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Educational Outcomes of After-School Programs in Korea: A Meta-Analysis

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	Abstract
<p>Article History</p> <p>Article Submission 25 October 2022</p> <p>Revised Submission 22 December 2022</p> <p>Article Accepted 16 January 2023</p>	<p>The purpose of this study was to investigate educational outcomes of after-school programs in Korea through a meta-analysis. Twenty-three eligible primary studies were obtained through a systematic literature review. An overall effect size was computed while moderator analyses were also conducted. Meta-analyses indicated the overall effect size for all studies was 0.662. Moderator analysis showed statistically significant differences by moderating variables. This included the effect size of cognitive domain as the largest, followed by affective domain and psychomotor domain. Regarding school levels, elementary school results were higher than those of middle school and high school. For the type of research design, the effect sizes were ranked as one group, non-equivalent control group, and post-test only control group. In conclusion, findings in this research could provide resources for developing effective and efficient after-school programs with educators and school administrators since it is important to invest in the analysis and implementation of elements of after-school programs grounded in empirical evidence. Future research is needed to evaluate which characteristics in after-school programs and academic components are related toward better results.</p> <p>Keywords: After-School Programs; Educational Policy; Program Effectiveness; Outcomes of Education; Meta-Analysis</p>

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Introduction

Korea ranks near the top on overall international literacy rates (Korea Ministry of Education, 2019). Education in Korea aims to enhance each student's academic success through appropriate content and effective instructional strategies that maximize their ability as a learner. After-school programs (ASPs), also part of the broader mission of education, have often been discussed as an option for elementary and secondary students to bolster the education received in regular public education settings. Although there have been after-school, summer, and winter school activities for many years for students whose parents could afford the cost for many years it was not until 2005 that the Korean Education Ministry began funding ASPs in schools specifically for parents and children who could not afford the programs (Korea Ministry of Education & Human Resources Development, 2007). The intent was to reduce the educational gap between wealthy and poor children. Since the implementation of funded ASPs many studies in various locations across Korea have been conducted to determine their effects, but no study has been conducted to synthesize the overall effect of ASPs in elementary and secondary schools in Korea. This meta-analysis hopes to fill that gap in the research.

ASPs are defined as extra-curricular activities reflecting the students and parental educational needs during non-school hours throughout the academic year (Lewalter et al., 2021). The ASP is also a term used to integrate previously and similarly implemented various school activities such as After-School Classroom, Talent and Aptitude Education, and Leveled Supplementary Learning until 2006. After-School Classroom usually refers to child care services for students whose parents cannot care for them due to work schedules or other personal reasons. Talent and Aptitude Education programs were established to develop individual student talents and specific interests in subject areas such as language arts, mathematics, science, computer, music, art, and physical education. School districts aimed to reduce educational costs to parents from private education markets through these activities in schools. Leveled Supplementary Learning is a type of individualized instruction where each student's ability and interests are closely linked to content, instructional materials and their pace of learning. Teachers usually create student ability groups into basic, intermediate, and advanced levels.

The Korea Ministry of Education & Human Resources (2007) has developed five purposes of ASPs. First, an open enrollment host school and/or partnerships with local communities without a host school are established to provide these opportunities to students. Students from other schools are free to sign up for programs in any schools in their district. It is also possible that students work with instructors recruited from the community if they are qualified. Second, ASPs make credible educational environments through partnerships with local agencies and the local school district by providing students with various classes at a reduced rate from the private education markets. Third, more local jobs are created by ASPs hiring instructors, program coordinators, and/or administrative assistants in schools. Fourth, students living in low socio-economic status can benefit by additional support from ASPs education vouchers. This ASPs opportunities could break a cycle of poverty within a family or community. Fifth, ASPs help increase an individual's aptitude, talent, creativity, and character. The ASPs become a place for educating the whole child.

ASPs have shown tremendous progress through guidance and support of students, parents, educators, school districts, and local agencies since the introduction in 2006 (Kim et al., 2018). For example, 99.9 percent of K-12 schools nationwide run ASPs, and 71.2 percent of students within them participate in ASPs (Korea Ministry of Education, 2016). At the time the average overall satisfaction of ASPs was 80.7 out of 100. In addition, a networking website called ASPs Portal System is in operation to gather information from various sources across the nation. Students and parents can search for program availability in their area. Case studies of schools that have received honors as some of the best ASPs are featured and described with details on the portal system. In addition every school with ASP status is listed on the web portal of School Information Disclosure System featuring each schools general information such as student demographics, faculty and staff, food services, and newsletter. The After-school Program Division has now become an independent administrative unit in the Korea Ministry of Education (Park & Joo, 2012).

