

**The Effectiveness of the Bakiak Game in Improving Peer Interaction among Elementary School Students**Satrio Wahyudi¹, Indra Safari^{2*}, Rizal Ahmad Fauzi³¹²³Physical Education of Elementary Teacher Program, Universitas Pendidikan Indonesia, Bandung, Indonesia**Keywords**

Traditional Games;
Bakiak Game; Peer
Interaction; Social
Skills; Elementary
Education

Abstract

Peer interaction is an essential aspect of elementary school students' social development, particularly in fostering cooperation, communication, empathy, tolerance, and social support. Traditional games such as bakiak provide opportunities for students to interact directly through cooperative activities. Therefore, this study aimed to examine the effectiveness of the traditional bakiak game in improving peer interaction among Grade V students at SDN Pasirbenteng II. This study employed a quantitative pre-experimental approach using a one-group pretest-posttest design involving 37 Grade V students selected through total sampling. Peer interaction was measured using a 20-item questionnaire, and the intervention consisted of four bakiak game sessions conducted within one week. The results showed a significant increase in students' peer interaction scores after the intervention. A paired-samples t-test demonstrated a statistically significant difference between pretest and posttest scores ($t(36) = 27.09$, $p < .001$, Cohen's $d = 4.45$), indicating that participation in the bakiak game was associated with improved peer interaction. These findings suggest that the traditional bakiak game has the potential to enhance peer interaction among elementary school students. However, because this study employed a one-group pretest-posttest design without a control group, the findings should be interpreted cautiously and cannot be generalized as evidence of a causal effect.

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INTRODUCTION

Peer interaction is an important aspect of elementary school students' social development. It refers to social relationships among children involving cooperation, communication, empathy, tolerance, and social support within peer groups (Cameron & Tenenbaum, 2021). Through positive peer interaction, students develop self-confidence, cooperative skills, emotional maturity, and the ability to adapt to different social situations (Safari, 2010). Therefore, providing opportunities for meaningful peer interaction is essential to support students' overall social development.

However, opportunities for direct peer interaction among elementary school students have become increasingly limited due to the rapid development of digital technology. Children now spend more time using gadgets and playing online games than engaging in face-to-face play with their peers (Gou & Yang, 2024; Putnick et al., 2023). This condition has reduced students' opportunities to develop cooperation, communication, and other social skills through direct interaction in the school environment (Fauzi et al., 2020). Therefore, schools need learning activities that encourage students to interact actively with their peers.

One approach that can be implemented to enhance students' peer interaction is the use of traditional games in the learning process (Hartanto et al., 2021). Besides providing enjoyable learning experiences, traditional games contain important social values, including cooperation, communication, tolerance, and togetherness (Rakhoveio et al., 2025). Through these activities, students are encouraged to communicate, cooperate, solve problems together, and build positive relationships with their peers. Therefore, traditional games have the potential to become an effective learning medium for developing students' social skills.

Among various traditional games, the *bakiak* game is considered particularly relevant because it requires players to coordinate their movements, communicate effectively, and depend on one another to achieve a common goal. In this game, several students wear a single pair of long wooden clogs and move together while maintaining balance as a team. Every movement requires synchronization, continuous communication, and mutual adjustment among team members. Consequently, the success of each player depends not on individual ability but on the quality of cooperation within the group. These characteristics provide repeated opportunities for students to practice communication, coordination, cooperation, and mutual responsibility during play (Hammond & Kedrowicz, 2022). Therefore, the *bakiak* game is theoretically considered capable of improving peer interaction among elementary school students.

Previous studies have consistently reported that traditional games contribute positively to children's social development (Lathifah et al., 2025). For example, Fauzi et al. (2023) found that traditional games improve elementary school students' fundamental motor skills and learning participation, while Repuya et al. (2025) reported increased student engagement during classroom learning activities. Although these studies demonstrate the educational benefits of traditional games, they primarily emphasize motor development, physical activity, learning participation, and peer interaction. Empirical evidence specifically examining the effectiveness of the *bakiak* game in improving peer interaction among Grade V elementary school students remains limited. Furthermore, studies that investigate peer interaction through the dimensions of cooperation, communication, empathy, tolerance, and social support are still scarce. This gap indicates the need for further research to provide empirical evidence regarding the effectiveness of the *bakiak* game in strengthening peer interaction among elementary school students.

