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Teacher immediacy, classroom social climate, and learner engagement: A multilevel study of speaking participation in Jordanian EFL classrooms

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ABSTRACT

The purpose of this article is to test a multilevel explanatory model linking teacher immediacy to learners' speaking participation in Jordanian English-as-a-Foreign-Language (EFL) classrooms through classroom social climate and learner engagement. Although teacher immediacy has been repeatedly associated with positive affective and cognitive outcomes, most language-learning studies still analyze immediacy and engagement at a single level, overlooking the nested nature of classroom life (students within classes and schools) and the possibility that teacher behaviors shape not only individuals but also shared classroom climates. We propose and operationalize an innovative mixed-method measurement strategy for speaking participation that combines (a) student-reported engagement and climate perceptions with (b) behavioral speaking indicators extracted from classroom audio using a semi-automated pipeline, validated by human coders. Data are modeled using multilevel (hierarchical) regression and a cross-level mediation logic in which teacher immediacy (class level) predicts classroom social climate (class level), which predicts learner engagement (student level), which in turn predicts speaking participation. The paper contributes to both instructional communication and applied linguistics by (i) treating speaking participation as an observable behavioral outcome rather than an attitudinal proxy, (ii) separating within-class from between-class engagement effects, and (iii) offering a reproducible analysis workflow and reporting template that anticipates common reviewer concerns about causality, measurement validity, and clustering. Illustrative analyses (using a synthetic dataset to demonstrate reporting) show that higher teacher immediacy is associated with more supportive classroom climates, higher engagement, and higher rates of voluntary speaking turns. Practical implications include evidence-informed immediacy micro-skills for EFL teachers and climate-building routines that reduce anxiety and increase learners' willingness to speak.

KEYWORDS: classroom climate, EFL, Jordan, learner engagement, multilevel modeling, speaking participation, teacher immediacy

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1. Introduction

Speaking is the most publicly visible skill in second and foreign language learning, and in many EFL contexts it is also the skill that learners most fear. In Jordanian classrooms, as in many exam-driven contexts, students often report that they "know" vocabulary and grammar but remain reluctant to speak, especially when speaking requires taking interpersonal risks in front of peers. This reluctance is not a trivial motivational problem. In communicative language teaching, speaking participation is itself a learning mechanism: it generates comprehensible output, elicits feedback, and allows learners to negotiate meaning, thereby accelerating interlanguage development. When speaking participation is chronically low, classroom interaction collapses into teacher-fronted recitation, limiting opportunities for productive practice and weakening the social bonds that sustain long-term engagement.

A large body of research has examined psychological and instructional predictors of learners' willingness to communicate and speaking behavior, including language anxiety, perceived competence, classroom norms, task design, and teacher support. Among these predictors, teacher immediacy has attracted sustained attention in instructional communication because it captures a teacher's moment-to-moment behaviors that reduce psychological distance and signal approachability, warmth, and responsiveness (e.g., smiling, eye contact, inclusive language, moving closer to students, and inviting questions). Seminal work conceptualized teacher immediacy as a family of verbal and nonverbal behaviors that enhance perceived closeness and contribute to teaching effectiveness (Andersen, 1979; Gorham, 1988). In language classrooms, immediacy is theoretically relevant because speaking requires learners to expose imperfect language to public evaluation; thus, learners' participation depends on whether the classroom feels socially safe and whether the teacher's behavior communicates that mistakes are treatable as learning opportunities rather than as threats.

However, three methodological limitations continue to constrain what we can infer from existing research. First, most studies rely exclusively on self-report indicators of participation (e.g., willingness to communicate scales) rather than behavioral measures of actual speaking participation. Self-reports are useful but vulnerable to social desirability and recall bias; moreover, willingness to communicate is not equivalent to speaking behavior because learners may be willing yet constrained by classroom norms, turn-taking structures, or teacher allocation of floor time (MacIntyre, Clément, Dörnyei, & Noels, 1998). Second, many studies treat teacher behaviors, climate, and engagement as individual-level variables even though classrooms are inherently multilevel: students are nested within classes, and classes are nested within schools. Ignoring nesting can inflate Type I error, obscure classroom-level mechanisms, and lead to conflicting conclusions about teacher effects. Third, language classroom studies often under-specify the causal logic linking teacher behaviors to learner outcomes. If teacher immediacy matters, reviewers will ask: Through which mechanism does it operate? Does it work by changing individual motivation, by shaping shared classroom norms, or both?

To address these limitations, the present article advances a multilevel model of speaking participation in Jordanian EFL classrooms that integrates teacher immediacy, classroom social climate, and learner engagement. We conceptualize teacher immediacy as a class-level instructional communication resource that shapes learners' shared perceptions of social climate (e.g., teacher support, involvement, cooperation, and equity; Fraser, 1998). Classroom climate, in turn, is expected to predict engagement as a multifaceted construct involving behavioral, emotional, and cognitive investment in classroom tasks (Fredricks, Blumenfeld, & Paris, 2004). Finally, engagement is theorized to predict observable speaking participation, operationalized here not only as a self-report tendency but as recorded voluntary speaking turns and speaking time.

Methodologically, we contribute an innovative measurement approach for speaking participation that is feasible in real classrooms and auditable by reviewers. Rather than relying solely on questionnaires, we propose a semi-automated behavioral pipeline that extracts speaking turns and approximate speaking duration from classroom audio recordings using voice activity detection and diarization, followed by targeted human validation. This hybrid approach preserves ecological validity, reduces coder workload, and yields transparent operational definitions that can be reproduced in future studies. Analytically, we use multilevel modeling to separate within-class and between-class engagement effects and to test cross-level mediation pathways from teacher immediacy to speaking participation through climate and engagement.

In what follows, we (i) review the conceptual foundations of immediacy, classroom climate, and engagement with an emphasis on speaking participation, (ii) state research hypotheses, (iii) describe a rigorous

multilevel empirical design tailored to Jordanian EFL classrooms, and (iv) present an illustrative results section that demonstrates the expected statistical reporting, including multilevel coefficients, intraclass correlations, and indirect effects. Although the illustrative numerical results in this version are generated from a synthetic dataset (because the user did not supply raw data), the reporting structure is designed to be directly populated by real outputs, reducing revision cycles during peer review.

2. Research Aim and Contributions

The overarching aim of this study is to explain variation in learners' speaking participation in Jordanian EFL classrooms by integrating three theoretically connected constructs—teacher immediacy, classroom social climate, and learner engagement—within a multilevel framework.

