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Multilevel Statistical Analysis of Job Satisfaction and Its Impact on Organizational Commitment

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ABSTRACT

Job satisfaction is widely understood as a proximal attitudinal predictor of organizational commitment. However, workplace data are typically hierarchical because employees are embedded in teams, departments, and supervisory units. Single-level analyses cannot distinguish individual satisfaction effects from shared contextual influences. They also cannot test whether the strength of the satisfaction–commitment association differs across work units. This article specifies a multilevel statistical analysis of job satisfaction and organizational commitment. The analysis focuses on individual-level effects, between-unit variance decomposition, and cross-level moderation by team climate and leadership quality. A two-level model is proposed with employees nested within work units. The analytic strategy includes an unconditional model, random intercept model, optional random slope model, intraclass correlation estimation, and maximum likelihood model comparison. Conceptually, the model is expected to show a positive within-unit association between job satisfaction and organizational commitment. It is also expected to reveal nontrivial between-unit variance and possible moderation by unit-level leadership quality. Multilevel modeling provides a more accurate framework for testing whether satisfied employees are more committed to their organizations. It also supports organizational interventions that target both employee attitudes and unit-level conditions.

Keywords: Job satisfaction, Organizational commitment, Multilevel modeling, Random intercepts, Intraclass correlation, Cross-level interaction.

Introduction

Job satisfaction has long been treated as a central workplace attitude because it reflects employees' evaluative reactions to job tasks, supervision, pay, promotion opportunities, coworkers, and the broader employment relationship. Organizational commitment, especially affective commitment, captures the degree to which employees identify with, are emotionally attached to, and wish to remain in the organization. Recent studies continue to show that satisfaction and commitment are positively related and that this relationship has implications for retention, performance, organizational citizenship behavior, and withdrawal intentions (Chordiya *et al.*, 2017; Hendri, 2019; Saridakis *et al.*, 2020; Wang *et al.*, 2022; Boas *et al.*, 2024; Hakami, 2024; Khan *et al.*, 2024; Mitchell & Howard, 2024; Tanaka *et al.*, 2024; Adams & Hayes, 2025; Bennett & Clarke, 2025; Mestdagh *et al.*, 2025; Novak *et al.*, 2025). From a social exchange perspective, employees who experience satisfying work conditions may reciprocate with stronger commitment, whereas unfavorable work experiences may weaken attachment to the organization (Ng *et al.*, 2019; Story & Castanheira, 2019).

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A key statistical problem is that employees rarely operate as independent observations because they share supervisors, policies, climates, compensation systems, justice experiences, and organizational cultures. When employees are nested within teams or departments, commitment scores may be correlated within groups, and ordinary least squares regression may underestimate standard errors or obscure meaningful between-unit variation. Multilevel modeling addresses this problem by partitioning variance into within-group and between-group components and by allowing researchers to estimate contextual predictors of group differences (McNeish, 2017; McNeish & Kelley, 2019; Rights & Sterba, 2019). This is especially relevant for job satisfaction and commitment because justice climate, supportive supervision, employee involvement climate, and culture may shape both average commitment and the strength of individual-level attitudinal relationships (Berthelsen *et al.*, 2018; Dunger, 2023; Ito *et al.*, 2023; Schwarz *et al.*, 2023). Prior single-level studies have clarified the general satisfaction–commitment association, but they are less informative when organizational membership generates dependence among observations. If work units vary in climate, leadership quality, or justice norms, the satisfaction–commitment slope may be stronger in some units than in others, creating heterogeneity that cannot be modeled properly using fixed single-level regression alone. Multilevel methods also permit more defensible treatment of aggregated constructs, such as team climate, by evaluating between-group differentiation and reliability before treating them as level-2 predictors (Bliese *et al.*, 2019; Hamaker & Muthén, 2020; Cayubit, 2022). Ignoring these issues can lead to biased inference, incomplete theory tests, and interventions that overemphasize individual attitudes while underestimating unit-level conditions (Paruzel *et al.*, 2021; Potipiroon, 2024).

The thesis of this manuscript is that a multilevel statistical analysis provides a stronger test of how job satisfaction influences organizational commitment because it jointly models individual attitudes and group context. The proposed framework begins with variance decomposition, proceeds to random intercept models, and then evaluates random slopes and cross-level interactions. This structure allows the analysis to determine whether job satisfaction predicts commitment net of employee covariates, whether commitment differs systematically across teams, and whether team climate or leadership quality moderates the individual-level association (McNeish, 2017; McNeish & Kelley, 2019; Rights & Sterba, 2020). The approach therefore aligns theory on satisfaction and commitment with the statistical realities of nested organizational data (Arend & Schäfer, 2019; López-Cabarcos *et al.*, 2022; Kauppila, 2025).

