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ADMINISTRATIVE INFORMATION

Support - Kyungpook National University RISE Research Center.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202560107

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 June 2025 and was last updated on 27 June 2025.

INTRODUCTION

Review question / Objective The systematic review and meta-analysis aims to evaluate the effectiveness of social skills intervention programs for children with borderline intellectual functioning.

Specifically, it addresses the following two research questions:

1. What are the overall effect sizes of social skills intervention programs for children with borderline intellectual functioning on social skills and their subdomains?
2. Do the effect sizes differ depending on moderator variables such as participant characteristics, intervention features, and implementation settings?

Rationale Children with borderline intellectual functioning (BIF) often exhibit significant challenges in social adaptation despite not qualifying for special education services. Social skills interventions have been developed to

support these children, but reported outcomes vary widely depending on intervention types, delivery methods, and study designs. This review aims to provide comprehensive, evidence-based conclusions by synthesizing data from existing intervention studies.

Condition being studied Borderline intellectual functioning (IQ 71–84) and associated social skill deficits in school-aged children.

METHODS

Search strategy Databases searched include RISS, KISS, DBpia, NDSL, and Google Scholar. Keywords used include “borderline intelligence,” OR “children with borderline intelligence,” OR “borderline intellectual functioning,” OR “borderline cognitive ability,” OR “slow learners,” OR “underachieving students,” AND “program,” OR “intervention,” AND “social skills,” OR “peer relationship skills,” OR “self-management skills,” OR “academic skills,” OR “compliance skills,” OR

“assertion skills,” OR “adaptive behavior.” PRISMA guidelines were used to structure the inclusion process.

Participant or population Children under 18 years of age with borderline intellectual functioning (IQ 71–84), or academically underachieving children with normal IQ (IQ 85–110) as judged by school performance or screening tests.

Intervention The interventions of interest are structured programs specifically designed to improve social skills among children with borderline intellectual functioning.

Comparator Control groups receiving no intervention or groups receiving an alternative non-targeted intervention. These programs require direct participation and active engagement from the children in various structured or semi-structured activities. Interventions may include, but are not limited to, approaches based on social learning theory, cognitive-behavioral techniques, or humanistic methods. No restrictions are placed on the type of program, implementing institution, delivery setting, or facilitator qualifications.

Study designs to be included Randomized controlled trials (RCTs) and quasi-experimental studies with sufficient statistical data (means, standard deviations, effect sizes, or test statistics).

Eligibility criteria Studies must (1) involve participants under 18 with BIF or poor academic performance; (2) include a social skills intervention program; (3) assess social skills as an outcome; (4) include a comparison/control group; and (5) report statistical data for effect size calculation. Excludes qualitative studies, reviews, or those lacking necessary data.

Information sources RISS, KISS, DBpia, NDSL, GoogleScholar.

Main outcome(s) The primary outcome is the improvement in overall social skills among children with borderline intellectual functioning, as measured by standardized social skills assessment tools. This includes both the total social skill score and subdomain scores (e.g., peer relationships skills, compliance, self-management skills, academic skills, compliance skills, and assertion skills). Effect sizes (Hedges' g) will be calculated to determine the magnitude of intervention effectiveness.

Additional outcome(s) Additional outcomes include moderator analyses to examine whether

the effectiveness of social skills intervention programs varies according to three groups of variables:

- (1) Participant characteristics, including gender and school level (elementary, middle, or high school);
- (2) Program characteristics, such as theoretical orientation (e.g., social learning, cognitive-behavioral, humanistic), type of media used (e.g., art, physical activity, academic learning, animal-assisted), study design (randomized or quasi-experimental), and the presence of co-facilitators;
- (3) Implementation (intervention) environment, including group size, number of sessions per week, duration of each session, and total number of sessions. Additional outcomes include moderator analyses to examine whether the effectiveness of the interventions varies by participant characteristics (e.g., gender, school level), program features (e.g., theoretical basis, intervention media, study design, and presence of co-facilitators), and implementation conditions (e.g., group size, session frequency).

Further analyses include publication bias assessment using funnel plots and Egger's regression test, sensitivity analysis through leave-one-out tests, and cumulative meta-analysis to assess stability of effect sizes over time.

Data management To ensure the reliability of data coding, the first author conducted cross-coding with two experts currently serving as professors of social welfare. Coding standards for independent variables, moderator variables, and outcome variables were collaboratively developed and documented in a coding manual. Discrepancies between coders were resolved through discussion and consensus to enhance inter-rater reliability.

Data will be managed using Excel for coding and R software for analysis. A standardized coding sheet will be used for data extraction and verified by independent reviewers.

Quality assessment / Risk of bias analysis ROBINS-I will be used for non-randomized studies and RoB 2.0 for randomized trials. Risk of bias will be evaluated across standard Cochrane domains.

Strategy of data synthesis Random-effects meta-analysis using Hedges' g . Forest plots and funnel plots will be produced. R software (metafor/meta packages) will be used.

Subgroup analysis Subgroup analyses will be conducted to investigate how intervention effectiveness varies across different participant

characteristics (e.g., gender, school level), program characteristics (e.g., theoretical orientation, media type, study design, co-facilitator presence), and implementation conditions (e.g., group size, session frequency, session duration, total number of sessions). Categorical moderators will be analyzed using meta-ANOVA, and continuous variables will be tested through meta-regression.

Sensitivity analysis Sensitivity analysis will be conducted to assess the robustness of the meta-analytic findings. A leave-one-out analysis will be performed, in which each study is sequentially removed to examine its individual influence on the overall effect size. Additionally, cumulative meta-analysis will be used to determine whether the pooled effect size remains stable as studies are added over time. Changes in effect size, confidence intervals, and heterogeneity statistics (e.g., I^2) will be monitored to evaluate the sensitivity of the results.

Language restriction Only studies published in Korean were included.

Country(ies) involved South Korea.

Other relevant information The protocol follows PRISMA 2020 guidelines and was ethically approved by the IRB of Kyungpook National University.

Keywords Children with Borderline Intellectual Functioning, Social Skills, Social Skills Intervention Program, Systematic literature review, Meta-Analysis.

Dissemination plans The findings of this systematic review and meta-analysis will be disseminated through publication in a peer-reviewed journal (MDPI Children). The results will also be included in the author's master's thesis at Kyungpook National University and may be presented at academic conferences and shared through institutional repositories or open-access platforms.

Contributions of each author

Author 1 - GaYe Park drafted the manuscript and conducted all stages of the meta-analysis.

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Author 2 - Keung Eun Lee supervised the research.

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