



RESEARCH ARTICLE

Vantage Sensitivity as a Boundary Condition: How Coworker Support Shapes Life Satisfaction Among Special Education Teachers

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Abstract. Special education teachers face complex emotional and professional demands that place their psychological well-being and life satisfaction at risk. Coworker social support has been identified as a protective resource for teacher well-being, yet individuals do not always benefit equally from the same level of support they receive. This study examined the moderating role of vantage sensitivity in the association between coworker social support and life satisfaction among special education teachers. A non-experimental quantitative survey with an explanatory correlational design was applied to 136 teachers recruited from two special schools. Data were collected using the Satisfaction with Life Scale, the Perceived Coworker Support Scale, and the Highly Sensitive Person Scale-12, and analyzed through moderated regression using the PROCESS macro with bootstrapping and heteroscedasticity-consistent standard errors. Results showed that coworker social support significantly predicted life satisfaction ($B = 0.188, p = .004$), whereas vantage sensitivity showed no significant direct effect ($B = 0.028, p = .390$). The interaction between coworker social support and vantage sensitivity was significant, although modest in size and close to the boundary of significance ($B = 0.020, p = .046, 95\% \text{ CI } [0.0004, 0.039], \Delta R^2 = .026$), suggesting that teachers with higher vantage sensitivity tended to benefit more strongly from coworker support; given the width of this confidence interval, the finding should be interpreted with appropriate caution. These findings highlight the importance of considering individual sensitivity when designing well-being interventions for special education teachers.

Keywords: coworker social support; life satisfaction; moderation; special education teachers; vantage sensitivity

INTRODUCTION

Special education teachers occupy a uniquely demanding position within the education workforce. Beyond delivering academic instruction, their responsibilities extend to individualized intervention, cross-sectoral coordination, and sustained emotional engagement with students who have diverse and often intensive support needs (Razalli et al., 2020; Jeon et al., 2022; Zuhria & Harisiwi, 2024). In Indonesia specifically, these demands are amplified by the ongoing shift toward inclusive education, which requires teachers to continually adapt instructional strategies to accommodate a wide range of student abilities while also carrying out therapeutic, counseling-like, and family-liaison roles (Calandri et al., 2025; Komarudin & Kaeni, 2023; Utomo & Rilianti, 2023; Stark et al., 2024; Kimhi & Bar Nir, 2025). This combination of academic, emotional, and administrative workload has

repeatedly been linked to elevated burnout among special education teachers, both internationally (Alahmed, 2024) and within the Indonesian context specifically (Sujarwanto et al., 2024; Syah & Zahara, 2023; Nurwahyuni & Widyana, 2024), underscoring that the occupational burden these teachers carry is substantial and largely distinct from that experienced by teachers in mainstream classrooms (Brunsting et al., 2025).

Because chronic occupational strain has the potential to affect not only how teachers experience their work but also how they evaluate their lives more broadly (Zhou et al., 2024; Wang, 2024), the present study focuses on life satisfaction as its primary outcome, rather than on burnout or job-specific evaluations. Life satisfaction is defined as an individual's cognitive evaluation of the overall quality of their life relative to the standards and expectations they set for themselves (Diener, 1984); it is a global, relatively stable judgment about life as a whole, and should be distinguished conceptually from more work-specific constructs such as job satisfaction, work engagement, and burnout, which refer to evaluations of, or emotional reactions to, the occupational role specifically (Fors Connolly & Gärling, 2024; Busseri, 2025). Because the Satisfaction with Life Scale used in this study captures this global evaluation rather than satisfaction with one's job, the mechanism through which a workplace-based resource could plausibly shape it requires

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explicit theoretical grounding. Work-to-life spillover theory offers one such mechanism, positing that psychological states and resources experienced in the work domain carry over into an individual's broader affective and cognitive evaluations of life outside work (Mao et al., 2024; Carranza Esteban et al., 2023). Consistent with this reasoning, a workplace resource such as coworker support may not only support day-to-day occupational functioning but, through spillover, also contribute to a more positive global evaluation of one's life as a whole.

To ground this focus empirically, a small preliminary study was conducted in October 2025 among four special education teachers in the Surakarta and Yogyakarta areas. This preliminary study is treated as an exploratory inquiry into how teachers in this occupational group subjectively experience life satisfaction, rather than as an estimate of prevalence. Three of the four teachers interviewed described low subjective life satisfaction, citing emotional exhaustion, limited recognition of their professional dedication, and insufficient support for self-development. Because this preliminary observation was based on an unstructured qualitative exploration of only four individuals, it is not directly comparable to the standardized, norm-referenced categorization later applied to the full survey sample of 136 teachers (see Results); differences in sample size, measurement approach (open-ended discussion versus the validated Satisfaction with Life Scale), and the specific individuals and settings involved likely account for the divergence between the preliminary impression of predominantly low life satisfaction and the subsequently observed pattern of predominantly high life satisfaction in the main sample. The preliminary study is retained here because it surfaced a theme directly relevant to the present study: participants repeatedly identified coworkers, rather than family, supervisors, or the institution, as the source of support most immediately available to them and most attuned to the specific demands of their work.

Coworker support refers to an individual's perception that colleagues provide the assistance, attention, appreciation, and support needed to manage work demands and problems, reflecting the quality of positive interpersonal relationships in the workplace (Uslukaya & Demirtas, 2024). It can take instrumental, informational, and emotional forms, such as sharing teaching strategies, exchanging experience in handling students with special needs, and offering emotional reassurance during professional difficulty (Wu et al., 2025; Fan et al., 2024). Within the Job Demands–Resources (JD–R) framework (Jeon et al., 2022), coworker support functions as a job resource: a workplace feature that helps employees achieve work goals, reduces the psychological cost of job demands, and stimulates personal growth. Positioning coworker support as a job resource within the JD–R framework provides a theoretical basis for expecting it to relate not only to occupational outcomes but, through the spillover mechanism outlined above, to teachers' broader life satisfaction as well. Because coworkers share the same daily working conditions and possess first-hand understanding of the demands of special education, they are often considered a particularly accessible and relevant source of support relative to supervisors, family, or the wider community (Uslukaya & Demirtas, 2024; Zeng et al., 2024). Prior research on special education teachers specifically has linked coworker and workplace social support to improved psychological well-being, sustained professional commitment, and greater work engagement (Alon & Harel-Gadassi, 2024; Wang et al., 2024).

