 | 37  | 80.11        | 12.55                | 2.06 |
| 29 | Study29    | 2018 | 57  | 86           | 8.3                  | 1.10 |
| 30 | Study30    | 2018 | 186 | 80.78        | 2.95                 | 0.22 |
| 31 | Study31    | 2018 | 47  | 89.51        | 2.58                 | 0.38 |
| 32 | Study32    | 2018 | 82  | 82.29        | 1.35                 | 0.15 |
| 33 | Study33    | 2018 | 119 | 84.33        | 2.33                 | 0.21 |
| 34 | Study34    | 2018 | 45  | 85.31        | 1.79                 | 0.27 |
| 35 | Study35    | 2018 | 45  | 82.9         | 2.62                 | 0.39 |
| 36 | Study36    | 2019 | 242 | 86.82        | 2.05                 | 0.13 |
| 37 | Study37    | 2020 | 40  | 86.18        | 4.98                 | 0.79 |
| 38 | Study38    | 2021 | 55  | 86.15        | 4.59                 | 0.62 |
| 39 | Study39    | 2022 | 71  | 81           | 2.23                 | 0.26 |
| 40 | study 40   | 2023 | 68  | 78.53        | 2.52                 | 0.31 |

By using the new aggregate mean  $ES$  and  $SE$ , *hypothesis testing can be carried out*. Hypothesis testing aims to find out whether the data is heterogeneous/homogeneous so that it can determine the type of further analysis. The heterogeneity test was carried out using the following equation. (Retnawati, 2018).

$$Q = \sum w_i ES_i^2 - \frac{(\sum w_i ES_i)^2}{\sum w_i}$$

with statistical decision-making criteria,  $H_0$  is rejected if  $Q >$  the chi-square table.  $H_0$  here states that *the effect size* ( $\overline{ES}$ ), between homogeneous studies. With the Decision Criteria  $H_0$  is rejected if  $Q >$  Chi Square Table ( $\alpha = 0.05$ ). Based on the results of the analysis using JASP 0.111 software, the following results were obtained:

Table 3. Fixed and Random Effects

|                                    | Q         | df | p      |
|------------------------------------|-----------|----|--------|
| Omnibus test of Model Coefficients | 36624.922 | 1  | < .001 |
| Test of Residual Heterogeneity     | 3054.208  | 39 | < .001 |

*Note.*  $p$  -values are approximate.

Because the value  $Q = 3054.208$  is too large compared to the chi-square value of the table ( $\alpha = 0.05, df = 39, \chi^2 = 54.58$ )  $H_0$  is rejected so that it can be proven that *the effect size* between studies is heterogeneous. Because based on hypothesis testing *the effect size* is heterogeneous, the fixed effect model cannot be used. The recommended model is random (*random effect model*).

For analysis using a random model, the values are estimated first. Based on the results of the analysis,  $\tau^2$  the following values are obtained:  $\tau^2$

**Table 4. Residual Heterogeneity Estimates**

|           | Estimate |
|-----------|----------|
| $\tau^2$  | 7,074    |
| $\tau$    | 2,660    |
| $I^2$ (%) | 98,394   |
| $H^2$     | 62,257   |

Using Tau Square ( $\tau^2$ ) in the table is 7.074. So the *SE* (Summary Effect) value of the effect size can be calculated using the formula  $SE^* = \sqrt{V}$  While the weighted average error or  $V^*$  can be calculated using the formula  $V^* = V_{ESi} + \tau^2$ . So the new weighting variant using the random effect model can be seen in the following table:

