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Traditional Games and Adversity Quotient: Exploring the Impact of Sunda Manda on Children Aged 5-6 Years

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Received: 20xx-xx-xx; Accepted: 20xx-xx-xx; Published: 20xx-xx-xx

Abstract

Adversity Quotient (AQ) reflects an individual's capacity to respond to challenges and difficulties. This study examined changes in the AQ scores of children aged 5-6 years following participation in Sunda Manda, a traditional Indonesian game. A pre-experimental one-group pretest-posttest design was conducted with 23 children at Al-Azhar 22 Semarang Kindergarten, Indonesia. Children's AQ was assessed using an observational instrument, and the data were analyzed using descriptive statistics and a paired-samples analysis. The mean AQ score increased from 43.83 (SD = 4.33) at pretest to 54.61 (SD = 3.77) at posttest, representing a mean increase of 10.78 points. The difference between pretest and posttest scores was statistically significant ($p < .001$). These findings indicate that children's observed AQ scores were higher following participation in structured Sunda Manda activities. The game's rules, physical challenges, and repeated opportunities to participate may provide a context for children to practise responding to difficulties. However, the absence of a comparison group and the small sample from a single kindergarten limit causal interpretation and generalizability. Further research involving larger samples and comparison groups is needed to examine the relationship between traditional games and AQ development in early childhood.

Keywords: *adversity quotient; early childhood; traditional games; Sunda Manda*

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INTRODUCTION

Early childhood is a critical period of human development in which experiences and environmental conditions contribute to children's physical, cognitive, social-emotional, language, and motor development(Isratati & Mahyuddin, 2022). Experiences during these formative years also provide opportunities for children to develop the capacities needed to respond to difficulties, regulate their behavior, and adapt to challenging situations. Early childhood education, therefore, should not only promote children's developmental and academic competencies but also provide meaningful experiences that support their emotional regulation, persistence, and adaptive responses to everyday challenges (Nelson et al., 2024; Tamblyn et al., 2023)

One of the important capacity relevant to these developmental needs is the adversity quotient (AQ). (Stoltz, 2019) conceptualizes AQ as an individual's capacity to respond to and overcome adversity, persist in the face of obstacles, and continue striving toward desired goals. In early childhood, AQ can be examined through observable behaviors, including children's responses to unsuccessful attempts, willingness to try again, emotional regulation when facing difficulties, and persistence in completing challenging tasks (Safi'i et al., 2021) . These behaviors are important because young children encounter various challenges in their daily activities, including completing learning tasks, interacting with peers, following rules, and performing simple activities independently. Previous studies have examined AQ in early childhood and its relationship with children's developmental experiences and abilities (Chairilsyah et al., 2022; Fitri et al., 2022; Isratati & Mahyuddin, 2022). Accordingly, early childhood learning environments need to provide developmentally appropriate opportunities for children to practice responding to difficulties, persisting with tasks, and managing their reactions when outcomes do not meet their expectations.

Preliminary observations conducted in Group B at Al-Azhar 22 Semarang Kindergarten identified behavioral challenges related to children's responses to everyday difficulties. Based on the preliminary observation records, 17 of the 23 children observed demonstrated difficulties in situations involving persistence, emotional responses to unsuccessful attempts, or independent completion of simple tasks. These behaviors included complaining when encountering difficulties during group assignments, crying when unable to finish a game, and seeking assistance from the teacher when experiencing difficulty opening lunch boxes. These observations provided an initial indication that some children needed further opportunities to practice persistence, emotional regulation, and adaptive responses to challenges. However, the observed behaviors were used to identify an educational concern and should not, by themselves, be interpreted as a comprehensive measure of children's adversity quotient. This initial evidence highlighted the need to explore learning activities that allow children to encounter manageable challenges and practice responding to them in meaningful and developmentally appropriate contexts.

