



Psychological Needs, Social Support, and Academic Pressure in Student Well-Being

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ABSTRACT

Purpose - This study investigates how Teacher Autonomy Support, Peer Support, and Academic Pressure influence Student Well-Being among Indonesian lower secondary students. It also examines the mediating role of Basic Psychological Need Satisfaction. Grounded in Self-Determination Theory (SDT), the research views the fulfillment of students' needs for autonomy, competence, and relatedness as a crucial psychological mechanism that translates contextual factors into well-being outcomes in educational settings.

Design/methodology/approach - A quantitative, cross-sectional survey used a self-administered structured questionnaire. Data were collected from 357 students attending public and private schools and analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4.0. The model examined both direct and indirect relationships among five latent constructs: three contextual factors, basic psychological need satisfaction, and student well-being. Multigroup analysis was also conducted to test differences across gender, school type, and age groups.

Findings - Results show that Teacher Autonomy Support and Peer Support positively affect Student Well-Being, both directly and indirectly through Basic Psychological Need Satisfaction. Conversely, Academic Pressure negatively affects well-being via the same mediator. Basic Psychological Need Satisfaction emerged as the strongest predictor of Student Well-Being, underscoring its critical role in fostering positive school experiences. Multigroup analysis revealed that Peer Support has a stronger impact on need satisfaction for girls, Teacher Autonomy Support is more significant in public schools, and the link between need satisfaction and well-being is stronger among older adolescents.

Originality/value - This study integrates source-specific relatedness within the SDT framework, distinguishing between relationships with teachers and peers to provide a more nuanced understanding of how social support shapes student well-being. The findings advance educational psychology theory by demonstrating how psychological need satisfaction mediates the effects of both supportive and stressful school factors. They also offer practical strategies for developing supportive school environments that reduce academic pressure and promote positive teacher-student and peer relationships, particularly in the Indonesian educational context.

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1. Introduction

Student well-being in secondary education has gained importance in educational psychology due to its strong association with engagement, motivation, and long-term academic development. In school, well-being goes beyond simply avoiding distress; it also includes positive aspects such as emotional stability, engagement, and active participation in learning. Fredricks et al. (2016) and Ryan and Deci (2000) consistently indicate that students' well-being is closely linked to their engagement and effective school adjustment, both of which are crucial for academic success. Furthermore, Ratelle and Duchesne (2014) show through longitudinal studies that changes in psychological well-being during adolescence significantly influence developmental paths in academic and social areas, highlighting how early school experiences impact future outcomes.

Self-Determination Theory (SDT) is the primary framework for understanding student well-being. Ryan and Deci (2000) posits that human motivation and optimal functioning rely on the fulfillment of three core psychological needs: autonomy, competence, and relatedness. When these needs are satisfied, individuals tend to exhibit higher motivation, personal growth, and well-being. Conversely, blocking these needs can lead to maladjustment and disengagement. SDT has been widely validated across various cultural contexts, reinforcing its effectiveness in explaining motivation in education (Chen et al., 2015; Ryan and Deci, 2000, 2017). In school settings, satisfying these needs is a key pathway linking environmental influences to student outcomes, with evidence indicating that meeting these psychological needs strongly correlates with positive academic outcomes and emotional health (Buzzai et al., 2022; Tian et al., 2014).

In educational settings, factors related to teachers and peers are crucial in shaping students' motivation and emotional well-being. Teacher autonomy support, which involves offering choices, providing meaningful reasons, and avoiding controlling behaviors, has been shown to strongly boost students' intrinsic motivation and engagement (Mammadov and Schroeder, 2023; Olivier et al., 2021). Likewise, peer support

enhances students' sense of belonging, emotional safety, and academic confidence, making it a vital part of classroom social interactions. Buzzai et al. (2022), Davidson et al. (2010), and León and Liew (2017) demonstrate that both teacher and peer relationships significantly influence feelings of relatedness and overall adjustment to school. These support networks work together to strengthen students' psychological resources and promote positive school experiences.