Table 5 Tabulation of *random effect model data*

| Studies | ESi   | S*i  | V*i   | Wi*  | W*i.ESi |
|---------|-------|------|-------|------|---------|
| Study1  | 80.13 | 9.37 | 87.83 | 0.01 | 0.91    |
| study2  | 85.58 | 9.66 | 93.28 | 0.01 | 0.92    |
| Study3  | 82.9  | 9.52 | 90.60 | 0.01 | 0.91    |
| Study4  | 83.33 | 9.54 | 91.03 | 0.01 | 0.92    |
| Study5  | 86.9  | 9.73 | 94.60 | 0.01 | 0.92    |
| Study6  | 82.63 | 9.50 | 90.33 | 0.01 | 0.91    |
| Study7  | 84.13 | 9.58 | 91.83 | 0.01 | 0.92    |
| Study8  | 84.49 | 9.60 | 92.19 | 0.01 | 0.92    |
| Study9  | 81.53 | 9.45 | 89.23 | 0.01 | 0.91    |
| Study10 | 84.53 | 9.60 | 92.23 | 0.01 | 0.92    |
| Study11 | 83.49 | 9.55 | 91.19 | 0.01 | 0.92    |
| Study12 | 80.7  | 9.40 | 88.40 | 0.01 | 0.91    |
| Study13 | 80.43 | 9.39 | 88.13 | 0.01 | 0.91    |
| Study14 | 80.23 | 9.38 | 87.93 | 0.01 | 0.91    |
| Study15 | 83.5  | 9.55 | 91.20 | 0.01 | 0.92    |
| Study16 | 85.64 | 9.66 | 93.34 | 0.01 | 0.92    |
| Study17 | 79.66 | 9.35 | 87.36 | 0.01 | 0.91    |
| Study18 | 79.6  | 9.34 | 87.30 | 0.01 | 0.91    |
| Study19 | 80.42 | 9.39 | 88.12 | 0.01 | 0.91    |
| Study20 | 81.84 | 9.46 | 89.54 | 0.01 | 0.91    |
| Study21 | 83.16 | 9.53 | 90.86 | 0.01 | 0.92    |
| Study22 | 83.85 | 9.57 | 91.55 | 0.01 | 0.92    |
| Study23 | 80.39 | 9.39 | 88.09 | 0.01 | 0.91    |
| Study24 | 79.72 | 9.35 | 87.42 | 0.01 | 0.91    |
| Study25 | 80.23 | 9.38 | 87.93 | 0.01 | 0.91    |
| Study26 | 86.11 | 9.69 | 93.81 | 0.01 | 0.92    |
| Study27 | 87.96 | 9.78 | 95.66 | 0.01 | 0.92    |
| Study28 | 80.11 | 9.37 | 87.81 | 0.01 | 0.91    |
| Study29 | 86    | 9.68 | 93.70 | 0.01 | 0.92    |
| Study30 | 80.78 | 9.41 | 88.48 | 0.01 | 0.91    |

| Studies  | ESi   | S*i    | V*i   | Wi*  | W*i.ESi |
|----------|-------|--------|-------|------|---------|
| Study31  | 89.51 | 9.86   | 97.21 | 0.01 | 0.92    |
| Study32  | 82.29 | 9.49   | 89.99 | 0.01 | 0.91    |
| Study33  | 84.33 | 9.59   | 92.03 | 0.01 | 0.92    |
| Study34  | 85.31 | 9.64   | 93.01 | 0.01 | 0.92    |
| Study35  | 82.9  | 9.52   | 90.60 | 0.01 | 0.91    |
| Study36  | 86.82 | 9.72   | 94.52 | 0.01 | 0.92    |
| Study37  | 86.18 | 9.69   | 93.88 | 0.01 | 0.92    |
| Study38  | 86.15 | 9.69   | 93.85 | 0.01 | 0.92    |
| Study39  | 81    | 9.42   | 88.70 | 0.01 | 0.91    |
| study 40 | 78.53 | 9.29   | 86.23 | 0.01 | 0.91    |
| Amount   | 3323  | 24,088 | 381.1 | 0.43 | 35.69   |

Based on the random effect model data tabulation, a forest plot chart can be created as can be seen in Figure 1.

