

THE INFLUENCE OF FORMAL AND INFORMAL LEADERSHIP ON
TEAM DYNAMICS IN TEAM SPORTS

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Abstract: *Background. Leadership in team sports is distributed across appointed captains and influential peers. Although both may shape coordination and cohesion, their respective roles are conceptually distinct. Objective. To develop and illustrate an integrated model linking formal and informal leadership with team cohesion, communication, interpersonal trust, collective efficacy, and conflict. Methods. A transparent synthetic cross-sectional dataset of 150 hypothetical athletes was generated for a worked statistical illustration. Seven five-point composite indicators were examined using descriptive statistics, Pearson correlations, and ordinary least-squares regression. Results. The illustrative data show positive associations of both leadership indicators with cohesion, communication, trust, and collective efficacy and negative associations with conflict. Conclusions. Complementary role clarity, peer influence, and inclusive communication offer a plausible pathway for more effective team dynamics. These illustrative numerical results are not empirical evidence and must not be reported as observed athletes' outcomes.*

Keywords: *formal leadership; informal leadership; team sports; cohesion; team dynamics; psychological climate; shared leadership.*

1. INTRODUCTION

Competitive team sports require athletes to synchronize performance tasks while maintaining stable interpersonal relations under time pressure. Tactical instructions alone cannot explain why some groups develop shared responsibility, rapid adaptation, and resilience after failure whereas others experience fragmented communication and avoidable interpersonal tension. Leadership is therefore best considered as a relational influence process embedded within team dynamics rather than a characteristic restricted to one designated individual.

Formal leadership is typically institutionalized through team captaincy or another officially assigned role. Captains are expected to communicate with coaches, represent team standards, organize on-field decisions, and model accountability. Informal leadership emerges from the recognition of teammates and may involve technical expertise, motivational influence, emotional support, or social brokerage. The roles may overlap without being identical.

1. INTRODUCTION (continued)

A growing literature challenges the assumption that a designated captain is necessarily the team's principal leader. Fransen et al. (2014) reported that 44% of respondents did not identify their captain as the principal leader in any of four examined roles; their survey involved athletes and coaches from multiple team sports [1]. This finding motivates the study of distributed influence, particularly when athletes differ in expertise, experience, and social position.

Cohesion has both task-related and social dimensions. The Group Environment Questionnaire (GEQ) conceptualizes team cohesion through individual attraction to the group and perceived group integration, each

differentiated into task and social aspects [2]. Team dynamics extend beyond cohesion to communication quality, mutual trust, coordination, collective efficacy, psychological safety, and disagreement management.

Research by Fransen and colleagues associates athlete-leader quality with team identification, collective efficacy, and team outcome confidence [3]. However, conceptual and methodological distinctions remain important: cross-sectional perceptions cannot demonstrate causality, leader emergence may itself depend on successful teamwork, and athletes nested within teams may share contextual influences.

Research aim and hypotheses

The aim is to examine, through a fully disclosed illustrative analysis, how perceptions of formal and informal leadership relate to multiple components of team dynamics and to articulate a fieldwork-ready research framework. H1: formal leadership is positively associated with cohesion and communication. H2: informal leadership is positively associated with interpersonal trust and collective efficacy. H3: both leadership types contribute unique explanatory variance to cohesion. H4: stronger perceived leadership is associated with lower interpersonal conflict.

The proposed mechanisms include role clarity (formal leader), peer legitimacy and social support (informal leader), and leadership alignment (complementarity between appointed and emergent influences). These mechanisms should be evaluated longitudinally before intervention effects are inferred.

2. MATERIALS AND METHODS

2.1. Research design and status of data

This article provides a methodological demonstration, not a report of completed field research. A synthetic dataset of $N = 150$ hypothetical player records was generated with a fixed random seed (2026). The sample size was chosen only to illustrate statistical procedures. The data do not represent a real country, sport club, roster, recruitment process, or administered questionnaire; no consent or ethics approval is claimed.

2.2. Operational definitions

Formal leadership represents perceived fairness, communication clarity, responsibility, and role organization of appointed athlete leaders. Informal leadership reflects perceived peer influence, emotional support, spontaneous coordination, and peer credibility. Cohesion represents perceived commitment to common tasks and social belonging. Communication, mutual trust, collective efficacy, and interpersonal conflict are modeled as separate outcomes. All scores use a conceptual 1–5 scale, with higher conflict values indicating a less favorable environment.

Construct	Conceptual indicators	Higher score implies
Formal leadership	Captain role clarity, fair decisions, accountability	More effective appointed leadership
Informal leadership	Peer support, initiative, motivational influence	Stronger emergent leadership
Team cohesion	Task unity and social belonging	Greater cohesion

Communication	Information sharing and constructive feedback	Better communication
Trust / collective efficacy	Reliance on teammates / shared capability	More favorable team functioning
Conflict	Frequency and intensity of interpersonal friction	More conflict

Table 1. Conceptual study variables. These categories guide future item development; they are not claimed to be newly validated psychometric scales.