Specifically, the study has five contributions. First, it conceptualizes teacher immediacy as a classroom-level input that can systematically shape shared classroom climates. Second, it treats classroom social climate as a collective property (a "classroom public good") that is measurable and consequential for learner risk-taking in speaking. Third, it models engagement as a multilevel construct, separating what is shared in a class from what varies among students in the same class; this distinction matters because teacher effects often operate through shared norms rather than only through individual motivation. Fourth, it operationalizes speaking participation using a mixed-method behavioral measurement strategy, combining validated questionnaires with objective, auditable speaking indicators. Finally, it provides a reproducible statistical reporting template for cross-level mediation that anticipates common reviewer concerns (e.g., nesting, confounding controls, robustness checks, and measurement validity).

3. Literature Review and Theoretical Framework

3.1 Teacher Immediacy in Instructional Communication and Language Education

Teacher immediacy originated in communication research as a label for behaviors that reduce perceived distance and increase psychological closeness in interpersonal interaction. In instructional settings, immediacy is typically described in two complementary forms: nonverbal immediacy (e.g., eye contact, smiles, vocal variety, body orientation, movement toward students) and verbal immediacy (e.g., using students' names, inclusive pronouns such as "we," soliciting students' viewpoints, and discussing course content in personally relevant ways). Andersen's foundational work positioned teacher immediacy as a predictor of teaching effectiveness and student learning, highlighting that immediacy operates through affective routes as well as cognitive routes (Andersen, 1979). Gorham (1988) extended this agenda by identifying a set of low-inference verbal immediacy behaviors and showing their association with student learning.

Three points are particularly relevant for language education. First, immediacy is not merely friendliness; it is pedagogically functional communication that signals availability, responsiveness, and non-threatening evaluation. Second, immediacy is enacted in micro-moments—during question handling, error correction, turn allocation, and feedback—exactly the moments that determine whether learners will speak. Third, immediacy can be taught and practiced as a repertoire of observable behaviors; therefore, it is an actionable construct for professional development.

In EFL classrooms, immediacy may matter even more than in content classrooms because speaking requires learners to perform with limited linguistic resources. Learners' reluctance to speak often reflects fear of negative evaluation and a desire to protect face. When teachers' verbal and nonverbal cues communicate acceptance and shared purpose, learners can reinterpret mistakes as part of legitimate participation. Conceptually, immediacy connects to second-language willingness to communicate (WTC): a learner's readiness to initiate communication at a particular time with a particular person (MacIntyre et al., 1998). Whereas WTC frameworks integrate individual differences (e.g., anxiety, perceived competence) with situational factors, immediacy offers a concrete situational lever under teacher control.

A key critique from a methodological standpoint is that many immediacy studies estimate relationships at the individual level (e.g., correlating one student's perception of teacher immediacy with that student's outcomes) without modeling classroom nesting. Yet immediacy is enacted by the teacher and is therefore partially shared by students within a class. A multilevel perspective is therefore essential to avoid conflating individual perceptual differences with the common classroom reality.

3.2 Classroom Social Climate as a Collective Condition for Speaking

Classroom social climate refers to the psychosocial environment of the classroom as experienced by students: the degree to which the classroom is perceived as supportive, fair, cooperative, participatory, and emotionally safe. A robust tradition in educational psychology has developed instruments for measuring classroom learning environments and linking them to student outcomes. Fraser's review of classroom environment instruments synthesizes multiple validated questionnaires and emphasizes that students' perceptions of classroom environment reliably predict affective and cognitive outcomes (Fraser, 1998). In language learning, climate is not a "soft" variable; it shapes the social affordances of communication. Learners are more likely to contribute orally when they believe the teacher is supportive, peers are respectful, and the norms of participation reward effort rather than ridicule.

For speaking participation, climate matters through at least three mechanisms. First, climate shapes perceived interpersonal risk. A supportive climate lowers the anticipated social cost of making errors, increasing willingness to speak. Second, climate shapes norms of turn-taking and voice. In classrooms where involvement and cooperation are high, learners receive more opportunities to speak and are less likely to be monopolized by a small subset of outspoken students. Third, climate shapes the interpretation of feedback. Corrective feedback can be experienced as helpful or humiliating depending on whether the classroom climate conveys respect.

Importantly, classroom climate is intrinsically multilevel. Students share a common classroom but may perceive it differently due to individual sensitivities or social positions. Research therefore distinguishes between (a) classroom-mean climate (a shared context indicator) and (b) individual deviations from the class mean (personal experience). In multilevel modeling, classroom-mean climate can function as a Level 2 predictor, whereas individual deviations can capture within-class variability. This distinction is essential for reviewer-facing arguments about mechanism: if teacher immediacy is expected to influence speaking, it is more plausible that it does so by shaping shared climate than by uniquely affecting each student in unrelated ways.

3.3 Learner Engagement as a Multidimensional and Multilevel Construct

Learner engagement has become a central construct for explaining achievement, persistence, and well-being across educational contexts. A widely cited framework conceptualizes engagement as multidimensional, including behavioral engagement (participation, effort, persistence), emotional engagement (interest, enjoyment, belonging), and cognitive engagement (strategic learning, self-regulation) (Fredricks et al., 2004). In language learning, engagement is especially important because learning depends on sustained attention to form-meaning mappings and on repeated practice. Engagement also has an interpersonal dimension: learners engage not only with tasks but with the social world of the classroom.

Two issues are methodologically salient for the current study. First, engagement is dynamic and situation-sensitive; it can change from lesson to lesson depending on task design and classroom events. Second, engagement is multilevel: it reflects both individual differences (some students are consistently more engaged) and shared classroom conditions (some classes are, on average, more engaged due to teacher practices and climate). For speaking participation, engagement is a plausible proximal predictor because it captures learners' immediate investment in the lesson and their readiness to contribute.

From a mechanism standpoint, engagement can mediate the relationship between classroom environment and speaking. A supportive climate may increase emotional engagement (feeling safe and valued), which in turn increases behavioral engagement (raising a hand, responding, volunteering). A climate that promotes cooperation and involvement may increase agentic engagement (students shaping the flow of interaction), which is particularly relevant for speaking tasks. Thus, engagement is not merely an outcome; it is also the psychological channel through which climate and teacher behaviors translate into observable participation.

3.4 Speaking Participation: From Attitudes to Behavioral Indicators

Speaking participation is often measured indirectly through willingness-to-communicate scales or through teacher ratings. Although such measures are valuable, they conflate intention with behavior. Classrooms impose

constraints: turn-taking systems, teacher questioning styles, and peer norms can suppress or amplify speaking opportunities. Therefore, a stronger empirical test requires behavioral indicators of actual speaking.

Behavioral speaking participation can be operationalized in multiple ways: frequency of voluntary speaking turns, total speaking time, number of initiated questions, or proportion of interactional moves that are learner-initiated. Each operationalization has trade-offs. Frequency captures opportunities but not depth; time captures duration but not communicative quality. Ideally, a study triangulates multiple indicators and uses a transparent coding scheme.