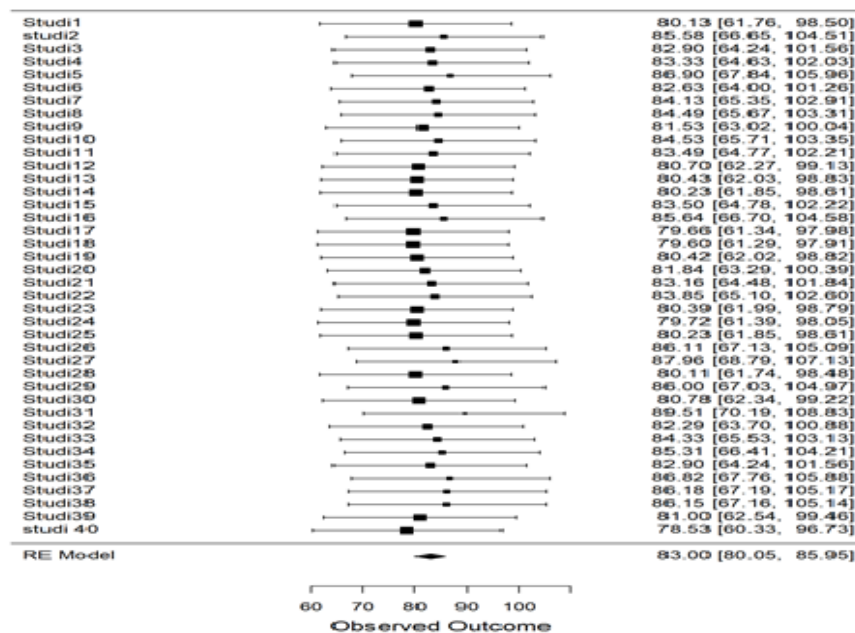


Figure 1 The Results of the Forest Plot Summary Effect

Based on table data and Figure 1, the average value of the aggregate *effect size* ( *effect size*) can be determined *Aggregate* ) or *summary effect* or weighted rarity of 83.00 with a standard error of the weighted mean of the random model of 1.526 with a standard value of the weighted mean (  $V_M$  ) =  $\frac{1}{\sum W^*} = \frac{1}{0.43} = 2.33$ . So the standard error value of the model's weighted average (  $SE_M$  ) =  $\sqrt{V_M} = \sqrt{2.33} = 1.526$ . at the 95% significance level, the upper and lower limits will be obtained at 80.05 and Islamic Religious Education at 85.95. By using the new ES and SE, hypotheses can be tested regarding the inequality of effect sizes, for example by using a score criterion of 80 using the formula  $Z = \frac{M - Mo}{SE * M} = \frac{83 - 80}{1.526} = 1.966$ . With

the  $H_0$  criterion, it is rejected if  $Z > 1.96$ . Because the value of  $Z = 1.966$  is more than the value of  $Z$ ,  $H_0$  is rejected. These results show that the average learning achievement of elementary to high school level students in Religion subjects is above 80.

Furthermore, finding indications of publication bias in research on learning achievement in the cognitive domain can be done in several ways, including carrying out analysis using the Regression Method and Trim-fill Analysis. The analysis was carried out with JASP 0.111 software with the following results:

Table 6. Regression test for Funnel plot asymmetry ("Egger's test")

|     | <b>z</b> | <b>p</b> |
|-----|----------|----------|
| sei | 1,770    | 0.077    |

In the Regression test for the Funnel plot asymmetry table ("Egger's test"), the  $z$  value in the table is the size of the regression coefficient. To test this, the  $p$ -value is compared with the value of  $\alpha = 0.05$ , if the  $p$ -value  $\geq \alpha = 0.05$  then the null hypothesis (funnel plot symmetry) or in other words there is no indication of publication bias. In the table above it is known that the value of  $p = 0.077 \geq \alpha = 0.05$  so it can be concluded that research on religious learning achievement does not indicate publication bias.