There exists widespread belief that ASPs serve various purposes for students including

improved cognitive, affective, and psychomotor development (Lester et al., 2020). However, ASPs have also generated controversy and other criticisms. This variation in reactions to ASPs is what motivated this meta-analysis and will be discussed further in the literature review and findings section of this paper. This meta-analysis can help to provide an up-to-date review of a growing systematic research base and provide insight into the future direction of studies on ASPs. To date no study has synthesized previous research findings related to ASPs implemented in Korea.

The former president of the World Educational Research Association, Eva Baker, emphasized the importance of ASPs and especially highlighted Korean ASPs to the worldwide audience (Baker, 2013). She asserted developing ASPs in Korea will provide a platform for activities in ASPs for many countries in an effort to help students deeply engaged in subject matter (Baker, 2013). Also, Baker (2013) proposed educators should simulate ASPs from countries such as Korea, Singapore, and Malaysia and adapt the features to their own setting. Based on an assertion and recommendation above, this study could provide information such as the importance and effects of ASPs to an international audience.

The researcher conducted this meta-analysis to address the following research questions. First, what is the overall effect size of ASPs on dependent variables such as cognitive, affective, and psychomotor domains in Korea? This question is to evaluate the treatment effect of ASPs. Second, what are effect sizes of moderator analyses by study characteristics? Third, what are effect sizes of moderator analyses by methodological characteristics? Fourth, what are effect sizes of moderator analyses by design characteristics? Fifth, what are effect sizes of moderator analyses by outcome characteristics? These questions could help us understand the treatment effects of ASPs moderated by a variety of characteristics. Sixth, what are effect sizes of meta-regression analysis by year of publication? This question was generated to estimate whether the effect of ASPs has increased over time.

Literature Review

Research on ASPs in Korea

Empirical evidences support the effectiveness of participating in the programs. First, studies showed impact of ASPs on cognitive outcomes. Kim and Choi (2018) reported that the experimental group participating in ASPs was much higher in creativity over the control group. Ku et al. (2005) identified that youth who participated in ASPs improved significantly on science inquiry skills. In addition, numerous studies on implementation of ASPs and academic achievement have been conducted. The following study tested the hypothesis that participation in ASPs would positively impact student performance. Park and Joo (2012) reported that ASPs had positive and significant effects among underachieving students in receiving positive results on English test scores.

Second, various learning outcomes in the affective domain have been also linked to participation in ASPs. First, in terms of attitude change toward subject areas, students participating in ASPs have a positive impact on their increase of interest in learning English (Park & Joo, 2012). Second, evaluations of ASPs revealed that student participation could significantly impact overall school adjustment and their relationships with teachers and peers (Lee & Kim, 2014).

Further, researchers argued that ASPs were considered a prime time in life to provide students with additional opportunities related to psychomotor development. Kim and Lee (2011) specifically examined if ASPs have shown any promise toward promoting student health. The findings indicated that student involvement in such programs is positively associated with better results in physical fitness.

However, on the flip side after reviewing primary studies, Lee and Kim (2014) reported negative effects of ASPs on students' academic performance, self-esteem, and adaptation to school. In another study, Durlak et al. (2010) also found no effects of ASPs on student academic achievement among students in the United States. Due to the conflicting findings, this paper will summarize primary studies systematically through meta-analysis, a method often used to help synthesize individual studies into one paper (Higgins et al., 2019).

Meta-analysis on ASPs outside of Korea

A number of studies on effects of ASPs through meta-analysis have been published outside of Korea.

First, two previous syntheses presented effects of ASPs on academic achievements as follows. Lauer et al. (2006) reported that ASPs implemented in the United States showed statistically significant positive effects on both reading and mathematics student achievement. They also found at-risk students participating in ASPs improved learning outcomes more than at-risk students who did not participate. In addition, the findings of the meta-analysis conducted in the United States by Crawford (2011) found ASPs in the United States had a significant impact on student academic achievements in the areas of reading and mathematics combined.

Second, increases in social and emotional outcomes were also reported as a result of ASPs. Durlak et al. (2010) analyzed research findings from ASPs which adopted to enhance the personal and social skills of children and adolescents in the United States. They reported that ASPs positively influenced increases in self-perceptions, bonding to school, positive social behaviors, school grades, and higher test scores and on significant reductions in problem behaviors. A notable implication was the positive benefits for students when ASPs integrated components of personal and social skills.

