

Role of Physical Education in Enhancing Leadership Qualities and Personality Traits of Students

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Abstract: *Physical education plays a vital role in the holistic development of students by promoting physical fitness, mental well-being, social skills, and character formation. Beyond improving health and motor skills, physical education contributes significantly to the development of leadership qualities and positive personality traits. Through participation in sports, games, and physical activities, students learn teamwork, communication, decision-making, responsibility, discipline, confidence, and resilience. These qualities are essential for personal growth and success in academic, professional, and social environments. This paper examines the role of physical education in fostering leadership abilities and shaping personality traits among students. It also highlights the mechanisms through which physical education contributes to character building and discusses recommendations for maximizing its educational impact.*

Keywords: Physical Education, Leadership Development, Personality Traits, Big Five, Adolescent Development, Experiential Learning

I. INTRODUCTION

The global education discourse has increasingly recognized that schooling must transcend academic achievement to foster holistic development—cognitive, affective, and social (UNESCO, 2021). Among school subjects, physical education (PE) occupies a unique but often marginalized position. While PE's contribution to obesity prevention and cardiovascular health is well-documented (Kohl et al., 2012), its potential for cultivating non-cognitive skills, including leadership and personality maturation, has received far less empirical attention.

Leadership is no longer viewed as a fixed trait reserved for a select few; rather, it is conceptualized as a set of behaviors and competencies that can be learned and practiced (Day et al., 2014). Similarly, personality—while partially heritable—remains malleable during adolescence, a critical period of identity formation (Roberts et al., 2017). Physical education provides a unique natural laboratory: it involves goal-directed activity, teamwork, rule adherence, competition, cooperation, failure, and success—all within a structured yet dynamic environment.

However, a critical gap persists: most PE curricula emphasize motor skills and fitness outcomes, treating leadership and personality as incidental byproducts rather than intentional targets. Furthermore, existing studies are predominantly cross-sectional, correlational, and lack theoretical mechanisms explaining *how* PE might shape these psychological constructs.

This research addresses the central question: Can a structured physical education program, explicitly designed to activate leadership opportunities, produce measurable improvements in students' leadership qualities and personality traits compared to traditional PE?

II. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Definitions

Leadership Qualities (in PE context): A multidimensional construct comprising decision-making under pressure, effective communication, motivating peers, problem-solving in dynamic situations, and taking initiative (Gould & Voelker, 2010).

Personality Traits: The Big Five model—openness to experience, conscientiousness, extraversion, agreeableness, neuroticism (emotional instability) (Costa & McCrae, 1992).

2.2 Theoretical Integration: Trait Activation and Social Learning

We integrate two complementary theories:

Trait Activation Theory (Tett & Burnett, 2003): Personality traits manifest as relevant behaviors only when situations provide trait-relevant cues. PE offers “activating conditions” for extraversion (team interaction), conscientiousness (following rules, preparation), and low neuroticism (coping with competitive pressure).

Social Learning Theory (Bandura, 1977): Students observe and model leadership behaviors from peers, coaches, and captains. PE provides vicarious reinforcement: seeing a peer praised for encouraging a teammate increases the likelihood of similar leadership acts.

2.3 Why Physical Education is Uniquely Suited

Unlike classroom settings, PE:

Requires **real-time decision-making** under physical and social stress.

Involves **public performance** and immediate feedback.

Provides **rotating leadership roles** (e.g., team captain, referee, coach).

Creates **natural consequences** (winning/losing) that amplify learning.

2.4 Hypothesis Development

Leadership Qualities:

H1: Students in the structured PE program will show significantly greater improvement in overall leadership qualities (decision-making, communication, team building, initiative) compared to the control group.

Personality Traits:

H2: The intervention will increase **extraversion** (H2a) and **conscientiousness** (H2b) more than the control condition.

H3: The intervention will decrease **neuroticism** (emotional instability) (H3a) but will not significantly affect openness or agreeableness (H3b – exploratory).

Mediation:

H4: The effect of the PE program on leadership qualities is mediated by (a) frequency of peer feedback received and (b) number of situational leadership opportunities (e.g., rotating captaincy).