Conversely, academic pressure acts as a significant environmental stressor that can threaten student well-being. Steare et al. (2023) found that high demands, performance expectations, and competitive school environments have been repeatedly linked to greater psychological distress and lower life satisfaction in adolescents. Recent SDT-focused studies emphasize the need to differentiate among source-specific psychological needs, especially in school settings, where relationships with teachers and peers may differentially affect need satisfaction and frustration. The improved measurement framework by Raimondi et al. (2026) underscores the importance of distinguishing among sources of relatedness to better understand students' psychological experiences. Additionally, Alivernini et al. (2023) indicate that differences in need satisfaction are closely linked to academic and socio-emotional adjustment, especially among students from diverse socioeconomic backgrounds.

While significant progress has been made in understanding motivational processes in education, certain limitations remain. Most research has not simultaneously explored teacher autonomy support, peer support, and academic pressure within a single model of student well-being, especially outside Western educational contexts. Moreover, the mediating role of satisfying source-specific basic psychological needs remains underexplored, particularly in Southeast Asian schools, where cultural and institutional factors differ markedly from those in Western settings. To fill these gaps, this study examines how Teacher Autonomy Support, Peer Support, and academic pressure jointly affect Student Well-Being at school, emphasizing the mediating impact of source-specific basic psychological need satisfaction among lower secondary students in Indonesia.

This study aims to examine how Teacher Autonomy Support, Peer Support, Academic Pressure, and source-specific Basic Psychological Need Satisfaction relate to Student Well-Being at School. It focuses on both the direct and indirect effects of social and academic factors on student well-being within a unified SDT framework in the Indonesian SMP/MTs context.

2. Literature Review

2.1 Theoretical Foundations

Self-Determination Theory (SDT), developed by Ryan and Deci (2000), posits that human motivation and psychological health depend fundamentally on satisfying three core needs: autonomy, competence, and relatedness. SDT highlights that people operate best when they feel a sense of choice, a sense of effectiveness, and meaningful social bonds. This theory was chosen as the main framework for this study because of its strong ability to connect social-contextual factors with motivation and well-being outcomes in educational settings. Unlike other models, SDT offers a comprehensive approach that combines environmental influences with internal psychological processes in a single, unified understanding of human functioning. In educational contexts, this theory is especially relevant because student well-being is deeply influenced by relationships, teaching methods, and perceived academic pressures. Therefore, SDT provides an effective perspective for examining how teacher actions, peer interactions, and academic challenges collectively impact students' psychological experiences in schools (Ryan and Deci, 2000).

Empirical research consistently supports SDT across various educational and cultural contexts, confirming its effectiveness in explaining student motivation and well-being (Chen et al., 2015). Recent studies indicate that autonomy-supportive teaching is strongly associated with greater psychological need satisfaction and positive learning outcomes, whereas controlling environments tend to lead to need frustration and lower well-being (Buzzai et al., 2022; Mammadov and Schroeder, 2023). Furthermore, Alivernini et al. (2023) and Di Domenico et al. (2024) reveal that student motivation results from complex interactions between social support systems and academic pressures, reaffirming SDT's relevance in understanding school-based psychological processes. Notably, recent revisions to the basic psychological needs concept emphasize the importance of differentiating source-specific relatedness, especially between relationships with teachers and peers, as highlighted in the updated measurement framework by Raimondi et al. (2026). Hence, SDT offers a strong, evidence-based framework for exploring how source-specific basic psychological need satisfaction mediates the link between social and academic factors and student well-being in Indonesian lower secondary schools.

2.2 Effects of Psychological and Social Determinants on Student Well-Being

Teacher Autonomy Support (TAS) involves instructional behaviors where teachers offer meaningful choices, recognize students' perspectives, provide clear justifications, and avoid controlling language during learning. According to Self-Determination Theory, such autonomy-supportive environments are essential for fostering students' internal motivation and psychological well-being. Mammadov and Schroeder (2023) show that autonomy-supportive teaching enhances positive learning outcomes by increasing students' intrinsic motivation, emotional engagement, and sense of control in academic activities. Additionally, Olivier et al. (2021) link need-supportive teaching practices to higher behavioral and emotional engagement, both crucial for student well-being at school. Earlier studies by Cheon and Reeve (2015) also reveal that reducing controlling teaching styles boosts students' motivation regulation and decreases amotivation, leading to better psychological adjustment in classrooms.

H1a: Teacher Autonomy Support positively affects Student Well-Being at School.

