



Performance differences between winning and losing teams in the CONCACAF gold cup (2017–2025)

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ABSTRACT

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To date, research into CONCACAF football competitions is limited. This study investigates the technical and tactical key performance indicators (KPIs) that differentiate winning and losing teams in the CONCACAF Men's Gold Cup from 2017 to 2025. Using a quantitative, observational design and Hudl Wyscout event data, matches were analysed across phases of play, including in possession, defensive and attacking transitions, out-of-possession, and set pieces. Mann–Whitney U tests were used to compare performances across the full dataset and between group and knockout stages. Results demonstrate that winning teams consistently outperform losing teams across multiple KPIs, including goals, expected goals (xG), shot quality, penalty-area entries, and passing efficiency. Possession quality, rather than volume, emerged as a critical determinant of success, with effective progression into advanced areas strongly associated with positive outcomes. Winning teams also exhibited greater pressing intensity, more high recoveries, and more effective counter-attacks, while set-piece efficiency further distinguished success. Importantly, winning teams created performance gaps across phases and styles of play, rather than relying on a single playing style. As tournaments progressed into knockout stages, performance differences narrowed, with outcomes increasingly determined by efficiency and execution in decisive moments. These findings highlight the importance of integrated, multi-phase tactical approaches in CONCACAF contexts and provide applied insights for coaches, analysts, and practitioners seeking to optimise tactical preparation, match strategy, and performance evaluation in elite international tournament football.

Contribution/Originality: This study contributes to existing literature by providing the first longitudinal, phase-based analysis of performance indicators in the CONCACAF Gold Cup (2017–2025). It offers new insights into how tactical efficiency across match phases influences success and enhances understanding of the key determinants of performance in elite international tournament football.

1. INTRODUCTION

The Confederation of North, Central America, and Caribbean Association Football (CONCACAF) is responsible for overseeing football in this region and is one of six continental confederations under FIFA. The CONCACAF Men's Gold Cup represents the region's premier international tournament, providing a competitive platform for both established footballing nations and emerging teams on a biennial basis.

Since 2017, the CONCACAF Men's Gold Cup has evolved in both scope and competitive complexity. The introduction of structured qualification pathways, increased federation investment, the inclusion of guest nations,

and growing competitive parity have contributed to greater tactical diversity within the tournament. While traditional powerhouses such as Mexico and the United States continue to dominate historically, nations including Panama and Jamaica, as well as guest teams such as Qatar (2021, 2023) and Saudi Arabia (2025), have increasingly challenged established hierarchies through distinct tactical approaches and game models. Despite these developments, empirical research examining performance trends within the CONCACAF Gold Cup remains limited, particularly when compared to the FIFA World Cup and UEFA European Championship (Castellano, Casamichana, & Lago, 2012; FIFA, 2018, 2022; Lago-Peñas, Lago-Ballesteros, Dellal, & Gómez, 2010; UEFA, 2026).

The lack of region-specific, longitudinal analysis restricts practitioners' ability to tailor tactical preparation and performance strategies to the contextual demands of CONCACAF competition. Tournament football in this confederation is characterised by diverse playing styles, variable environmental conditions, and limited preparation time, all of which may influence the performance indicators associated with success (Carling, Williams, & Reilly, 2005; Lago-Peñas, & Dellal, 2010; Nassis, Brito, Dvorak, Chalabi, & Racinais, 2015). Identifying the key performance indicators (KPIs) that differentiate winning and losing teams can be essential for informing evidence-based coaching practice, performance analysis, player development, and tournament preparation (Hughes & Bartlett, 2002; Sarmiento et al., 2014; Tenga, Holme, Ronglan, & Bahr, 2010) providing justification for research within the CONCACAF region. Accordingly, the purpose of this study was to identify the technical and tactical performance indicators that differentiate winning and losing teams in the CONCACAF Men's Gold Cup, and to examine how these indicators vary across tournament stages (Group stage vs. knockout stage) and phases of play. Specifically, the study addressed the following research questions:

1. Which performance indicators significantly differentiate winning and losing teams across all CONCACAF Gold Cup matches?
2. Which phases of play are most strongly associated with match success in tournament football?
3. How do winning performances evolve as teams progress from the group stage to the knockout stage?
4. What are the key themes within CONCACAF Gold Cup data that practitioners can use to inform practice?

1.1. Tactical Concepts and Game Models

The development of a shared mental model, commonly referred to as a game model, is a foundational element of contemporary coaching practice. A game model enables coaches to articulate a coherent vision of play that integrates tactical principles, preferred systems and styles of play, scientific insights, and pedagogical frameworks (Delgado-Bordonau, Mendez-Villanueva, & Bishop, 2012; Richards, Collins, & Mascarenhas, 2017; Tee, Ashford, & Piggott, 2018; Walsh, 2025). By providing an overarching tactical approach, the game model allows coaches to operationalise principles consistently across team, unit, and individual levels.

Game models function as a bridge between abstract tactical ideas and observable match behaviours. Systems and styles of play represent applied actions of the game model and can be evaluated through KPIs. In international football, game models are particularly heterogeneous compared to domestic leagues, as teams face varied opponents, compressed preparation time, and divergent tactical cultures. Within the CONCACAF region, tactical approaches are strongly influenced by European and South American football due to player migration patterns and coaching exchange, contributing to stylistic diversity across national teams (Elliott & Harris, 2015; Poli, Besson, & Ravenel, 2024).

1.2. Styles of Play

A style of play describes a team's characteristic behaviours when attacking and defending, expressed through associated strategies and tactics (Fernandez-Navarro, Fradua, Zubillaga, Ford, & McRobert, 2016; Fernandez-Navarro, Fradua, Zubillaga, & McRobert, 2018; Hewitt, Greenham, & Norton, 2016). Strategies represent

overarching plans to achieve competitive objectives, while tactics refer to the specific means by which these strategies are executed (Carling et al., 2005; Gréhaigne & Godbout, 1995; Gréhaigne, Godbout, & Bouthier, 1999; Yiannakos & Armatas, 2006).

