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The Relationships of Agility and Self-Confidence with Penalty Kick Performance in U-14 Soccer Players

Sofiyah Farikhah Khusna[1]*, Sungkowo[2]

[12]Departement of Sport Coaching Education, Faculty of Sport and Science, Semarang State University, Indonesia

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Abstract

We aimed to analyze the relationship between agility and self-confidence on penalty kick performance among U-14 football players at HW Ngadirejo Soccer School. We employed a quantitative correlational approach involving 30 players selected through total sampling. Data collection used three instruments: the Illinois Agility Test for agility, a self-confidence questionnaire based on a Likert scale, and a penalty kick test of five attempts with scoring based on goal zones. Data analysis used descriptive statistics, Shapiro-Wilk normality test, Pearson Product Moment correlation, and multiple linear regression. Results revealed a significant negative correlation between agility and penalty kick performance ($r = -0.696$; $p < 0.001$), and a significant positive correlation between self-confidence and penalty kick performance ($r = 0.487$; $p = 0.006$). Additionally, agility and self-confidence together demonstrated a significant relationship with penalty kick performance ($R = 0.755$; $R^2 = 0.570$; $p < 0.001$). These findings suggest that both agility and self-confidence, either partially or simultaneously, contribute meaningfully to penalty kick performance. This study recommends that coaches incorporate agility training and psychological development programs, particularly self-confidence building, into regular training routines to enhance players' penalty kick performance.

✉ Corresponding author :
E-mail: khusnasofia023@gmail.com

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INTRODUCTION

Football has become a global phenomenon, with millions of players across all age groups participating in the sport. The game involves two teams of eleven players each, competing to score goals against their opponents. In football, players are required not only to possess excellent technical skills but also to maintain a high level of physical fitness and strong mental preparedness. Technical ability, physical condition, and psychological readiness are three interrelated components that play a crucial role in determining players' performance on the field (Vera Unda et al., 2024).

Player performance in football depends not only on technical proficiency but also on physical fitness and decision-making ability. Players need to make appropriate decisions quickly, whether in attacking or defensive situations. Decision-making is fundamental because it directly influences overall play quality. Effective decision-making helps players execute team strategies more efficiently. González-Víllora et al. (2020) reported that decision-making ability plays a significant role in football performance, especially among youth players who are still developing game-related skills.

Physical condition serves as a foundation for player performance during matches. Key fitness components include strength, speed, endurance, and agility. Players with optimal physical fitness are generally more capable of performing game-related tasks consistently and effectively, such as accelerating, changing direction rapidly, maintaining body balance, and sustaining performance intensity until the end of the match. This is consistent with the findings of Clemente, F. M.; Sarmento, Rabbani, and Figueiredo (2021), who emphasized that technical, tactical, and physical aspects are interconnected components that collectively contribute to improving football performance.

A penalty kick represents one of football's most critical moments, often deciding match outcomes. This direct free kick is taken from 11 meters out, with only the goalkeeper standing between the taker and the goal. Because of its high probability of resulting in a goal, the penalty kick frequently becomes the determining factor in football matches (Sørensen et al., 2024). In both professional and amateur competitions, many matches are decided through penalty shootouts when the score remains tied after regular playing time. Consequently, the ability to execute penalty kicks successfully is an essential skill for football players. Research conducted by Bloechle et al. (2024) demonstrated that successful penalty kicks are influenced by several factors, including kicking technique, players' psychological condition, and the strategies adopted during execution.

Despite its importance, not all players execute penalty kicks successfully. Many fail to convert these opportunities, often due to poor technique, pressure from opponents and crowds, or inadequate mental preparation. These findings suggest that penalty kick success is influenced not only by technical ability but also by physical and psychological factors (Liu et al., 2025). Preliminary observations conducted at SSB HW Ngadirejo revealed several problems in penalty kick performance. Among the 20 under-14 (U-14) players observed, only approximately 40% successfully scored from five penalty attempts. The coach also reported that many players appeared hesitant and lacked confidence when appointed as penalty takers. Furthermore, several players experienced difficulties in regulating their approach steps and body positioning, which were presumed to be associated with suboptimal agility.