Peer Support reflects how students perceive emotional acceptance, academic help, mutual respect, and belonging within their peer group. During adolescence, peer relationships are vital for social-emotional growth and greatly influence identity development and psychological health. Davidson et al. (2010) show that feeling connected to peers and teachers is a key factor in school adjustment and overall well-being in early adolescence. Moreover, León and Liew (2017) demonstrate that different patterns of peer and teacher relatedness can significantly impact students' well-being and academic performance, highlighting the unique role of peer interactions in school life. Recent research by Buzzai et al. (2022) also reveals that both positive and negative peer interactions greatly affect students' emotional states and engagement at school. Overall, these insights suggest that supportive peer environments promote a sense of belonging and emotional safety, which are crucial for student well-being.

H1b: Peer Support positively affects Student Well-Being at School.

Academic Pressure refers to students' perceived stress caused by heavy workloads, exams, performance expectations, social comparisons, and time limits. In educational psychology, excessive academic pressure is seen as a chronic stressor that can harm emotional stability and mental health. Steare et al. (2023) consistently link high academic pressure to increased psychological distress and mental health issues among adolescents. From a motivational point of view, this pressure may lead to frustration of basic psychological needs, especially when students face less autonomy and more external control in their learning environments (Tian et al., 2014). Additionally, Alivernini et al. (2023) indicate that students from different socioeconomic backgrounds may face varying levels of vulnerability to academic stress, impacting their motivation and

well-being. While moderate academic challenges can promote achievement, excessive pressure often worsens emotional health and engagement.

H1c: Academic Pressure negatively affects Student Well-Being at School.

Together, the three factors—Teacher Autonomy Support, Peer Support, and Academic Pressure—are interconnected social and psychological influences that affect students' well-being at school. Supportive social environments created by teachers and peers are likely to boost engagement and emotional health, while high academic stress can threaten psychological stability. These links align with engagement theories that stress the interaction between environmental support and how students adapt (Fredricks et al., 2016). Ratelle and Duchesne (2014) indicate through long-term studies that adolescents' psychological experiences can have lasting effects on their developmental paths related to well-being and academic success. Recent integrated models of motivation by Di Domenico et al. (2024) also emphasize the complex relationship between support and stressors in determining educational outcomes. Thus, exploring these factors together offers a thorough view of their role as structural predictors of student well-being in schools.

2.3 Psychological Pathways of Social Support and Academic Pressure on Source-Specific Basic Psychological Needs Satisfaction

Teacher Autonomy Support (TAS) involves teaching strategies where educators offer meaningful choices, recognize students' perspectives, and reduce controlling behaviors. This approach helps foster autonomous motivation and meet psychological needs. According to Self-Determination Theory, environments that support autonomy are essential for satisfying Basic Psychological Needs, as they directly promote students' sense of autonomy, competence, and relatedness during learning. Mammadov and Schroeder (2023) show that autonomy-supportive teaching improves students' internalization of learning goals and enhances psychological need satisfaction, leading to better academic performance. Similarly, Olivier et al. (2021) demonstrate that classrooms with need-supportive climates boost engagement and psychological well-being by fulfilling key motivational needs. Early experimental studies by Cheon and Reeve (2015) also indicate that autonomy-support strategies decrease amotivation and increase perceived competence and volition among students.

H2a: Teacher Autonomy Support positively influences Basic Psychological Needs Satisfaction.

Peer Support relates to the quality of social interactions among students, including emotional support, academic assistance, mutual respect, and a sense of belonging. During adolescence, peer relationships become increasingly important as they serve as a key context for satisfying relatedness needs. Davidson et al. (2010) show that both peer and teacher relationships are vital for fulfilling psychological needs and are strong predictors of positive educational outcomes. León and Liew (2017) demonstrate that different profiles of peer interactions can influence students' psychological adjustment in various ways, highlighting the importance of relationship quality in meeting psychological needs. Recent studies by Buzzai et al. (2022) indicate that supportive peer behaviors promote the fulfillment of basic psychological needs, while interactions that hinder these needs can adversely affect students' mental health at school.

H2b: Peer Support positively impacts Basic Psychological Needs Satisfaction.