Although coworker support has repeatedly been associated with improved teacher well-being, its benefits are not uniform across individuals. Some teachers appear to derive substantial benefit from coworker support, while others report only minimal benefit despite receiving comparable levels of support, indicating meaningful heterogeneity in individual response (Yang & Jiang, 2020; Lahelma et al., 2024). This heterogeneity suggests that the average effect of coworker support on life satisfaction may obscure important individual variation, pointing to the need for a moderating variable capable of explaining why teachers who receive similar support nonetheless experience different psychological benefit.

One candidate boundary condition is environmental sensitivity, an individual-difference trait describing the degree to which people register and are affected by both positive and negative aspects of their environment (Pluess et al., 2023). Building on this broader trait, Pluess and Belsky (2013) proposed vantage sensitivity as a theoretical framework specifically explaining why individuals higher in environmental sensitivity tend to derive disproportionately greater benefit from positive experiences, without necessarily showing a corresponding cost when experiences are negative a pattern distinct from differential susceptibility, which concerns heightened responsiveness to both positive and negative environments (Moscardino et al., 2021; Villiers et al., 2018). It is important to note that vantage sensitivity is a theoretical framework about differential benefit, not itself a directly measured trait; empirical studies, including the present one, typically operationalize vantage sensitivity by measuring an individual's level of sensory processing sensitivity, most commonly with instruments such as the Highly Sensitive Person Scale and then testing whether that sensitivity moderates the association between a positive experience and a relevant outcome. Accordingly, in the present study, sensory processing sensitivity as measured by the HSP-12 is treated as the operational moderator through which a vantage-sensitivity interpretation is tested, rather than as directly equivalent to vantage sensitivity itself. Evidence consistent with this moderating pattern has been reported among adolescents, where those higher in sensory processing sensitivity showed greater emotional well-being gains following positive events (Iimura, 2021), and among adults with a history of childhood neglect, where highly sensitive individuals showed greater relational well-being in supportive social contexts (Di Paola et al., 2023). Applying this framework to occupational settings, and to special education teachers specifically, remains largely unexplored.

Existing research therefore leaves an important gap. Much of the literature on coworker and workplace social support has examined its average effect on teacher outcomes, implicitly assuming that a given level of support confers a similar benefit across individuals. The vantage sensitivity framework instead suggests a conditional-effect perspective: coworker support may be a beneficial resource on average, but the magnitude of that benefit may depend on a teacher's level of environmental sensitivity. This shift in framing from asking whether coworker support matters on average to asking for whom, and under what individual conditions, it matters most has rarely been tested among special education teachers and, to the authors' knowledge, has not previously been examined within the Indonesian context. Most prior vantage sensitivity research has also relied on child or adolescent samples, leaving its applicability to working adult populations, including teachers, largely untested. This study therefore tested the following hypotheses: (H1) coworker social support is

positively associated with life satisfaction among special education teachers; and (H2) vantage sensitivity, operationalized through sensory processing sensitivity, moderates this association, such that the positive association between coworker social support and life satisfaction is stronger among teachers with higher vantage sensitivity.

METHODS

Research design

This study employed a non-experimental quantitative approach using the survey method. The quantitative approach was chosen because the study aims to test the relationship and effect between theoretically defined variables through numerical measurement that can be statistically analyzed (Azwar, 2017), while the survey method allows the collection of large amounts of data from respondents whose characteristics correspond to the target population, thereby strengthening the generalizability of the results (Creswell, 2018). The design corresponds to an explanatory correlational design, as it seeks to explain the extent to which vantage sensitivity functions as a moderator that strengthens or weakens the effect of coworker social support (X) on life satisfaction (Y); in other words, the study centers on a moderated regression analysis examining whether the effect of coworker social support on life satisfaction differs across low and high levels of vantage sensitivity (Hayes, 2022). To make the study's underlying logic explicit, Figure 1 presents a simple conceptual diagram depicting coworker social support as the predictor, life satisfaction as the outcome, and vantage sensitivity as the moderator of this association.

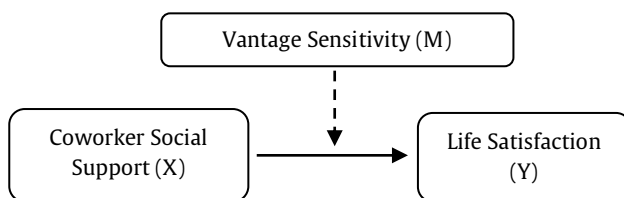


Figure 1. Conceptual Model of Study

Research setting

This study was conducted at special schools (SLB) located in the Special Region of Yogyakarta, Indonesia. This location was selected because Yogyakarta is a major education hub with a substantial number of special schools, allowing an adequate sample size to be obtained. According to official data from the Yogyakarta Provincial Education Office, there are 79 special schools in the province, comprising 9 public (state) schools and 70 private schools. Data collection took place at SLB Negeri Pembina Yogyakarta and SLB Negeri 1 Bantul, both selected for having an adequate number of teaching staff and for serving students with diverse types of disability, providing a relevant context for examining coworker social support, vantage sensitivity, and life satisfaction among special education teachers.