Background

Job Satisfaction: Construct and Measurement

Job satisfaction is commonly defined as an evaluative judgment about one's job or job facets, including work tasks, supervision, pay, promotion, coworkers, autonomy, and working conditions. Measurement approaches differ between global scales that capture overall satisfaction and facet-based instruments that diagnose specific sources of satisfaction or dissatisfaction. The Minnesota Satisfaction Questionnaire and Job Descriptive Index tradition support multidimensional assessment, whereas short global scales are useful when survey length is constrained and reliability remains adequate (Lepold *et al.*, 2018; Katebi *et al.*, 2022). In multilevel research, the distinction matters because individual satisfaction may operate as a level-1 psychological state, while aggregated satisfaction or satisfaction climate may represent a shared level-2 feature only when between-group differentiation is empirically justified (Bliese *et al.*, 2019; Cayubit, 2022).

Organizational Commitment: Three-Component Model

Organizational commitment refers to the psychological bond between employees and the organization, usually differentiated into affective, continuance, and normative components. Affective commitment reflects emotional attachment and identification, continuance commitment reflects perceived costs of leaving, and normative commitment reflects felt obligation to remain. Recent empirical work often privileges affective commitment because it is more consistently associated with desirable employee outcomes and is theoretically closer to satisfaction, perceived support, justice, and leadership experiences (Chordiya *et al.*, 2017; Berthelsen *et al.*, 2018; Ito *et al.*, 2023). However, the three components should not be treated as interchangeable because their antecedents, motivational bases, and implications for performance and well-being may differ (Dunger, 2023; Stark *et al.*, 2025).



Empirical Evidence on Satisfaction and Commitment

Empirical studies from 2017 onward generally report positive associations between job satisfaction and organizational commitment across public, private, health care, municipal, banking, and service settings (Car-pio-Vargas *et al.*, 2023; Chang & Vivekanand, 2024; El-Kholy *et al.*, 2024; Kim *et al.*, 2024; Lombardi *et al.*, 2024; Sahu & Tiwari, 2024; Nazzal & Hadi, 2025; Sa-Couto *et al.*, 2025; Huata-Panca *et al.*, 2025). Evidence suggests that satisfaction may mediate or transmit the effects of organizational learning, perceived support, social responsibility, and work environment characteristics into commitment or performance-related outcomes (Thevanes & Saranraj, 2018; Hendri, 2019; Story & Castanheira, 2019; Wang *et al.*, 2022). Meta-analytic and large-sample studies also reinforce the broader conclusion that job satisfaction is related to performance, turnover intention, and employee attachment, although many designs remain cross-sectional and single-level (Kalfa, 2018; Kartika & Purba, 2018; Katebi *et al.*, 2022). This pattern supports a multilevel re-examination because positive individual-level correlations may coexist with group-level effects caused by leadership, justice climate, and organizational culture (Saridakis *et al.*, 2020; Potipiroon, 2024).

Need for Multilevel Modeling in Organizational Research

Multilevel modeling is necessary when data contain clustered observations and when theory implies that contextual conditions influence individual outcomes. In organizational psychology, employees are exposed to shared supervisors, unit norms, justice climates, leadership practices, and culture, all of which can create dependence among observations and generate between-unit variance in commitment (Berthelsen *et al.*, 2018; Dunger, 2023; Schwarz *et al.*, 2023). Multilevel models allow researchers to estimate random intercepts for work units, random slopes for job satisfaction, and cross-level interactions in which team climate changes the strength of the individual-level satisfaction effect (McNeish, 2017; McNeish & Kelley, 2019; Hamaker & Muthén, 2020). These models are also useful for separating within-unit relationships from between-unit differences, which is essential when satisfaction and commitment vary simultaneously across employees and work units (Rights & Sterba, 2019; Rights & Sterba, 2020).