Play offers a meaningful context for providing such experiences because children can encounter challenges, make decisions, interact with others, and learn from unsuccessful attempts in an engaging environment. Through play, children have opportunities to practice concentration, persistence, risk-taking, creativity, and problem-solving (Hasbi, 2020) A systematic review and meta-analysis by (Alotaibi, 2024) provides broader evidence of the developmental potential of game-based learning, including outcomes related to children's cognitive, social, and emotional development, motivation, and engagement. Traditional games are particularly relevant because they combine physical movement, rule-following, social interaction, and culturally meaningful experiences. Previous research has also associated traditional games with children's social-emotional development and opportunities to practice interaction and emotional management (Ashar et al., 2024; Estiani & Suparno, 2022; McFarland & Laird, 2018)

One traditional game that may provide a relevant context for examining children's responses to challenges is Sunda Manda, also known as "engklek" in several Indonesian contexts. Although the game is associated with Sundanese tradition, similar forms of hopscotch are played in different regions of Indonesia. In the present study, Sunda Manda was selected not on the assumption that it was already culturally familiar to children in Semarang, Central Java, but because its structured rules and physical challenges provided opportunities to observe children's responses to manageable difficulties. The game generally involves throwing a marker into designated squares and hopping through a sequence of spaces while following specific rules. These activities require children to coordinate their movements, maintain balance, follow instructions, wait for their turns, and respond when an attempt is unsuccessful. Such characteristics make the game a potentially relevant context for examining observable behaviors associated with adversity quotient (AQ), particularly persistence and responses to setbacks. Previous research has examined traditional games in relation to physical-motor and social-emotional development

(Darmawati & Widyasari, 2022; Nurhayati et al., 2025). However, these outcomes are distinct from AQ as the primary outcome examined in the present study.

Although previous studies have investigated traditional games in relation to physical-motor development, social-emotional competencies, and resilience-related outcomes, these areas of research do not necessarily address adversity quotient as the primary outcome. For example, (Abidin & Asy'ari, 2024) examined *Sunda Manda* in relation to children's physical-motor development, whereas (Nurhayati et al., 2025) reviewed research on *engklek* and social-emotional development. These studies establish a relevant foundation for understanding the developmental potential of traditional games, while leaving a more specific question concerning changes in adversity quotient among young children participating in *Sunda Manda* activities (Hayani, 2023) . Thus, the research gap addressed by the present study concerns the examination of adversity quotient as an explicitly operationalized developmental construct, rather than a general claim that traditional games have not previously been studied.

Based on this research gap, the present study aimed to examine differences in the adversity quotient scores of children aged 5-6 years before and after participation in the traditional *Sunda Manda* game at Al-Azhar 22 Semarang Kindergarten. Adversity quotient was examined through four dimensions: Control, Origin and Ownership, Reach, and Endurance. The contribution of this study lies in examining pretest–posttest changes in these dimensions within a culturally rooted play context, complementing previous research that has primarily focused on physical-motor development or broader social-emotional outcomes. The findings may inform the development of culturally responsive play-based learning activities that provide children with opportunities to practice persistence, emotional regulation, responsibility, and adaptive responses to everyday challenges.

METHODS

Research Design

This study employed a pre-experimental, one-group pretest–posttest design to examine changes in children's Adversity Quotient (AQ) scores following participation in traditional Sunda Manda game activities. The children's AQ scores were measured before and after the intervention, and the two sets of scores were compared to determine whether a statistically significant difference occurred over the study period. As the study did not include a control or comparison group, the design was intended to examine changes in the participating children rather than establish a definitive causal effect of the intervention.

Participants and Research Setting

The study was conducted at Al-Azhar 22 Semarang Kindergarten, Semarang, Central Java, Indonesia. Participants comprised 23 children aged 5–6 years in Group B. The study focused on this age group because the children were participating in early childhood educational activities in which responses to challenges, persistence, and behavioral regulation could be observed during structured play.

Sunda Manda Intervention

The intervention consisted of 12 sessions of Sunda Manda activities, each lasting approximately 45 minutes. The activities were conducted over a three-month period and facilitated by the researcher together with the classroom teacher. The 23 children were organized into six small groups of three to four children.

The game patterns were drawn on a flat surface using chalk or colored tape. Small, flat objects, such as tile fragments or thick coins, served as markers. Each session began with an explanation and demonstration of the rules, followed by the main play activity and a closing activity. Children threw markers into designated squares and moved through the pattern by hopping on

one foot or using both feet where required. They were expected to follow the sequence of movements, avoid stepping on boundary lines, and observe the rules of the game. An unsuccessful attempt, such as throwing a marker outside the designated square, losing balance, or stepping on a boundary line, ended the child's turn. Children could participate in subsequent turns and attempt the activity again.