Participants and sampling procedure

The accessible population comprised active teachers at SLB Negeri Pembina Yogyakarta and SLB Negeri 1 Bantul who met the study's inclusion criteria. Inclusion criteria were: (1) actively teaching for a minimum of six months, and (2) direct interaction with students with special needs during the learning process. The six-month threshold is supported by the induction and newcomer-socialization literature, which typically treats this period as the initial professional-adaptation phase during which mentoring and evaluation practices help new teachers adjust to job demands (Cobanoglu & Tuncel, 2018; Lindqvist et al., 2023; OECD, 2025). Schmidt et al. (2024) found that teachers with longer teaching experience tend to show lower work stress and higher life satisfaction due to more effective coping strategies and stronger professional networks, while Elsayed et al. (2025) noted that intensive direct interaction with students with special needs can increase empathy and a sense of meaning at work, but may also heighten emotional strain without adequate social support. Applying these inclusion criteria across the two schools yielded 136 eligible teachers (82 from SLB Negeri 1 Bantul and 54 from SLB Negeri Pembina Yogyakarta). Questionnaires were distributed to all 136 eligible teachers, and all 136 returned a completed questionnaire; none were subsequently excluded from analysis. Because the full eligible population at both schools was surveyed rather than a further-selected subset, and because 100% of the eligible population participated, this procedure is more accurately described as a census of the accessible population than as probability or conventional purposive sampling. The final analytic sample was therefore $N = 136$, corresponding to a response rate of 100%.

Sample size was determined through a priori statistical power analysis using G*Power 3.1 (Faul et al., 2009), with $\alpha = .05$, power $(1 - \beta) = .95$, an expected effect size of $f^2 = .15$ (medium), and three predictors (coworker social support, vantage sensitivity, and their interaction term). This analysis yielded a minimum required sample of 119 respondents; anticipating incomplete data, the target was increased by approximately 10% to 130 respondents. The final sample obtained comprised 136 teachers, exceeding the minimum requirement. The main data collection took place in July 2026. Participant characteristics are summarized in Table 1. Because the effect size actually observed for the interaction term ($\Delta R^2 = .026$, incremental $f^2 \approx .029$) was considerably smaller than the medium effect size ($f^2 = .15$) assumed at the design stage, a post-hoc sensitivity analysis was conducted to characterize the study's statistical power for the effect actually detected. Given the achieved sample size ($N = 136$) and the degrees of freedom associated with testing a single additional predictor in the full three-predictor model ($df_1 = 1$, $df_2 = 132$, $\alpha = .05$), the study had approximately 50% power to detect an interaction effect of the magnitude observed ($f^2 \approx .029$), and could reliably detect (power = .80) an incremental effect no smaller than $f^2 \approx .06$. This indicates that the design was somewhat underpowered relative to the effect size ultimately observed, and this limitation is revisited when interpreting the significance and stability of the interaction effect in the Results and Discussion.

Operational definitions and measures

Life satisfaction was defined as an individual's cognitive judgment of the extent to which their life corresponds to their personal expectations, goals, and values, and was measured with the Satisfaction with Life Scale (SWLS; Diener et al., 1985), using the Indonesian adaptation validated by Ekayanti et al. (2026). The scale consists of 5

items rated on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree), with higher scores indicating higher life satisfaction. The theoretical score range is 5–35, and the scale contains no reverse-scored items; items ask respondents to evaluate, in general terms, the overall conditions and outcomes of their life against their own standards (see Diener et al., 1985, for the full item set). In this sample, the SWLS showed a Cronbach's alpha of .718; confirmatory factor analysis (CFA) yielded $\chi^2(5) = 38.2$, $p < .001$, CFI = .835, TLI = .669, and RMSEA = .221 (90% CI [.159, .289]), with standardized factor loadings ranging from .300 to .763 across the five items (all $p < .001$), and McDonald's omega = .673.

Coworker social support was defined as an individual's perception of the assistance, attention, appreciation, and support provided by coworkers in the professional environment, and was measured with the Perceived Coworker Support Scale (PCS; Ladd & Henry, 2000), adapted into Indonesian for this study. The scale comprises 9 items rated on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree) across four dimensions: concern for well-being, availability of assistance, recognition and appreciation, and support for goals, values, and opinions. The theoretical score range is 9–63, and, consistent with the original scale (Ladd & Henry, 2000), no items are reverse-scored. Although the PCS comprises four content dimensions, it was scored as a single global index of perceived coworker support in the present study because the theoretical construct of interest was the overall degree of support teachers perceive from coworkers as a general workplace resource, rather than the differential contribution of each specific dimension; this treatment follows the original scale developers' use of the instrument (Ladd & Henry, 2000). Cronbach's alpha for the PCS was .721; CFA (single-factor model) indicated $\chi^2(27) = 42.3$, $p = .031$, CFI = .913, TLI = .884, and RMSEA = .0646 (90% CI [.0203, .100]), with standardized factor loadings ranging from .177 (item PCS5, $p = .036$) to .542, and McDonald's omega = .630.