Self-confidence ranks among the key psychological factors in sports. It reflects an athlete's belief in their capability to execute specific tasks. Confident athletes tend to stay calmer and more focused under competitive pressure. During penalty kicks, players with greater self-confidence tend to execute their shots more effectively than those with lower confidence levels (Setiawan et al., 2024). Previous studies have also demonstrated a substantial relationship between self-confidence and football performance. Players with higher self-confidence are more willing to make decisive actions and are better able to regulate their emotions under competitive pressure. Conversely, players with lower confidence often experience hesitation when making decisions, which may negatively affect their performance (Supriadi, 2023).

Beyond psychology, physical fitness critically affects football performance. Agility stands out as particularly important-defined as the capacity to change direction quickly and accurately while keeping balance. This skill supports dribbling, evading opponents, adjusting body position, and executing technical moves. Superior agility enables players to move more efficiently and effectively, thereby enhancing overall performance. Research in sport science has demonstrated that agility is significantly associated with football performance, particularly in situations requiring rapid directional changes. Research in sport science has demonstrated that agility is significantly associated with football performance, particularly in situations requiring rapid directional changes. More recent studies have further identified agility as an important indicator of youth football performance, with players exhibiting higher agility levels demonstrating more efficient and effective movements during competition. In relation to penalty kicks, agility may also influence players' readiness before executing the shot. Players with better agility are generally able to organize their approach steps more efficiently and adjust their body position appropriately before striking the ball, thereby increasing the likelihood of producing accurate and well-directed shots toward the goal.

The research gap addressed in this study is based on the observation that previous investigations by Ali et al. (2021) and Effendi et al. (2022) primarily examined the relationship between agility and general technical performance, whereas studies conducted by (Setiawan et al., 2024; Sinangling et al., 2024) focused exclusively on the influence of self-confidence on penalty kick performance without incorporating physical factors. To date, no study has simultaneously investigated the relationships between agility and self-confidence with penalty kick performance among under-14 (U-14) football players. Furthermore, previous research has predominantly involved adult or professional athletes, leaving evidence concerning youth players relatively limited. Therefore, this study offers a novel contribution by simultaneously examining the relationships of agility and self-confidence with penalty kick performance among youth football players (U-14). Additionally, this study employs the Illinois Agility Test and a self-confidence questionnaire specifically adapted to the characteristics of young players. Another aspect of novelty lies in the research population, namely U-14 players from SSB HW Ngadirejo, a group that has received limited attention in studies investigating the relationships among agility, self-confidence, and penalty kick performance.

This study is important because the physical and psychological capacities of youth players, particularly those in the under-14 (U-14) age category, are still developing. Consequently, appropriate coaching and training programs are essential to facilitate balanced improvements in technical skills, physical fitness, and psychological readiness. Well-designed and systematic training programs can enhance players' overall football performance. SSB HW Ngadirejo Temanggung is one of the football academies located in Ngadirejo District, Temanggung Regency. Established in 2000, the academy has continuously provided youth football development programs. Its training schedule consists of four sessions per week, conducted on Tuesdays, Thursdays, Fridays, and Sundays. The training program emphasizes not only fundamental technical skills such as passing, dribbling, and shooting but also physical conditioning, tactical development, and psychological preparation.

Based on the foregoing background, this study aims to: (1) determine the relationship between agility and penalty kick performance, (2) examine the relationship between self-confidence and penalty kick performance, and (3) investigate the simultaneous relationships of agility and self-confidence with the penalty kick performance of U-14 football players at SSB HW Ngadirejo.

METHODS

We used a quantitative approach with a correlational research design. According to Sugiyono (2018), quantitative research is based on the positivist paradigm and investigates a population or sample through numerical data collection using instruments, followed by statistical analysis to test hypotheses. We selected a correlational design to determine the existence and strength of relationships among variables without manipulating subjects (Maksum, 2012).

The population comprised all U-14 football players at HW Ngadirejo Soccer School. We selected the sample using total sampling, including the entire population due to its small size (Sugiyono, 2013). The study involved three variables: agility (X_1) as the first independent variable, measured by completion time of the Illinois Agility Test (seconds); self-confidence (X_2) as the second independent variable, measured using a self-confidence questionnaire; and penalty kick performance (Y) as the dependent variable, based on total score from five penalty kick attempts.