Research Instrument

Children's Adversity Quotient (AQ) was assessed using a 20-item observational instrument. Each item was rated on a four-point frequency scale ranging from 1 (*Never*) to 4 (*Always*), yielding a possible total score ranging from 20 to 80. Higher total scores represented more frequently observed AQ-related behaviors.

The instrument covered four dimensions: Control, Origin and Ownership, Reach, and Endurance. The total score was calculated by summing the item ratings. The same instrument and scoring approach were used at pre-assessment and post-assessment to support comparison between the two measurement occasions.

Data Collection Procedure

AQ observations were conducted before and after the Sunda Manda intervention. The same observational instrument and scoring scale were used at both assessment occasions. The pre-assessment provided the initial measurement, while the post-assessment was conducted after the intervention period to examine changes in the children's observed AQ scores.

Data Analysis

The quantitative data were analyzed using IBM SPSS Statistics, version 22. Descriptive statistics, including the mean, standard deviation, median, minimum, and maximum, were used to summarize pre-assessment and post-assessment scores. The Shapiro–Wilk test was used to examine the normality of the score distributions. A paired-samples *t*-test was then used to compare the children's pre-assessment and post-assessment AQ scores. Statistical significance was evaluated at the .05 level. The results were interpreted by considering both the magnitude of the observed score change and the limitations of the one-group pretest–posttest design.

RESULTS AND DISCUSSION

Result

Descriptive Statistics of Children's Adversity Quotient Scores

The study involved 23 children aged 5–6 years at Al-Azhar 22 Semarang Kindergarten, Indonesia. Children's Adversity Quotient (AQ) scores were assessed before and after participation in the Sunda Manda activities using a 20-item observational instrument. Each item was rated on a four-point frequency scale ranging from 1 (*Never*) to 4 (*Always*), yielding a possible total score ranging from 20 to 80.

The descriptive analysis showed that the mean AQ score increased from 43.83 (SD = 4.33) at pre-assessment to 54.61 (SD = 3.77) at post-assessment, representing a mean increase of 10.78 points. Pre-assessment scores ranged from 37 to 52, whereas post-assessment scores ranged from 48 to 63. The median score increased from 43 at pre-assessment to 56 at post-assessment. All 23 children obtained higher scores at post-assessment than at pre-assessment.

Table 1. Descriptive Statistics of Children's Adversity Quotient Scores

Assessment	N	Mean	SD	Median	Minimum	Maximum
Pre-assessment	23	43.83	4.33	43	37	52
Post-assessment	23	54.61	3.77	56	48	63

Note. N = number of participants; SD = sample standard deviation.

The descriptive results indicate an increase in the average AQ score after participation in the intervention. However, descriptive statistics alone cannot determine whether the difference between the two measurements is statistically significant. Therefore, distributional assumptions were examined before selecting the appropriate inferential test.

Distribution of AQ Score Categories

Based on the score classification documented in the study records, scores of 20–40 were categorized as low, scores of 41–60 as moderate, and scores of 61–80 as high. At pre-assessment, five children (21.7%) were classified in the low category and 18 children (78.3%) in the moderate category. No children were classified in the high category. At post-assessment, 21 children (91.3%) were classified in the moderate category and two children (8.7%) in the high category. No children were classified in the low category.

Table 2. Distribution of AQ Score Categories Before and After the Intervention

AQ category	Pre-assessment, n (%)	Post-assessment, n (%)
Low (20–40)	5 (21.7%)	0 (0.0%)
Moderate (41–60)	18 (78.3%)	21 (91.3%)
High (61–80)	0 (0.0%)	2 (8.7%)
Total	23 (100%)	23 (100%)

Note. Categories follow the score classification documented in the study records.

Normality Test

The Shapiro–Wilk test was used to examine the distributions of the pre-assessment scores and post-assessment scores. The pre-assessment scores did not significantly depart from normality ($W = 0.957$, $p = .402$), and the post-assessment scores also did not significantly depart from normality ($W = 0.955$, $p = .368$). These results indicate that both score distributions were consistent with the normality assumption. The paired-samples *t*-test was used to compare the pre-assessment and post-assessment scores.

Table 3. Results of the Shapiro-Wilk Normality Test

Variable	Shapiro–Wilk statistic	N	*p*-value
Pre-assessment	0.957	23	.402
Post-assessment	0.955	23	.368

Note. The significance level was set at $\alpha = .05$.