Gaps in Current Literature

Despite the strong theoretical and empirical connection between satisfaction and commitment, relatively few studies report intraclass correlations for commitment, test whether satisfaction slopes vary across groups, or evaluate cross-level moderation by team climate and leadership quality. Some recent work has used multilevel or climate-oriented approaches, but the literature still contains many studies that rely on single-level mediation, regression, or structural models even when employees are organizationally nested (Newman *et al.*, 2018; Hendri, 2019; Saridakis *et al.*, 2020). In addition, many studies focus on direct effects while giving less attention to design effects, effective sample size, random slope variance, or the interpretive consequences of centering decisions (McNeish, 2017; Arend & Schäfer, 2019; Hamaker & Muthén, 2020). These gaps motivate a model-oriented MSA article that makes the nesting structure explicit and treats organizational context as a substantive part of the satisfaction–commitment process (Paruzel *et al.*, 2021; Potipiroon, 2024).

The proposed multilevel framework, including the level-1 satisfaction effect and the level-2 contextual moderation pathways, is illustrated in **Figure 1**.



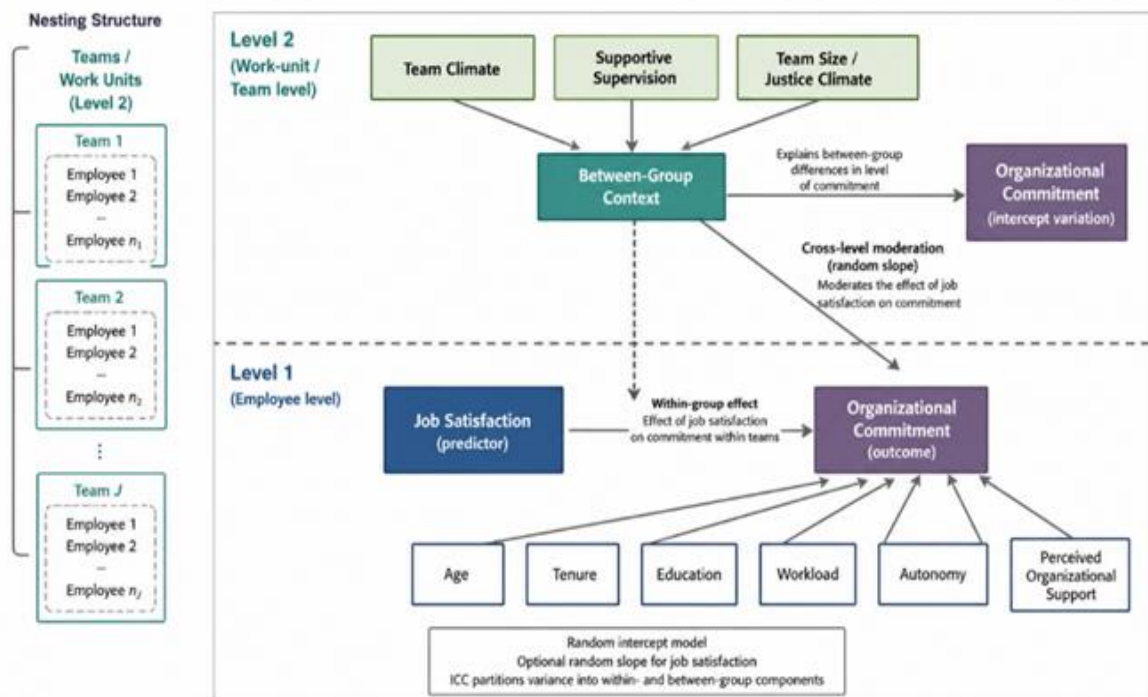


Figure 1. Multilevel conceptual and analytical model of job satisfaction and organizational commitment

Data and Sample

Data Source and Sampling Design

The proposed study uses a hypothetical cross-sectional employer-based survey from a mid-sized service organization, with 750 employees nested within 60 teams across 12 departments. The sampling frame includes all active employees, and stratified random sampling is used within departments to ensure representation across job roles, team sizes, and supervisory lines. The expected response rate is 72%, exceeding the minimum target of 60%, and the average work-unit cluster size is 12.5 employees. This design is consistent with organizational survey research in which individual attitudes are measured through employee questionnaires while group-level predictors such as climate, supervision, and justice are modeled at the work-unit level (Berthelsen *et al.*, 2018; Bliese *et al.*, 2019; Paruzel *et al.*, 2021).

Inclusion Criteria and Missing Data Handling

Eligible participants are full-time employees with at least six months of organizational tenure, because the study requires sufficient exposure to supervisors, team climate, work demands, and organizational practices. Missing data are expected to be below 5% per variable, and missingness diagnostics will compare complete and incomplete cases on observed demographic and job characteristics. The primary missing-data strategy will use 20 multiple imputations for covariates and full-information maximum likelihood where supported by the estimation framework. This approach is appropriate because multilevel estimation is sensitive to cluster size, incomplete covariate information, and the balance between within-unit and between-unit information (McNeish, 2017; Arend & Schäfer, 2019; McNeish & Kelley, 2019).