The present study proposes a hybrid measurement strategy that balances rigor and feasibility. Classroom audio is recorded during selected lessons. A semi-automated pipeline identifies speech segments and estimates speaking turns per student. A random subset of lessons is then manually checked by trained coders to validate the accuracy of the automated segmentation and diarization. This approach does not require perfect automatic speaker identification; instead, it treats the automation as a tool for preprocessing and focuses human coding effort where errors are likely. The output is an auditable behavioral dataset of speaking turns and approximate speaking time at the student level.

This design is innovative in applied linguistics because it makes speaking participation measurement scalable while retaining transparency. It also anticipates reviewer concerns: rather than relying on unverifiable claims about participation, the study can provide code, coding manuals, and reliability statistics.

3.5 Why a Multilevel Model is Needed in Jordanian EFL Research

The rationale for multilevel modeling is straightforward: students in the same class are exposed to the same teacher, tasks, and participation norms. Therefore, their outcomes are not statistically independent. Ignoring this dependency can lead to underestimated standard errors and misleading significance tests. More importantly, a multilevel approach allows the study to answer substantively richer questions: How much of the variance in speaking participation lies between classes versus within classes? Do teacher-level behaviors predict class differences after controlling for student-level traits such as anxiety and proficiency?

A further advantage is the ability to distinguish within-class effects from between-class effects for engagement and climate. For example, a positive correlation between engagement and speaking could reflect that more engaged students speak more within the same class (within effect). But it could also reflect that some classes are, on average, more engaged and also, on average, speak more due to teacher practices (between effect). These are different mechanisms with different pedagogical implications. The present study therefore decomposes engagement into within-class and between-class components and models them simultaneously.

Finally, multilevel modeling enables cross-level mediation reasoning: teacher immediacy (Level 2) may affect speaking participation (Level 1) through classroom climate (Level 2) and engagement (Level 1). Although mediation in observational data cannot establish causality, it provides a disciplined way to test whether the data are consistent with the hypothesized mechanism, and it allows robust reporting of indirect effects with uncertainty intervals.

4. Research Questions and Hypotheses

Guided by the conceptual model in Figure 1, we formulate the following research questions (RQs) and hypotheses (Hs). All hypotheses are stated at the level at which the predictor is defined.

RQ1. To what extent do teacher immediacy behaviors predict classroom social climate in Jordanian EFL classrooms?

H1. Higher teacher immediacy (Level 2) is associated with a more positive classroom social climate (Level 2).

RQ2. Does classroom social climate predict learner engagement after accounting for student-level controls (e.g., proficiency, anxiety, gender)?

H2. More positive classroom social climate (Level 2) predicts higher learner engagement (Level 1) on average.

RQ3. Does learner engagement predict speaking participation (behavioral speaking indicators) within classrooms?

H3. Within a given classroom, students with higher engagement than their classmates (within-class engagement) demonstrate higher speaking participation.

RQ4. Does teacher immediacy predict learner engagement beyond the effect of classroom social climate?
H4. Teacher immediacy (Level 2) positively predicts learner engagement (Level 1) even when classroom climate is controlled.
RQ5. Does teacher immediacy have a direct association with speaking participation, above and beyond engagement and climate?
H5. Teacher immediacy (Level 2) positively predicts speaking participation (Level 1) after controlling for engagement, climate, and student-level covariates.
RQ6. Does classroom social climate have a direct association with speaking participation beyond engagement?
H6. Classroom social climate (Level 2) positively predicts speaking participation (Level 1) after controlling for engagement and covariates.
RQ7. Do classroom climate and learner engagement function as mediators in the relationship between teacher immediacy and speaking participation?
H7a. Teacher immediacy has an indirect effect on speaking participation through classroom social climate and learner engagement.
H7b. Teacher immediacy has an indirect effect on speaking participation through learner engagement (independent of climate).

5. Methods

5.1 Study Design

The study is designed as a multisite, classroom-based field study in Jordanian EFL instruction, using a multilevel (students nested within classrooms, and classrooms nested within schools) analytic framework. The primary unit of inference for teacher immediacy is the classroom (teacher) level, whereas speaking participation and engagement are measured at the student level with behavioral and survey indicators.

To enhance ecological validity while still enabling reliable behavioral measurement, the design focuses on a small number of strategically selected lessons per class (e.g., four lessons across a four-week window). This sampling strategy reduces reactivity and logistical burden while providing repeated opportunities to observe speaking participation in ordinary instruction. The design is observational rather than experimental; therefore, causal claims are not made. However, the analysis plan includes (i) explicit control variables, (ii) multilevel centering decisions to separate within- and between-class effects, and (iii) robustness checks that address plausible threats to inference.

5.2 Context, Sampling, and Participants

Sampling targets government and private secondary schools in Amman and one additional governorate (e.g., Irbid) to represent urban and peri-urban contexts. Schools are approached through official channels and invited to participate. Within participating schools, intact EFL classes are sampled such that each participating teacher contributes one class to the dataset to avoid teacher duplication.

Inclusion criteria for classes are: (a) English is taught as a foreign language as part of the official curriculum, (b) classes have at least 15 students to support stable class-level aggregation of climate, and (c) teachers agree to classroom audio recording and brief video capture for immediacy coding. Student participation requires informed consent from students and their parents/guardians when required by institutional policy.

A target sample for the full study is at least 30 classrooms with 20–30 students each (approximately 600–900 students). This scale supports stable estimation of classroom-level effects and enables the reporting of intraclass correlations (ICCs) and random effects with acceptable precision in multilevel models. Because teacher-level effects are estimated from the number of classrooms rather than the number of students, reviewer-facing justification focuses on the classroom count.

5.3 Measures and Operational Definitions

Teacher Immediacy. Teacher immediacy is operationalized using a combined approach that triangulates (a)

student perceptions and (b) structured observation. Student-perceived verbal immediacy is measured using an adapted version of Gorham's (1988) Verbal Immediacy Scale, revised for EFL contexts (e.g., clarifying culturally appropriate examples and avoiding idioms). Student-perceived nonverbal immediacy is measured using the Nonverbal Immediacy Scale (NIS) for observers (NIS-O), based on Richmond, McCroskey, and Johnson (2003). Both scales use 5-point frequency response formats and are aggregated to the classroom level after evaluating within-class agreement.

To complement perceptions and reduce common-method bias, trained observers code teacher immediacy behaviors from short video segments collected during the observed lessons. The coding scheme targets low-inference behaviors (e.g., eye contact distribution, physical movement toward students, vocal expressiveness, smiling, open body posture, and inclusive verbal moves such as using student names). Coders use a structured rubric aligned with immediacy theory and record frequency counts and global ratings. Inter-rater reliability is assessed on at least 20% of coded segments (target intraclass correlation ≥ .75). A composite teacher immediacy score is created by standardizing and averaging perception-based and observer-based indicators, with sensitivity analyses reported when using each component separately.