2.3. Generation and statistical analysis

The two leadership indices were generated as partially correlated bounded continuous variables. Outcomes were simulated using weighted combinations of those indices and random disturbances, then clipped to the 1–5 range. Means, standard deviations, Pearson correlations, and a multiple linear regression of cohesion on both leadership indices were computed. Correlation and regression coefficients therefore describe the programmed synthetic data structure rather than empirical effect sizes. Statistical significance tests are intentionally omitted because simulated “p values” would not establish real-world evidence.

3. RESULTS

3.1. Descriptive profile

Indicator	N	Mean	SD
Formal leadership	150	3.60	0.67
Informal leadership	150	3.71	0.73
Team cohesion	150	3.66	0.67

Communication	150	3.76	0.69
Mutual trust	150	3.83	0.60
Conflict (higher = more)	150	2.43	0.66
Collective efficacy	150	3.50	0.76

Table 2. Descriptive statistics (synthetic observations, N = 150). Scores range from 1 to 5.

Both leadership indices cluster above the midpoint, while modeled conflict is lower than other team-process ratings. The displayed averages are properties of the simulation design; they are not benchmarks for athletes or indicators of typical team performance. The comparatively high cohesion and trust values permit the illustration of how positive interpersonal processes may coexist with nonzero conflict.

3.2. Leadership and team-process correlations

Team-dynamics outcome	r: formal leader	r: informal leader
Team cohesion	0.40	0.58
Communication	0.51	0.38
Mutual trust	0.43	0.47
Collective efficacy	0.39	0.42
Interpersonal conflict	-0.25	-0.25

Table 3. Pearson correlation coefficients in synthetic data. Positive values indicate co-variation in the same direction; negative values indicate inverse co-variation.

In this constructed example, both leader perceptions are positively associated with cohesion, communication, trust and collective efficacy. Conflict is inversely related to leadership. The pattern is consistent with the proposed hypotheses by construction, so it should be understood as a demonstration of possible results and of their interpretation rather than a test of those hypotheses.

3. RESULTS (continued)

3.3. Joint association with cohesion

Predictor	Unstandardized B
Intercept	0.76
Formal leadership	0.31
Informal leadership	0.48
Model R ²	0.43

Table 4. Ordinary least-squares regression of cohesion on formal and informal leadership (synthetic data).

Both coefficients are positive in the simulated regression. Controlling for the other leader index, a one-point increase in perceived formal leadership is associated with a model-estimated rise of 0.31 cohesion points; the corresponding coefficient for informal leadership is 0.48. The two indices together account for approximately 43.26% of synthetic cohesion variance. These numerical values are not generalizable estimates, and no causal direction can be concluded.

3.4. Distribution across perceived leadership groups

Combined leadership category	Participants	Mean cohesion
Lower	50	3.21

Middle	50	3.67
Higher	50	4.11

Table 5. Tertile-based illustrative contrasts. Grouping is based on the sum of the two simulated leadership indices.

The ranking of group means is monotonic in this sample: players assigned to the higher combined-leadership tertile also have the greatest modeled cohesion. This is a descriptive comparison, not evidence that changing leadership would produce an equivalent improvement in a real team. Group comparisons in actual field research should account for clustering within teams and possible confounders including performance level, coach behavior, and team tenure.

Interpretive caution

Measurement choice is consequential. Captains may score highly for procedural coordination but lower for emotional connection, while peer leaders may be socially central without having clear responsibility for decision-making. Thus, a single global leadership rating may obscure divergent pathways into task and social cohesion. Future observational research should retain distinct role dimensions and test whether alignment between leader types moderates team outcomes.

3. RESULTS (figures)

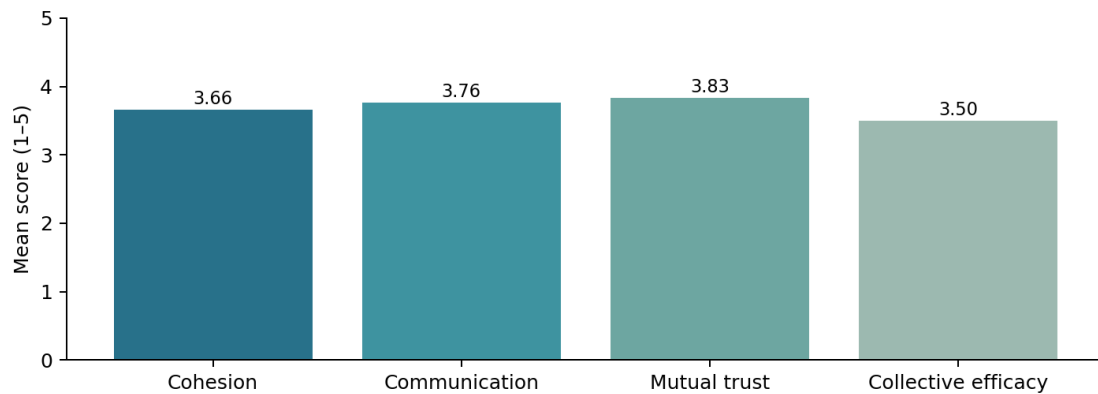


Figure 1. Model-generated means of four positive team-dynamics indicators (synthetic data).