Publication bias can also be identified by looking at the results of Trim fill analysis. Trim-fill analysis is an iterative procedure to remove the most extreme small studies from the positive side of the funnel plot, recalculating the effect size at each iteration with a symmetrical funnel plot (Retnawati, et al, 2018). The key is in the forest plot image, if the research is indicated by publication bias, then the summary effect from the fixed-effect model will shift or be less than the previous summary effect (summary effect before being analyzed using the trim-fill method) and the number of research samples will increase by itself (label: filled 1, filled 2, and filled  $n$ ). On the other hand, if there is no indication of publication bias, then the summary effect from the fixed effect model will remain the same as the summary effect we obtained previously (summary effect before being analyzed using the trim-fill method) and the number of research samples will not increase. In the funnel plot image, if the research indicates publication bias, then there are open circles in the plot (missing or unpublished research that must be added) and closed circles (original research samples).

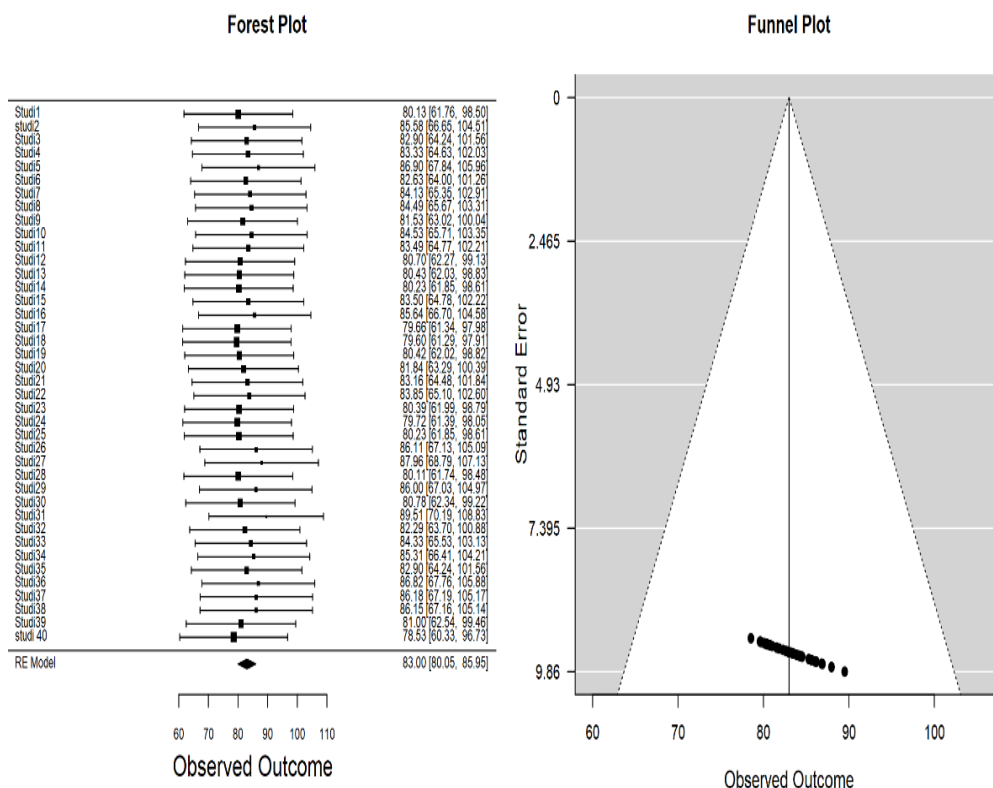
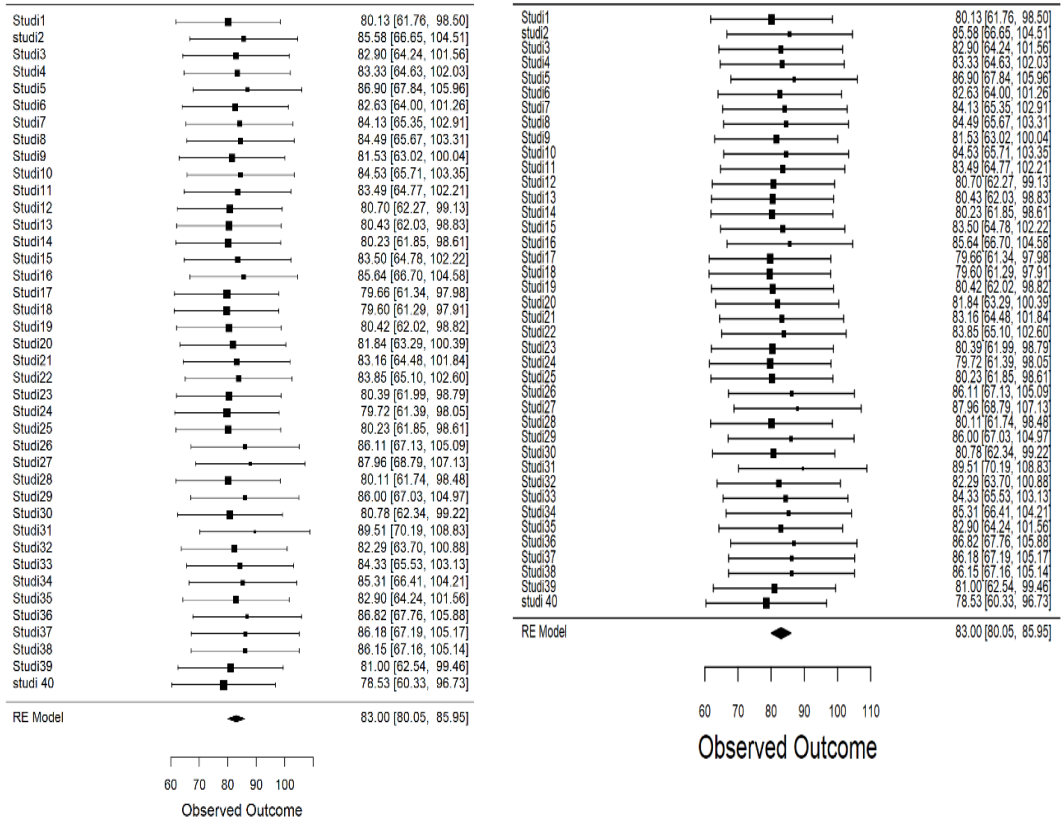