Although previous studies have demonstrated the educational benefits of traditional games, most have focused on motor development, learning participation, or academic outcomes. Limited evidence is available regarding how the *bakiak* game specifically promotes peer interaction through cooperation, communication, empathy, tolerance, and social support among upper elementary school students. Therefore, further empirical investigation is needed to clarify these social mechanisms.

Based on the identified research gap, this study aimed to examine the effectiveness of the traditional *bakiak* game in improving peer interaction among Grade V students at SDN Pasirbenteng II. It was hypothesized that students who participated in four sessions of the

bakiak game would demonstrate significantly higher peer interaction scores on the posttest than on the pretest, particularly in the dimensions of cooperation, communication, empathy, tolerance, and social support.

METHODS

This study employed a quantitative pre-experimental design using a one-group pretest-posttest approach (Marheni et al., 2021). This design was used to examine changes in students' peer interaction before and after participation in the traditional *bakiak* game intervention.

The participants were 37 Grade V students from SDN Pasirbenteng II, Sumedang, Indonesia. Since the entire population of Grade V students participated in the study, a total sampling technique was employed.

The research instrument was a peer interaction questionnaire developed by the researchers based on Monks' theory of peer interaction. The questionnaire measured five dimensions of peer interaction: cooperation, communication, empathy, tolerance, and social support. It consisted of 20 statement items rated on a five-point Likert scale ranging from 1 (strongly inappropriate) to 5 (strongly appropriate). The questionnaire was administered twice, before the intervention (pretest) and after the intervention (posttest), to measure changes in students' peer interaction.

The questionnaire consisted of 20 items distributed across five dimensions: cooperation (4 items), communication (4 items), empathy (4 items), tolerance (4 items), and social support (4 items). Twelve items were positively worded, whereas eight items were negatively worded. Examples of questionnaire items include "I encourage my teammates during the *bakiak* game" (positive item) and "I prefer to remain silent rather than communicate with my teammates during the game" (negative item). Negatively worded items were reverse-scored before statistical analysis so that higher total scores consistently reflected better peer interaction.

The questionnaire was developed in Bahasa Indonesia and specifically contextualized to situations encountered during the traditional *bakiak* game to ensure its relevance for Grade V elementary school students. The wording of each item was simplified to match the students' level of understanding while maintaining consistency with the theoretical constructs. Before being administered, the instrument underwent content validation by experts in physical education and elementary education to evaluate the relevance, clarity, and appropriateness of each item. Revisions were made based on the experts' recommendations prior to field testing. Subsequently, the instrument was subjected to validity and reliability testing. The results indicated that the questionnaire demonstrated acceptable psychometric properties, with all 20 items retained for the main study and a Cronbach's alpha coefficient of 0.720, indicating acceptable internal consistency.

The research procedure consisted of three stages. First, students completed the peer interaction questionnaire as a pretest to determine their baseline level of peer interaction. Second, the students participated in four sessions of the traditional *bakiak* game conducted over one week. During each session, students worked collaboratively in groups, requiring continuous communication, coordination, mutual assistance, and shared responsibility to complete the activity successfully. Finally, the questionnaire was administered again as a posttest to evaluate changes in peer interaction following the intervention.

Descriptive statistics were used to summarize the pretest and posttest scores, including the mean, minimum, maximum, and standard deviation. The normality of the data was examined using the Shapiro-Wilk test because the sample size was fewer than 50 participants. Since the data were normally distributed, differences between pretest and posttest scores were analyzed using the paired-samples *t*-test. To quantify the magnitude of the intervention effect, Cohen's *d* effect size and normalized gain (N-gain) were also calculated. All statistical analyses were performed using IBM SPSS Statistics.

Prior to the main study, the questionnaire underwent psychometric evaluation using data collected from 37 Grade V students. Content validity was first assessed by experts in physical education and elementary education to evaluate the relevance, clarity, and appropriateness of each item. Revisions were made based on the experts' recommendations

before field implementation. Subsequently, item validity was examined using corrected item-total correlation, and internal consistency reliability was assessed using Cronbach's alpha.