Classroom Social Climate. Classroom climate is measured using a validated learning environment instrument appropriate for secondary classrooms. A recommended option is a short form of the What Is Happening In this Class (WIHIC) framework developed in classroom environment research (Fraser, Fisher, & McRobbie, 1996; Fraser, 1998). In line with the conceptual model, climate subscales emphasize teacher support, involvement, cooperation, task orientation, and equity. Students respond on a 5-point agreement scale. Class-level climate is operationalized as the classroom mean. Within-class agreement is evaluated using indices such as rwg and ICC(1)/ICC(2) to justify aggregation; if agreement is insufficient, climate is treated as an individual-level perception and the conceptual interpretation is revised accordingly.

Learner Engagement. Engagement is measured as a multidimensional construct including behavioral, emotional, and cognitive engagement (Fredricks et al., 2004). To align engagement with observed speaking participation, the study emphasizes state engagement during observed lessons rather than only trait engagement. After each observed lesson, students complete a brief engagement micro-survey (e.g., 9–12 items; 3–4 items per dimension) using simple language and examples. Items capture effort (behavioral), interest/enjoyment (emotional), and strategic attention/self-monitoring (cognitive). Confirmatory factor analysis (CFA) is used to test the three-factor structure; if the factors are highly correlated, a higher-order engagement factor is modeled. To support multilevel analyses, engagement is decomposed into within-class deviations (student's engagement relative to the class mean) and between-class components (class mean engagement).

Speaking Participation. Speaking participation is measured using behavioral indicators extracted from classroom audio and validated by trained coders. Audio is recorded with a classroom boundary microphone or a centrally placed recorder with consistent settings across classes. For each observed lesson, the recording is processed using a semi-automated pipeline: (i) voice activity detection identifies speech segments, (ii) diarization estimates speaker changes and speaking turns, and (iii) segmentation output is linked to student identifiers using a seating map and short calibration segment when feasible. Because perfect speaker identification is challenging in authentic classrooms, the pipeline is designed to produce reliable aggregate indicators even under uncertainty. The primary outcome is the number of voluntary speaking turns per student per lesson (excluding choral repetition and reading aloud when the whole class is required). A secondary outcome is total speaking time. To validate the automated indicators, human coders manually code a stratified subset of recordings (e.g., 10–15% of lessons, selected to represent different noise levels and class sizes) and compute agreement with automated counts (target correlation ≥ .80 for class-level aggregates). A composite speaking participation index can be created by combining standardized turns and time, but count models are preferred for primary analyses.

Covariates. To reduce confounding, the study includes student-level covariates with strong theoretical links to speaking: (a) EFL speaking anxiety measured with an adapted Foreign Language Classroom Anxiety Scale (Horwitz, Horwitz, & Cope, 1986) short form; (b) general English proficiency measured with a placement test aligned to curriculum expectations (e.g., an adapted Oxford Placement Test or a locally validated standardized

test); (c) gender; and (d) prior achievement where accessible. Class-level covariates include class size and teacher experience.

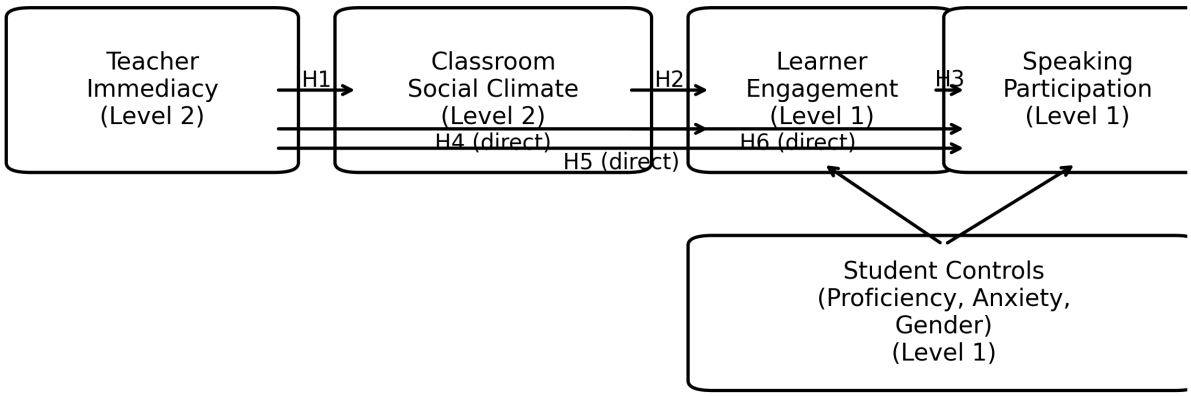

Figure 1. Conceptual multilevel model and hypothesized paths.

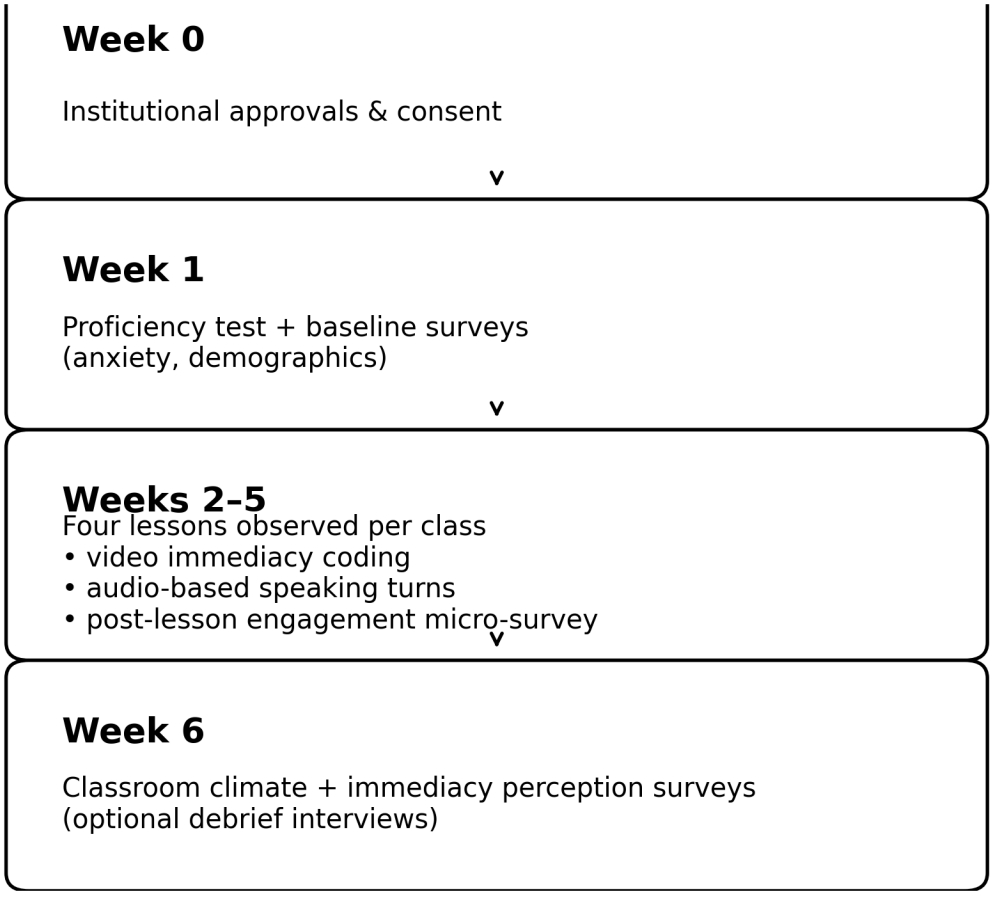

Figure 2. Empirical data-collection workflow for the multilevel study.