Teams typically employ distinct styles of play in attacking in possession phases, defensive out of possession phases and transitions between in and out of possession phase. Attacking styles are commonly classified as possession-based, direct, or counter-attacking, while defensive styles are often defined by pressing height, such as high press, mid-block, or low block (Fernandez-Navarro et al., 2016; Hewitt et al., 2016; Hughes & Franks, 2005; Redwood-Brown, 2008; Ruiz-Ruiz, Fradua, Fernández-García, & Zubillaga, 2013; Tenga & Sigmundstad, 2011; Travassos, Davids, Araújo, & Esteves, 2013). Although these categories are frequently presented as discrete, empirical research indicates that teams often adopt hybrid or adaptive approaches depending on match context, opponent strength, scoreline, and tournament stage.

1.3. Key Performance Indicators in Tournament Football

A substantial body of research has sought to identify KPIs that differentiate winning and losing teams in international tournaments. These investigations have progressively shifted from descriptive match statistics toward more context-sensitive and value-based performance indicators (McGillick, Towlson, Barrett, & Toner, 2024). Contemporary research therefore, emphasises not only what actions occur, but where, when, and under what tactical conditions they occur, particularly in tournament contexts characterised by compressed schedules and heightened strategic variability.

Contemporary performance analysis increasingly conceptualises football through interconnected moments of the game: in possession, out of possession, attacking transition, defensive transition, and set pieces (Fernandez-Navarro et al., 2018; Sarmiento, Anguera, Pereira, & Araújo, 2018). Each moment imposes distinct tactical and technical demands, and the relevance of specific KPIs varies accordingly (Walsh, 2025). Tournament football accentuates moment-specific behaviours due to limited preparation time, heightened contextual variability, and the disproportionate influence of transitions and set pieces on outcomes (FIFA, 2018, 2022; UEFA, 2026). A phase-based analytical framework, therefore, provides a more ecologically valid understanding of performance in international competitions.

Collectively, the literature identifies xG differential, shot quality and accuracy, territorial indicators (final-third and penalty-area entries), pressing efficiency (PPDA, recovery time, high regains), transition effectiveness, and set-piece outcomes as the most informative KPIs at the international level. Accounting for contextual variables such as opponent strength, game model, venue, and match state further enhances the robustness of these indicators (Collet, 2013; Walsh, 2025).

1.4. Possession and Measuring the Quality of Possession

Possession percentage, once considered a dominant indicator of success, is now widely regarded as insufficient when analysed in isolation. Studies controlling for team quality and match context demonstrate that possession alone does not reliably predict outcomes (Lago-Peñas, Gómez, Megías-Navarro, & Pollard, 2016; Lago-Peñas et al., 2010). Instead, possession quality and territorial dominance, especially in advanced zones, provide stronger explanatory power (UEFA, 2026). Indicators such as final-third entries, penalty-area touches, and box entries are strongly associated with winning outcomes, while general possession metrics can be comparatively weak predictors (Casal, Maneiro, Ardá, Losada, & Rial, 2015; Decroos, Bransen, Van Haaren, & Davis, 2019; Fernández, Bornn, & Cervone, 2021). UEFA technical reports emphasise that sustained presence in advanced areas and rapid penetration into the penalty area are more decisive than overall ball circulation (UEFA, 2026). Advanced performance frameworks such as expected threat (xT) and the Valuing Actions by Estimating Probabilities (VAEP) models similarly demonstrate that line-breaking passes, forward progression, and actions that destabilise defensive

structures contribute more substantially to match success than overall possession volume (Casal et al., 2015; Decroos et al., 2019; Fernández et al., 2021).

Among the most robust findings is the central importance of chance quality rather than attacking volume. Expected goals (xG) has consistently emerged as the strongest match-level predictor of success, with xG differential outperforming traditional metrics such as possession percentage and total shots (Jerome et al., 2024; Rathke, 2017). Measures of shot quality, including xG, xG per shot and shot accuracy, provide greater explanatory power than raw shot counts (Lago-Peñas et al., 2016; UEFA, 2026).

Whilst in possession KPIs have been discussed as a method of measuring attacking effectiveness in football, this framework can also be inverted to evaluate defensive out-of-possession performance, whereby teams seek to restrict territorial progression, reduce shot quality, and minimise expected goals conceded (Castellano et al., 2012; Collet, 2013). For example, a team will aim to enhance their attacking in possession performance to retain the ball, progress the ball into advanced zones and produce attacking patterns to generate a higher frequency and higher quality of shots, xG and goals. Conversely, teams will aim to restrict opponents ball progression and limit shots, xG and goals conceded.

1.5. Pressing, Defensive Recoveries, and Transitions

Pressing effectiveness and defensive recoveries constitute another critical set of KPIs in modern football. When transitioning into defensive phases, successful teams tend to exhibit lower passes per defensive action (PPDA), shorter recovery times, and a greater volume of high regains, particularly within 40 metres of the opponent's goal (Castellano & Pic, 2019). To start transitions into attacks, recoveries that lead directly to shots or goal-scoring opportunities frequently occur within ten seconds of the regain, underscoring the importance of transition speed and decision-making (FIFA, 2022). PPDA has become a widely adopted metric for quantifying pressing intensity, with lower values reflecting earlier and more aggressive defensive engagement (Andrzejewski et al., 2021). Empirical studies demonstrate that high-intensity pressing disrupts opponent build-up, reduces passing accuracy, and increases forced long passes and turnovers (Andrzejewski et al., 2021; Castellano & Pic, 2019). Crucially, the spatial location of defensive actions also matters, as high regains in the middle and attacking thirds are strongly associated with increased shot probability and xG generation (López-Valenciano et al., 2021). These findings highlight pressing as a proactive attacking strategy rather than a purely defensive mechanism.

Transitions, particularly attacking transitions following high regains, represent some of the most decisive moments in tournament football. Counter-attacks executed against disorganised defences generate disproportionately high xG values relative to settled possession phases (Rein, Raabe, & Memmert, 2017). Importantly, transition effectiveness is not exclusive to low-possession teams. High-possession sides frequently rank among the most effective counter-attacking teams due to their ability to recover the ball in advanced zones and exploit spatial imbalances immediately (Link & Hoernig, 2017). Consequently, transition frequency, location, and efficiency offer a more accurate representation of the attacking threat than possession share alone.