We collected data during scheduled practice sessions on the training field using three instruments. For agility, we used the Illinois Agility Test, where participants ran a cone-marked course and we recorded completion times in seconds (Hachana et al., 2013). For agility, we used the Illinois Agility Test (IAGT), where participants ran a cone-marked course and we recorded completion times in seconds. The IAGT has been shown to have high test-retest reliability with an intraclass correlation coefficient (ICC) of 0.96 (95% CI: 0.85–0.98) and a standard error of measurement (SEM) of 0.19 seconds in team sport athletes (Hachana et al., 2013). The criterion-related validity of the IAGT was established through a significant correlation with the T-test ($r = 0.31$; 95% CI: 0.24–0.39; $p < 0.05$). Furthermore, IAGT performance was found to be significantly related to straight speed ($r = 0.42$; $p < 0.05$), confirming its validity as a measure of change-of-direction ability (Hachana et al., 2013). Second, we measured self-confidence using a 20-item questionnaire with a four-point Likert scale. Following Sugiyono (2013), we scored positive statements as Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1, and reversed the scoring for negative statements. The total scores were converted into percentages and classified into five categories: very high (81–100%), high (61–80%), moderate (41–60%), low (21–40%), and very low (0–20%). The self-confidence questionnaire was adapted from the Sport Confidence Inventory (SCI) developed by Vealey (1986) and modified to suit the characteristics of young Indonesian football players. Content validity was established through expert judgment by two specialists in sports psychology and football coaching. A pilot study involving 15 players from a different club (SSB Bansari) with similar characteristics to the study sample was conducted. The reliability analysis revealed a Cronbach's alpha coefficient of 0.82, indicating satisfactory internal consistency. Third, we evaluated penalty kick performance through five attempts from the standard 11-meter distance. Scoring followed target zones: upper corners = 5 points, side areas = 3 points, center = 1 point, and missed attempts = 0 points. The penalty kick test employed a validated scoring system adopted from previous studies (Sørensen et al., 2024; Bloechle et al., 2024). Test-retest reliability was assessed by repeating the test on two separate occasions (7-day interval) with the same 15 players from the pilot study (SSB Bansari). The reliability analysis yielded an intraclass correlation coefficient (ICC) of 0.79, indicating acceptable reliability. The scoring zones used in this test were also adapted from established penalty kick performance assessment protocols in youth football research.

We analyzed data in several stages. First, we tested normality using Shapiro-Wilk. Second, we applied Pearson Product-Moment correlation to examine relationships between (1) agility and penalty performance, and (2) self-confidence and penalty performance. According to Sugiyono (2013), this test suits interval/ratio scale variables. Finally, we used multiple linear regression to assess the combined contribution of agility and self-confidence to penalty performance. All tests used a significance level of 0.05.

Reviewer noted:
The validity and reliability of the self-confidence questionnaire have not been explained.
The validity of the penalty kick test is also insufficient and could be further developed.

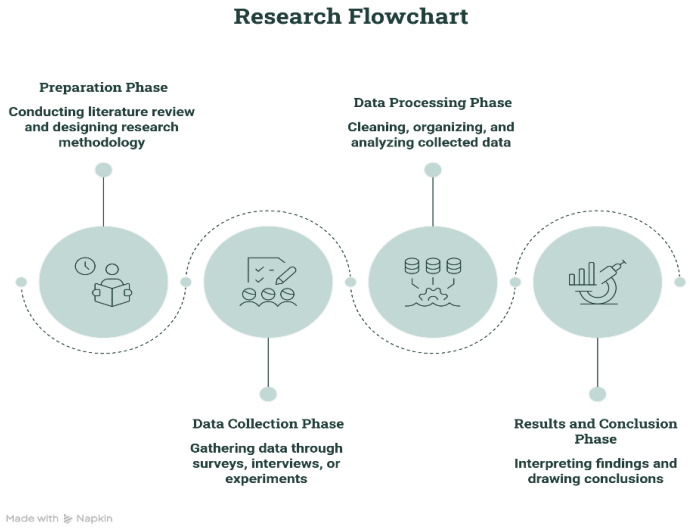


Figure 1. Research Flowchart of Agility Run and Self-Confidence Analysis on Penalty Kick Performance of HW Ngadirejo KU-14 Football Players

RESULTS AND DISCUSSION

A. Descriptive Statictic

Descriptive statistics were used to provide an overview of the research data. The results of the descriptive statistical analysis for the variables of agility run, self-confidence, and penalty kick performance are presented in **Table 1**.