Academic Pressure differs from other pressure types, relating specifically to students' perceived external demands like workload, exam stress, performance expectations, and social comparison. According to SDT, excessive academic pressure fosters a controlling environment that can undermine students' autonomy and competence, thereby decreasing the satisfaction of Basic Psychological Needs. Steare et al. (2023) show that higher academic stress is strongly linked to frustration of psychological needs and lower motivation in adolescents. Furthermore, Tian et al. (2014) demonstrate that persistent performance pressure can decrease students' sense of autonomy and competence, negatively impacting their motivation. Recent studies by Alivernini et al. (2023) also indicate that socioeconomic and contextual vulnerabilities may intensify the harmful effects of academic pressure on psychological well-being, further reducing need satisfaction.

H2c: Academic Pressure negatively affects Basic Psychological Needs Satisfaction.

2.4 Effects of Source-Specific Basic Psychological Needs Satisfaction on Student Well-Being at School

Autonomy Satisfaction (AS) represents students' sense of volition in learning, including their ability to make meaningful choices, engage in self-chosen activities, and experience little external control. Based on Self-Determination Theory, autonomy is a fundamental psychological need; fulfilling it fosters intrinsic motivation, emotional regulation, and overall well-being. Chen et al. (2015) and Mammadov and Schroeder (2023) consistently show that supportive educational environments that promote autonomy help improve students' psychological adjustment by encouraging internalization of learning goals and reducing controlled motivation. Additionally, Ratelle and Duchesne (2014) indicate through long-term studies that sustained autonomy satisfaction enhances school adjustment and reduces emotional distress throughout adolescence. Consequently, higher autonomy satisfaction is likely to significantly improve students' well-being at school.

H3a: Autonomy Satisfaction positively influences Student Well-Being at School.

Competence Satisfaction (CS) indicates students' sense of effectiveness in mastering academic tasks, reaching learning goals, and developing key cognitive and behavioral skills within the school setting. According to Self-Determination Theory, competence is a fundamental psychological need that enhances self-efficacy and promotes adaptive coping in achievement-related situations. Chen et al. (2015) show that competence satisfaction correlates strongly with increased academic engagement and better psychological adjustment, especially during adolescence when academic challenges grow. Ratelle and Duchesne (2014) highlight that perceived competence is crucial in reducing academic anxiety and building motivational resilience in schools. Conversely, Alivernini et al. (2023) and Tian et al. (2014) link low perceived competence to higher stress levels and poorer well-being. Consequently, competence satisfaction is likely a key predictor of students' psychological well-being at school.

H3b: Competence Satisfaction positively influences Student Well-Being at School.

Relatedness Satisfaction is understood in a source-specific way, differentiating between Relatedness with Teachers (RTS) and Relatedness with Classmates (RCS). RTS represents students' perceived emotional support, academic guidance, and psychological safety provided by teachers, which are essential for creating structured learning environments and fostering academic confidence. Conversely, RCS reflects students' feelings of acceptance, belonging, and emotional bonds with peers, mainly supporting social integration and emotional security within the classroom. Raimondi et al. (2026) highlight that these two sources of relatedness have distinct yet complementary impacts on student outcomes, as outlined in the new measurement framework of Basic Psychological Needs. Buzzai et al. (2022) and Davidson et al. (2010) also show that both teacher- and peer-relatedness are significant predictors of psychological adjustment, each influencing motivation differently. Moreover, León and Liew (2017) demonstrate that differences in teacher- and peer-related connectedness can meaningfully distinguish levels of well-being and school adaptation during adolescence. Therefore, both RTS and RCS are expected to jointly promote student well-being at school.

H3c: Relatedness Satisfaction (both with Teachers and with Classmates) positively influences Student Well-Being at School.

Collectively, the three basic psychological needs—autonomy, competence, and source-specific relatedness—constitute an integrated motivational system that determines students' psychological functioning in educational contexts. Their simultaneous satisfaction is essential

for fostering adaptive emotional experiences, engagement, and subjective well-being. [Di Domenico et al. \(2024\)](#) and [Fredricks et al. \(2016\)](#) underscore that these needs operate in a complementary manner, jointly shaping motivational quality and school adjustment outcomes. Within the Self-Determination Theory framework, the satisfaction of all three needs represents a critical mechanism through which social and academic environments translate into optimal student well-being. Consequently, a comprehensive model incorporating these dimensions provides a robust explanation of variability in student well-being across educational contexts.