Comparison of Pre-Assessment and Post-Assessment Scores

A paired-samples *t*-test was conducted to examine the difference between children's AQ scores before and after participation in the Sunda Manda activities. The results indicated a statistically significant difference between pre-assessment and post-assessment scores, $t(22) = -13.734$, $p < .001$. The mean difference, calculated as pre-assessment minus post-assessment, was −10.78 points (95% CI [−12.41, −9.15]). This result indicates that the children's observed AQ scores were higher at post-assessment than at pre-assessment.

Table 4. Results of the Paired-Samples *t*-Test

Comparison	N	Mean difference (Pre − Post)	95% CI	*t*	df	*p*-value
Pre-assessment vs. post-assessment	23	−10.78	[−12.41, −9.15]	−13.734	22	< .001

Note. CI = confidence interval. The mean difference was calculated as pre-assessment minus post-assessment. Statistical significance was evaluated at α = .05.

Hypothesis Testing

The hypothesis was tested using a paired-samples *t*-test to determine whether there was a statistically significant difference in children's AQ scores before and after participation in the Sunda Manda activities. The analysis revealed a statistically significant difference between the two assessment occasions, $t(22) = -13.734$, $p < .001$. Therefore, the null hypothesis stating that there was no difference between pre-assessment and post-assessment scores was rejected, and the alternative hypothesis was supported. The findings indicate that children's observed AQ scores were significantly higher after participation in the Sunda Manda activities. However, because the study employed a one-group pretest-posttest design without a comparison group, the findings demonstrate a change over the study period but do not establish that the intervention alone caused the observed increase.

Discussion

The present study examined changes in the Adversity Quotient (AQ) scores of children aged 5–6 years following participation in the traditional Sunda Manda game. The results showed an increase in children's total AQ scores between pre-assessment and post-assessment, accompanied by a statistically significant difference between the two measurements ($p < .001$). This pattern indicates that higher AQ-related behaviors were observed after the intervention. The finding is educationally relevant because young children regularly encounter challenges that require them to manage frustration, follow rules, respond to unsuccessful attempts, and continue activities despite difficulties. Nevertheless, the results should be interpreted as an improvement observed following participation in Sunda Manda rather than definitive evidence of a causal effect, given the absence of a comparison group.

The findings can be interpreted through (Stoltz, 2019) conceptualization of adversity quotient as an individual's capacity to respond to and deal with adversity. In this framework, AQ comprises Control, Origin and Ownership, Reach, and Endurance. These dimensions provide a theoretical lens for understanding why experiences involving manageable challenges may be relevant to young children's adaptive behavior. During Sunda Manda, children encounter rules, physical demands, unsuccessful attempts, and opportunities to participate again. Such experiences are conceptually related to responding

to difficulty, recognizing one's actions, limiting the impact of a setback, and sustaining effort (Darmawati & Widyasari, 2022) . However, because the present analysis was based on total AQ scores, the findings do not establish that each dimension improved independently. Stoltz's framework therefore helps interpret the overall pattern without serving as evidence that any particular dimension changed more than another.

The findings are broadly consistent with (Alotaibi, 2024) systematic review and meta-analysis of game-based learning in early childhood education. Across 136 included studies, the meta-analysis identified positive effects on social development ($g = 0.38$), emotional development ($g = 0.35$), cognitive development ($g = 0.46$), motivation ($g = 0.40$), and engagement ($g = 0.44$). These outcomes are not identical to AQ, but social and emotional competencies are relevant to children's responses to challenging situations. The present study adds a more specific perspective by examining total AQ scores in the context of a traditional physical game. At the same time, the broader evidence should not be taken to mean that all forms of play produce equivalent outcomes; the developmental implications of a game depend on its characteristics, implementation, and the outcome being assessed.

Evidence from studies of traditional games also provides a useful point of comparison. (Indriyani et al., 2021) investigated traditional engklek and puzzle games in relation to the social-emotional abilities of young children using a quasi-experimental pretest-posttest design with a comparison group. Both activities were associated with improvement, although the reported normalized gain was slightly higher for the puzzle group than for the engklek group. This finding is important because it suggests that traditional games can be useful learning contexts without necessarily being more effective than other structured activities. Compared with Indriyani's study, the present research focuses on AQ as its primary outcome rather than general social-emotional abilities. The two studies therefore offer complementary evidence about different developmental outcomes associated with play, rather than directly interchangeable evidence of the same effect.