Beets et al. (2009) presented that ASPs in Australia, Spain, and the United States showed effects on behavioral outcomes. They asserted that ASPs resulted in positive impacts improving physical activity levels and physical fitness of students in secondary schools.

Conversely, two studies reported no statistically significant effect sizes in ASPs. Taheri and Welsh (2016) reported that three primary intervention types of ASPs implemented in Canada, Sweden, and the United States such as academic, recreation, and skills training/mentoring did not have a strong influence on the overall effect of ASPs on delinquency. In that study, program characteristics such as youth grade level and treatment duration did not show a significant relationship to the effectiveness of ASPs, but the researchers were only looking at the effect on delinquency not any of the other results mentioned above. Also, ASPs in Ireland and the United States indicated a very small, non-statistically significant effect on attendance and external behaviors (Kremer et al., 2015). It should be noted that the meta-analysis studies mentioned in this section were not conducted on Korean schools and in some cases a narrow outcome of all the possible effects ASPs might offer. However, this meta-analysis does lend itself to some potential future cross-cultural comparisons.

Research questions

Research questions are as follows. First, what is the overall effect size of ASPs on dependent variables such as cognitive, affective, and psychomotor domains in Korea? Second, what are effect sizes of moderator analyses by study characteristics? Third, what are effect sizes of moderator analyses by methodological characteristics? Fourth, what are effect sizes of moderator analyses by design characteristics? Fifth, what are effect sizes of moderator analyses by outcome characteristics? Sixth, what are effect sizes of meta-regression analysis by year of publication?

Methodology

This meta-analytic review describes effects of ASPs for students on cognitive, affective, and psychomotor domains. Systematic review like meta-analysis is the highest possible level on the hierarchy of evidence to evaluate effectiveness of interventions since the findings of primary studies are limited and often contradictory (Cooper et al., 2019). The study follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2009) and recommendations of the Cochrane Handbook for systematic reviews of interventions (Higgins et al., 2019).

Search process

This research aimed to synthesize empirical studies using quantitative methods. The researcher examined the general effects of intervention in ASPs primary studies using experimental or quasi-experimental designs, because the review purpose is to assess the effects of

ASPs, and interventional studies are often performed in studies to establish effects of procedures (Meline, 2006).

The keywords and descriptors used in the search include: after school program, after school education, or after school AND evaluation, outcome, or impact. The following international databases were searched: ERIC, Google Scholar, Scopus, and Web of Science. These databases together provide a comprehensive coverage of journal articles and conference proceedings. Lester et al. (2020) argued that the future meta-analyses of ASPs need to be representative of the larger literature base.

Inclusion and exclusion criteria for primary studies

For this meta-analysis a study was considered to be appropriate if it met the following criteria (1) investigated ASPs for students attending elementary and secondary schools in Korea, (2) was implemented in a public or private school, (3) operated on a regular basis during non-school hours, (4) was supervised by adults. In addition to meeting these criteria, ASPs had to include one or more of the following outcomes; cognitive domain, affective domain, or psychomotor development. Studies not included in this meta-analysis had one or more of the following characteristics: studies using qualitative methods; included linear relationships between variables; provided insufficient statistical or quantitative information to allow calculation of the effect size; operated out of school environments such as community centers and religious institutions.

The literature search yielded (357) studies: (344) journal papers and (13) unpublished conference papers. Of these, 26 studies that did not meet inclusion criteria based on title, abstract, or keywords were discarded at the first screening. In addition, (308) studies in full texts did not fulfill the criteria to select primary studies. Ultimately, (23) studies were selected for the meta-analysis. All studies analyzed after 2020 did not show results that met the criteria. The lack of useable studies after 2020 is probably because ASPs were closed due to COVID-19. The data extraction procedure is represented in Figure 1.