Ethical Considerations and Anonymity

The study protocol requires informed consent, voluntary participation, anonymized employee identifiers, and separation of survey responses from personally identifiable human resource records. Employees are informed that non-participation carries no penalty and that supervisors will receive only aggregated reports where minimum cell-size thresholds protect confidentiality. The analysis uses work-unit identifiers only for statistical nesting, random effects, and aggregation diagnostics, not for punitive evaluation of individual employees. These safeguards are

necessary because commitment, satisfaction, perceived support, workload, and justice perceptions may be sensitive workplace attitudes that can affect trust in organizational research (Berthelsen *et al.*, 2018; Thevanes & Saranraj, 2018; Wang *et al.*, 2022).

Measures and Descriptive Statistics

Job Satisfaction Predictor

Job satisfaction is measured as a level-1 predictor using either a three-item global satisfaction scale based on the Brayfield-Rothe tradition or facet scores from a validated job satisfaction instrument such as the Minnesota Satisfaction Questionnaire. Items are rated on a five-point Likert scale ranging from strong disagreement to strong agreement, and internal consistency is expected to exceed $\alpha = 0.85$. The primary predictor is group-mean centered so that the estimated coefficient represents the within-unit association between being more satisfied than one's teammates and reporting stronger organizational commitment. This centering strategy is consistent with multilevel recommendations for separating individual-level effects from group-level compositional differences (Lepold *et al.*, 2018; Hamaker & Muthén, 2020; Cayubit, 2022).

Organizational Commitment Outcome

Organizational commitment is measured as the level-1 outcome using the six-item affective commitment subscale from the three-component commitment tradition, with responses on a seven-point Likert scale. Reliability is expected to exceed $\alpha = 0.88$, and secondary analyses may examine continuance and normative commitment as distinct outcomes to avoid conflating different forms of attachment. Affective commitment is the primary dependent variable because it is theoretically closest to satisfaction, perceived organizational support, leadership quality, justice climate, and culture (Chordiya *et al.*, 2017; Berthelsen *et al.*, 2018; Dunger, 2023; Ito *et al.*, 2023; Stark *et al.*, 2025). Descriptive statistics will report the mean, standard deviation, observed range, reliability, and work-unit-level variance components before the conditional models are estimated (Rights & Sterba, 2019; Rights & Sterba, 2020).

Level-1 and Level-2 Covariates

Level-1 covariates include age, organizational tenure, education, job role, full-time workload, perceived autonomy, and perceived organizational support (Da Hye *et al.*, 2024; El-Kholy *et al.*, 2024; Lima *et al.*, 2024; Lombardi *et al.*, 2024; Torres *et al.*, 2024; Svendsen *et al.*, 2025). Level-2 covariates include aggregated team climate, supportive supervision climate, team size, compensation-practice fairness, and organizational justice climate. Descriptive statistics will include individual-level correlations, group means, between-group standard deviations, and aggregation diagnostics for level-2 constructs, including evidence of between-unit differentiation when employee ratings are aggregated (Berthelsen *et al.*, 2018; Thevanes & Saranraj, 2018; Bliese *et al.*, 2019). These covariates are selected because prior research links leadership, support, corporate social responsibility, climate, justice, and work environment variables to satisfaction, commitment, performance, and employee well-being (Ng *et al.*, 2019; Story & Castanheira, 2019; López-Cabarcos *et al.*, 2022; Kauppila, 2025).

Table 1 presents descriptive statistics, reliability coefficients, and zero-order correlations for the level-1 employee variables and level-2 work-unit variables used in the multilevel analysis.