Figure 1 highlights the profile of positive team functioning in the illustrative dataset. Because variables use the same 1–5 response range, their means can be displayed on a common axis. The chart is intended to demonstrate clear outcome visualization; small differences among means must not be interpreted as evidence of meaningful practical differences.

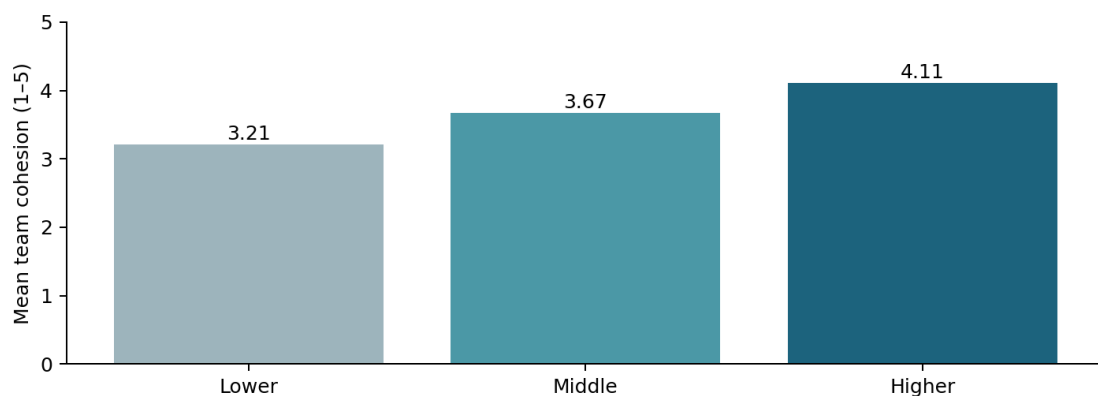


Figure 2. Model-generated cohesion scores by combined leadership tertile (synthetic data).

Figure 2 shows a positive gradient from the lower to the higher leadership category. This gradient derives from the deliberately specified

simulation equations. An empirical test would require random or representative sampling, validated instruments, appropriate power analysis, uncertainty intervals, and multilevel modeling if players belong to multiple teams.

4. DISCUSSION

The theoretical implication of the analysis is that leadership in team sports is best interpreted as an interaction between assigned authority and peer-endorsed influence. Formal leaders can preserve continuity of standards, resolve procedural ambiguity, and provide a stable channel to coaching staff. Informal leaders may convey norms through daily interpersonal exchanges, support teammates during setbacks, and influence collective confidence without occupying any official position.

This perspective is compatible with the distribution of athlete leadership roles reported by Fransen et al. [1] and the association between high-quality athlete leadership, team identification, and outcome confidence described by Fransen et al. [3]. It also aligns with the distinction between task and social cohesion in the GEQ framework [2]. Neither body of literature implies that every team benefits from the same leadership structure or that the simulated coefficients reported here should be expected in practice.

For coaching practice, a promising strategy is to distinguish between responsibility and influence: appoint leaders according to transparent functional criteria, identify respected peers through sociometric nomination, and coordinate captain–peer leader communication. Shared decision routines and team reflection meetings may reduce status competition while preserving the authority needed for urgent competitive decisions. However, such interventions require evaluation against meaningful baselines and potential unintended effects.

Methodological limitations

The most important limitation is that no real athlete data were analyzed. The analysis lacks actual questionnaire administration, verified scale reliability, ethical recruitment, competition contexts, coach reports, objective team performance and repeated measurements. Moreover, the simulated athlete-level independence assumption neglects within-team similarity. Consequently, no external validity, statistical inference, or intervention effectiveness is asserted.

Future empirical work should enroll multiple teams and several sports, document team membership and competition level, use validated GEQ subscales for cohesion, apply psychometric analyses to leadership measures, and distinguish team-level from athlete-level effects. Longitudinal waves or controlled leadership-development trials would clarify whether leader development precedes team improvements or whether successful teams simply rate leaders more favorably.

5. CONCLUSION

Formal and informal athlete leaders represent complementary but nonidentical sources of influence. Appointed captains can facilitate role clarity, consistent standards, and structured communication; emergent leaders can support belonging, motivation, peer trust, and adaptation. The illustrated synthetic analysis shows how simultaneous positive associations of both types of leadership with team cohesion and other team processes may be modeled and visualized. It does not establish an observed causal or correlational effect in a real athlete population.

The proposed applied implication is to assess leadership as a distributed system and to develop mutually reinforcing captain and peer-leader roles.

Validation of this implication requires preregistered hypotheses, ethically collected athlete-level measurements, team-sensitive analyses, and transparent reporting of uncertainty.

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Transparency statement

All tables and figures are author-generated from a synthetic computational example. No primary field observations are reported. The article provides an IMRAD-formatted methodological model suitable for adaptation once genuine research data are collected.