1.6. Set Pieces and Restarts

Set pieces continue to account for a substantial proportion of goals at international tournaments, reinforcing their importance as KPIs. FIFA World Cup 2022 and UEFA EURO 2020 technical reports highlight the decisive role of corners and wide free kicks in match outcomes (FIFA, 2022; UEFA, 2026). For example, a significant proportion of England's goals at the 2018 World Cup originated from set-piece situations. Successful teams not only generate higher xG from dead-ball scenarios but also demonstrate superior organisation in defending second phases (Bradley & Ade, 2018). Numerous studies confirm the influence of set pieces on match outcomes in elite and international football (Pulling, 2015; Yiannakos & Armatas, 2006).

Beyond traditional set pieces, restarts such as throw-ins have increasingly been recognised as structured attacking opportunities. Stone, Smith, and Barry (2021) showed that successful teams retained possession more effectively following throw-ins, particularly in advanced areas, facilitating longer attacking sequences and improved territorial control. Possession retention from restarts has also been linked to reduced exposure to defensive transitions (Tenga et al., 2010). Recent technical reports suggest that elite teams employ organised throw-in routines to manage tempo, sustain pressure, and minimise turnover risk, particularly in high-stakes tournament contexts (FIFA, 2022).

1.7. Stage-Specific Performance Dynamics

The tournament stage significantly shapes tactical behaviour. Group-stage matches tend to encourage more open or experimental strategies, while knockout fixtures favour conservative, risk-averse approaches (Carling et al., 2005). In elimination matches, shot volume, pass frequency, and possession typically decline (Sarmiento, Anguera, Pereira, & Araújo, 2018). FIFA World Cup technical reports consistently document a shift toward compact defending, transitional play, and set-piece efficiency in later rounds (FIFA, 2018, 2022). Evidence from the 2023 CONCACAF Gold Cup similarly indicates reduced pressing intensity and increased vertical play during knockout stages (CONCACAF, 2023). Substitution strategies also evolve, prioritising defensive stability and late-game management (McHale, Scarf, & Folker, 2012).

As tournaments progress, performance indicators associated with efficiency and error minimisation become increasingly salient. Finishing efficiency, shot location, and decision-making quality differentiate successful teams more reliably than attacking volume in knockout matches (Armatas & Yiannakos, 2010; Spearman, 2018). Successful teams exhibit higher shot accuracy, fewer unforced errors, and greater composure under pressure, reflecting a tactical emphasis on risk management and outcome optimisation rather than stylistic dominance (Bradley, Lago-Peñas, Rey, & Gomez Diaz, 2013; Mackenzie & Cushion, 2013).

1.8. Longitudinal Trends and the CONCACAF Context

Longitudinal analyses reveal evolving tactical norms at the international level. Men's World Cups between 2002 and 2014 showed increased high pressing, zonal defending, and short-passing combinations, trends that continued through 2018 and 2022 (FIFA, 2022). Law changes permitting defenders to receive the ball inside the penalty area from goal kicks have further reinforced controlled build-up and goalkeeper involvement. These developments have contributed to the increased prevalence of patterned build ups, inverted full-backs and structured possession in defensive phases (FIFA, 2022; Walsh, 2025). Comparative research within CONCACAF remains limited, though cross elite tournaments, recent research using passing network analysis has documented shifts in positional centrality patterns that may reflect broader tactical evolution in build-up play (Pan, Peñas, Wang, & Liu, 2025). In CONCACAF tournaments, the United States and Mexico have consistently dominated territorial metrics, while teams such as Jamaica and Panama have demonstrated more direct styles characterised by higher transition speed and tempo (CONCACAF, 2023). González-Ródenas, Aranda, Aranda-Malavés, Tudela-Desantes, and Casal (2021) argue that cross-tournament KPI comparisons can reveal shifts in successful playing styles, yet such analyses remain underdeveloped within the CONCACAF region.

Overall, existing research indicates that success in international tournaments is driven less by possession volume and more by efficiency in chance creation, transitions, and set-piece execution. However, these conclusions are largely derived from FIFA and UEFA competitions, leaving regional tournaments such as the CONCACAF Gold Cup underrepresented. Addressing this gap through longitudinal, KPI-based analysis may provide valuable insight into evolving tactical norms and determinants of success within the region.

2. MATERIALS AND METHODS

2.1. Research Design

This study employed a quantitative, observational research design using secondary data to investigate differences in performance indicators between winning and losing teams in the CONCACAF Gold Cup across all editions from 2017 to 2025. Performance was examined both overall and by competition stage (group stage vs. knockout stage).

2.2. Data Collection

Match performance data was sourced from the Hudl Wyscout platform, which provided detailed event-level statistics across multiple match contexts. Only official tournament matches from the 2017, 2019, 2021, 2023, and 2025 Gold Cup editions were included. Each match contributed two team performances (winning and losing teams). Drawn matches were excluded to allow clear binary comparison between successful and unsuccessful performances, consistent with prior match analysis research.

2.3. Key Performance Indicators

Performance indicators were selected to reflect key phases of play within the football game model. Indicators were grouped into five categories.

- In possession (e.g. Goals, xG, shots, crosses, penalty box entries, final third entries, possession).
- Defensive transition (e.g. PPDA, high recoveries, aerial duels).
- Out of possession (e.g., defensive duels, interceptions, clearances).
- Attacking transition (e.g., counterattacks, counter attacks with shots).
- Set pieces (e.g., corners, free kicks and shot, xG and goal values from such situations).

Operational definitions for each KPI collected by Hudl Wyscout can be found in Hudl Wyscout's glossary (Hudl Wyscout, 2025). The selected KPIs were consistent with those commonly used in elite football match analysis research (Kempe, Vogelbein, Memmert, & Nopp, 2014; Tenga et al., 2010) and applied analysis databases, while acknowledging the emergence of more advanced possession-value metrics in recent literature (Fernández et al., 2021; Spearman, 2018).

Given that winning and losing performances were analysed from each relevant match, performance indicators related to concession e.g. goals conceded, xG conceded were not analysed as the opposing outcome value matches concession values e.g., goals conceded for the losing team is the same as goals scored for the winning team. Naturally, some performance indicators blend with the game model classification e.g., PPDA could be applied to the defensive transition or out of possession category, or, shots may occur during an attacking transition counterattack but are still covered in the overall in possession values given the team were in possession of the ball during the counterattack.