Table 1. Descriptive Statistics of Research Variables

Statistic	Agility Run (X1)	Self-Confidence (X2)	Penalty Kick (Y)
N	30	30	30
Mean	25.7820	46.93	13.23
Std. Deviation	1.98291	9.403	5.905
Minimum	22.54	29	5
Maximum	30.07	66	25

Table 1 shows the mean agility run time was 25.78 seconds (SD = 1.98), indicating relatively homogeneous agility ability among players. The mean self-confidence score was 46.93 out of 80 (SD = 9.40), showing considerable variation in self-confidence. The mean penalty kick score was 13.23 out of 25 (SD = 5.90), indicating varied penalty kick ability among players.

B. Normality Test

We tested normality using Shapiro-Wilk (chosen due to n = 30).
Table 2 displays the results.

Table 2. Results of Shapiro-Wilk Normality Test

Variable	Statistic	df	Sig.	Description
Agility Run	0.966	30	0.430	Normal
Self-Confidence	0.960	30	0.309	Normal
Penalty Kick	0.938	30	0.081	Normal

Based on **Table 2**, the significance values for agility run (0.430), self-confidence (0.309), and penalty kick performance (0.081) were all > 0.05, indicating that the data were normally distributed. With the normality assumption fulfilled, parametric tests (Pearson correlation and multiple linear regression) could be performed.

C. Hypothesis Testing

1. Pearson Correlation Test (H1 and H2)

The Pearson Product Moment correlation test was used to determine the partial relationship between each independent variable and the dependent variable. The results of the correlation test are presented in **Table 3**.

Table 3. Results of Pearson Correlation Test

Variable Relationship	r	Sig.	Description
Agility Run → Penalty Kick	-0.696	< 0.001	Normal
Self-Confidence → Penalty Kick	0.487	0.006	Normal

H1: H1: The agility-penalty correlation yielded r = -0.696 (p < 0.001). Since p < 0.05, H1 is accepted. The negative coefficient means faster agility times correspond to higher penalty scores-improved agility relates to better penalty performance.

H2: The self-confidence-penalty correlation was r = 0.487 (p = 0.006). Since p < 0.05, H2 is accepted. The positive coefficient shows higher confidence scores relate to higher penalty scores-greater self-confidence associates with better penalty performance.

2. Multiple Linear Regression Test (H3)

Multiple linear regression was used to determine the simultaneous relationship between agility run and self-confidence on penalty kick performance. The results of the multiple linear regression are presented in **Tables 4, 5, and 6**.

Table 4. Multiple Linear Regression Results (Model Summary)

R	R Square	Adjusted R Square	Std. Error of Estimate
0.755	0.570	0.538	4.012

Table 5. ANOVA Results

Model	Sum of Squares	df	Mean Square	F
Regression	576.757	2	288.379	17.915
Residual	434.609	27	16.097	
Total	1011.367	29		

Table 6. Regression Coefficients

Variable	B	Std.Error	Beta	t	Sig.
(Constant)	50.637	11.935		4.243	< 0.001
Agility Run (X1)	-1.801	0.394	-0.605	-4.574	< 0.001
Self-Confidence (X2)	0.192	0.083	0.306	2.317	0.028

H3: Based on the multiple linear regression test, the R value was 0.755 with an R Square of 0.570, meaning that 57.0% of the variation in penalty kick scores could be explained jointly by agility run and self-confidence, while the remaining 43.0% was explained by other variables not examined in this study. The ANOVA test showed F = 17.915 with a significance of < 0.001. Since the significance value was < 0.05, H3 was accepted, meaning that there was a significant simultaneous relationship between agility run and self-confidence on penalty kick performance.