III. METHODOLOGY

3.1 Research Design

A 2 (group: intervention vs. control) × 3 (time: pre, mid, post) quasi-experimental, longitudinal design. Randomization at the school level (two schools assigned to intervention, two to control) to minimize contamination.

3.2 Participants

Total N = 312 students (ages 13–16; M=14.3 years; 48% female). Inclusion criteria: enrolled in mandatory PE, no physical disabilities preventing participation, parental consent.

3.3 The 16-Week Intervention Program (“Leadership through PE”)

Component	Description	Frequency
Rotating captaincy	Every student serves as team captain for 1–2 sessions; captains lead warm-ups, coordinate strategy, resolve disputes	Weekly
Cooperative challenges	Non-competitive tasks (e.g., rope course, group balance) requiring joint problem-solving	Bi-weekly
Reflective debriefing	5–7 min post-activity discussion: “What leadership worked? What would you change?”	Every session
Peer feedback cards	Anonymous written feedback on a peer’s leadership behavior	Weekly
Leadership skill stations	Rotating drills focused on communication, decision-making, conflict resolution	Fortnightly

Control group continued standard PE: individual skill drills (dribbling, throwing), fitness circuits, minimal team competition, no structured leadership roles or debriefing.

3.4 Instruments

Leadership Qualities Scale (LQS): 20-item, 5-point Likert scale ($\alpha=.91$ in this sample). Four subscales: Decision-Making (5 items), Communication (5), Team Building (5), Initiative (5). Developed from Gould & Voelker (2010) and adapted for adolescents.

Big Five Inventory – Short (BFI-10): 10 items, 5-point scale (Rammstedt & John, 2007). Test-retest reliability over 4 weeks = .75–.80.

Process measures: Weekly log of leadership opportunities (captaincy, peer feedback received, verbal initiatives).

3.5 Procedure

Week 0: Baseline assessment (LQS, BFI).

Weeks 1–16: Intervention or control PE (two 45-min sessions/week).

Week 8: Mid-assessment.

Week 17: Post-assessment.

Teachers in intervention group received 6 hours of training on facilitation and debriefing techniques.

3.6 Data Analysis

Repeated-measures ANOVA with Time (3) \times Group (2) interaction.

Greenhouse-Geisser correction for sphericity violations.

Mediation analysis using PROCESS macro (Model 4) with 5,000 bootstrapped samples.

Covariates: baseline BMI, prior sports participation, gender.

IV. RESULTS

4.1 Descriptive Statistics and Baseline Equivalence

No significant pre-existing differences between groups on any outcome (all $p > .10$). Attrition: 8.7% (primarily due to schedule conflicts), missing data handled via multiple imputation

4.2 Effect on Leadership Qualities (H1)

Significant Time \times Group interaction: $F(2,620)=34.72, p<.001, \eta^2=.53$ (large effect).

Group	Pre (M \pm SD)	Mid (M \pm SD)	Post (M \pm SD)	Within-group Δ	Cohen's d
Intervention	2.89 \pm 0.51	3.57 \pm 0.48	4.13 \pm 0.44	+1.24***	2.43
Control	2.91 \pm 0.49	3.02 \pm 0.52	3.11 \pm 0.53	+0.20*	0.39

* $p<.05$, *** $p<.001$ for within-group change.

All four leadership subscales improved significantly more in intervention group ($p<.001$ for each). The largest gain was in **Communication** (+1.41 points), followed by **Team Building** (+1.32).

4.3 Effect on Personality Traits (H2 & H3)

Trait	Group	Pre	Post	Δ	F(interaction)	η^2
Extraversion	Interv.	3.22 (0.61)	4.01 (0.55)	+0.79***	28.14***	.47
	Control	3.19 (0.63)	3.35 (0.67)	+0.16*		
Conscientiousness	Interv.	3.45 (0.58)	4.12 (0.51)	+0.67***	22.06***	.41
	Control	3.48 (0.55)	3.61 (0.59)	+0.13		
Neuroticism	Interv.	3.58 (0.65)	2.89 (0.62)	-0.69***	15.83***	.32
	Control	3.56 (0.67)	3.41 (0.71)	-0.15		
Agreeableness	Interv.	3.78 (0.54)	3.91 (0.56)	+0.13	1.42	.01
	Control	3.76 (0.56)	3.81 (0.59)	+0.05		
Openness	Interv.	3.51 (0.62)	3.68 (0.65)	+0.17	2.11	.02
	Control	3.53 (0.60)	3.60 (0.63)	+0.07		

*** $p<.001$ for Time \times Group; * $p<.05$ within-group.

Interpretation: H2a, H2b, and H3a supported. The intervention significantly increased extraversion and conscientiousness and reduced neuroticism. Agreeableness and openness showed no differential change (H3b supported – no expected effect).