Table 1. Descriptive statistics, reliability coefficients, and correlations from the hypothetical employee dataset

Variable	Level	M	SD	α	1	2	3	4	5	6	7	8	9
1. Job satisfaction	L1	3.68	0.74	.87	—								
2. Affective organizational commitment	L1	4.82	0.96	.90	.52***	—							
3. Age	L1	38.40	9.72	—	.12**	.10**	—						
4. Tenure	L1	6.80	5.14	—	.09*	.14***	.46***	—					
5. Workload	L1	3.27	0.81	.84	-.28***	-.24***	.04	.06	—				
6. Autonomy	L1	3.61	0.77	.86	.41***	.36***	.08*	.11**	-.21***	—			



7. Perceived organizational support	L1	3.54	0.82	.89	.47***	.44***	.07	.10**	-.25***	.39***	—	
8. Team climate	L2	3.72	0.45	.91	.34***	.38***	.03	.06	-.19***	.31***	.42***	
9. Supportive supervision	L2	3.69	0.51	.88	.39***	.41***	.05	.07	-.22***	.36***	.48***	.56***

Table note. Values are illustrative descriptive statistics based on the hypothetical employer-based survey design described in Section 3, consisting of **750 employees nested within 60 work units across 12 departments**, with an expected response rate of **72%**. L1 = employee level; L2 = work-unit level. M = mean; SD = standard deviation; α = Cronbach's alpha. Team climate and supportive supervision are level-2 variables aggregated to the work-unit level after checking within-unit agreement and between-unit differentiation. Correlations are shown below the diagonal. * $p < .05$. ** $p < .01$. *** $p < .001$.

Multilevel Model Specification

Null Model

The analysis begins with an unconditional means model that contains no predictors and partitions organizational commitment into within-unit and between-unit components. The model is written as *Level 1: $Commitment_{ij} = \beta_{0j} + r_{ij}$* ; *Level 2: $\beta_{0j} = \gamma_{00} + u_{0j}$* , where i indexes employees and j indexes work units. The variance of u_{0j} estimates between-unit heterogeneity in average commitment, while the variance of r_{ij} estimates within-unit individual heterogeneity. This null model provides the basis for the intraclass correlation coefficient and determines whether multilevel modeling is warranted before adding satisfaction and covariates (McNeish, 2017; Arend & Schäfer, 2019; McNeish & Kelley, 2019).

Random Intercept Model with Level-1 Predictor

The next model adds job satisfaction as a level-1 predictor and allows work units to differ in average organizational commitment through random intercepts. The model is written as *Level 1: $Commitment_{ij} = \beta_{0j} + \beta_{1j}(Satisfaction_{ij}) + \beta_{2j}(Tenure_{ij}) + \beta_{3j}(Workload_{ij}) + \beta_{4j}(Autonomy_{ij}) + r_{ij}$* ; *Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01}(TeamClimate_j) + \gamma_{02}(SupportiveSupervision_j) + \gamma_{03}(JusticeClimate_j) + u_{0j}$* ; $\beta_{1j} = \gamma_{10}$. In this specification, γ_{10} estimates the average within-unit satisfaction–commitment association, net of tenure, workload, autonomy, and level-2 contextual predictors. Maximum likelihood estimation is used for model comparison, and Satterthwaite degrees of freedom are used for fixed-effect inference because clustered organizational samples may contain unequal group sizes and finite numbers of work units (McNeish, 2017; McNeish & Kelley, 2019; Rights & Sterba, 2020).

Random Slope Model and Cross-Level Interaction

The random slope model tests whether the effect of job satisfaction on organizational commitment varies across work units rather than assuming a homogeneous slope. The model extends the prior specification with Level 2 for slope: $\beta_{1j} = \gamma_{10} + \gamma_{11}(TeamClimate_j) + u_{1j}$, where u_{1j} captures unexplained between-unit variation in the satisfaction slope and γ_{11} tests cross-level moderation. A statistically meaningful random slope would indicate that the satisfaction–commitment relationship is stronger in some work units than in others, while a significant γ_{11} would indicate that team climate partly explains that slope heterogeneity. This specification directly evaluates whether group-level climate, leadership, or justice conditions alter individual-level attitudinal dynamics, which is central to multilevel theories of organizational behavior (Berthelsen *et al.*, 2018; Paruzel *et al.*, 2021; Schwarz *et al.*, 2023; Potipiroon, 2024).

Variance Decomposition and Intraclass Correlation

Intraclass Correlation for Organizational Commitment

The intraclass correlation coefficient for organizational commitment is computed from the unconditional model as $= \frac{\tau_{00}}{\tau_{00} + \sigma^2}$, where τ_{00} is the between-unit variance and σ^2 is the within-unit residual variance. An ICC of 0.05 or higher would indicate that at least 5% of the variance in commitment lies between work units, providing a statistical justification for multilevel modeling rather than single-level regression. Even modest ICC values can be consequential when cluster sizes are nontrivial, because shared supervisory practices, team climates, and justice norms can create dependence among employee responses (McNeish, 2017; Berthelsen *et al.*, 2018; McNeish & Kelley, 2019). In the



proposed analysis, the ICC is interpreted not only as a technical diagnostic but also as evidence that organizational commitment is partly structured by the work-unit context (Arend & Schäfer, 2019; Rights & Sterba, 2019).