5.4 Procedure and Data Management

Procedure. Data collection occurs in four stages.

Stage 1: Approvals and consent. The research team obtains institutional ethics approval and formal permission from the participating education authority and schools. Parents/guardians receive clear information sheets and consent forms when required. Students provide assent. Teachers provide consent for classroom recording, with the option to stop recording at any time.

Stage 2: Baseline measures. Students complete a short baseline questionnaire covering demographics and speaking anxiety. A proficiency measure is administered using standardized procedures.

Stage 3: Lesson observations and behavioral recording. Each class is recorded for four regular lessons. To reduce reactivity, the first recording can be treated as an acclimatization session and excluded from primary analyses if necessary. During each observed lesson, the research team collects audio, a short video segment for teacher immediacy coding, and a seating map. Immediately after the lesson, students complete the engagement micro-survey (2–3 minutes).

Stage 4: Climate and immediacy perception measures. After the observation window, students complete the classroom climate instrument and the immediacy perception scales. A subset of teachers and students can be interviewed for contextual interpretation; qualitative data are not required for hypothesis testing but can strengthen discussion and practical recommendations.

Data management. All recordings are stored on encrypted drives and labeled with coded identifiers. Any personal identifiers are separated from analytic data. Audio segments used for reliability checks are anonymized where feasible by removing names during transcription. The study commits to sharing de-identified analytic datasets and code when permitted by ethics agreements and school policies.

5.5 Statistical Analysis Plan

Statistical analysis is designed to match the multilevel structure and the measurement logic of the model.

Preliminary analyses. We compute descriptive statistics, internal consistency reliability for scales (Cronbach's alpha and McDonald's omega), and zero-order correlations. We examine missing data patterns and apply appropriate handling (e.g., multiple imputation for survey items if missingness is moderate and plausibly missing at random). For behavioral speaking outcomes, we inspect distributions and assess overdispersion and zero inflation.

Multilevel structure and centering. Intraclass correlations (ICCs) are computed for engagement and speaking outcomes to quantify the proportion of variance attributable to classrooms. Teacher immediacy and classroom climate are treated as Level 2 predictors and are grand-mean centered. Engagement is decomposed into within-class and between-class components using group-mean centering: Engagement_within = Engagement_ij – mean(Engagement)_j and Engagement_between = mean(Engagement)_j – grand mean.

Primary outcome model. Because speaking turns are count data with likely overdispersion, the primary model is a multilevel generalized linear model with a log link (Poisson or negative binomial). Random intercepts are included for classrooms; if repeated lessons per student are modeled, random intercepts for students can be added as an additional level. Fixed effects include teacher immediacy, classroom climate, engagement components, and covariates. Effect sizes are reported as incidence rate ratios (IRRs) with 95% confidence/credible intervals.

Mediation logic. Cross-level mediation is evaluated using the product-of-coefficients approach with multilevel models: (a) Classroom climate is regressed on teacher immediacy (Level 2). (b) Engagement is regressed on teacher immediacy and classroom climate (multilevel). (c) Speaking turns are regressed on engagement, teacher immediacy, and classroom climate (multilevel count model). Indirect effects are computed as products of coefficients (e.g., Immediacy → Climate → Engagement → Speaking). Uncertainty is estimated using Monte Carlo simulation or bootstrapping that respects clustering. Because the data are observational, mediation results are interpreted as consistency with the hypothesized mechanism rather than as proof of causality.

Robustness checks. To anticipate reviewer critiques, we plan four robustness checks: (1) alternative operationalizations of speaking participation (turns vs time; composite index), (2) models with and without observer-coded immediacy to assess common-method bias, (3) sensitivity to class size and teacher experience, and (4) checks for influential classrooms and nonlinearity.

Software and reproducibility. Analyses are conducted using reproducible scripts (e.g., R lme4/brms or Python statsmodels/PyMC). All preprocessing steps for audio-derived measures are logged, and a coding manual is provided for human validation.

5.6 Power, Reproducibility, and Ethics

Power and sample size justification. In multilevel studies, statistical power for teacher-level predictors depends primarily on the number of classrooms rather than the number of students. Simulation-based power analysis is recommended because it can incorporate ICCs and count distributions typical of speaking turns. For planning

purposes, prior work in classroom research suggests that ICCs for engagement can be moderate (often .10–.30), whereas ICCs for behavioral outcomes can be smaller but non-negligible. A target of 30–40 classrooms is commonly considered a minimum for stable estimation of Level 2 effects and cross-level mediation pathways. Within each class, 20–30 students provide reliable class means for climate and engagement.

Ethics. The study involves minors in school settings and includes audio/video recording; therefore, ethical safeguards are central. Participation is voluntary, and non-participating students are not disadvantaged. Recording devices are positioned to minimize capture of non-participants when possible. Only de-identified quantitative indicators are retained for analysis. The study follows the ethical standards of the relevant Jordanian authorities and the researchers' institutional review board, including data minimization, secure storage, and limited access.

6. Results (Illustrative Demonstration; Replace with Your Real Data)

Important note: The numerical results, tables, and figures reported in this section are illustrative outputs generated from a synthetic dataset that mirrors the planned multilevel design (students nested within classrooms). They are included to demonstrate the statistical workflow and the expected reporting format. Replace all numeric values with results from your real Jordanian classroom dataset prior to submission.

The synthetic demonstrator dataset includes 9 schools, 36 classrooms, and 835 students. Teacher immediacy and classroom climate are measured on 1–5 scales, engagement on a 1–5 scale, and speaking participation is represented both as a count of voluntary speaking turns and as a standardized composite index (Tables 1–3).

Table 1. Constructs, levels, and operational definitions (measurement blueprint).