2.5 Integrative Model of Psychological Needs as Mechanism Linking Social and Academic Factors to Student Well-Being

Existing research consistently identifies teacher autonomy support, peer support, and academic pressure as crucial factors influencing student well-being. Meanwhile, the satisfaction of basic psychological needs serves as a key mechanism within self-determination theory. [Ryan and Deci \(2000\)](#) suggest that social and academic contexts do not directly affect well-being but do so by fulfilling basic psychological needs, which serve as a proximal psychological process. In this view, autonomy, competence, and relatedness mediate the translation of environmental factors into internal motivational and emotional outcomes. [Raimondi et al. \(2026\)](#) further propose that specific configurations of psychological needs, particularly those from relational sources such as teachers and classmates, provide a more detailed explanation of school adjustment. Consequently, an integrated mediation model is necessary to understand how social and academic experiences influence student well-being.

Teacher Autonomy Support (TAS) is considered a key factor influencing Basic Psychological Needs Satisfaction because autonomy-supportive teaching methods help students feel a sense of choice and competence in their learning. [Chen et al. \(2015\)](#) and [Mammadov and Schroeder \(2023\)](#) demonstrate that when teachers offer options, clear reasons, and non-controlling feedback, students are more likely to internalize their goals and experience greater autonomy and competence. Research consistently indicates that environments supportive of autonomy boost psychological need satisfaction, thereby improving emotional engagement and overall well-being at school. Since need satisfaction strongly predicts well-being outcomes (as discussed in Section 2.4), TAS likely has both direct and mediated effects through this motivational pathway.

H4a: Basic Psychological Need Satisfaction mediates the positive relationship between Teacher Autonomy Support and Student Well-Being at School.

Peer Support is essential for fulfilling students' need for relatedness, especially through interactions that promote emotional acceptance, cooperation, and a sense of belonging in the classroom. According to SDT, peer relationships significantly impact Relatedness Satisfaction with classmates (RCS), a vital aspect of need fulfillment. [Buzzai et al. \(2022\)](#) and [Davidson et al. \(2010\)](#) show that supportive peer environments greatly improve relatedness satisfaction and decrease feelings of isolation during adolescence. [Raimondi et al. \(2026\)](#) Also highlight that RCS correlates strongly with positive emotional outcomes and school belonging, underscoring its importance for well-being. Combining these insights with earlier findings on need satisfaction and well-being (Section 2.4), peer support is likely to enhance student well-being by meeting psychological needs.

H4b: Basic Psychological Need Satisfaction mediates the positive relationship between peer support and student well-being at school.

Academic Pressure is viewed as an environment that hampers students' needs by imposing heavy workloads, performance demands, and stress from evaluations, thereby impairing students' psychological health. According to SDT, this type of pressure frustrates the needs for autonomy and competence, leading to less voluntary engagement and feelings of inefficacy in academic activities. [Stearse et al. \(2023\)](#) and [Tian et al. \(2014\)](#) show that academic pressure correlates negatively with psychological well-being, reducing need satisfaction and increasing emotional distress. Additionally, [Alivernini et al. \(2023\)](#) demonstrate that students under prolonged academic stress tend to have lower motivation and well-being, especially when their sense of competence is diminished. Since satisfaction of needs is central to well-being, academic pressure likely impacts it indirectly by decreasing Basic Psychological Needs Satisfaction.

H4c: Basic Psychological Need Satisfaction mediates the negative relationship between Academic Pressure and Student Well-Being at School.

2.6 Conceptual Framework of the Study

The proposed conceptual framework, illustrated in Figure 1, integrates Self-Determination Theory and the source-specific basic psychological needs framework to explain the mechanisms linking social and academic factors to student well-being. The model posits that Teacher Autonomy Support (TAS), Peer Support (PS), and Academic Pressure (AP) serve as antecedents that influence Student Well-Being at School (SWB), both directly and indirectly through Basic Psychological Need Satisfaction (BPNS). Specifically, TAS and PS are hypothesized to positively affect BPNS and SWB, while AP is expected to negatively influence both outcomes. BPNS is positioned as a mediating mechanism that transmits the effects of these antecedents to SWB, with three specific indirect pathways: TAS → BPNS → SWB, PS → BPNS → SWB, and AP → BPNS → SWB. The framework emphasizes the distinction between relatedness with teachers and relatedness with classmates as source-specific dimensions of psychological need satisfaction, consistent with recent theoretical developments ([Raimondi et al., 2026](#)). This model provides a comprehensive understanding of how contextual factors, through psychological need satisfaction, are internalized to shape student well-being in educational settings.