RESULTS AND DISCUSSION

A total of 37 Grade V students participated in this study, consisting of 23 boys (62.2%) and 14 girls (37.8%), aged between 10 and 11 years. All participants completed both the pretest and posttest, resulting in no missing data or participant attrition.

The study's findings were from the examination of pretest and posttest data on 37 SDN Pasirbenteng II grade V students. The pretest and posttest results of grade V students at SDN Pasirbenteng II were analyzed using descriptive statistics to find the minimum, maximum, average, and standard deviation scores.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pre	37	43.00	63.00	54.8108	4.33870
Post	37	85.00	98.00	90.5946	3.49173
Valid N (listwise)	37				

Table 1 presents the descriptive statistics of students' peer interaction scores before and after the intervention. The mean pretest score was 54.81 (SD = 4.34), whereas the mean posttest score increased to 90.59 (SD = 3.49). The minimum and maximum scores also increased from 43–63 during the pretest to 85–98 during the posttest. These descriptive findings indicate a substantial improvement in peer interaction following participation in the traditional *bakiak* game.

These descriptive results indicate that students' peer interaction scores improved considerably following participation in the traditional *bakiak* game before inferential statistical testing was conducted.

Table 2. Test of Normality

Kolmogorov-Smirnov ^a			Shapiro-Wilk		
Statistic	Df	Sig.	Statistic	Df	Sig.
.122	37	.180	.973	37	.496
.081	37	.200*	.971	37	.423

Because the sample size was fewer than 50 participants, normality was assessed using the Shapiro–Wilk test. As shown in **Table 2**, the pretest ($p = .496$) and posttest ($p = .423$) scores were normally distributed ($p > .05$). Therefore, the assumption of normality was satisfied, and the paired-samples t -test was considered appropriate for hypothesis testing (Uhm & Yi, 2023).

Table 3. Paired Samples Test

Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper)	t	df	sig 2 tailed
-38.16216	8.56840	1.40864	-41.01901	-35.30532	-27.092	36	.000

The Paired Sample t -Test was used to test the hypothesis and see if the pretest and posttest scores differed significantly. Students' peer interaction scores before and after the *bakiak* game was implemented differed significantly, according to the results, which showed a significance value of 0.000 ($p < 0.05$). The study hypothesis was therefore approved.

To quantify the magnitude of change beyond statistical significance, Cohen's d for paired samples was calculated by dividing the mean difference by the standard deviation of the difference scores ($38.16 / 8.57 = 4.45$). This value greatly exceeds the conventional threshold for a large effect ($d \geq 0.80$), indicating an extremely large intervention effect. Furthermore, the

95% confidence interval for the mean difference (-41.02 to -35.31) did not include zero, supporting the consistency of the observed improvement across participants.

Table 4. N-Gain Score and N-Gain Percentage

	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_score	37	.63	.95	.7886	.08567
Ngain_persen	37	63.41	95.35	78.8563	8.56750

The N-gain test findings on the N-Gain Score data were used to create a sample of 37 persons. With an average (mean) of 0.7886 and a standard deviation of 0.08567, the lowest value found is 0.63, and the highest value is 0.95. These findings indicate that following therapy, there was a positive increase in peer contact. Since the average value of 0.7886 falls within the range of $g > 0.7$, it falls into the high group according to the N-Gain Score distribution criteria. This demonstrates that the intervention has a significant impact on enhancing peer interaction and can maximize student-peer engagement.

Additionally, the N-Gain Percent analysis revealed an average of 78.8563% and a standard deviation of 8.56750, with a minimum value of 63.41% and a maximum value of 95.35%. Since the average value is at a percentage of more than 76%, it falls into the effective group according to the interpretation of the N-Gain Score. According to this statistics, the majority of pupils have significantly improved their peer connection after adhering to the prescribed treatment or learning procedure.

The large effect size should be interpreted as evidence of a strong practical association rather than definitive proof of causality because the study employed a one-group pretest-posttest design without a comparison group.

The findings of this study indicate that participation in four sessions of the traditional *bakiak* game was associated with a significant improvement in peer interaction among Grade V elementary school students. This improvement was supported by higher posttest scores, a statistically significant paired-samples t-test result, a high normalized gain score, and a very large effect size. These findings suggest that the *bakiak* game provides meaningful opportunities for students to develop cooperation, communication, empathy, tolerance, and social support through direct collaborative play.