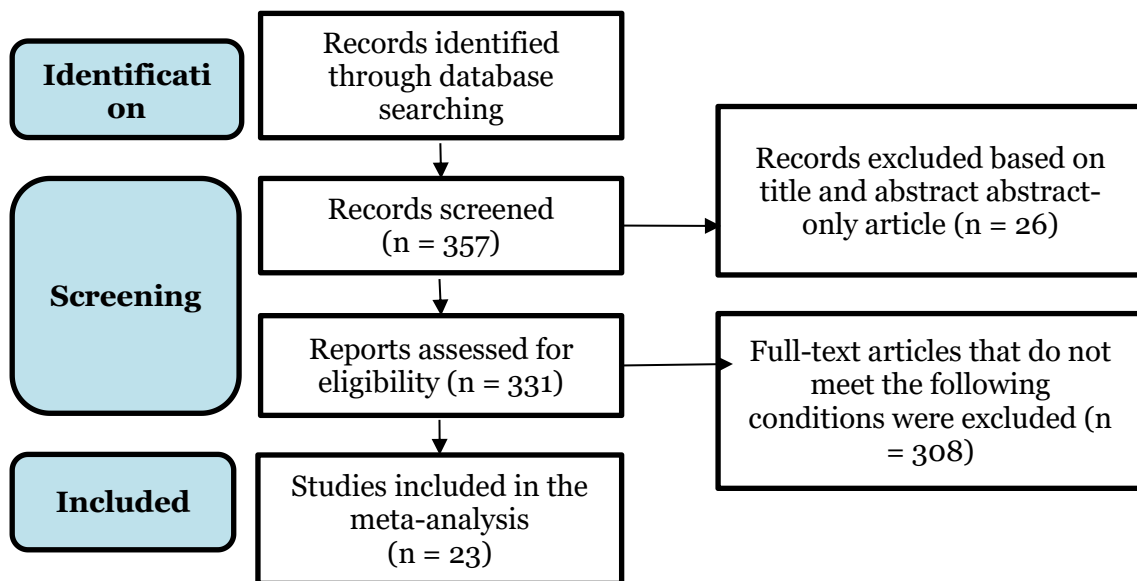


Figure 1. PRISMA flowchart

Quality assessment criteria

The researcher used the Cochrane's Risk of Bias to evaluate the quality of primary studies included in this meta-analysis (Higgins et al., 2019). Three different coders assessed literature in terms of sequence generation, allocation concealment, blinding, incomplete outcome data, selective outcome reporting, and other potential threats to validity. The quality assessment revealed no risk of error in any of the studies.

Data extraction

The researcher screened abstracts for eligibility, examined full texts of related literature, and ultimately discussed which studies to include with two prominent researchers in the field. A summary of the included studies containing specified characteristics is reported in Table 1.

Table 1. Characteristics of studies included in this meta-analysis

Study	Sample Size	Research Design	School	Students	Subject
Baek and Keum (2014)	92	One Group	Elementary	FR	Practical Arts
Cho and Ahn (2017)	22	NCG	Middle	FR	P.E.
Cho (2012)	42	NCG	Middle	AR	Music
Han and Heo (2013)	123	POCG	Middle	FR	P.E.
Keum (2014)	222	One Group	Elementary	FR	Practical Arts
Keum and Yoon (2008)	64	NCG	High	FR	Science
Kim et al. (2018)	20	NCG	Middle	FR	P.E.
Kim and Hwang (2009)	62	NCG	Elementary	FR	P.E.
Kim (2010)	520	POCG	Middle	FR	P.E.
Kim and Lee (2011)	40	NCG	Elementary	FR	P.E.
Kim et al. (2018)	20	POCG	-	FR	Fine Arts
Kim and Lee (2017)	12	One Group	High	FR	P.E.
Ku et al. (2005)	80	NCG	Middle	FR	Science
Lee (2012)	349	POCG	Middle	FR	P.E.
Lee (2013)	597	POCG	-	FR	P.E.
Lee et al. (2015)	14	NCG	Middle	FR	P.E.
Lee and Kim (2014)	347	POCG	Elementary	FR	-
Moon (2010)	120	POCG	Elementary	FR	P.E.
Park and Kim (2008)	420	POCG	Middle	FR	P.E.
Park et al. (2016)	70	One Group	Elementary	FR	P.E.
Park and Kim (2017)	20	NCG	Elementary	FR	P.E.
Park and Joo (2012)	20	One Group	Elementary	AR	English
Wi and Won (2014)	52	One Group	Elementary	FR	English

Note. FR: Full-Range of Classroom Abilities, NCG: Non-equivalent Control Group, P.E.: Physical Education, AR: At-Risk Students, POCG: Post-Test Only Control Group

Coding Reliability

The researcher classified all the papers to be analyzed based on the inclusion and exclusion criteria shown in the eligibility section introduced earlier. The coding manual was developed with the consent of the researcher and her colleagues. After that, 7 papers, which accounted for (30%) of the total (23) papers corresponding to the inclusion criteria, were first coded. Specifically, three different coders extracted and verified the data to maintain reliable practices. In this process, the inter-rater reliability was 0.9, which was excellent. This is probably why each coder have more than several years of teaching and research experience in the field of education. If disagreements emerged during the coding process, they were resolved through discussion.