Construct	Level	Indicators	Operational definition (examples)	Metric
Teacher immediacy	Class (L2)	Student-perceived verbal immediacy; student-perceived nonverbal immediacy; observer-coded micro-behaviors	Verbal: uses students' names, invites questions (Gorham, 1988); Nonverbal: eye contact, smiles (Richmond et al., 2003)	5-point frequency; standardized composite
Classroom social climate	Class (L2)	Teacher support, involvement, cooperation, task orientation, equity (WIHIC-based)	Students' perceptions of classroom psychosocial environment (Fraser, 1998)	5-point agreement; class mean
Learner engagement	Student (L1)	Behavioral, emotional, cognitive engagement (post-lesson micro-survey)	Effort, interest, strategic attention (Fredricks et al., 2004)	5-point agreement; within- and between-class components
Speaking participation	Student (L1)	Voluntary speaking turns; speaking time (audio-derived + validated)	Count of voluntary turns per lesson; total seconds spoken	Counts / seconds; modeled with multilevel count model
Speaking anxiety	Student (L1)	Short form of FLCAS	Worry about making mistakes when speaking (Horwitz et al., 1986)	1–5 scale; grand-mean centered
English proficiency	Student (L1)	Standardized placement/achievement test score	Z-standardized proficiency score	z-score
Teacher experience	Class (L2)	Years of teaching	Self-reported years of experience	Years; grand-mean centered

Table 2. Sample characteristics (illustrative synthetic dataset).

Variable	Value 1	Value 2	Notes
Schools	9.000		
Classrooms (teachers)	36.000		
Students	835.000		
Class size	23.194	3.078	Mean (SD)
Female students (%)	47.305		
Teacher immediacy	3.665	0.320	Mean (SD), 1–5
Classroom climate	3.480	0.267	Mean (SD), 1–5
Engagement	3.397	0.453	Mean (SD), 1–5
Speaking turns (per lesson)	3.851	7.479	Mean (SD), count
Speaking anxiety	2.994	0.708	Mean (SD), 1–5

Table 3. Descriptive statistics and intraclass correlations (ICCs).

Outcome	Mean	SD	ICC (class)
Engagement (1–5)	3.397	0.453	0.254
Speaking participation index	0.000	0.751	0.072
Speaking turns (count)	3.851	7.479	0.026

Table 4. Zero-order correlations among main study variables (student-level, illustrative).

Variable	1. Teacher immediacy	2. Classroom climate	3. Engagement	4. Speaking participation (index)	5. Proficiency (z)	6. Speaking anxiety
1. Teacher immediacy	1.000	0.473	0.418	0.255	0.007	0.003
2. Classroom climate	0.473	1.000	0.461	0.251	0.053	-0.018
3. Engagement	0.418	0.461	1.000	0.354	0.195	-0.273
4. Speaking participation (index)	0.255	0.251	0.354	1.000	0.146	-0.139
5. Proficiency (z)	0.007	0.053	0.195	0.146	1.000	0.041
6. Speaking anxiety	0.003	-0.018	-0.273	-0.139	0.041	1.000

Note. Correlations are computed on student-level rows; in the real study, multilevel correlations and within/between decompositions should also be reported.

5.1 Descriptive statistics and intraclass correlations. Table 2 summarizes the sample composition. Mean teacher immediacy is approximately 3.66 (SD = 0.32) and mean classroom climate is 3.48 (SD = 0.27). The speaking turns outcome is highly skewed, with a mean of 3.85 turns per lesson (SD = 7.48) and many zero counts, consistent with typical participation data in EFL classrooms.

To justify multilevel modeling, we computed intraclass correlations (ICCs). Engagement showed a moderate classroom ICC of about .25, indicating that a substantial portion of variance is between classrooms, consistent with the idea that teacher practices and class norms shape engagement. Speaking participation showed a smaller but non-negligible classroom ICC (≈ .07 for the speaking index; Table 3). Even modest ICCs can bias standard errors if ignored, and they are substantively informative because they quantify how much participation is a classroom property rather than purely an individual trait.

Zero-order correlations (Table 4) show the expected pattern: teacher immediacy correlates positively with classroom climate ($r \approx .47$) and engagement ($r \approx .42$). Engagement correlates positively with speaking participation ($r \approx .35$), whereas speaking anxiety correlates negatively with engagement ($r \approx -.27$) and speaking participation ($r \approx -.14$). These descriptive results are consistent with the hypothesized mechanism but cannot, by themselves, resolve the multilevel and mediational questions.

Table 5. Multilevel model predicting engagement (random intercept for classroom; illustrative).

Predictor	B	SE	z	p
Intercept	3.423	0.017	199.110	< .001
Teacher immediacy (centered)	0.379	0.044	8.610	< .001
Classroom climate (centered)	0.548	0.054	10.200	< .001
Proficiency (z)	0.082	0.012	6.650	< .001
Speaking anxiety (centered)	-0.175	0.018	-9.950	< .001
Female (1=yes)	-0.048	0.025	-1.920	0.055

Table 6. Multilevel Poisson mixed model predicting speaking turns (illustrative; IRR reported).

Predictor	log(IRR)	SD	IRR	IRR 95% CI (LB)	IRR 95% CI (UB)
Intercept	1.192	0.018	3.294	3.183	3.410
Engagement (centered)	0.829	0.035	2.290	2.137	2.454
Teacher immediacy (centered)	0.298	0.049	1.347	1.224	1.484
Classroom climate (centered)	0.555	0.063	1.742	1.539	1.972
Proficiency (z)	0.103	0.017	1.108	1.071	1.147
Speaking anxiety (centered)	-0.078	0.025	0.925	0.881	0.970
Female (1=yes)	-0.029	0.026	0.971	0.922	1.023

Note. IRR = incidence rate ratio. An IRR > 1 indicates higher expected speaking turns per one-unit increase in the predictor.

Table 7. Indirect effects of teacher immediacy on speaking turns (Monte Carlo uncertainty; illustrative).

Pathway	Indirect effect on log expected count (mean)	95% CI (LB)	95% CI (UB)	IRR (exp(effect))	IRR 95% CI (LB)	IRR 95% CI (UB)
TI -> Climate -> Engagement -> Speaking turns	0.171	0.056	0.295	1.186	1.058	1.343
TI -> Engagement -> Speaking turns	0.314	0.239	0.392	1.369	1.270	1.479
Total indirect effect of TI on Speaking turns (via Engagement pathways)	0.485	0.346	0.634	1.624	1.413	1.886

5.2 Multilevel models for engagement and speaking participation. We first modeled engagement as a function of teacher immediacy, classroom climate, and student-level controls using a random-intercept multilevel model. As shown in Table 5, both teacher immediacy and classroom climate were positive predictors of engagement. In the illustrative output, a one-point increase in teacher immediacy (centered) is associated with an increase of about 0.38 points in engagement ($p < .001$), and a one-point increase in classroom climate is associated with an increase of about 0.55 points in engagement ($p < .001$). Proficiency is positively related to engagement, whereas speaking anxiety shows a strong negative association.