Vantage sensitivity was operationalized through sensory processing sensitivity, based on the environmental sensitivity framework, which holds that individuals with higher sensitivity are more responsive to environmental influences both positive and negative, and therefore more likely to show an optimal response to positive experiences. It was measured using the Highly Sensitive Person Scale-12 (HSP-12; Pluess et al., 2023), a 12-item short form of the original 27-item Highly Sensitive Person Scale (Aron & Aron, 1997), comprising three dimensions: Ease of Excitation (EOE; 5 items), Aesthetic Sensitivity (AES; 4 items), and Low Sensory Threshold (LST; 3 items), rated on a 7-point Likert scale. The theoretical score range is 12–84; all items loaded in the same direction in the present CFA, consistent with none of the 12 items being reverse-scored. Although the scale is multidimensional, the total score was used to represent overall vantage sensitivity, consistent with its treatment as a unidimensional construct in prior work (Pluess et al., 2023); because the vantage-sensitivity hypothesis under test in this study concerns the overall degree to which an individual benefits more from a positive experience rather than which specific facet of sensitivity (excitability, aesthetic responsiveness, or sensory threshold) drives that benefit a global total score is the operationalization most directly aligned with the study's theoretical question. The HSP-12 demonstrated a Cronbach's alpha of .718; a three-factor CFA yielded $\chi^2(51) = 133$, $p < .001$, CFI = .789, TLI = .727, and RMSEA = .109 (90% CI [.0865, .132]), with standardized factor loadings ranging

from .148 to 1.095 (see Validity and reliability, below, for discussion of the latter value).

Table 1. Participant Characteristics (N = 136)

Characteristic/Category	n	%
Gender		
Female	96	70.6
Male	40	29.4
Age		
30–39 years	43	31.6
40–49 years	29	21.3
50–59 years	64	47.1
Institution		
SLB Negeri Pembina Yogyakarta	54	39.7
SLB Negeri 1 Bantul	82	60.3
Teaching position		
Classroom teacher	93	68.4
Subject teacher	39	28.7
Special-program teacher	4	2.9
Tenure		
1–8 years	32	23.5
9–16 years	36	26.5
17–24 years	46	33.8
25–34 years	22	16.2

Note. Percentages are as reported in the original data set.

Validity and reliability

Content validity was examined through expert judgment by two psychology experts using Gregory's index; all items across the three scales achieved full agreement between raters (Gregory's index = 1.00), indicating strong evidence of content validity and no items requiring revision. Construct validity was examined through confirmatory factor analysis (CFA) with a minimum acceptable standardized factor loading of .40 (Hair et al., 2014). CFA was estimated using maximum likelihood estimation in jamovi (SEM module), with the factor variance fixed to 1 for identification, placing the reported loadings on a standardized latent-variable metric. As reported above, model fit varied considerably across the three instruments: the PCS showed acceptable-to-good fit ($\chi^2(27) = 42.3$, $p = .031$, CFI = .913, TLI = .884, RMSEA = .0646, 90% CI [.0203, .100]), whereas the SWLS ($\chi^2(5) = 38.2$, $p < .001$, CFI = .835, TLI = .669, RMSEA = .221, 90% CI [.159, .289]) and the HSP-12 ($\chi^2(51) = 133$, $p < .001$, CFI = .789, TLI = .727, RMSEA = .109, 90% CI [.0865, .132]) showed fit indices below conventional thresholds (Hu & Bentler, 1999), indicating that the hypothesized factor structure of these two instruments was not fully supported in the present sample. Composite reliability was additionally examined using McDonald's omega, computed from the standardized factor loadings: $\omega = .673$ for the SWLS and $\omega = .630$ for the PCS, both congeneric single-factor estimates. A reliable omega estimate could not be computed for the HSP-12 total score, because the CFA solution for this instrument contained a Heywood case (see below); an omega calculated naively from the reported loadings would be inflated by this

improper solution and is therefore not reported as a trustworthy estimate. Regarding the HSP-12 item with the highest loading (HSP10, on the Aesthetic Sensitivity factor, standardized estimate = 1.095): because the factor variance was fixed to 1 rather than a marker-item loading, this value is already on a standardized latent-variable metric, and a loading exceeding 1 on this metric is not interpretable as a valid standardized coefficient. This is a Heywood case – the item's model-implied variance exceeds its total observed variance, yielding an impossible (negative) residual variance for this indicator – and should be understood as an indication of model misspecification rather than as evidence of an unusually strong item. A plausible contributor is that the Aesthetic Sensitivity factor is estimated from only four indicators and shows a near-unity latent correlation with the Low Sensory Threshold factor in this sample ($r = .981$), suggesting the two factors may not be empirically distinct here; the Ease of Excitation and Aesthetic Sensitivity factors, by contrast, were essentially uncorrelated ($r = .007$). Resolving this would likely require re-specifying the HSP-12 measurement model (e.g., re-examining the three-factor structure, adding indicators, or treating vantage sensitivity as a single general factor rather than three subscales) in future work using this instrument in Indonesian samples. Given these fit indices, internal consistency reliability at or above .70 for all three instruments (Cronbach's α ; Hair et al., 2022) is reported here strictly as an index of item covariance, not as evidence of adequate construct validity; the two psychometric properties are conceptually and statistically distinct, and a Cronbach's alpha above the conventional threshold does not compensate for suboptimal CFA model fit. Accordingly, the three instruments are not described here as uniformly 'supported for use' on the basis of reliability alone; the implications of imperfect model fit, particularly for the SWLS and HSP-12, are discussed as a methodological limitation in the Discussion. For the PCS and HSP-12, cross-cultural adaptation into Indonesian followed a forward-backward translation procedure conducted through a certified, professional translation service, followed by expert review to confirm semantic and conceptual equivalence with the original English versions prior to data collection.

Procedure and research ethics

This study received ethical clearance from the Research Ethics Commission of Universitas Negeri Yogyakarta. All participants were provided with an information sheet describing the study's purpose, procedures, benefits, and potential risks, as well as their right to decline or withdraw at any time without consequence, and provided written informed consent prior to completing the questionnaire. Printed questionnaires were distributed directly to teachers at each school following permission from school authorities; all data were treated confidentially, without personal identifying information, and used solely for academic purposes.

Data analysis

Descriptive statistics were computed for all study variables using continuous indices (M, SD, range, skewness, and kurtosis). Scores were additionally categorized into low, moderate, and high levels based on hypothetical norms (Azwar, 2012); because these norms have not been empirically validated for the Indonesian special-education-teacher population, the resulting categories are reported for descriptive orientation only, and continuous statistics were relied upon for all substantive inferential interpretation.