Figure 2. Trim fill analysis

In Figure 2, the forest plot in the trim fill analysis does not show any additional studies such as the labels filed 1, filed 2, etc. Meanwhile, in the funnel plot, there are no open circles (missing or unpublished research that needs to be added). So it can be concluded that research on learning achievement in the cognitive domain of religion has not detected publication bias.

This is also reinforced by the appearance of *the forest plot* before and after using the *Trim and Fill method* as presented in Figure 3. Figure 3 shows that *the summary effect* of the *fixed-effect model* before using the *Trim and Fill method* (original) is the same as *the summary effect* after using the method. *Trim and Fill*. This condition indicates that the conclusions made based on *the random effects model* regarding the average religious cognitive ability of students above 80 are valid.



(a) (b)  
Figure 4 (a) *Forest Plot Before* and (b) *Forest Plot After*  
Using the *Trim and Fill Method*

## DISCUSSION

Learning achievement in the cognitive aspect is very interesting to discuss because student learning outcomes in religious learning are often used as indicators of measures that influence a person's character and religious devotion. Based on previous findings, it shows that in learning, cognitive (intellectual) abilities play a very big role in understanding the content of the subject matter, and its application as well as absorbing the values contained in the subject matter (Love & Kruger, 2005). Based on the explanation of the results of meta-analysis research on 40 publications, the average aggregate *effect size* (*effect size*) was obtained *Aggregate* ) or *summary effect* or weighted rarity of 83.00 with a random model weighted average standard error of 1.526 with a combined average score lower limit of 80.05 and upper limit of 85.95. This shows that the Islamic religious learning abilities/achievements of Indonesian students at elementary school to high school level are in a good category and have attained a minimum completion of Islamic Religious Education, namely 75. This good religious ability in the