2.4. Data Analysis

All statistical analyses were conducted using SPSS (version 29; IBM Corp., Armonk, NY, USA). Data were first assessed for normality using the Shapiro–Wilk test. In accordance with applied sports analysis suggestions (Hopkins, Marshall, Batterham, & Hanin, 2009; McGarry, 2009), as the majority of performance indicators were not normally distributed, non-parametric Mann–Whitney U tests were used to compare differences between winning and losing team performances across (a) the full dataset and (b) within competition stages (group & knockout). Statistical significance was set at $p < 0.05$ with mean $\pm$ SD and standardised effect sizes (r) determined to contextualise practical significance. Negative or positive effect sizes are used to demonstrate the direction of any differences between performances as results are presented.

3. RESULTS

3.1. Overall Differences Between Winning and Losing Teams

Across all CONCACAF Men's Gold Cup matches between 2017 and 2025, statistically significant differences were observed between winning and losing teams across multiple performance indicators.

3.2. In Possession

Winning teams recorded higher values for goals, expected goals (xG), shots on target, and shot accuracy compared to losing teams (all $p < 0.001$; Table 1). Winning teams also completed more progressive passes, recorded more penalty-area entries, and had a higher percentage of possession (all $p < 0.001$).

Losing teams attempted shots from greater average distances than winning teams ($p < 0.001$). No significant differences were observed between winning and losing teams for offsides or offensive duels attempted ($p > 0.05$).

Overall, 46 in possession KPIs differed between winning and losing teams; the results text and tables highlight key differences.

Table 1. Key In-Possession Performance Indicators Differentiating Winning and Losing Teams.

KPI	Winning Teams (Mean $\pm$ SD)	Losing Teams (Mean $\pm$ SD)	Effect Size	p-value
Goals	2.61 $\pm$ 1.44	0.56 $\pm$ 0.79	-0.73	< 0.001
Expected Goals (xG)	2.09 $\pm$ 1.18	1.02 $\pm$ 0.75	-0.52	< 0.001
Shots	14.24 $\pm$ 5.49	9.77 $\pm$ 4.84	-0.41	<0.001
Shots on Target	6.17 $\pm$ 2.77	3.13 $\pm$ 2.03	-0.56	< 0.001
Shot Accuracy (%)	44.35 $\pm$ 13.90	31.53 $\pm$ 14.96	-0.43	< 0.001
Penalty-Area Entries	24.18 $\pm$ 9.15	18.94 $\pm$ 8.87	-0.29	< 0.001
Progressive Passes	74.22 $\pm$ 15.40	64.92 $\pm$ 15.97	-0.33	< 0.001
Possession (%)	53.83 $\pm$ 10.05	46.17 $\pm$ 10.05	-0.37	< 0.001
Average Shot Distance (m)	18.10 $\pm$ 2.55	20.53 $\pm$ 4.07	-0.34	< 0.001
Long Pass %	10.27 $\pm$ 4.06	12.40 $\pm$ 3.52	-0.30	<0.001
Average Pass Length	19.80 $\pm$ 1.63	20.29 $\pm$ 1.32	-0.20	0.002
Pass Tempo	16.52 $\pm$ 1.56	15.59 $\pm$ 1.28	-0.31	<0.001
Pass Accuracy %	84.78 $\pm$ 4.84	82.00 $\pm$ 4.04	-0.35	<0.001
Crosses	14.08 $\pm$ 6.74	11.57 $\pm$ 6.66	-0.21	0.002
Accurate Crosses	4.83 $\pm$ 2.96	3.45 $\pm$ 2.76	-0.25	<0.001
Cross Accuracy %	34.49 $\pm$ 15.87	29.26 $\pm$ 17.71	-0.14	0.026
Passes to Final Third	54.45 $\pm$ 15.25	46.05 $\pm$ 15.39	-0.28	<0.001
Deep Completed Crosses	4.64 $\pm$ 2.90	3.35 $\pm$ 2.75	-0.24	<0.001
Deep Completed Passes	9.41 $\pm$ 5.60	5.44 $\pm$ 3.63	-0.41	<0.001
Touches in Penalty Area	20.34 $\pm$ 10.22	11.87 $\pm$ 7.46	-0.48	<0.001

3.3. Defensive Transition

Significant differences were identified in defensive transition indicators (Table 2). Winning teams recorded lower passes per defensive action (PPDA) values than losing teams ($p < 0.001$). Winning teams also recorded fewer total possession losses, including fewer losses in low and medium zones ($p \leq 0.007$). High recoveries were greater for winning teams ($p < 0.001$).

Table 2. Defensive Transition and Pressing Indicators.

KPI	Winning Teams (Mean $\pm$ SD)	Losing Teams (Mean $\pm$ SD)	Effect Size	p-value
Passes per Defensive Action (PPDA)	9.26 $\pm$ 3.69	13.29 $\pm$ 6.78	-0.39	< 0.001
Total Possession Losses	92.65 $\pm$ 16.22	97.42 $\pm$ 14.55	-0.18	0.006
Low-Zone Losses	15.47 $\pm$ 7.47	18.57 $\pm$ 7.48	-0.21	0.001
Medium-Zone Losses	32.83 $\pm$ 8.82	36.25 $\pm$ 8.60	-0.17	0.007

3.4. Out-of-Possession Performance

Out-of-possession indicators are presented in Table 3. Winning teams recorded higher duel win percentages and aerial duel win percentages (both $p < 0.001$) and received fewer yellow cards ($p = 0.007$). No significant differences were found for total interceptions, clearances, or fouls committed ($p > 0.05$).

Table 3. Out-of-Possession Efficiency Indicators.

KPI	Winning Teams (Mean $\pm$ SD)	Losing Teams (Mean $\pm$ SD)	Effect Size	p-value
Duel Win Percentage (%)	49.46 $\pm$ 4.17	46.39 $\pm$ 4.02	-0.38	< 0.001
Aerial Duel Win Percentage (%)	49.67 $\pm$ 10.34	42.80 $\pm$ 9.65	-0.31	< 0.001
Yellow Cards	1.53 $\pm$ 1.47	1.88 $\pm$ 1.23	-0.17	0.007
Red Cards	0.03 $\pm$ 0.16	0.11 $\pm$ 0.39	-0.13	0.044

3.5. Attacking Transition

Differences in attacking transition indicators are shown in Table 4. Winning teams recorded a higher number of counterattacks and counterattacks resulting in shots than losing teams ($p = 0.007$). Winning teams also recorded more ball recoveries in medium zones ($p < 0.001$).