Prior to hypothesis testing, assumption tests were conducted, including normality (Kolmogorov–Smirnov test, supplemented by visual inspection and skewness/kurtosis criteria; Field, 2013; Kline, 2016), linearity (ANOVA test for linearity; Ghazali, 2021), multicollinearity (tolerance and variance inflation factor, with mean-centering applied to predictor and moderator variables; Hair et al., 2019), and heteroscedasticity (Glejser test). Hypotheses were tested using moderated regression analysis with the PROCESS macro version 4.2 (Model 1; Hayes, 2022), applying 5,000 bootstrap samples and heteroscedasticity-consistent standard errors (HC3) to obtain robust parameter estimates, followed by simple slope analysis and a Johnson–Neyman analysis to interpret the pattern of the interaction effect across the full range of vantage sensitivity. The moderation model is expressed as $Y = b_0 + b_1X + b_2M + b_3(X \times M) + e$, where Y is life satisfaction, X is coworker social support, M is vantage sensitivity, and $X \times M$ represents their interaction; a significant interaction coefficient (b_3 , $p < .05$) indicates that vantage sensitivity moderates the effect of coworker social support on life satisfaction.

RESULTS OF STUDY

Descriptive Statistics

Based on descriptive analysis of the 136 participants, coworker social support scores ranged from 38 to 61 ($M = 51.38$, $SD = 4.255$), vantage sensitivity scores ranged from 36 to 78 ($M = 55.49$, $SD = 7.168$), and life satisfaction scores ranged from 16 to 35 ($M = 28.26$, $SD = 3.132$). Categorization based on hypothetical norms showed that coworker social support and life satisfaction were dominated by the high category, whereas vantage sensitivity was dominated by the moderate category (Table 2). Specifically, 92.6% of teachers ($n = 126$) perceived a high level of coworker social support, 70.6% ($n = 96$) fell into the moderate vantage sensitivity category, and 90.4% ($n = 123$) reported a high level of life satisfaction. As these categories are based on hypothetical, rather than empirically validated, norms for this population, they are reported here for descriptive orientation only; substantive interpretation in this study relies on the continuous regression-based analyses summarize in table 2.

Assumption Testing

The Kolmogorov–Smirnov test on the standardized regression residuals yielded an Exact Sig. (2-tailed) of .191 ($p > .05$), indicating that the residuals did not deviate significantly from a normal distribution; this was corroborated by histogram and normal Q–Q plot inspection as well as skewness (–0.880) and kurtosis (2.945) values within the acceptable range (Kline, 2016). The linearity test showed that the relationship between coworker social support and life satisfaction was linear (Linearity $p = .001$; Deviation from Linearity $p = .099$). The relationship between vantage sensitivity and life satisfaction showed a non-significant deviation from linearity (Deviation from Linearity $p = .428$), indicating no strong evidence against the linear-effect assumption for this variable. Nevertheless, because vantage sensitivity was modeled as a moderator rather than a direct predictor, hypothesis testing proceeded using the PROCESS macro's bootstrap-based inferential procedure (Hayes, 2022), which addresses non-normality and heteroscedasticity in standard errors but does not itself correct functional-form misspecification. Multicollinearity diagnostics indicated no problematic collinearity among

predictors following mean-centering: coworker social support (tolerance = .969, VIF = 1.032), vantage sensitivity (tolerance = .982, VIF = 1.019), and their interaction term (tolerance = .956, VIF = 1.046), all within the acceptable range (tolerance > .10, VIF < 10.00; Hair et al., 2019). The Glejser test indicated a possible heteroscedasticity concern for coworker social support ($p = .033$), while vantage sensitivity ($p = .256$) and the interaction term ($p = .245$) showed no such indication; this was addressed by using heteroscedasticity-consistent standard errors (HC3) in all subsequent regression analyses.

Table 3 presents the means, standard deviations, and internal consistency reliabilities for coworker social support, vantage sensitivity, and life satisfaction. A standalone zero-order correlation matrix among these three variables was not computed as part of the original analysis; the corresponding bivariate associations are instead available from the moderated regression results reported in Table 4 (e.g., the significant positive association between coworker social support and life satisfaction, $B = 0.188$, $p = .004$).

Hypothesis testing

The overall moderated regression model was statistically significant, $R = .330$, $R^2 = .109$, $F(HC3) = 5.000$, $p = .003$, indicating that coworker social support, vantage sensitivity, and their interaction jointly accounted for 10.9% of the variance in life satisfaction among special education teachers. As shown in Table 4, coworker social support significantly and positively predicted life satisfaction ($B = 0.188$, $SE = 0.063$, $t = 2.965$, $p = .004$, 95% CI [0.062, 0.313]), supporting H1 and indicating that teachers who perceived greater coworker support reported higher life satisfaction. Vantage sensitivity did not show a significant direct effect on life satisfaction ($B = 0.028$, $SE = 0.032$, $t = 0.863$, $p = .390$, 95% CI [-0.036, 0.090]). Most importantly, the interaction between coworker social support and vantage sensitivity significantly predicted life satisfaction ($B = 0.020$, $SE = 0.010$, $t = 2.018$, $p = .046$, 95% CI [0.0004, 0.039]), and the inclusion of this interaction term accounted for an additional 2.6% of variance in life satisfaction beyond the main effects, $\Delta R^2 = .026$, $F(HC3)(1, 132) = 4.074$, $p = .046$. Because the

interaction term explained a comparatively small proportion of additional variance and its 95% confidence interval lies close to zero, this pattern is best described as consistent with, rather than definitive confirmation of, the hypothesized moderating role of vantage sensitivity (H2); it should be interpreted with appropriate statistical caution and considered alongside the sensitivity/power analysis reported in the Methods.