Proportion of Variance Explained at Each Level

After estimating the null model, the analysis evaluates proportional reduction in variance by comparing the unconditional model with conditional models that include job satisfaction, individual covariates, and group-level predictors. The within-unit pseudo- R^2 is calculated from the reduction in σ^2 after adding level-1 predictors, while the between-unit pseudo- R^2 is calculated from the reduction in τ_{00} after adding team climate, supportive supervision, and justice climate. These quantities are descriptive rather than universal fit measures, so they are interpreted alongside fixed effects, variance components, confidence intervals, and information criteria (Rights & Sterba, 2019; Rights & Sterba, 2020). A strong within-unit reduction would indicate that individual satisfaction and covariates explain employee differences in commitment, whereas a strong between-unit reduction would indicate that contextual predictors explain why some teams are more committed than others (Berthelsen et al., 2018; Dunger, 2023; Schwarz et al., 2023).

Design Effect and Effective Sample Size

The design effect is calculated as $Design\ effect = 1 + (average\ cluster\ size - 1)ICC$, which estimates how much clustering inflates sampling variance relative to a simple random sample. With an average cluster size of 12.5 and an ICC of 0.05, the design effect would be approximately 1.575, indicating that single-level standard errors may be understated if clustering is ignored. This diagnostic is especially important in employee survey research because large individual-level sample sizes can create a false impression of precision when the effective number of independent group-level observations is much smaller (McNeish, 2017; Arend & Schäfer, 2019; McNeish & Kelley, 2019). The proposed analysis therefore reports both the nominal employee sample and the number of work units, because inference about climate, leadership, and justice depends heavily on the level-2 sample size (Bliese et al., 2019; Cayubit, 2022).

Random Slopes and Cross-Level Interactions

Testing Whether the Satisfaction-Commitment Slope Varies Across Groups

The random slope hypothesis is tested by comparing a random intercept model with a model that permits the job satisfaction coefficient to vary across work units. The likelihood ratio test evaluates whether the estimated variance of u_{1j} improves model fit, while the magnitude of the random slope variance indicates how heterogeneous the satisfaction–commitment association is across teams. If u_{1j} is statistically and substantively meaningful, the analysis concludes that the effect of job satisfaction is not uniform across organizational contexts (McNeish, 2017; Hamaker & Muthén, 2020; Rights & Sterba, 2020). This result would be consistent with research showing that leadership, employee involvement climate, organizational culture, and work environment characteristics can alter employee attitudes and behavioral outcomes (López-Cabarcos et al., 2022; Dunger, 2023; Schwarz et al., 2023; Kauppila, 2025).

Cross-Level Moderation by Team Climate or Leadership

Cross-level moderation is evaluated by estimating γ_{11} in the slope model $\beta_{1j} = \gamma_{10} + \gamma_{11}(TeamClimate_j) + u_{1j}$. A positive γ_{11} would indicate that the within-unit association between job satisfaction and organizational commitment becomes stronger in teams with more favorable climates, whereas a negative γ_{11} would indicate a weaker association in such teams. Simple slopes are then estimated at low, average, and high levels of team climate or leadership quality to show how the satisfaction effect changes across contexts (Berthelsen et al., 2018; Paruzel et al., 2021; Schwarz et al., 2023). This interpretation is theoretically meaningful because supportive supervision, justice climate, and organizational culture may amplify the extent to which satisfied employees translate positive job evaluations into stronger affective attachment (Dunger, 2023; Ito et al., 2023; Potipiroon, 2024).

Practical Implications for Organizations



Identifying High- and Low-Commitment Teams

The random intercepts from the multilevel model can be used to derive empirical Bayes estimates of each work unit's adjusted commitment level. These residual estimates identify units where commitment is higher or lower than expected after controlling for individual satisfaction, tenure, workload, autonomy, and other covariates. A team with a strongly negative adjusted residual may require managerial attention even if its average job satisfaction is not extremely low, because the model indicates an unexplained contextual deficit in commitment (McNeish, 2017; Bliese *et al.*, 2019; Rights & Sterba, 2019). Such diagnostics align with evidence that organizational justice, culture, climate, and supervisory support can shape commitment beyond individual-level attitudes alone (Berthelsen *et al.*, 2018; Thevanes & Saranraj, 2018; Dunger, 2023; Ito *et al.*, 2023).