Losing teams recorded a higher proportion of recoveries in low defensive zones ($p = 0.043$). No significant difference was found in the proportion of counterattacks resulting in shots between winning and losing teams ($p > 0.05$).

Table 4. Attacking Transition Performance Indicators.

KPI	Winning Teams (Mean $\pm$ SD)	Losing Teams (Mean $\pm$ SD)	Effect Size	p-value
Counter-Attacks	2.61 $\pm$ 2.34	1.79 $\pm$ 1.79	-0.18	0.007
Counter-Attacks with Shots	1.14 $\pm$ 1.28	0.67 $\pm$ 0.81	-0.18	0.007
Recoveries	77.68 $\pm$ 11.40	74.29 $\pm$ 13.71	-0.15	0.023
Low Recoveries	33.54 $\pm$ 8.59	36.04 $\pm$ 8.90	-0.13	0.043
Medium Recoveries	32.25 $\pm$ 7.74	28.55 $\pm$ 7.72	-0.23	< 0.001
High Recoveries	11.89 $\pm$ 5.33	9.69 $\pm$ 4.97	-0.23	< 0.001

3.6. Set-Piece Performance

Set-piece indicators revealed significant differences between winning and losing teams (see Table 5). Losing teams recorded a greater total number of set-piece situations ($p = 0.027$). Winning teams recorded a higher proportion of set-piece situations resulting in shots ($p < 0.001$), including from corners ($p = 0.034$). Winning teams also recorded higher success rates from goal-kick situations ($p = 0.004$).

No significant differences were observed between winning and losing teams for free kicks, penalties, or throw-ins in terms of volume or accuracy ($p > 0.05$).

Table 5. Set Piece Performance Indicators.

KPI	Winning Teams (Mean $\pm$ SD)	Losing Teams (Mean $\pm$ SD)	Effect Size	p-value
Set Pieces	25.33 $\pm$ 4.99	26.71 $\pm$ 5.52	-0.14	0.027
Set Pieces with Shots	3.71 $\pm$ 2.10	2.88 $\pm$ 2.03	-0.22	<0.001
% of Set Pieces with Shots	14.74 $\pm$ 8.12	10.84 $\pm$ 7.27	-0.26	<0.001
Corners	4.90 $\pm$ 2.71	4.10 $\pm$ 2.55	-0.14	0.034
Goal Kicks	6.97 $\pm$ 3.06	8.35 $\pm$ 3.52	-0.19	0.004

3.7. Group-Stage vs Knockout-Stage Winning Performances in all Phases of Play

Significant differences were observed between group-stage and knockout-stage winning performances (see Table 6). Group-stage wins were associated with higher values for goals, shots on target, match tempo, percentage of forward passes accurate, long-pass accuracy percentage, offensive duel win percentage, and the percentage of positional attacks with shots (all $p < 0.05$).

Knockout-stage wins were associated with higher values for total duels, duels won, aerial duels, aerial duels won, interceptions, clearances, total losses, medium-zone losses, throw-ins, and accurate throw-ins (all $p < 0.05$).

No significant differences were identified between stages for the remaining performance indicators analysed (all $p > 0.05$).

Table 6. Significant Differences Between Group-Stage and Knockout-Stage Winning Performances.

Phase	Variables	Group Stage Win (Mean $\pm$ SD)	Knockout Win (Mean $\pm$ SD)	Effect Size	p-value
In Possession	% of forward passes accurate	77.64 $\pm$ 6.18	74.59 $\pm$ 6.90	-0.20	0.028
In Possession	% of positional attacks with shots	29.80 $\pm$ 10.10	26.04 $\pm$ 10.11	-0.20	0.032
In Possession	Goals	2.88 $\pm$ 1.50	1.79 $\pm$ 0.86	-0.33	< 0.001
In Possession	Long Pass Accuracy %	59.26 $\pm$ 8.45	54.62 $\pm$ 10.74	-0.18	0.047
In Possession	Long Passes	41.01 $\pm$ 10.90	46.17 $\pm$ 11.61	-0.18	0.045
In Possession	Match Tempo	16.71 $\pm$ 1.43	15.90 $\pm$ 1.81	-0.22	0.017
In Possession	Offensive Duels Won %	42.74 $\pm$ 7.67	39.01 $\pm$ 8.14	-0.20	0.026
In Possession	Shots on Target	6.52 $\pm$ 2.95	5.07 $\pm$ 1.75	-0.22	0.016
Defensive Transition	Losses	89.52 $\pm$ 14.70	102.34 $\pm$ 17.14	-0.33	< 0.001
Defensive Transition	Medium Losses	31.52 $\pm$ 8.67	36.90 $\pm$ 8.13	-0.28	0.003
Out of Possession	Aerial Duels	30.82 $\pm$ 10.72	39.38 $\pm$ 12.17	-0.3	0.001
Out of Possession	Aerial Duels Won	15.16 $\pm$ 5.39	18.86 $\pm$ 5.74	-0.28	0.003
Out of Possession	Clearances	14.00 $\pm$ 7.35	16.62 $\pm$ 6.05	-0.18	0.047
Out of Possession	Defensive Duels Won	40.19 $\pm$ 10.06	45.34 $\pm$ 13.83	-0.20	0.031
Out of Possession	Duels	189.30 $\pm$ 29.41	214.24 $\pm$ 46.77	-0.22	0.015
Out of Possession	Duels Won	93.72 $\pm$ 15.59	104.66 $\pm$ 22.69	-0.22	0.017
Out of Possession	Interceptions	36.44 $\pm$ 10.09	41.00 $\pm$ 12.98	-0.19	0.042
Set Pieces	Accurate Throw-ins	15.60 $\pm$ 5.29	18.83 $\pm$ 5.95	-0.25	0.007
Set Pieces	Throw-ins	17.29 $\pm$ 5.72	20.52 $\pm$ 6.16	-0.24	0.009

3.8. Differences Between Knockout Wins and Knockout Losses in All Phases of Play

Significant differences were identified between winning and losing teams in knockout-stage matches (see Table 7). Winning teams recorded higher values for goals, expected goals (xG), total shots, shots on target, shot on target percentage, pass accuracy percentage, cross accuracy percentage, smart-pass accuracy percentage, penalty-area entries with runs, and touches in the penalty area (all $p < 0.05$). Winning teams also recorded shorter average shot distance ($p < 0.05$).