Simple slope analysis was conducted to further interpret the moderation pattern (Table 5). At -1 SD of vantage sensitivity, the effect of coworker social support on life satisfaction was not significant ($b = 0.046$, $SE = 0.099$, $t = 0.468$, $p = .640$). At the sample mean of vantage sensitivity, the effect became positive and significant ($b = 0.188$, $SE = 0.063$, $t = 2.965$, $p = .004$). At $+1$ SD of vantage sensitivity, the effect was stronger and highly significant ($b = 0.329$, $SE = 0.090$, $t = 3.649$, $p < .001$). These values represent conditional effects estimated at three specific points along a continuous moderator, rather than three discrete psychological categories of 'low,' 'moderate,' and 'high' sensitivity; they are reported here, and in Table 5, as -1 SD, the mean, and $+1$ SD accordingly. This pattern is consistent with the interpretation that the higher a teacher's vantage sensitivity, the greater the association between coworker social support and life satisfaction, while among teachers with low vantage sensitivity, coworker social support was not significantly associated with life satisfaction. To characterize this pattern more precisely across the full continuum of vantage sensitivity, a Johnson–Neyman analysis was also conducted to identify the specific region of vantage-sensitivity scores at which the association between coworker social support and life satisfaction becomes statistically significant (Hayes, 2022). This analysis identified a transition value of HSP-12 total score = 52.98: below this value (36.76% of the sample) the association between coworker social support and life satisfaction was not statistically significant, whereas above this value (63.24% of the sample) the association was statistically significant. This approach provides a more precise, continuous characterization of the boundary condition than simple-slope estimates at three selected points alone.

Table 2. Descriptive Statistics and Categorization of Study Variables

Variable	M	SD	Min–Max	Low n (%)	Moderate n (%)	High n (%)
Coworker social support	51.38	4.255	38–61	0 (0%)	10 (7.4%)	126 (92.6%)
Vantage sensitivity	55.49	7.168	36–78	0 (0%)	96 (70.6%)	40 (29.4%)
Life satisfaction	28.26	3.132	16–35	0 (0%)	13 (9.6%)	123 (90.4%)

Table 4. Results of the Moderated Regression Analysis Predicting Life Satisfaction

Predictor	B	SE (HC3)	t	p	95% CI
Constant	28.234	0.259	109.080	< .001	[27.722, 28.746]
Coworker social support (X)	0.188	0.063	2.965	.004	[0.062, 0.313]
Vantage sensitivity (M)	0.028	0.032	0.863	.390	[-0.036, 0.090]
X × M (interaction)	0.020	0.010	2.018	.046	[0.0004, 0.039]

Note. $R = .330$, $R^2 = .109$, $F(HC3)(3, 132) = 5.000$, $p = .003$. Interaction term: $\Delta R^2 = .026$, $F(HC3)(1, 132) = 4.074$, $p = .046$. Bootstrap sample = 5,000; HC3 heteroscedasticity-consistent standard errors.

Table 5. Conditional Effects of Coworker Social Support on Life Satisfaction at Values of Vantage Sensitivity

Value of Vantage Sensitivity	Effect (b)	SE	t	p	95% CI
–1 SD	0.046	0.099	0.468	.640	[–0.148, 0.240]
Mean	0.188	0.063	2.965	.004	[0.065, 0.311]
+1 SD	0.329	0.090	3.649	< .001	[0.153, 0.505]

Supplementary analyses by demographic characteristics

These supplementary, exploratory analyses of demographic subgroup differences are reported for descriptive completeness rather than as a central test of the study's hypotheses. Independent-samples t-tests and one-way ANOVAs were conducted to examine whether the study variables differed across demographic groups. No significant differences were found by gender for coworker social support ($t(134) = -1.062$, $p = .290$, $d = -0.18$), vantage sensitivity ($t(134) = -0.325$, $p = .746$, $d = -0.06$), or life satisfaction ($t(134) = -0.798$, $p = .426$, $d = -0.14$), nor by age group (coworker social support: $F(2, 133) = 0.628$, $p = .535$, $\eta^2p = .009$; vantage sensitivity: $F(2, 133) = 1.172$, $p = .313$, $\eta^2p = .017$; life satisfaction: $F(2, 133) = 2.444$, $p = .091$, $\eta^2p = .035$), teaching position (coworker social support: $F(2, 133) = 0.157$, $p = .855$, $\eta^2p = .002$; vantage sensitivity: $F(2, 133) = 1.251$, $p = .289$, $\eta^2p = .018$; life satisfaction: $F(2, 133) = 0.930$, $p = .397$, $\eta^2p = .014$), or tenure (coworker social support: $F(3, 132) = 1.107$, $p = .349$, $\eta^2p = .024$; vantage sensitivity: $F(3, 132) = 1.136$, $p = .337$, $\eta^2p = .025$; life satisfaction: $F(3, 132) = 1.831$, $p = .145$, $\eta^2p = .040$); all effect sizes were small. A significant difference emerged for vantage sensitivity across the two participating institutions ($t(134) = 2.828$, $p = .005$, $d = 0.49$, a small-to-moderate effect), while coworker social support ($t(134) = -0.051$, $p = .959$) and life satisfaction ($t(134) = 0.881$, $p = .380$) did not differ by institution.