cognitive aspect is certainly something to be proud of. However, whether the results of this meta-analysis are publication-biased or not must be proven. Several ways can be used to detect publications according to Retnawati two of which are using the Regression test for Funnel plot asymmetry ("Egger's test") and *Trim and Fill* analysis.<sup>25</sup> The regression method was proposed by Egger, Smith, & Minder, this method aims to test the linear relationship between the estimate of the intervention effect and the standard error<sup>26</sup>. In general, the regression method is stronger than rank correlation. Based on the results of the Regression method analysis, a p-value of  $= 0.077 \geq \alpha = 0.05$  was obtained, so it can be concluded that research on religious learning achievement does not indicate publication bias. In addition, publication bias can be detected by looking at the *Trim and Fill analysis results*. In the Forest Plot Trim Fill Analysis image, it is clear that there are no added study results such as the appearance of the labels filed 1, filed 2, etc. Meanwhile, in the funnel plot, there are no open circles (missing or unpublished research that needs to be added). So it can be concluded that research on learning achievement in the cognitive domain of religion has not detected publication bias. This is also reinforced by the appearance of *the forest plot* before and after using the *Trim and Fill method* as presented in Figure 3. Figure 3 shows that *the summary effect of the fixed-effect model* before using the *Trim and Fill method* (original) is the same as *the summary effect* after using the method. *Trim and Fill*. This condition indicates that the conclusions made based on *the random effect model* regarding the average student's religious cognitive ability of 83 are valid. Therefore, it can be concluded that research on students' Islamic learning achievement in the cognitive domain is not publication-biased.

## CONCLUSION

The average ability or learning achievement of students in Islamic religious subjects in the cognitive domain is 83. The average aggregate *effect size* (*effect size*). *Aggregate*) or *summary effect* or weighted rarity of 83.00 with a random model weighted average standard error of 1.526 with a combined average score lower limit of 80.05 and upper limit of 85.95. This shows that the Islamic religious learning ability/achievement of Indonesian students at elementary school to high school level is in a good category and has attained a minimum completion of Islamic Religious Education, namely 75. Furthermore, based on the Regression Method and Trim and Fill analysis, it was found that there was no publication bias. So it can be concluded that based on a random model, research on Islamic learning achievement is declared valid (describes the real thing)

This research has limitations because there is very little information about Religious learning achievement that comes from reputable international/national

<sup>25</sup> Retnawati, Pengantar, p. 22

<sup>26</sup> Egger, M., Smith, D.G., Schneider, M., & Minder, C. Bias In Meta-Analysis Detective By Simple, Graphical Test. BMJ. No. 315 (1997). 629-634.

journals and is mostly obtained from student theses (S1). However, this research has benefits for scientific development related to the study of meta-analysis which focuses on the aggregate average of Islamic religious learning achievement. What needs to be recommended is that future research should conduct meta-analysis studies, especially regarding the relationship between religious learning outcomes and a person's behaviour and devotion to worship. Because of the current reality, many students have good grades in Religion subjects but their behavior is not good.