No defensive-transition, out of possession or attacking-transition indicators significantly differentiated knockout wins and losses (all $p > 0.05$). Within set pieces, winning teams recorded more penalties, more penalties converted, a higher penalty conversion rate, and higher throw-in accuracy (all $p < 0.05$). No other set-piece indicators differed significantly (all $p > 0.05$).

Table 7. Significant Differences Between Knockout-Stage Winning and Losing Performances.

Phase	Variables	Knockout Wins (Mean $\pm$ SD)	Knockout Losses (Mean $\pm$ SD)	Effect Size	p-value
In Possession	Goals	1.79 $\pm$ 0.86	0.38 $\pm$ 0.61	-0.74	< 0.001
In Possession	xG	1.79 $\pm$ 0.74	0.91 $\pm$ 0.72	-0.55	< 0.001
In Possession	Shots	12.72 $\pm$ 4.37	10.31 $\pm$ 4.67	-0.29	0.026
In Possession	Shots on Target	5.07 $\pm$ 1.75	3.28 $\pm$ 1.81	-0.46	< 0.001
In Possession	Shot on Target %	41.67 $\pm$ 12.64	30.56 $\pm$ 13.98	-0.39	0.003
In Possession	Pass Accuracy %	83.42 $\pm$ 5.39	81.74 $\pm$ 3.91	-0.28	0.030
In Possession	Cross Accuracy %	35.46 $\pm$ 15.45	27.73 $\pm$ 13.66	-0.27	0.038
In Possession	Penalty Area Entries with Runs	3.48 $\pm$ 2.34	2.59 $\pm$ 1.81	-0.27	0.038
In Possession	Touches in Penalty Area	18.38 $\pm$ 9.34	13.48 $\pm$ 8.06	-0.36	0.006
In Possession	Smart Pass Accuracy %	38.55 $\pm$ 25.41	26.75 $\pm$ 27.86	-0.28	0.030
In Possession	Average Shot Distance	18.51 $\pm$ 2.42	21.04 $\pm$ 4.80	-0.27	0.038
Set Pieces	Penalties	0.24 $\pm$ 0.51	0.03 $\pm$ 0.19	-0.26	0.044
Set Pieces	Penalties Converted	0.21 $\pm$ 0.41	0.00 $\pm$ 0.00	-0.34	0.010
Set Pieces	Penalty Conversion Rate %	18.97 $\pm$ 38.76	0.00 $\pm$ 0.00	-0.34	0.010
Set Pieces	Throw-in Accuracy %	91.94 $\pm$ 7.36	88.78 $\pm$ 8.95	-0.3	0.023

3.9. Data Availability

Full KPI tables for all phases of play and non-significant variables are available from the corresponding author upon reasonable request.

4. DISCUSSION

4.1. Theme One: Organised Ball Progression and Possession Security

Across all matches, winning teams in the CONCACAF Gold Cup demonstrated consistently superior in-possession performance compared to losing teams. This superiority was characterised by shorter and faster passing sequences, higher passing accuracy, and greater ball security, particularly within the defensive and middle thirds. In contrast, losing teams exhibited a greater frequency of turnovers in deep areas, which directly facilitated increased shot volume, expected goals (xG), and goal-scoring opportunities for winning teams. These findings reinforce the importance of possession quality and territorial progression, rather than possession volume alone, as key determinants of match success.

The attacking profiles observed among winning teams align closely with previous research in both international and elite domestic contexts. Similar studies have reported that successful teams are more effective at progressing the ball into advanced zones through controlled, shorter passing sequences, resulting in increased penalty-area entries, higher shot frequency, and superior shot quality (Gonzalez-Rodenas, Mitrotasios, Aranda, & Armatas, 2020). The present findings extend this evidence within the CONCACAF Gold Cup, demonstrating that winning teams generated significantly more goals (2.61 vs. 0.56), xG (2.09 vs. 1.02), and shots on target (6.17 vs. 3.13), while also achieving higher shot accuracy. These patterns are consistent with technical reports from international tournaments, which highlight that sustained attacking pressure and repeated access to central and penalty-area zones underpin successful outcomes (Casal et al., 2015; Castellano et al., 2012; FIFA, 2018; UEFA, 2026).

Importantly, the findings support the growing body of literature suggesting that possession percentage alone is a limited indicator of success when contextual factors are accounted for. Instead, the effectiveness of possession in advanced areas reflected here through greater progressive passing, final-third entries, penalty-area entries and touches appear to have a stronger relationship with goal-scoring outcomes. Advanced performance frameworks such as expected threat (xT) and the Valuing Actions by Estimating Probabilities (VAEP) models similarly demonstrate that line-breaking passes, forward progression, and actions that destabilise defensive structures

contribute more substantially to match success than overall possession volume (Casal et al., 2015; Decroos et al., 2019; Fernández et al., 2021). The present study's results are therefore congruent with these models, highlighting that winning teams consistently converted possession into meaningful territorial and scoring advantages.

In contrast, losing teams displayed a greater reliance on longer passes and long-range shooting, as indicated by higher average pass length, a greater proportion of long passes, and shots taken from significantly greater distances. Comparable trends have been identified in international tournament settings, where less successful teams often adopt more direct strategies due to opposition pressure, defensive compactness, and restricted access to central spaces (Casal et al., 2015; Castellano et al., 2012). These behaviours are typically associated with lower probability scoring opportunities, which is reflected in the reduced xG and shot accuracy observed among losing teams in the present study (Jerome et al., 2024; Jones, James, & Mellalieu, 2004). Within the specific CONCACAF context, these findings carry particular relevance. The Gold Cup features substantial variation in technical proficiency, tactical cohesion, and preparation time across national teams. In such an environment, structured possession play and controlled ball progression may provide a more stable and repeatable framework for chance creation than reactive or overly direct approaches. From a defensive perspective, the results also emphasise the importance of organised pressing and compact defensive structures aimed at blocking progression and forcing turnovers in less dangerous areas, thereby limiting opposition access to high-value shooting zones.

From an applied standpoint, these findings suggest that coaches and practitioners working in international tournament contexts should prioritise training interventions that enhance positional play, progressive passing, and decision-making under pressure in advanced areas. Equally, defensive strategies designed to protect central spaces and reduce deep turnovers may be critical to mitigating opponent xG and shot quality. Together, these insights reinforce the notion that success in the Gold Cup is underpinned by both effective possession-based attacking structures and disciplined defensive organisation.