Data Analysis

The researcher used Comprehensive Meta-Analysis (CMA) Version 2 to calculate effect size and 95% confidence intervals. Overall effects were weighted by the inverse of variance. A random-effects model was adopted for the main effect and moderator analyses since significant heterogeneity was present by visual inspection of forest plots and by calculating Q statistic and I² statistic (Cooper et al., 2019). The study was used as a unit for calculation of overall effect size while the effect size was used as a unit for calculating moderator analyses according to Cooper (1989)'s shifting unit of analysis.

When interpreting the effect size, the researcher referred to two studies. Cohen (2013) explained that if an average effect size of 0.2 or less, it is small, 0.5 is moderate, and if it is greater than 0.8, it is large. Wolf (1986) suggested that an effect size of 0.25 or more was educationally significant, and an effect size of 0.50 or more was clinically significant.

Results

Description of Effects

Twenty-three studies included in this meta-analysis were reported between 2005 and 2018. The method introduced previously provided (192) effect sizes. Multiple outcomes exist within a study; therefore, reviewers should be careful about the dependence of any study outcomes.

Overall Analysis

Figure 2 shows the descriptive statistics for all (23) studies. This includes forest plots, variances, and standard errors. The forest plot identifies the precision of each study by the length of the confidence interval. Each square dot represents the effect size of each sample, and the horizontal line represents the 95% confidence interval of the effect size. The standard error was (0.011), and the 95% confidence interval ranged from (0.642) to (0.687).

The results of the homogeneity test are as follows. The effect sizes for the primary studies were heterogeneous ($Q = 3916.192$, $df = 191$, $p < .001$, $I^2=95.123$).

The effect of ASPs with elementary and secondary school students was (0.662) standard deviations, which had a medium-to-large effect size (Cohen, 2013) and was clinically significant (Wolf, 1986).

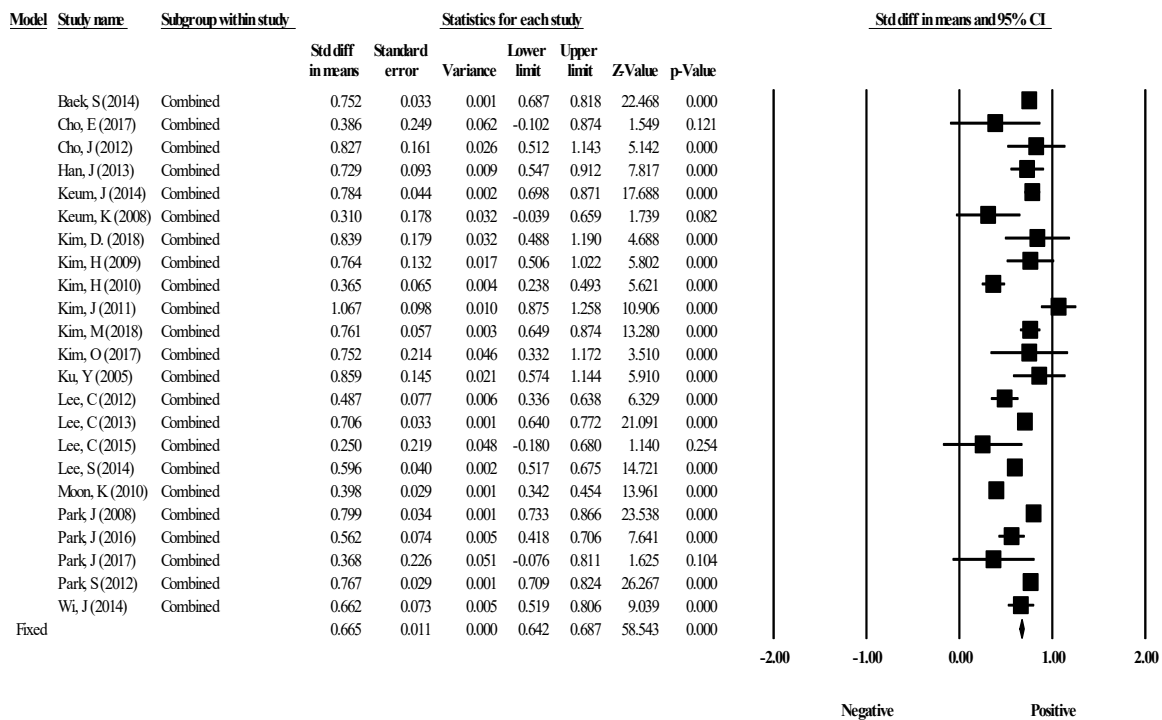


Figure 2. Forest plots

Moderator Analyses

This analysis was conducted to identify the source of variability and moderators, which affect the direction and degree of relation and difference among moderators (Hedges & Vevea, 1998).