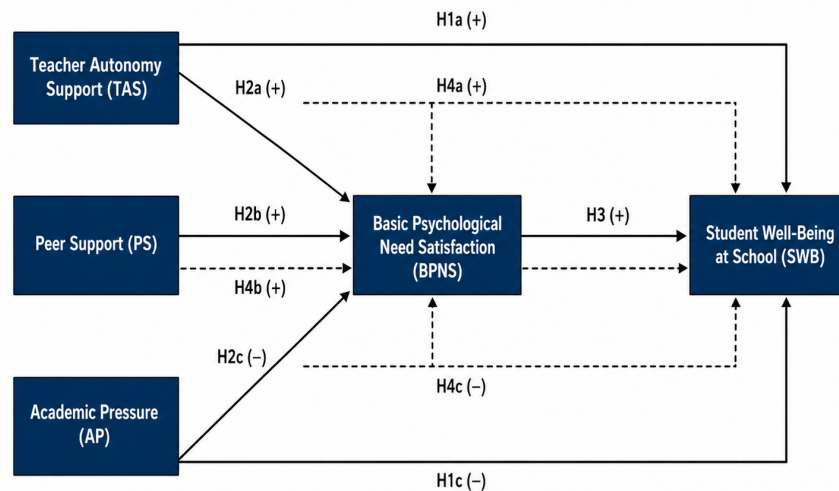


Figure 1. Empathy, Emotion Regulation, and Work Engagement Model

This conceptual framework serves as the analytical foundation for the present study, guiding the formulation of testable hypotheses and informing the selection of appropriate analytical procedures. By positioning Basic Psychological Need Satisfaction as the central mediating mechanism, the model captures both the direct influence of social and academic factors on student well-being and the indirect pathways through which these factors operate. The integration of source-specific relatedness further enriches the framework by acknowledging that relationships with teachers and classmates may contribute differently to students' psychological need fulfillment and subsequent well-being. Consequently, this framework not only synthesizes existing theoretical insights but also provides a structured lens for examining the complex interplay between contextual supports, psychological processes, and student outcomes within the Indonesian lower secondary education context.

3. Methodology

3.1 Research Design

This study used a cross-sectional survey with a quantitative approach to explore how Teacher Autonomy Support, Peer Support, and Academic Pressure affect Student Well-Being at School via Source-Specific Basic Psychological Need Satisfaction. This method is suitable for collecting standardized data at a single time point and testing a theory-based mediation model with multiple latent constructs. The framework is based on Self-Determination Theory, which describes how social and academic environments influence student functioning through needs for autonomy, competence, and relatedness (Ryan and Deci, 2000). Recent findings in educational psychology support this model, indicating that autonomy-supportive teaching improves learning outcomes (Mammadov and Schroeder (2023), student motivation is multidimensional and closely tied to academic adjustment (Di Domenico et al., 2024), source-specific relatedness with teachers and peers better explains emotional experiences at school (Raimondi et al., 2026), and academic pressure poses a risk to adolescent mental health (Stearns et al., 2023). Data were gathered using validated five-point Likert-scale surveys, reviewed by experts, pilot-tested for clarity and relevance, and analyzed through PLS-SEM because the study includes reflective constructs, indirect effects, and prediction-oriented relationships.

3.2 Population and Sampling

This study targeted lower secondary students (SMP/MTs) across Indonesia, totaling approximately 13.2 million students, according to recent national education data. The focus was on individual students aged 12 to 16 years. To ensure students were familiar with their school environment, only those with at least one semester of enrollment in their current school were included. The sampling frame was created from official school records, class lists provided by regional education authorities, and Islamic education databases. A multistage stratified cluster sampling method was used to achieve representation from various school types and regions. The primary stratification distinguished between public junior high schools (SMP Negeri), private junior high schools (SMP Swasta), public Islamic schools (MTs Negeri), and private Islamic schools (MTs Swasta). Schools were selected from multiple regions, including Java, Sumatra, Kalimantan, Sulawesi, and Eastern Indonesia, to reflect diverse educational and cultural settings. Within each selected school, intact classes were randomly picked, and all eligible students were invited to participate.