Further contextual support comes from (Nurhayati et al., 2025), whose systematic literature review mapped research on engklek and social-emotional development in early childhood. The review discusses the relevance of traditional games to social interaction, emotional regulation, rule-following, and other social-emotional experiences. These areas overlap conceptually with behaviors that may be relevant to AQ, particularly when children face setbacks in shared activities. The present findings extend this line of inquiry by examining changes in total AQ scores after a structured series of Sunda Manda sessions. However, the relationship remains one of conceptual relevance: evidence concerning social-emotional development cannot, by itself, demonstrate that a traditional game improves AQ. The contribution of the present study lies in examining AQ directly as an outcome, while recognizing the need for further studies using designs that permit stronger comparisons.

One possible explanation for the observed increase concerns the structure of Sunda Manda itself. The game requires children to follow a sequence, aim a marker at a designated square, coordinate their movements, maintain balance, and avoid crossing boundary lines. These requirements introduce immediate and understandable challenges, with outcomes that children can observe directly. When an attempt is unsuccessful, the child may have another opportunity to participate during a subsequent turn. Repeated exposure to such situations may provide opportunities to practise responding to difficulty in a familiar play environment. This interpretation is consistent with the broader literature on game-based learning, but the present study did not isolate the game's individual components. It is therefore not possible to determine whether physical movement, rule-following, repeated attempts, peer interaction, or their combination was most closely associated with the observed change.

Stoltz's Control dimension offers one way to interpret the relevance of these experiences. Control concerns the extent to which individuals perceive or exercise control over their responses to difficult situations. In the context of Sunda Manda, children may encounter unsuccessful throws, loss of balance, or the need to stop a turn after violating a rule (Fitri et al., 2022) . These situations create opportunities to respond to disappointment and continue participating. However, an unsuccessful

attempt does not automatically lead to improved self-regulation. Children's responses may depend on their developmental characteristics, prior experiences, the reactions of peers, and the guidance provided by adults. Accordingly, the increase in total AQ scores is compatible with the possibility that children had opportunities to practise adaptive responses, but it does not independently demonstrate an improvement in the Control dimension.

The dimensions of Origin and Ownership, Reach, and Endurance provide additional conceptual perspectives. The immediate consequences of actions during Sunda Manda may create opportunities for children to recognize how their choices affect the progress of the game, which is relevant to age-appropriate responsibility. Similarly, an unsuccessful turn does not necessarily prevent a child from participating in subsequent turns; this feature may help situate a setback as a limited event rather than the end of the activity. Repeated opportunities to play may also encourage continued engagement after unsuccessful attempts. These characteristics are conceptually relevant to Origin and Ownership, Reach, and Endurance, respectively. Nevertheless, because dimension-level pretest and posttest scores were not available for separate analysis, these interpretations describe possible connections between the game's structure and Stoltz's framework. They should not be presented as empirical evidence of improvement in each individual dimension (Stoltz, 2019) .

The social context of the intervention may also be relevant. Children participated in small groups, waited for turns, observed other players, and experienced success and failure within a shared activity. Such circumstances can create opportunities to practise patience, respond to differences in performance, and continue participating alongside peers. Research on traditional games has similarly considered their potential relevance to social-emotional development (Barliana et al., 2024). However, peer interaction was not examined as an independent variable in the present study. It is therefore not possible to determine whether social interaction contributed to the change in AQ scores, or to separate its possible contribution from the physical and rule-based demands of the game. The social environment should be understood as a feature of the intervention that may warrant further investigation.

The findings also have implications for the use of culturally familiar play activities in early childhood education. Sunda Manda brings physical movement, rules, turn-taking, and repeated attempts together in an activity that can be adapted to children's developmental needs. Its educational relevance is not that a traditional game necessarily produces resilience or AQ, but that it can provide a context in which children encounter manageable challenges. Teachers may make such experiences more constructive by explaining rules clearly, modelling calm responses to mistakes, acknowledging children's efforts, and allowing children opportunities to participate again. These practices are plausible pedagogical implications of the game's structure, rather than mechanisms directly tested by this study. Further research is needed to determine which forms of facilitation are associated with stronger developmental outcomes.