4.2. Theme Two: Pressing Intensity and Counter-Attacking Potential

The present findings indicate that winning teams consistently exhibited more aggressive and effective pressing behaviours, regaining possession more frequently in advanced zones and generating a greater volume of counter-attacking actions than losing teams. Significantly, these differences emerged despite losing teams generally recording lower possession shares, challenging the assumption that counterattacking is primarily a strategy of possession-disadvantaged teams. Winning teams demonstrated significantly higher pressing intensity, as reflected by a substantially lower PPDA, aligning with previous research identifying PPDA as a robust indicator of higher pressing intensity, proactive defensive behaviour and territorial dominance (Andrzejewski et al., 2021). Lower PPDA values suggest that successful teams applied pressure earlier in opposition possession sequences, limiting passing options and accelerating opponent decision-making. This supports earlier work showing that intense pressing disrupts structured build-up play and reduces long-pass success rates, particularly against organised defensive blocks (Andrzejewski et al., 2021; Castellano & Pic, 2019).

The spatial distribution of ball recoveries further reinforces this interpretation. Winning teams achieved significantly more recoveries in the middle and attacking thirds, while losing teams recovered possession more frequently in low defensive zones. Similar patterns have been observed in elite international and club competitions, where high recoveries are strongly associated with increased expected goal values and shot probability (López-Valenciano et al., 2021; Tenga et al., 2010). Technical reports from FIFA World Cups and UEFA competitions consistently highlight that a substantial proportion of goals originate within 10–15 seconds following a high regain, underlining the strategic value of pressing triggered transitions (FIFA, 2018; UEFA, 2026).

Defensive transition efficiency also differentiated match outcomes. Winning teams incurred fewer overall losses, particularly in low- and medium-risk zones, indicating superior ball security and positional support during possession. The absence of significant differences in high-zone losses suggests that risk-taking in advanced areas is

a shared characteristic across outcomes; however, winning teams appear better equipped to immediately counter-press following such losses. This finding aligns with the concept of “defensive attack,” where immediate pressure after loss serves both to prevent counterattacks and to create secondary attacking opportunities (Guardiola & Perarnau, 2014; Rein et al., 2017; Sarmiento et al., 2018).

Attacking transition metrics further highlight the interconnected nature of pressing and offensive success. Winning teams not only executed more counterattacks but also produced significantly more shots from these situations. However, there was a lack of differences between winning and losing teams regarding the percentage of counterattacks resulting in shots suggests that transition effectiveness was driven primarily by opportunity frequency rather than superior effectiveness. This supports previous (Rein et al., 2017; Sarmiento et al., 2018).

Moreover, these results contradict the traditional narrative that high-frequency counterattacking is predominantly associated with low-possession or reactive teams. Instead, they support a more contemporary game model in which dominant teams leverage aggressive pressing to create favourable transition moments against temporarily disorganised opponents. Similar conclusions have been reported in analyses of elite pressing teams such as those in the UEFA Champions League, where high-possession sides also ranked highest in counter-attacking shot production due to frequent high regains (Link & Hoernig, 2017; UEFA, 2026).

From an applied perspective, these findings emphasise the importance of integrating pressing and attacking transition principles within a unified tactical framework. Training environments should replicate moments immediately following ball recovery, particularly in medium and high zones, with constraints that encourage verticality, numerical exploitation, and rapid shot creation. Conditioning pressing triggers without rehearsing the subsequent attacking behaviours may limit the effectiveness of high regain strategies.

Overall, the evidence reinforces the view that pressing, possession, and transition phases should not be analysed or trained in isolation. Instead, successful performance emerges from the coordinated interaction of these phases, where defensive intensity directly enhances attacking potential through structured yet opportunistic transition play (Delgado-Bordonau et al., 2012; Tee et al., 2018; Walsh, 2025).

4.3. Theme Three: Set-Piece Effectiveness as a Determinant of Tournament Success

The analysis of winning teams in the CONCACAF Gold Cup demonstrates that set-piece effectiveness, rather than sheer frequency of set-piece opportunities, distinguishes successful from unsuccessful sides. Although losing teams generated a marginally greater number of set-piece situations overall (26.71 vs. 25.33), winning teams converted a significantly higher proportion of these situations into shots. Though insights into the positioning of such set pieces is unclear, these results indicate that efficiency in dead-ball execution, not volume alone, underpins competitive advantage in tournament contexts where goals are at a premium.

The findings echo and extend prior research that emphasises quality over quantity in set-piece outcomes. Yiannakos and Armatas (2006) found that elite European teams exhibited superior organisation and conversion rates from corners and free kicks, rather than simply generating more opportunities. Similarly, Pulling (2015) reported that set plays accounted for a disproportionately high share of goals in UEFA club competitions, driven largely by team preparation and tactical coherence. Casal et al. (2015) further highlighted that teams with rehearsed routines consistently achieved higher expected goal values from set pieces than less structured opponents. This pattern aligns with our results: winning Gold Cup sides did not necessarily earn more set pieces, but they were more threatening and efficient in their application.

Technical analyses from major international tournaments also underscore the strategic value of dead-ball situations. FIFA's technical report from the 2022 World Cup identified set pieces as one of the most common sources of goals and key attacking sequences, particularly noting the influence of well-designed corner and wide free-kick routines on match outcomes (FIFA, 2022). Moreover, UEFA's EURO 2020 report similarly emphasised that successful sides exhibited structured set-piece systems that generated high-quality scoring chances while

minimising second-phase counter threats (UEFA, 2026). For example, 75% of England's goals in the 2018 World Cup stemmed from set pieces or set-piece derived sequences, illustrating the decisive impact of dead-ball proficiency in elite competition.

Prominently, tournament data revealed that penalty conversions further differentiate winners from losers, particularly in the knockout stage. The greater incidence and conversion of penalties among winning teams likely reflect enhanced attacking penetration and sustained pressure in the penalty area, consistent with findings by Bradley and Ade (2018), who documented the interplay between in-possession effectiveness and set-piece outcomes. This suggests that teams capable of progressing play into high-probability scoring zones are more likely to earn and exploit dead-ball situations effectively.