Table 2. Moderator analyses

Moderator	Categories	k	ES	SE	-95% CI	+95% CI
Study characteristics						

Student gender	Female	31	0.404	0.038	0.329	0.479
	Male	49	0.462	0.036	0.392	0.533
Moderator	Categories	k	ES	SE	-95% CI	+95% CI
	Both	112	1.120	0.078	0.968	1.272
Student type	LD or at-risk	24	2.293	0.390	1.529	3.057
	FR	168	0.646	0.032	0.583	0.708
School level	Elementary	134	0.909	0.076	0.760	1.057
	Middle	40	0.714	0.068	0.581	0.847
	High	7	0.528	0.160	0.215	0.842
Locale	Rural	13	0.604	0.146	0.317	0.890
	Suburban	36	1.868	0.253	1.371	2.364
	Urban	113	0.624	0.037	0.552	0.696
Methodological characteristics						
Research design	One Group	68	1.302	0.136	1.036	1.569
	POCG	78	0.553	0.037	0.481	0.625
	NCG	46	0.841	0.111	0.624	1.059
Sample size	1-200	152	0.597	0.036	0.527	0.667
	201-400	31	1.284	0.120	1.049	1.518
	More than 400	9	1.969	0.410	1.166	2.773
Design characteristics						
Frequency of session	Less than 11	33	0.567	0.052	0.464	0.669
	11-20	24	0.770	0.083	0.608	0.933
	21-30	12	1.135	0.191	0.762	1.509
	More than 30	44	1.322	0.218	0.895	1.749
Length of instruction	1 hour or less	78	1.293	0.134	1.029	1.556
	More than 1 hour	38	0.683	0.068	0.551	0.816
Outcome characteristics						
Domains of learning	Cognitive	25	2.603	0.454	1.713	3.493
	Affective	129	0.640	0.036	0.570	0.711
	Psychomotor	38	0.504	0.050	0.406	0.602
Subjects	Computer	2	3.798	1.311	1.229	6.367
	Cosmetology	4	0.891	0.415	0.078	1.705
	English	28	1.947	0.353	1.256	2.639
	Environment Science	2	0.817	0.053	0.713	0.920
	Korean	4	0.705	0.234	0.247	1.164
	Music	11	0.456	0.072	0.315	0.598
	Physical Education	116	0.609	0.033	0.545	0.672
	Practical Arts	12	0.897	0.153	0.597	1.198
	Science	5	0.933	0.488	-0.024	1.890

Note. K: Number of Effect Size, ES: Effect Size, SE: Standard Error, LD: Learning Disability, FR: Full-Range of Classroom Abilities, POCG: Post-Test Only Control Group, NCG: Non-equivalent Control Group

Effect sizes by moderators related to study characteristics

Variables related to study characteristics were student gender, student type, school level, and locale (Table 2). In student gender, the results ranked in the order of both (1.12), male (0.462), and female (0.404). For student type, the effect size of students with learning disability or students at-risk (2.293) was larger than that of students not at-risk or full-range of students (0.646). Regarding school level, the result for elementary schools (0.909) was higher than that of middle schools (0.714) and high schools (0.528). In the locale category, the effect sizes of suburban (1.868), urban (0.624), and rural (0.604) were in order.

Effect sizes by moderators related to methodological characteristics

The type of research design and sample size were variables related to methodological characteristics (Table 2). The data in primary studies had three different formats. The effect sizes

were ranked as one group (1.302), non-equivalent control group (0.841), and post-test only control group (0.553). For sample size, the effect sizes of more than 400 participants (1.969), 201-400 participants (1.284), and 1-200 participants (0.597) were in order.

Effect sizes by moderators related to design characteristics

Variables related to design characteristics were frequency of session and length of instruction (Table 2). In frequency of sessions, the effect sizes were ranked as more than 30 (1.322), 21-30 (1.135), 11-20 (0.77) and less than 11 (0.567). In length of instruction, the effect size of one hour or less was (1.293), whereas that of more than one hour was (0.683).

Effect sizes by moderators related to outcome characteristics

Domains of learning and subject areas were variables related to outcome characteristics (Table 2). For domains of learning, the results ranked in the order of cognitive domain (2.603), affective domain (0.64), and psychomotor domain (0.504). In subject areas, the effect sizes were ranked as Computer (3.798), English (1.947), Science (0.933), Practical Arts (0.897), Cosmetology (0.891), Environment Science (0.817), Korean (0.705), Physical Education (0.609), and Music (0.456).