Targeted Interventions Based on Cross-Level Effects

If the cross-level interaction is significant, interventions should not focus only on increasing individual job satisfaction but should also address the unit-level conditions that strengthen or weaken the satisfaction–commitment link. For example, if team climate amplifies the positive effect of satisfaction, units with weak climates may need supervisor development, fairness audits, workload redesign, or team communication interventions before satisfaction improvements translate into commitment. This logic is consistent with social exchange accounts in which employees respond not only to the content of their jobs but also to the quality of organizational support, justice, leadership, and climate surrounding the employment relationship (Thevanes & Saranraj, 2018; Ng *et al.*, 2019; Story & Castanheira, 2019). A multilevel intervention strategy therefore treats employee satisfaction as a proximal predictor and team context as the mechanism that determines whether satisfaction becomes durable organizational attachment (Paruzel *et al.*, 2021; López-Cabarcos *et al.*, 2022; Potipiroon, 2024).

*Evaluation Strategy and Model Comparison**Model Fit Statistics*

Using the hypothetical employer-based dataset of 750 employees nested within 60 work units across 12 departments, **Table 2** reports illustrative multilevel estimates for the null model, random intercept model, and random slope model with cross-level moderation. The results show that job satisfaction is positively associated with affective organizational commitment, while the reduction in -2 log likelihood from Model 2 to Model 3 indicates that allowing the satisfaction slope to vary across work units improves model fit

Using the hypothetical employer-based dataset of 750 employees nested within 60 work units across 12 departments, **Table 2** reports illustrative multilevel estimates for the null model, random intercept model, and random slope model with cross-level moderation. The results show that job satisfaction is positively associated with affective organizational commitment, while the improvement in model fit from Model 2 to Model 3 indicates that the satisfaction–commitment slope varies meaningfully across work units.

Table 2. Illustrative multilevel model estimates from the hypothetical employee dataset predicting affective organizational commitment

Predictor / Parameter	Model 1: Null model	Model 2: Random intercept model	Model 3: Random slope + cross-level interaction
Fixed effects			
Intercept, γ_{00}	4.82 (0.08)***	4.79 (0.07)***	4.80 (0.07)***
Job satisfaction, γ_{10}	—	0.46 (0.04)***	0.43 (0.05)***
Tenure	—	0.03 (0.01)*	0.03 (0.01)*
Workload	—	−0.18 (0.04)***	−0.17 (0.04)***
Autonomy	—	0.21 (0.05)***	0.20 (0.05)***
Perceived organizational support	—	0.29 (0.05)***	0.28 (0.05)***
Team climate, γ_{01}	—	0.31 (0.09)**	0.27 (0.09)**
Supportive supervision	—	0.24 (0.08)**	0.22 (0.08)**
Justice climate	—	0.19 (0.07)**	0.18 (0.07)*

Job satisfaction × Team climate, γ_{11}	—	—	0.12 (0.04)**
Random effects			
Within-unit variance, σ^2	0.92	0.61	0.58
Between-unit intercept variance, τ_{00}	0.14	0.08	0.07
Job satisfaction slope variance, τ_{11}	—	—	0.03
Intercept–slope covariance, τ_{01}	—	—	0.01
ICC	0.132	0.116	0.108
Model fit			
–2 Log Likelihood	2148.36	1976.42	1964.18
AIC	2154.36	1998.42	1992.18
BIC	2168.21	2049.19	2056.80
Δ–2LL	—	171.94***	12.24**
Pseudo-R² within	—	0.337	0.370
Pseudo-R² between	—	0.429	0.500

Table note. Values are illustrative estimates based on the hypothetical employer-based survey design described in Section 3, consisting of **750 employees nested within 60 work units across 12 departments**, with an expected response rate of **72%**. Entries for fixed effects are unstandardized coefficients with standard errors in parentheses. Model 1 is the unconditional means model. Model 2 adds level-1 predictors and level-2 predictors with random intercepts. Model 3 adds a random slope for job satisfaction and a cross-level interaction between job satisfaction and team climate. ICC = intraclass correlation coefficient. AIC = Akaike information criterion. BIC = Bayesian information criterion. * $p < .05$. ** $p < .01$. *** $p < .001$.