DISCUSSION

The results of the moderated regression analysis are consistent with the study's hypotheses. Coworker social support was positively associated with special education teachers' life satisfaction (H1), and the interaction between coworker social support and vantage sensitivity significantly predicted life satisfaction ($B = 0.020$, $p = .046$, 95% CI [0.0004, 0.039], $\Delta R^2 = .026$), a pattern compatible with H2 and with the hypothesized moderating role of vantage sensitivity. Because the interaction effect was modest in size and its confidence interval lies close to zero, this finding is best described as consistent with, rather than definitive confirmation of, a vantage-sensitivity interpretation of the association between coworker social support and life satisfaction. The simple slope analysis illustrates this pattern: the association between coworker support and life satisfaction was not statistically significant at –1 SD of vantage sensitivity ($b = 0.046$, $p = .640$, approximate 95% CI [–0.148, 0.240]), became significant at the sample mean ($b = 0.188$, $p = .004$, approximate 95% CI [0.065, 0.311]), and was largest at +1 SD ($b = 0.329$, $p < .001$, approximate 95% CI [0.153, 0.505]). These values represent conditional effects estimated at specific points along a continuous moderator rather than three discrete psychological categories, and the Johnson–Neyman analysis identified a more precise boundary: the association between coworker support and life satisfaction became statistically significant once vantage sensitivity (HSP-12

total score) exceeded 52.98, a threshold below the sample mean ($M = 55.49$) that was surpassed by 63.24% of teachers in this sample, indicating that the majority of teachers in this sample fell within the region where coworker support was significantly associated with life satisfaction.

This pattern is broadly consistent with vantage sensitivity theory (Pluess & Belsky, 2013), which proposes that individuals differ in their capacity to benefit from positive experiences, such that a given positive experience – here, coworker social support – does not necessarily confer the same benefit for every individual (Assary et al., 2023). The gradient observed here, in which higher sensory processing sensitivity was associated with a progressively stronger association between coworker support and life satisfaction, resembles the 'for better' pattern described in the environmental-sensitivity literature, whereby more sensitive individuals derive disproportionate benefit from positive experience without a clearly corresponding cost among less sensitive individuals (Damatac et al., 2025). It is also consistent with the broader theoretical proposition that individuals higher in environmental sensitivity process environmental information, including interpersonal experiences, more thoroughly, plausibly amplifying the psychological impact of positive workplace relationships (Pluess et al., 2023). Because the HSP-12 measures sensory processing sensitivity rather than directly measuring 'vantage sensitivity' as a construct, this finding is more precisely described as compatible with a vantage-sensitivity interpretation of sensitivity-related moderation than as direct confirmation of vantage sensitivity theory itself; the present design cannot rule out that the same sensitivity trait would also amplify the effect of negative workplace experiences, a pattern more consistent with differential susceptibility than with vantage sensitivity specifically, and future research incorporating both positive and negative environmental conditions is needed to adjudicate between these two frameworks, as discussed further below.

Beyond its moderating role, coworker social support also showed a significant, positive direct association with life satisfaction ($B = 0.188$, $p = .004$): teachers who perceived greater support from coworkers reported higher life satisfaction. This is consistent with prior evidence that social support functions as a protective resource that helps individuals manage occupational pressure and sustain psychological well-being (Bekiros et al., 2022), and with Ladd and Henry's (2000) conceptualization of coworker support as reflecting the emotional, informational, and instrumental assistance colleagues provide. Consistent with the buffering hypothesis, such support may help teachers appraise job demands as manageable challenges rather than threats (Gillman et al., 2023), and with evidence that the quality of collegial interaction is an important predictor of teacher life satisfaction (Qu, 2024).

Relevance to the special education context. These patterns carry particular relevance for special education teachers, whose daily work involves substantial emotional investment, the need to accommodate highly diverse student needs, and considerable administrative responsibility. Within this demanding context, coworkers

who share experience, help resolve instructional problems, and provide emotional support during difficult periods represent a psychologically significant resource. This is broadly consistent with earlier findings that workplace social support significantly influenced special education teachers' psychological well-being (Alon & Harel-Gadassi, 2024; Wang et al., 2024), although the specific contribution of coworker support relative to other sources of support, such as family or supervisors, has varied across studies, being reported as comparatively modest in some occupational samples of non-permanent teachers (Suryani et al., 2026). In the present sample, 92.6% of teachers reported high coworker social support, suggesting that supportive coworker relationships may be a particularly salient resource in this specific institutional context; because this is a single-sample descriptive observation rather than a between-context comparison, it should be treated as a contextual observation rather than a generalizable claim about special education settings as a whole.

One plausible mechanism for the observed pattern is that teachers with higher vantage sensitivity are, in principle, better able to perceive, process, and derive meaning from the support coworkers provide, resulting in a stronger translation of that support into life satisfaction. It is important to emphasize that this is offered as a plausible interpretive mechanism consistent with the environmental-sensitivity literature (Pluess et al., 2023; Vieregge et al., 2024), rather than as a study finding, because the present design did not directly measure perception, processing, or meaning-making; testing this proposed mechanism would require methods such as experience-sampling, cognitive-appraisal measures, or qualitative inquiry into how teachers interpret coworker support. Other explanations should also be considered. Because the design was cross-sectional, reverse causality cannot be ruled out: teachers who are already more satisfied with their lives may perceive coworker behavior more favorably, rather than coworker support necessarily preceding and causing greater life satisfaction (Fors Connolly & Gärling, 2024). Unmeasured confounding variables, including workload, supervisor support, salary, school climate, optimism, personality traits, family support, and job satisfaction, may be associated with both coworker support and life satisfaction and could not be ruled out or controlled for in the present analysis; some of these unmeasured factors, particularly dispositional traits such as optimism or general positive affectivity, could plausibly account for part of the observed association between perceived coworker support and life satisfaction.

Consistent with theoretical expectations, vantage sensitivity itself showed no significant direct association with life satisfaction ($B = 0.028$, $p = .390$), in line with its conceptualization as a trait that amplifies responsiveness to environmental quality rather than one that is inherently advantageous or disadvantageous on its own (Pluess & Belsky, 2013, 2015). The supplementary, exploratory demographic analyses similarly showed no significant differences by gender, age group, teaching position, or tenure, and only a small-to-moderate institutional difference in vantage sensitivity ($d = 0.49$); given the largely non-significant pattern and modest effect sizes involved, these results are interpreted cautiously as suggesting that, within this sample, demographic characteristics were not strongly associated with the study variables, rather than as evidence that they are unimportant more generally.