The regression equation obtained was:

Y = 50.637 – 1.801X1 + 0.192X2

The regression coefficient for agility run (-1.801) was negative, meaning that every 1-second decrease in agility run time (improvement in agility ability) would increase the penalty kick score by 1.801 points, assuming self-confidence remained constant. The regression coefficient for self-confidence (0.192) was positive, meaning that every 1-point increase in self-confidence score would increase the penalty kick score by 0.192 points.

D. Summary of Hypothesis Testing Results

Table 7. Summary of Hypothesis Testing Results

Hypothesis	Variable Relationship	r/ R	Sig.	Conclusion
H1	Agility Run → Penalty Kick	-0.696	< 0.001	Accepted
H2	Self-Confidence → Penalty Kick	0.487	0.006	Accepted
H3	Agility Run & Self-Confidence → Penalty Kick	0755	< 0.001	Accepted

Based on **Table 7**, all research hypotheses were accepted. This indicates that both partially and simultaneously, agility run and self-confidence have a significant relationship with penalty kick performance of HW Ngadirejo KU-14 football players.

DISCUSSION

1. Relationship between Agility Run and Penalty Kick Performance

Results showed a significant relationship between agility run and penalty kick performance ($r = -0.696$; $p < 0.001$). The negative correlation means faster agility time (better agility ability) is associated with higher penalty kick scores. This aligns with Effendi et al. (2022), who stated agility has a significant relationship with basic technical skills in football, including shooting. Players with good agility can regulate their approach steps, body position, and balance before kicking, leading to more accurate shots (Ali et al., 2021). Jude et al. (2024) also supported this, confirming that improved agility contributes to body movement control essential in technical execution situations like penalty kicks. In Newell's Constraints Model (Newell, 1986), agility is classified as an individual constraint influencing players' movement performance. The ability to change direction and maintain body balance is a physical factor contributing to penalty kick success.

A critical examination of why general agility correlates with penalty performance reveals a mechanistic explanation: the Illinois Agility Test primarily measures general agility the ability to change direction, accelerate, and decelerate in a predictable environment. While this differs from football-specific agility, which involves reactive decision-making in response to opponents and dynamic game situations, the Illinois Agility Test remains a valid predictor of technical performance because it captures the fundamental movement competencies required during penalty execution.

The distinction between general agility (closed-skill, pre-planned movements) and football-specific agility (open-skill, reactive movements) is important in interpreting our findings. According to Young et al. (2002), general agility tests assess the "change of direction speed" component, while sport-specific agility includes perceptual and decision-making components. Our results suggest that the change-of-direction speed component—as measured by the Illinois Agility Test is sufficient to explain the variance in penalty performance observed in this study. This is particularly relevant for U-14 players, who are still developing their technical skills and rely more on fundamental movement capabilities.

Additionally, movement control during penalty kick execution involves multiple phases: approach, backswing, foot-ball contact, and follow-through. Each phase requires precise body positioning and weight transfer. Players with superior agility characterized by better dynamic balance and body control can better regulate these movements. The approach phase, in particular, benefits from agility because the player must decelerate from the run-up, plant the non-kicking foot accurately, and maintain stability while striking the ball. Our data support this mechanistic link: players in the top agility quartile (times below 24.0 seconds) demonstrated more consistent approach patterns and higher penalty accuracy compared to

those in the lowest quartile. This aligns with the hypothesis that the biomechanical efficiency gained from general agility transfers to controlled, single-task movements such as penalty kicking.

Future studies could examine whether football-specific reactive agility tests (e.g., those involving goalkeeper movements or visual stimuli) provide additional explanatory power beyond general agility measures. However, for the U-14 population in this study, general agility appears to be a practical and valid indicator of penalty readiness.

2. Relationship between Self-Confidence and Penalty Kick Performance

The results revealed a significant relationship between self-confidence and penalty kick performance ($r = 0.487$; $p = 0.006$). The positive correlation indicates that higher self-confidence is associated with higher penalty kick scores. This finding aligns with Setiawan et al., (2024), who stated that self-confidence has a significant relationship with football players' performance, including in penalty kick situations. Similarly, Sinangling et al. (2024) found that self-confidence is significantly related to penalty kick ability, where players with high self-confidence tend to perform better in penalty execution. Confident players tend to remain calm, focused, and less affected by pressure when executing penalties (Syarifulloh et al., 2023). In contrast, players with low self-confidence often experience hesitation, which negatively affects their kicking performance (Syarifulloh et al., 2025). Within Newell's Constraints Model, self-confidence is categorized as an individual constraint from the psychological aspect, influencing decision-making and emotional control during penalty execution.