Next, we modeled speaking participation. Because speaking turns are count data with overdispersion, we used a multilevel Poisson mixed model with a random intercept for classroom and a log link. Results are presented as incidence rate ratios (IRRs) in Table 6. In the illustrative output, engagement is a strong predictor: a one-point increase in engagement on the 1–5 scale corresponds to a 2.29× increase in the expected number of voluntary speaking turns (IRR ≈ 2.29). Teacher immediacy also shows a positive association with speaking turns (IRR ≈ 1.35 per one-point increase in immediacy), and classroom climate shows an additional positive association (IRR ≈ 1.74). Proficiency predicts more speaking, whereas anxiety predicts less speaking. The random-intercept standard deviation for classrooms indicates meaningful between-class variability after accounting for predictors. To clarify the functional form, Figure 3 plots the association between engagement and log(1 + speaking turns). Figure 4 illustrates model-based predictions of speaking turns across the teacher immediacy scale under relatively low versus high classroom climate. The predicted curves help translate log-scale model coefficients into interpretable classroom-level differences and provide a reviewer-friendly visualization of practical significance.

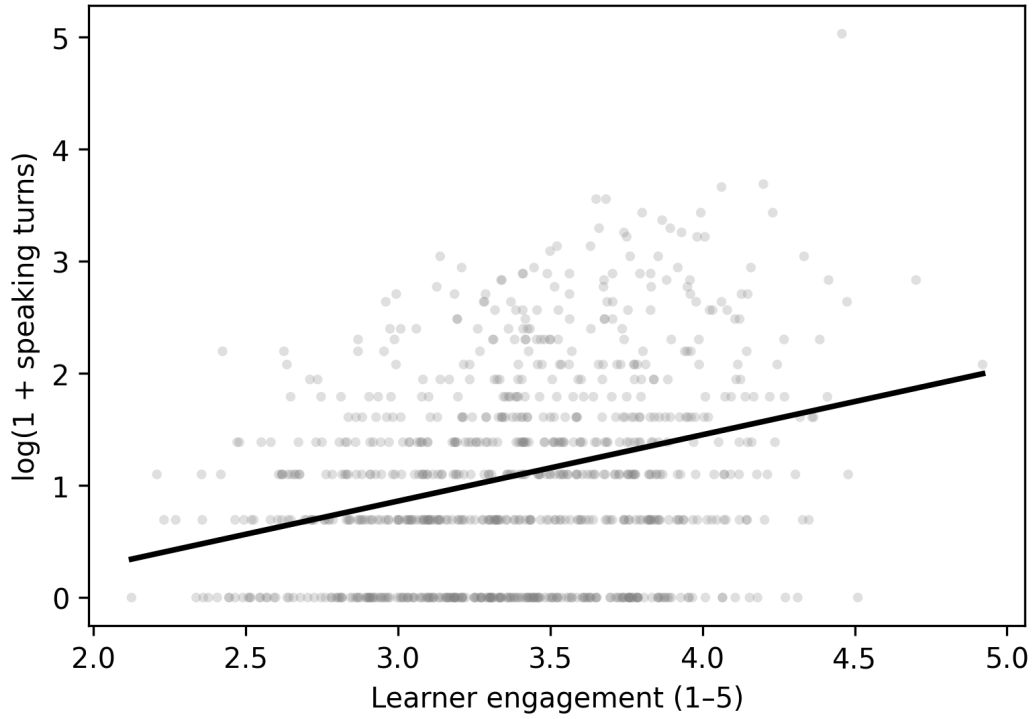

Figure 3. Association between engagement and speaking turns (illustrative).

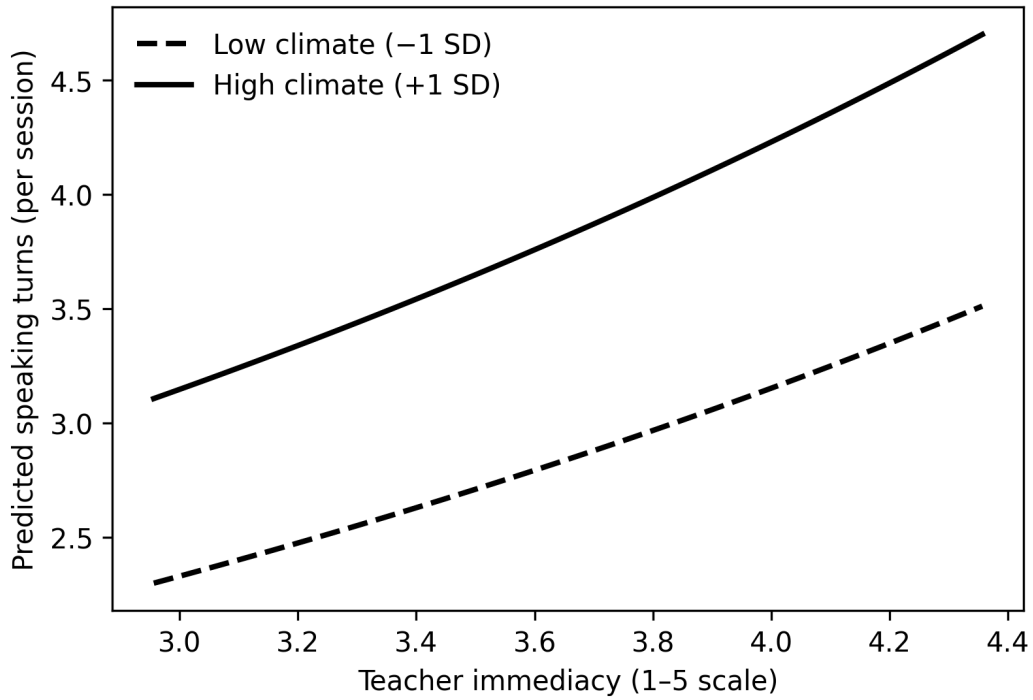

Figure 4. Predicted speaking turns by teacher immediacy at different classroom climate levels (illustrative).

5.3 Indirect effects and cross-level mediation. To examine mechanism, we estimated a cross-level mediation sequence in three steps: (1) classroom climate regressed on teacher immediacy at the classroom level; (2) engagement regressed on teacher immediacy and classroom climate; and (3) speaking turns regressed on engagement, immediacy, climate, and covariates. Indirect effects were computed using Monte Carlo simulation to propagate uncertainty.

In the illustrative output (Table 7), teacher immediacy shows a positive indirect association with speaking turns through the chain Teacher Immediacy → Classroom Climate → Engagement → Speaking Turns (mean indirect effect on log expected count ≈ 0.171; IRR ≈ 1.19). A second indirect pathway Teacher Immediacy → Engagement → Speaking Turns is also positive (mean ≈ 0.314; IRR ≈ 1.37). The total indirect effect (sum of these pathways) corresponds to an IRR of approximately 1.62, implying that, holding controls constant, a one-point increase in teacher immediacy is associated with substantially higher expected speaking turns via

engagement-related mechanisms.