Publication Bias

To investigate the publication bias, the researcher used three methods: the funnel plot, the rank correlation test, and the Orwin's fail-safe N test. First, the funnel plot was slightly asymmetrical in Figure 3. Second, in the rank correlation test (Begg & Mazumdar, 1994), Kendall's tau was (-0.166) and p was (0.267), which means that it is difficult to see that a significant correlation existed. Third, the researcher calculated Orwin (1983)'s fail-safe N. It indicates the number of missing studies needed to bring the estimated effect size value under 0.2, which is a criterion for a trivial effect. The total effect size for 23 papers is (0.662) in this study. According to Orwin's fail-safe N, (54) studies showing no effect at all are necessary for the effect size of this study to be 0.2. Therefore, there is no publication bias for the overall effect size. In summary, visual inspection of the funnel plot and outcomes of statistical analyses suggest that publication bias is unlikely in the current study.

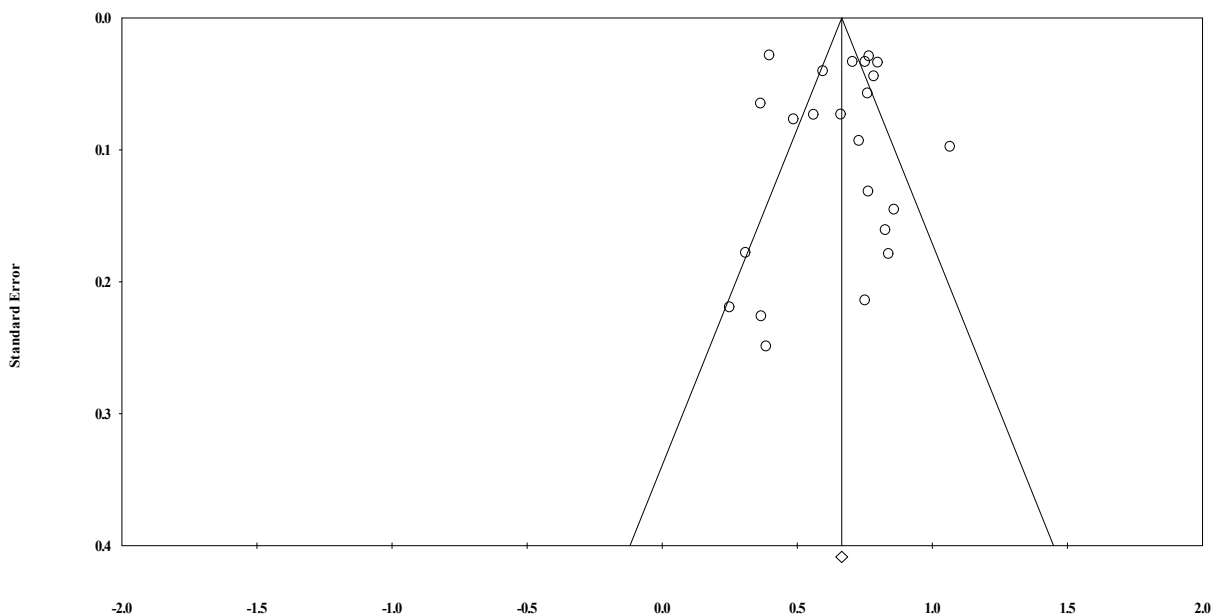


Figure 3. Funnel plot

Discussion

This research examined and synthesized the influence of ASPs in elementary and secondary schools within the contents of 23 primary studies conducted in Korea.

Responding to the first research question, what is the overall effect size of ASPs in Korea? I found the overall effect of ASPs was (0.662) which was a medium-to-large effect size. The result indicates that ASPs had an overall positive impact on participating students and elementary and secondary education when researchers consider that effect sizes of 0.1 to 0.2 were not negligible and could be typical for remedial programs (Lipsey & Wilson, 2001). The result from this study was higher than the overall effect sizes from two previous meta-analyses from the United States; Crawford (2011) reported the significant impact on students' academic achievements with the overall mean effect size of (0.4). Durlak et al. (2010)'s meta-analysis examining the impact of ASPs showed the overall effect size of 0.22. The finding is also noteworthy since systematic evidence for the effectiveness of ASPs in Korean schools has not yet been found.

As for the second research question, what are effect sizes of moderator analyses by study, methodological, design, and outcome characteristics? The findings from moderator analyses provided meaningful practice implications (Lewalter et al., 2021). The effectiveness of ASPs differed by various characteristics in four categories: study characteristics, methodological characteristics, design characteristics, and outcome characteristics.