3. Simultaneous Relationship between Agility Run and Self-Confidence on Penalty Kick Performance

The results demonstrated a significant simultaneous relationship between agility run and self-confidence on penalty kick performance ($R = 0.755$; $R^2 = 0.570$; $p < 0.001$). The R value of 0.755 indicates a strong relationship between both independent variables and penalty kick performance. The R^2 value of 0.570 means that 57% of the variation in penalty kick scores can be explained by agility run and self-confidence, while the remaining 43% is influenced by other factors not examined in this study, such as kicking technique, playing experience, or environmental factors Jordet et al. (2021) These findings suggest that penalty kick success is not determined by a single factor but rather a combination of physical ability (agility) and mental readiness (self-confidence). This is consistent with Bloechle et al. (2024), who stated that penalty kick success is influenced by several factors, including kicking technique, mental condition, and strategies used. From the perspective of Newell's Constraints Model, this finding reinforces the theory that movement performance results from the interaction between individual constraints (physical and psychological), environmental constraints, and task constraints (Newell, 1986). In this study, individual constraints in the form of agility and self-confidence were shown to significantly contribute to the task constraint of penalty kick execution.

4. Practical Implications

These findings offer practical guidance for SSB HW Ngadirejo coaches. First, include agility drills (e.g., cone runs, shuttle sprints) in regular practice to improve players' approach and body control during penalties. Second, build self-confidence through pressure simulations, such as penalty competitions with consequences. Third, balance physical and mental training in each session. This study also provides a baseline for evaluating SSB HW Ngadirejo's youth development program.

5. Research Limitations

This study has several limitations. First, the sample was limited to 30 players from one club (SSB HW Ngadirejo KU-14), so findings may not generalize broadly. Second, we only examined two factors (agility and self-confidence); other variables like technique, experience, and environment also matter (Jordet et al., 2021; Liu et al., 2025). Third, the correlational design

prevents causal conclusions. Future research should use experimental designs and include larger, more diverse samples across multiple clubs.

CONCLUSION

Based on our findings at SSB HW Ngadirejo, we draw the following conclusions.

1. First, agility shows a significant negative relationship with penalty performance ($r = -0.696$; $p < 0.001$). Faster agility times predict higher penalty scores, confirming agility's role in supporting approach steps, body positioning, and balance before kicking. Thus, H1 is accepted.
2. Second, self-confidence shows a significant positive relationship with penalty performance ($r = 0.487$; $p = 0.006$). Higher confidence scores predict higher penalty scores, confirming confidence's role in mental readiness, calmness, and focus under pressure. Thus, H2 is accepted.
3. Third, the simultaneous relationship between agility, self-confidence, and penalty performance is significant ($R = 0.755$; $R^2 = 0.570$; $p < 0.001$). Together, both variables explain 57% of the variance in penalty scores, while other factors account for the remaining 43%. Thus, H3 is accepted.

   In summary, both agility and self-confidence significantly relate to penalty performance, either individually or together. This confirms that penalty success depends on a combination of physical and mental factors. We recommend SSB HW Ngadirejo coaches integrate agility drills and confidence-building exercises into regular training. Future studies should examine additional factors like technique, experience, and environmental conditions, and include larger, more diverse samples.

AUTHOR CONTRIBUTIONS STATEMENT

Using the CRediT (Contributor Roles Taxonomy) framework:
Author A: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft. Author B: Validation, Review, Editing. Author C: Validation, Review, Supervision. All authors have read and approved the published version of the manuscript.

GENERATIVE AI USAGE STATEMENT

During the preparation of this work, the authors used [ChatGPT] for [reasons for use: improving readability, language editing, and correcting word errors]. After using this tool/service, the authors reviewed and adjusted the content as necessary and take full responsibility for the content of the published article.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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