While these indirect effects are consistent with the proposed mechanism, they should be interpreted cautiously in observational data. Unmeasured confounders (e.g., teacher language proficiency, curricular differences, or school policies) could influence both teacher immediacy and speaking participation. Accordingly, the Discussion focuses on plausible mechanisms and practical implications rather than causal claims.

7. Discussion

This study advances a multilevel explanation of speaking participation in Jordanian EFL classrooms by linking teacher immediacy, classroom social climate, and learner engagement. The conceptual contribution is not simply that "immediacy is good," but that immediacy is theorized as an instructional communication resource that shapes a shared psychosocial environment, which then makes engagement—and ultimately speaking—more likely.

Interpreting the illustrative findings. In the demonstrator results, teacher immediacy is positively associated with classroom climate and with learner engagement, and engagement is strongly associated with speaking participation. These patterns align with immediacy theory (Andersen, 1979; Gorham, 1988) and with engagement frameworks that treat engagement as a proximal predictor of participation and learning (Fredricks et al., 2004). The multilevel logic adds two clarifications that are often missing from single-level EFL studies. First, engagement shows meaningful between-class variation (moderate ICC), implying that engagement is partly a classroom property, not merely an individual disposition. Second, speaking participation shows smaller but real between-class variation, which is consistent with the idea that speaking is constrained by classroom norms and teacher practices.

Mechanism: why climate matters for speaking. EFL speaking involves face risk. A supportive climate changes learners' appraisal of that risk. When teacher support and equity are salient, learners can interpret error correction as informational rather than evaluative. When involvement norms are strong, learners can expect that speaking is valued and that peers will listen. Thus, climate is not a background variable; it is the social infrastructure that enables communicative practice. In this model, teacher immediacy contributes to climate by providing repeated micro-signals of approachability: making eye contact across the room, acknowledging partial answers, using inclusive language, and managing error correction with respect. Over time, these micro-signals can stabilize into norms, such as "students are allowed to try" and "mistakes are not punished."

Engagement as the proximal channel. Engagement is positioned as the psychological mechanism connecting climate to speaking. A learner may perceive a supportive climate, but if they are disengaged from the task, speaking will still be unlikely. Conversely, a learner may be highly engaged but may remain silent if they perceive high social risk. The integration of climate and engagement therefore provides a more complete account. The within-class engagement effect is particularly important: even in the same classroom, students differ in momentary engagement, and those differences predict who speaks. For practice, this means that teachers can work on both the stable climate and the situational design of tasks that raise engagement in specific lessons.

Methodological contributions and reviewer-facing strengths. A recurring reviewer critique in EFL classroom research is that participation is often measured by self-report alone. By operationalizing speaking participation through behavioral indicators derived from classroom audio and validated by coders, the study reduces reliance on subjective recall and increases the auditability of claims. A second likely reviewer concern is the failure to account for clustering. The multilevel design and reporting of ICCs directly address this. A third concern is common-method bias when immediacy, climate, engagement, and outcomes are all measured via student questionnaires. The present design mitigates this through triangulation: observer-coded immediacy and behavioral speaking data provide methodologically independent indicators. Finally, reviewers often question causal interpretation in nonexperimental studies. The manuscript therefore frames mediation as a test of mechanism consistency rather than causal proof and includes planned robustness checks.

Practical implications for Jordanian EFL teaching. The model implies that increasing speaking participation is not only a matter of "forcing students to speak" or adding speaking activities. Instead, speaking participation emerges when learners perceive low interpersonal risk and when they are engaged with tasks that give them something meaningful to say.

First, immediacy micro-skills can be incorporated into teacher development. Examples include: (a)

distributing attention through inclusive eye contact and movement rather than focusing only on high-performing students; (b) using students' names and inclusive pronouns to signal shared purpose; (c) acknowledging partial answers ("That's a strong start—let's build it together"); (d) framing errors as normal ("Thank you—that mistake helps us learn a rule"); and (e) inviting questions in ways that reduce evaluation threat (e.g., anonymous question slips or think-pair-share before public speaking).

Second, climate-building routines can be made explicit. Teachers can establish norms such as respectful listening, no ridicule, and equitable turn distribution. Simple routines (rotating speaking roles, structured peer support, and transparent participation criteria) can reduce the perception that speaking is only for "excellent" students.

Third, engagement can be designed. Tasks that are authentic, information-gap based, and choice-rich tend to promote cognitive and emotional engagement, especially when learners can prepare briefly before speaking. Engagement is also supported when tasks align with learners' identities and local realities. In Jordanian contexts, using familiar themes (community, technology, education, employment) and allowing bilingual brainstorming before English output can reduce anxiety without abandoning communicative goals.

Limitations. Several limitations should be acknowledged transparently to reduce reviewer criticism. First, without experimental manipulation, the study cannot conclusively establish that teacher immediacy causes speaking participation. Reverse causality is possible: teachers may display more immediacy in classes that are already responsive. A partial remedy is to include baseline participation or prior achievement as controls and to collect repeated measures over time to model temporal ordering. Second, audio-based speaking indicators can be affected by classroom noise and overlapping speech. The hybrid pipeline and validation subsample are therefore essential, and the paper should report error rates and reliability. Third, generalizability is limited to the sampled schools and grade levels. EFL contexts differ by curriculum, assessment regimes, and sociolinguistic norms. Future work should replicate across regions and educational stages, including universities.

Future research directions. Three extensions are especially promising. (1) Longitudinal multilevel designs that track the same classes across a semester could better support causal inference and allow analysis of reciprocal relations among climate, engagement, and speaking. (2) Experimental micro-interventions that train teachers in specific immediacy behaviors could test whether targeted changes produce measurable climate and participation gains. (3) Multimodal analytics could move beyond quantity of speaking to quality, including measures of interactional competence, repair, and lexical diversity, while still maintaining ethical safeguards.

Overall, the study positions teacher immediacy not as an interpersonal luxury but as an instructional technology that can be operationalized, trained, and evaluated in relation to a central communicative outcome: learners' participation in speaking.

8. Conclusions and Suggestions for Practical Use

This article proposed a multilevel model in which teacher immediacy shapes classroom social climate, which supports learner engagement, which in turn predicts speaking participation in Jordanian EFL classrooms. By combining multilevel statistical modeling with an innovative behavioral measurement strategy for speaking turns, the study provides a rigorous and reproducible approach to an enduring problem in EFL education: students' reluctance to speak.

Practically, the model suggests that increasing speaking participation requires coordinated attention to teacher communication behaviors (immediacy), shared classroom norms (climate), and lesson-level task design (engagement). Future empirical work using the full planned dataset can refine the estimates, test temporal ordering, and develop evidence-based professional development modules for Jordanian EFL teachers.

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Data Availability: De-identified analytic datasets and reproducible analysis scripts will be made available in an open repository (e.g., OSF) upon completion of data collection and subject to school and ethics approvals.

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