Collectively, the literature converges on the notion that set-piece performance is both a technical and tactical determinant of international and elite football success. While volume metrics capture opportunity frequency, efficiency metrics better predict competitive outcomes, especially in low-scoring, tightly contested fixtures where marginal advantages are decisive. This Gold Cup-specific analysis reinforces this evidence base and extends it by demonstrating that winning teams' set-piece efficiency holds even when they do not dominate in total dead-ball count.

A notable additional finding was that winning teams in knockout matches exhibited significantly higher throw-in success rates when compared to losing teams in knockouts. Although throw-ins are rarely treated as a KPI in performance analysis, this result highlights the importance of marginal gains in high-stakes tournament matches. In tightly contested fixtures, where possession turnovers can be decisive, the ability to retain the ball from restarts represents a subtle but meaningful advantage. Previous research supports the strategic value of throw-ins as structured attacking restarts rather than neutral events (Gómez, Lago-Peñas, & Pollard, 2012; Tenga et al., 2010). Gómez et al. (2012) demonstrated that successful teams were more effective at maintaining possession following throw-ins, particularly in advanced pitch zones, contributing to longer attacking sequences and increased territorial control. Similarly, Tenga et al. (2010) noted that possession retention from restarts was associated with higher-quality attacking phases in elite competition. Technical tournament reports have also begun to acknowledge the role of throw-ins within broader restart strategies, with FIFA highlighting the increasing use of organised throw-in routines to sustain pressure and manage game tempo (FIFA, 2022).

From an applied perspective, these findings advocate for dedicated training emphasis on structured set-piece routines, including rehearsed delivery patterns, spatial organisation, and penalty proficiency. Improved throw-in efficiency likely reflects greater tactical organisation, player spacing, and decision-making under pressure. Structured throw-in routines across different pitch zones can facilitate ball security, support sustained attacking phases, and reduce exposure to opposition transitions. In knockout contexts, where risk management is paramount, these small gains in possession retention may cumulatively influence match outcomes. Consequently, throw-in effectiveness should be considered alongside other set-piece indicators when evaluating performance in elite tournament football. Such practice not only enhances direct scoring potential but also improves team preparedness for defending second phases following set plays, a dual objective consistently highlighted across empirical studies and technical reports alike. Moreover, both Hewitt et al. (2016) and Walsh (2025) highlight the importance of set pieces when designing a game model and are a key strategy within the modern game.

4.4. Theme Four: Group Stage vs Knockout Wins and Key Knockout Insights

Winning performances differed markedly between the group and knockout stages. In comparison to knockout-stage wins, group-stage victories were associated with higher attacking output, including goals, shots on target, percentage of positional attacks with shots and forward passing accuracy, reflecting greater attacking effectiveness and ball progression in earlier tournament phases. In contrast, knockout-stage wins were characterised by increased defensive actions. Compared to group-stage wins, knockout-stage wins recorded more defensive and aerial duels,

interceptions, clearances, ball losses and medium zone ball losses. Overall, this analysis suggests that as the competition progresses from group-stages to knockout stages, matches become more competitive with reduced attacking output, increased defensive actions and more compact defensive structures leading to more middle third possession changes and reduced pressing heights.

Within knockout matches specifically, throw-ins and penalties have already been discussed regarding differences between winning and losing teams. In possession, compared to losing teams, winning teams in knockout matches were characterised by higher goals, xG, shots, and shots on target, shot on target accuracy, pass accuracy, cross accuracy, penalty area entries, penalty area touch and average shot distance. These findings indicate that the quality of possession, rather than its quantity, is decisive in high-stakes contexts, consistent with previous international tournament research linking knockout success to technical efficiency and reduced error rates (Bradley et al., 2013; Carling et al., 2005; Lago-Peñas et al., 2010). No single attacking style was associated with knockout success. Possession-based, direct, counterattacking, and set-piece-oriented approaches all featured among winning teams. However, outcomes were determined by finishing efficiency and shot quality. Winning teams generated higher xG from shots taken closer to goal, outperformed expected goals, and were awarded and converted more penalties, reinforcing the importance of shot location, decision-making, and composure (Armatas & Yiannakos, 2010; Mackenzie & Cushion, 2013; Spearman, 2018).

Similarly, transitional and set-piece volume did not differentiate outcomes in knockout matches. Instead, the ability to convert a limited number of high-quality opportunities proved decisive, consistent with evidence of reduced attacking volume and increased match balance in elimination fixtures (Jones et al., 2004; Tenga et al., 2010). Defensively, success was associated with control rather than activity: winning teams maintained higher passing accuracy, and limited opponents to lower-quality shooting opportunities, supporting prior work emphasising organisation, emotional regulation, and error avoidance under knockout pressure (Castellano et al., 2012; McHale et al., 2012).

Overall, these findings indicate that knockout-stage matches in the CONCACAF Gold Cup reward efficiency over style. As opposition quality converges and tactical risk decreases, success becomes less dependent on how teams construct attacking situations and more dependent on how effectively decisive actions such as ball retention, penalty-area penetration, and finishing are executed.

5. CONCLUSION

Taken together, the findings indicate that success in the CONCACAF Gold Cup is characterised by multi-phase effectiveness rather than reliance on a single tactical approach. Winning teams demonstrated superior in-possession progression, more effective pressing and transition behaviours, and greater efficiency from set pieces across the tournament. As competition progressed from the group stage to the knockout stage, the number of differentiating KPIs declined, with outcomes increasingly determined by execution quality in decisive moments rather than overall tactical dominance.

These results highlight the importance of adaptability in tournament football, where teams must balance proactive behaviours with risk management as contextual demands evolve. For coaches and practitioners within the CONCACAF region, the findings emphasise the value of developing integrated game models that prioritise ball progression, pressing coordination, and set-piece efficiency, while remaining flexible to the differing demands of group and knockout competition.

6. LIMITATIONS AND FUTURE RESEARCH

Several limitations should be acknowledged. First, the study utilised event-level data and did not incorporate player-tracking information, limiting insight into physical and spatial dynamics. Second, contextual variables such as travel distance, environmental conditions, altitude, and squad rotation were not controlled for and may have

influenced performance. Third, KPI definitions were dependent on Hudl Wyscout's operational framework, which may differ from alternative data providers.

Future research should extend this work by integrating tracking data, examining player-level contributions, and exploring contextual moderators of performance. Comparative analyses involving Women's Gold Cup tournaments, qualification competitions, and inter-confederation tournaments would further enhance understanding of performance dynamics within CONCACAF football.

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Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

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