Because the interaction effect observed here was modest and its confidence interval close to zero, the findings do not yet provide a sufficient basis for recommending differentiated well-being interventions targeted separately

at 'high-sensitivity' and 'low-sensitivity' teachers. A more proportionate implication is to prioritize cultivating a universally supportive collegial climate for all special education teachers, for example through structured mentoring, peer consultation, collaborative problem-solving, and the promotion of psychological safety within teaching teams. Whether the effectiveness of specific forms of support varies systematically according to individual sensitivity is a promising direction for future intervention research, consistent with evidence that the benefit of social support is heterogeneous and shaped by individual factors (Falkenstein et al., 2026), but this possibility should first be tested directly – for example through experimental or quasi-experimental designs that vary the intensity or form of support and examine sensitivity as a moderator of intervention effectiveness – before being used to guide differentiated practice.

Limitations

Several limitations should be considered when interpreting these findings. First, measurement validity represents a substantive methodological concern rather than a minor administrative issue: confirmatory factor analyses indicated less-than-optimal model fit for the SWLS (CFI = .835, TLI = .669, RMSEA = .221) and the HSP-12 (CFI = .789, TLI = .727, RMSEA = .109), and the PCS included at least one comparatively weak item-level loading (.177). Most notably, the HSP-12 measurement model produced a Heywood case (a standardized loading of 1.095 for one Aesthetic Sensitivity item), alongside a near-unity latent correlation between the Ease of Excitation and Low Sensory Threshold factors ($r = .981$); together these indicate that the three-factor structure of the HSP-12 was not well identified in this sample, and a reliable composite reliability (omega) estimate could not be computed for this instrument as a result. Acceptable internal-consistency reliability ($\alpha \approx .72$ for all three instruments; McDonald's $\omega = .673$ for the SWLS and .630 for the PCS) does not, by itself, establish adequate construct validity, and the imperfect fit of the SWLS and HSP-12 in particular means that the study's substantive conclusions should be interpreted with appropriate caution until they can be examined using instruments, or a re-specified Indonesian adaptation of the HSP-12, with demonstrably stronger measurement properties. Second, the interaction effect central to this study's main conclusion was modest in magnitude ($\Delta R^2 = .026$) and its confidence interval lay close to zero; combined with the study's comparatively limited statistical power to detect an effect of this size, this finding should be treated as an initial, rather than a definitive, indication of a vantage-sensitivity pattern. Third, because the design was cross-sectional and correlational, causal interpretation is not warranted; reverse causality and unmeasured confounding, as discussed above, remain plausible alternative explanations. Fourth, data collection at one of the participating schools was coordinated by school authorities without the researchers' direct supervision, which may have introduced minor inconsistencies in respondents' understanding of certain items despite clear instructions and assured confidentiality. Finally, because participants were drawn from only two special schools in the Special Region of Yogyakarta, the findings cannot be generalized to the broader population of special education teachers in Indonesia; differences in school characteristics, organizational culture, resource availability, and regional context may shape coworker support, vantage sensitivity, and life satisfaction differently elsewhere, and although an

institutional difference in vantage sensitivity was observed, the present design was not intended to identify which specific organizational features drive that difference.

CONCLUSION

This study's findings are consistent with vantage sensitivity theory, suggesting – rather than definitively demonstrating – that the benefit special education teachers derive from coworker social support may depend in part on their individual level of sensitivity to positive experience: teachers with higher vantage sensitivity showed a numerically stronger association between coworker support and life satisfaction than teachers with lower sensitivity, for whom the association was not statistically significant, although the interaction effect underlying this pattern was modest in size and should be interpreted with appropriate caution. Coworker social support itself also emerged as a direct, positive correlate of life satisfaction, underscoring the potential value of collegial relationships as a psychosocial resource within the demanding context of special education, whereas vantage sensitivity alone did not directly predict life satisfaction, consistent with its theoretical role as an amplifier rather than a direct determinant of well-being. Taken together, these findings suggest that efforts to strengthen the well-being of special education teachers may benefit from combining broad, universally accessible collegial-support initiatives with continued attention to individual differences in psychological sensitivity, rather than relying solely on uniform, one-size-fits-all approaches, pending further confirmatory research. Future research employing longitudinal designs, daily-diary or experience-sampling approaches, experimentally delivered supportive interventions, and multisite samples is needed to establish the direction and stability of the observed associations; such designs should also assess both positive and negative environmental or workplace conditions so that vantage sensitivity can be more clearly distinguished from differential susceptibility, and should extend the present model to additional sources of support, such as school leadership and family, to build a more complete and generalizable understanding of how social support, individual sensitivity, and life satisfaction interrelate among special education teachers.

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DECLARATION

Ethics approval and consent to participate

This study was approved by the Research Ethics Commission of Universitas Negeri Yogyakarta. All participants provided written informed consent prior to participation.

Consent for publication

Not applicable

Availability of data and materials

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of interest statement

The authors declare no conflict of interest.

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Artificial intelligence-assisted technology (ChatGPT, OpenAI) was used to improve the language, grammar, and readability of the manuscript. The authors reviewed and edited the generated content and take full responsibility for the final version of the manuscript.

Authors' contributions

A.N. conceptualized the study, collected the data, performed the statistical analyses, interpreted the findings, and drafted the manuscript. R.E.I. supervised the research process, contributed to the study design, provided critical revisions, and approved the final version of the manuscript. All authors read and approved the final manuscript.

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