Sensitivity Analyses

Sensitivity analyses test whether the findings depend on centering decisions, estimation method, cluster size, or measurement specification. The primary model uses group-mean centering for level-1 satisfaction and grand-mean centering for level-2 climate, but parallel models with grand-mean-centered satisfaction can clarify whether between-unit compositional differences change the interpretation. Models are also re-estimated using restricted maximum likelihood for variance components, maximum likelihood for model comparison, and exclusions of very small work units with fewer than three respondents (McNeish, 2017; Arend & Schäfer, 2019; Hamaker & Muthén, 2020). Additional robustness checks compare global satisfaction with facet-based satisfaction and affective commitment with continuance or normative commitment to ensure that conclusions are not driven by a single operationalization (Lepold et al., 2018; Katebi et al., 2022; Stark et al., 2025).

Replication and External Validation

Replication is evaluated through split-sample cross-validation within the organization, with work units randomly divided into calibration and validation subsets where feasible. The expected direction and magnitude of the satisfaction coefficient, ICC, and team climate interaction are then compared across subsets to assess whether the model is stable rather than sample-specific. External validation would require applying the same specification to another organization, industry, or public workplace dataset, particularly because satisfaction, commitment, and climate may differ across national and occupational contexts (Chordiya et al., 2017; Kalfa, 2018; Saridakis et al., 2020). This replication logic is important because studies in health care, public administration, banking, and service organizations suggest broad but not necessarily identical satisfaction–commitment dynamics (Thevanes & Saranraj, 2018; Hendri, 2019; Wang et al., 2022; Ito et al., 2023).

Limitations

Cross-Sectional Design and Causality

The proposed study is cross-sectional, so it cannot establish that job satisfaction causes organizational commitment even if the multilevel coefficient is positive and statistically significant. Reverse causation is plausible because committed employees may report higher satisfaction, and reciprocal effects may unfold over time through repeated social exchange, identity reinforcement, or cognitive consistency processes. Longitudinal or time-lagged multilevel



designs would be needed to distinguish stable between-person differences, within-person change, and delayed contextual effects (Hamaker & Muthén, 2020; Saridakis *et al.*, 2020; Wang *et al.*, 2022). Future research should therefore collect repeated measures of satisfaction and commitment across employees and teams to evaluate whether changes in satisfaction precede changes in commitment within the same organizational units (Kartika & Purba, 2018; Newman *et al.*, 2018; Katebi *et al.*, 2022).

Common Method Bias and Generalizability

The use of employee self-report surveys may inflate associations among satisfaction, perceived support, climate, and commitment because all variables are measured from the same source at the same time. Linking surveys to human resource records, supervisor ratings, archival team metrics, or objective turnover data would reduce this concern and provide stronger validation of the organizational consequences of commitment. Generalizability is also limited because the hypothetical sample comes from one mid-sized service organization, and satisfaction–commitment relationships may differ across cultures, sectors, compensation systems, and institutional environments (Chordiya *et al.*, 2017; Kalfa, 2018; Ng *et al.*, 2019). These limitations support cautious interpretation and motivate replication across industries, countries, and organizational forms (Story & Castanheira, 2019; Paruzel *et al.*, 2021; Potipiroon, 2024).

Conclusion

A multilevel statistical analysis clarifies the relationship between job satisfaction and organizational commitment by aligning the statistical model with the hierarchical structure of workplace data. Employees are nested within work units, and this nesting means that commitment may reflect both individual attitudes and shared contextual conditions. By estimating variance decomposition, random intercepts, and cross-level moderation, the analysis distinguishes employee-level satisfaction effects from team-level differences in commitment.

The key statistical contribution is the explicit estimation of intraclass correlation, random slope variance, and group-level moderators of individual-level relationships. The ICC indicates whether commitment is clustered within work units, while random slope testing evaluates whether the satisfaction–commitment association differs across teams. Cross-level interaction terms then identify whether team climate, leadership quality, or related contextual features explain this slope heterogeneity.

For organizations, the model provides a practical diagnostic system for identifying teams where commitment is unexpectedly low after accounting for employee satisfaction and individual characteristics. Empirical Bayes residuals can help locate units that may require deeper managerial review, while cross-level effects can guide targeted interventions. This approach shifts the managerial focus from generic satisfaction improvement to evidence-based interventions tailored to unit-level conditions.

Future research should extend this framework using longitudinal multilevel designs, repeated employee surveys, and linked organizational records. Such designs would strengthen causal inference, separate short-term attitudinal fluctuations from stable team effects, and test whether changes in satisfaction predict later changes in commitment. Replication across industries, countries, and organizational structures would further improve the generalizability of multilevel evidence on job satisfaction and organizational commitment.

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