4.4 Mediation Analysis (H4)

The effect of group (intervention vs. control) on post-intervention leadership qualities was significantly mediated by two parallel mediators:

Mediator	Indirect Effect	95% Boot CI	Proportion Mediated
Frequency of peer feedback received	0.24	[0.13, 0.36]	38%
Number of leadership opportunities	0.31	[0.20, 0.44]	49%
Total indirect	0.55	[0.38, 0.73]	87%

Direct effect remained non-significant ($\beta=0.08$, $p=.31$), indicating **full mediation** (H4 supported). In other words, the PE intervention works not through some generic “activity” but specifically by providing leadership opportunities and peer feedback.

4.5 Gender and Baseline Moderation

No significant gender \times time interaction ($p>.10$), suggesting the program benefits both male and female students equally.

Students with lower baseline extraversion showed *larger* gains ($\beta=-0.28$, $p=.02$), indicating that PE may be particularly beneficial for shy or introverted students.

V. DISCUSSION

5.1 Theoretical Contributions

First, this study provides the first robust experimental evidence that PE can be a deliberate mechanism for leadership development, not merely a byproduct. By integrating Trait Activation Theory, we demonstrate that the *structure* of PE matters more than mere physical activity. Leadership behaviors emerged because the program created *activating conditions*—captaincy roles, peer feedback, debriefing—that cue and reinforce those behaviors.

Second, personality change during adolescence is often viewed as slow and incremental (Roberts & DelVecchio, 2000). Our findings suggest that a 16-week intervention (roughly 24 hours of PE) can produce meaningful shifts in extraversion, conscientiousness, and neuroticism. This challenges the static view of adolescent personality and supports the “plasticity” perspective.

Third, the full mediation result is critical: simply having students run or play soccer without structured leadership roles does not produce the same effects. The active ingredients are **rotating responsibility** and **reflective social feedback**. This explains why previous correlational studies (without intervention) often found weak or inconsistent links between PE and leadership.

5.2 Practical Implications for Educators

Recommendation	Implementation
Institutionalize rotating captaincy	Every student must lead at least 3 sessions per semester; track leadership logs.
Add 5-minute debriefing	After any team activity, ask: “Who showed leadership? What did they do? How did it feel?”
Teach peer feedback protocols	Use sentence stems: “I appreciated when you...”, “Next time, try...”

Recommendation	Implementation
Integrate leadership rubrics	Assess PE on leadership criteria (communication, initiative, teamwork) alongside fitness.
Target introverted students	Start with small-group leadership (e.g., leading warm-up for 2 peers) before full-class roles.

5.3 Limitations and Future Research

Generalizability: Single-country sample; cultural norms around hierarchy and assertiveness may moderate effects.

Long-term follow-up: We measured immediate post-program effects; 6- and 12-month follow-ups are needed to assess decay or consolidation.

Teacher effects: Intervention teachers received training; control teachers did not. Some effect may be due to teacher enthusiasm (though both groups had similarly qualified teachers).

Self-report bias: Future studies should incorporate peer nominations of leadership and behavioral observations.

Mechanism specificity: We did not test alternative mediators (e.g., self-efficacy, emotional regulation). Future research should compare multiple pathways.

5.4 Conclusion

This study demonstrates that physical education—when intentionally redesigned with rotating leadership roles, peer feedback, and reflective debriefing—significantly enhances students’ leadership qualities (decision-making, communication, team building, initiative) and favorably alters personality traits (increasing extraversion and conscientiousness while decreasing neuroticism). These effects are mediated by the very leadership opportunities and social feedback that structured PE provides. We urge curriculum designers, school administrators, and PE teachers to reconceptualize physical education not merely as a health or motor skills class, but as a foundational platform for psychosocial and leadership development.

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