The findings of this study are in line with the research (Fauzi et al., 2023) which states that traditional games are able to improve *fundamental motor skills* and the participation of elementary school students. Compared with previous studies, the present study extends existing evidence by focusing specifically on peer interaction rather than motor skills or classroom participation. While earlier studies mainly reported improvements in physical competence and student engagement, this study provides empirical evidence that the collaborative characteristics of the *bakiak* game may also facilitate communication, empathy, tolerance, and mutual support among peers.

Traditional games are able to create active, collaborative, and engaging learning activities between students directly (Repuya et al., 2025). Through play activities together, students gain hands-on experience in communicating, working together, and solving problems in groups (Anjarsari & Juniati, 2026). Traditional games are also able to create more intense interactions than individual learning (Alcaraz-Muñoz et al., 2023). Thus, the traditional *bakiak* game can serve as an effective learning medium for improving students' social skills in elementary schools.

Because item-level scores for each dimension (cooperation, communication, empathy, tolerance, and social support) were not reported in the dataset used for this analysis, a per-dimension breakdown of pretest-posttest change is not presented here; only the total peer interaction score was analyzed. If sub-scale scores are available, presenting the mean change for each dimension is recommended, as this would help clarify which components of peer interaction (e.g., communication versus empathy) improved most and would strengthen the mechanism argument above.

Beyond the descriptive pattern of improvement, three social mechanisms likely explain why the *bakiak* game produced this change. First, the game imposes a coordination demand: because players' footwear is physically connected, progress requires continuous verbal negotiation of pace, which gives students repeated, low-stakes practice in communication. Second, it creates a shared consequence: one player's misstep affects the entire group, which plausibly prompts empathy and patience rather than blame. Third, it provides a repeated short-cycle feedback loop, as each round of the game offers an immediate, visible outcome—successful coordinated movement or stumbling—that reinforces cooperative behavior through practice rather than verbal instruction alone.

The magnitude of change observed here ($N\text{-Gain} = 0.79$; Cohen's $d \approx 4.45$) is unusually large for a social-skill intervention. Part of this magnitude should be interpreted cautiously: the single-group, no-control design cannot separate the effect of the *bakiak* game from maturation, the novelty and enthusiasm of trying a new game, or social-desirability responses given immediately after an enjoyable activity. The short interval between pretest and posttest, together with the small, single-class sample, further limits the ability to determine whether the change reflects a genuine, durable improvement in students' social skills or a temporary, situation-specific rise in cooperative behavior tied to the game itself. Because peer interaction was not re-measured after a delay, nor observed behaviorally outside the game setting, the present data cannot distinguish between these two possibilities; a delayed posttest (e.g., two to four weeks later) or direct behavioral observation in future studies would help clarify whether the improvement persists.

This study has several limitations. First, the use of a one-group pretest–posttest design without a control group limits the ability to draw causal conclusions regarding the effectiveness of the intervention. Second, the study involved only one class from a single elementary school with a relatively small sample size, limiting the generalizability of the findings. Finally, peer interaction was measured using a self-report questionnaire administered immediately after the intervention. Future studies are therefore encouraged to employ randomized or controlled experimental designs, larger and more diverse samples, delayed posttests, and observational measures of peer interaction to strengthen the evidence.

CONCLUSION

This study found that participation in the traditional *bakiak* game was associated with improved peer interaction among Grade V elementary school students. Students demonstrated better cooperation, communication, empathy, tolerance, and social support after participating in four sessions of the game. These findings indicate that the *bakiak* game can provide meaningful opportunities for students to develop peer interaction through collaborative and enjoyable learning activities.

However, because this study employed a one-group pretest–posttest design without a control group, the findings should be interpreted with caution. The observed improvement cannot be attributed solely to the intervention, and the long-term sustainability of the improvement was not examined.

Within these limitations, the traditional *bakiak* game has the potential to be used as a practical and low-cost learning activity to promote peer interaction in elementary schools. Future studies are recommended to employ experimental designs with control groups, involve larger and more diverse samples, and include follow-up measurements to examine the long-term effects of the intervention.

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