In study characteristics, regarding school level, the result for elementary school was higher than that of middle school and high school. On the contrary, Lauer et al. (2006) found that the largest effect size was observed for high school students followed by the effect size for middle school students in their study. More in-depth investigation could be conducted to explore the difference of effectiveness according to school level.

In methodological characteristics, for sample size, the effect sizes of more than 400 participants, 201-400 participants, and 1-200 participants were in order. This result might not be connected to the fact that ASPs usually provide a small student to teacher ratio and could help students show better achievement and development through authentic relationship building (Zief et al., 2006).

In design characteristics, the effect size of more than 30 sessions was the highest for frequency of sessions. While Taheri and Welsh (2016) reported that the effect size of ASPs for more sessions was much larger, the result from this study was a similar outcome.

For length of instruction, the effect size of one hour or less was higher than that of more than one hour. The result suggests that ASPs were more effective when implemented in shorter class times. Considering what occurs during the class in ASPs is also important, it is important that educators recognize students' interests and select learning activities to foster participation in activities.

In outcome characteristics, the effect size of cognitive domain was the largest, followed by affective and psychomotor domains. Educators recognized ASPs mainly as a possible means to improve students' academic achievement and provided opportunities to promote critical thinking and problem solving (Lee, 2012). The result from this study was similar to prior research showing that the effect size of academics was the largest (Lauer et al., 2006). In addition, results of affective and psychomotor domains are still remarkable in that ASPs supplement and complement the regular education. ASPs offer students opportunities to develop their personal and social skills through participation with schoolmates in meaningful activities and a range of adult-supervised activities (Durlak et al., 2010). Students also take a safe and supportive environment to physically explore their world (Beets et al., 2009).

Future Recommendation

The cognitive, affective, and psychomotor effects of ASPs in this study are good news since educators will be able to consider ASPs as a factor toward increasing student abilities and developing the whole person.

First, ASPs were more effective when implemented in shorter class times. Considering what occurs during the class in ASPs is also important, educators need to recognize students' interests and select learning activities to foster participation in activities. Additionally, new ASPs should investigate student perspectives and needs before developing and providing programs. Decision-making without appropriate information from students might not produce correct ASPs for the

target population (Durlak et al., 2010).

Second, students often facing numerous constraints such as lower level of educational support, fewer educational programs and facilities, and inadequate transportation in rural areas are less likely to benefit from ASPs. However, prior research investigating the effect of ASPs on students of rural communities reported that students can break out of the cycle of poverty through learning opportunities since ASPs are their only opportunities or supplemental enrichment in subject areas and preparation for college entrance exams (Afterschool Alliance, 2008). ASPs could provide an affordable way of overcoming challenges students in rural areas face and helping students reach their potential.

Limitations

There are limitations in this study which need to be considered. First, the total number of articles for data analysis was only 23 which indicated more primary studies are needed. This is a shortcoming that the author could not control. More primary studies from peer-reviewed journals on ASPs needs to be conducted. This will also allow for future meta-analysis studies that manifest complexity and statistical power. Second, this study reviewed primary studies which adopt experimental designs. Research findings with correlational data might also be reviewed to understand the status of ASPs. Third, more synthesis of qualitative research on ASPs should be examined together for additional understanding. As a result of exclusion of qualitative studies, the research findings in this study should be interpreted with caution, although they present empirical evidence. Fourth, research findings from multiple moderator analyses can be misleading. Moderator analyses are not based on randomized comparisons. False negative and false positive significance tests may increase rapidly as more moderator analyses are implemented. Regarding Type 1 error, Higgins et al. (2019), for instance, recommended decreasing the critical value to .01 to control error rates in meta-analysis. Polanin (2013) also summarized methods controlling Type 1 error by reviewing various procedures in previous research.

Conclusion

Surprisingly no rigorous evaluation on effects of ASPs in Korea has been conducted despite the increase of popularity once funding was made available. The systematic review and meta-analysis conducted in this study were to synthesize effects of ASPs to understand the present status. Based on primary studies passing inclusion criteria, this study shows a recent trend of a growing body of literature. Findings in this research could provide resources for developing effective and efficient ASPs with educators and school administrators since it is important to invest in the analysis and implementation of elements of ASPs grounded in empirical evidence. It is my hope that ASPs could develop students' abilities in their cognitive, affective, and psychomotor domains benefitting them to have successful learning experiences in schools. Finally, the researcher suggests that future research is needed to evaluate which characteristics of the ASP and academic components are associated with better outcomes. Another future direction is to investigate the relationship between cognitive and affective domains in ASPs because promoting affective learning outcomes improves academic achievement.

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