Several methodological considerations should be taken into account when interpreting the findings. First, the study involved 23 children from a single kindergarten, which limits the extent to which the results can be generalized to children in other settings. Second, the one-group pretest-posttest design did not include a control or comparison group. Consequently, the analysis cannot rule out other explanations for the observed change, including normal development over time, familiarity with the assessment procedure, or concurrent experiences in the classroom. Third, the results were based on total AQ scores. The available data therefore do not allow conclusions about which of Stoltz's four dimensions contributed most to the overall increase. These limitations do not negate the observed difference, but they define the strength and scope of the conclusions that can reasonably be drawn.

Future studies could address these limitations by involving larger samples from multiple early childhood education settings and incorporating comparison groups or controlled intervention designs. Researchers could also report separate pretest and posttest scores for each AQ dimension, provided that the instrument and scoring procedures support such analysis. Follow-up assessments would help establish whether observed changes are maintained after the intervention ends. In addition, future studies

could examine the role of adult facilitation, peer interaction, and repeated opportunities to respond to challenges. Such approaches would help distinguish whether changes are associated with participation in the game itself, particular features of the activity, or the wider learning environment in which it is implemented.

Overall, this study provides preliminary evidence of increased observed AQ scores following participation in Sunda Manda activities among children aged 5-6 years. The findings complement existing research on game-based learning and traditional games by examining AQ as a specific outcome rather than treating it as synonymous with general social-emotional development. Interpreted through Stoltz's framework, Sunda Manda offers a plausible context in which children can encounter and respond to manageable challenges. Nevertheless, the current findings do not establish a definitive causal effect or demonstrate separate improvements across the four AQ dimensions. The principal contribution of the study is therefore to provide an initial empirical basis for further investigation of culturally familiar traditional games in relation to AQ in early childhood education.

Limitations and Directions for Future Research

Several limitations should be considered when interpreting the findings. First, the study used a one-group pretest–posttest design without a comparison group. Consequently, the increase in AQ scores cannot be attributed exclusively to Sunda Manda because maturation, repeated exposure to the assessment, other classroom experiences, or changes in adult support may also have contributed to the observed difference. Second, the sample consisted of 23 children from one kindergarten, which limits the generalizability of the findings to other early childhood settings. Third, the available results concerned total AQ scores; separate changes in Control, Origin and Ownership, Reach, and Endurance were not established through dimension-specific analyses.

Fourth, the use of observational ratings introduces the possibility that judgments may be influenced by observer expectations or the context in which the behavior occurs. Future research should report inter-rater reliability, provide clear operational definitions for each item, and use independent observers where feasible. Fifth, the current results do not establish whether the observed changes were maintained over time or transferred to situations outside the game. Follow-up assessments and observations in other learning contexts would help address these questions.

Future studies should use quasi-experimental or randomized controlled designs with comparison groups, larger and more diverse samples, and clearly documented intervention procedures. Researchers should also report intervention fidelity, analyze changes across the four AQ dimensions, and examine whether structured reflection, teacher facilitation, or peer interaction contributes to observed outcomes. Such research would help clarify whether Sunda Manda and other traditional games can support the development of adaptive responses to challenges in early childhood, and under what conditions these activities may be most beneficial.

In conclusion, the recovered data indicate that children's observed AQ scores were higher after participation in Sunda Manda activities. The result is theoretically consistent with the possibility that rule-governed traditional play provides opportunities to practice persistence, behavioral regulation, responsibility, and constructive responses to unsuccessful attempts. However, given the study design and sample, the findings should be regarded as preliminary evidence of change following participation, not definitive proof of a causal effect.

CONCLUSION

This study examined changes in the Adversity Quotient (AQ) scores of children aged 5–6 years following participation in the traditional Sunda Manda game. The mean AQ score increased from 43.83 (SD = 4.33) before the intervention to 54.61 (SD = 3.77) afterward, representing a mean increase of 10.78 points. The paired-samples analysis indicated a statistically significant difference between pretest and posttest scores ($p < .001$). These findings suggest that participation in structured Sunda Manda activities was associated with higher observed AQ scores among the participating children. However,

the one-group pretest–posttest design, small sample, and single-school setting limit causal interpretation and generalizability. Future research should involve larger samples and comparison groups to examine the contribution of traditional games to AQ development in early childhood more rigorously.

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