## REFERENCES

- Borenstein, M., Hedges, L.V Higgins, J.P.T & Rothstein, Hr., "Introduction To Meta Analysis", Wiley, 2009.
- Çiftçi, S. K., & Yildiz, P. "The Effect of Self-Confidence on Mathematics Achievement: The Metaanalysis of Trends in International Mathematics and Science Study (TIMSS)". *International Journal of Instruction* 12, No.2, (2019): 683-694.
- Çoğaltay, N., & Karadağ, E. "Introduction to meta-analysis". In *Leadership and Organizational Outcomes* Springer, Cham. (2015): 19-28
- Egger, M., Smith, D.G., Schneider, M., & Minder, C. (1997). Bias In Meta-Analysis Detective By Simple, Graphical Test. *BMJ* No.315 (1997) 629-634.
- El-Anzi, F.O. (2005). Academic Achievement And Its Relationship With Anxiety, Self Esteem, Optimism, And Pessimism In Kuwaiti Students. *Social Behavior And Personality* 33, No. 1 (2005): 95-104.
- Hunter, J. E. & Schmidt, F.L. "Methods Of Meta-Analysis: Correcting Error And Bias In Research Findings" Newbury Park: Sage Publications. Inc. 2004.
- Kadir. "Meta-Analysis of the Effect of Learning Intervention Toward Mathematical Thinking on Research and Publication of Student". *TARBIYA: Journal of Education in Muslim Society* 4. No. 2 (2017):162-175. [https:// doi:10.15408/tjems.v4i2.8010](https://doi.org/10.15408/tjems.v4i2.8010).
- Love, A., & Kruger, A.C. (2005). "Teacher Beliefs And Student Achievement In Urban Schools Serving African American Students". *The Journal Of Educational Research* 99, No.2 (2005): 87-98.
- Lyons, L.C. 'Meta-Analysis: Methods Of Accumulating Result Across Research Domains Manassas, Virginia: Portions, 2003.
- Majid, A. & Dian A. "*Pendidikan Agama Islam Berbasis Kompetensi Konsep Dan Implementasi Kurikulum 2004*". Bandung: PT Remaja Rosdakarya, 2004.

- Merdinger, Joan, M., Hines, A.M., Osterling, K.L., & Wyatt, P. "Pathways To College For Former Foster Youth: Understanding Factors That Contribute To Educational Success ". *Child Welfare League Of America* 84, (2005). 867-898
- Mertens, D. M. "*Research And Evaluation In Education And Psychology: Integrating Diversity With Quantitative, Qualitative, And Mixed Methods*" Sage publications. 2014.
- Moore, D. S "*The Basic Practice Of Statistics (4 Th Ed)*". New York: W.H Fereman And Co. 2007.
- Olejnik, S., & Algina, J. (2003). "*Generalized Eta And Omega Squared Statististik Measures Of Effect Size For Some Psychological Methods* "8, No.4 (2003) : 434-447.
- Pigott, T." *Advances in meta-analysis* "Springer Science & Business Media. 2012
- Purwanto "Evaluasi Hasil Belajar". Yogyakarta: Pustaka Pelajar. 2010.
- Retnawati, H., Apino, E., Kartianom, Djidu, H., & Anazifa, R. D. "Pengantar Analisis Meta". Yogyakarta, Parama Publishing, 2018
- Sabornie, E.J., Cullinan, D., Osborne, S.S., & Brock, L.B. "Intellectual Acade- Micy And Behavioral Functioning Of Students With High-Incidence Disabilities: A Cross-Categorical Meta-Analysis ". *Council For Exceptional Children* 72, No. 1 (2005):47-63.
- Subarkah, I."Studi Meta Analisis Pengaruh Scientific Approach dalam Meningkatkan Hasil Belajar Pendidikan Agama Islam" *Jurnal Cakrawala Kebumen, Manajemen Pendidikan Islam (MPI)* 2, No. 2 .(2018)
- Sugiyono "Metode Penelitian Pendidikan." Alfabeta, Bandung, 2011
- Sujana, N. "Proses dan Hasil Belajar" Jakarta: Bumi Aksara. 2010
- Sujana, N. "Proses dan Hasil Belajar". Jakarta: Bumi Aksara. 2010.
- Trainin, G., & Swanson, H. Lee. "Cognition, Metacognition, And Achieve- Ment Of College Student With Learning Disabilities". *Learning Disability Quarterly* 28, (2005): 261-272.
- Tsani, I "Model Evaluasi Aspek Afektif Pada Pendidikan Agama Islam Di Madrasah Aliyah Dan Pondok Pesantren". *Thesis*, UNY (2018) <https://Eprints.Uny.Ac.Id/57781/>