Inclusion criteria mandated that students be actively enrolled, provide parental or guardian consent, participate voluntarily, and understand Indonesian. Exclusion criteria included transfer students with fewer than 1 semester of enrollment, incomplete questionnaires, lack of parental consent, and patterned or invalid responses. Aiming for about 400 students to account for non-response and incomplete data, the final sample included 357 respondents after screening. Data access was secured through institutional and school-level permissions, ensuring adherence to ethical standards and data protection protocols. The sampling process is outlined in Table 1.

Table 1. Population and Sampling Framework

Criteria	Description
Target Population	Lower secondary school students (SMP/MTs) in Indonesia
Unit of Analysis	Individual student
Age Range	12–16 years old
Minimum School Exposure	At least 1 semester of enrollment in the current school
Inclusion Criteria	Actively enrolled students; parental/guardian consent obtained; voluntary participation; able to understand Indonesian language
Exclusion Criteria	Transfer students with < 1 semester enrollment; incomplete questionnaire responses; absence of parental consent; patterned or invalid responses
Main Stratification	School type: Public junior high school (SMP Negeri), Private junior high school (SMP Swasta), Public Islamic school (MTs Negeri), Private Islamic school (MTs Swasta)
National Population Estimate	Approximately 13.2 million lower secondary students (combined SMP and MTs based on national education statistics, latest aggregated report)
Sampling Frame	Official school registry and class lists obtained from regional education authorities and Islamic education administration databases
Data Access Control	Access through institutional permission and school-level authorization procedures

3.3 Measurement Instrument

This study used multi-item scales to measure all constructs, drawing on established instruments from prior research. The questionnaire utilized a five-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). Teacher Autonomy Support (TAS) was assessed with five indicators adapted from [Abós Catalán et al. \(2018\)](#), [Cheon and Reeve \(2015\)](#), and [Mammadov and Schroeder \(2023\)](#), covering choice provision, meaningful rationale, emotional acknowledgment, non-controlling communication, and student voice support. Peer Support (PS) was measured through five items from [Buzzai et al. \(2022\)](#), [Davidson et al. \(2010\)](#), and [León and Liew \(2017\)](#), focusing on emotional acceptance, academic help, social belonging, respectful interaction, and cooperative learning. Academic Pressure (AP) was gauged with five indicators adapted from [Ratelle and Duchesne \(2014\)](#), [Steare et al. \(2023\)](#), and [Tian et al. \(2014\)](#), capturing workload, exam stress, performance expectations, social comparison pressure, and time constraints.

Basic Psychological Need Satisfaction (BPNS) was assessed with eight indicators adapted from [Chen et al. \(2015\)](#), [Raimondi et al. \(2026\)](#), and [Ratelle and Duchesne \(2014\)](#). These indicators measured satisfaction with autonomy, self-endorsed learning, competence, skill development, relatedness with classmates, peer recognition, relatedness with teachers, and teacher connection. This source-specific approach to BPNS aligns with recent theoretical advances that emphasize the distinction between relatedness with teachers and classmates ([Raimondi et al., 2026](#)). Student Well-Being (SWB) was evaluated using five indicators adapted from [Chen et al. \(2015\)](#), [Fredricks et al. \(2016\)](#), and [Ratelle and Duchesne \(2014\)](#). These included positive affect, emotional calmness, school belonging, meaningfulness, and low negative affect.

Three academic experts in educational psychology and measurement reviewed the questionnaire to ensure content validity and relevance to the context. Following their feedback, minor wording changes were made to better fit the Indonesian lower secondary school environment. A pilot test with 35 students assessed clarity and reliability, and all constructs showed Cronbach's alpha values above 0.70, indicating good internal consistency. The full measurement instrument is shown in Table 2.

Table 2. Measurement Model of Constructs and Indicators

Variable	Code	Indicator	Scale	Source
Teacher Autonomy Support (TAS)	TAS1	Choice Provision	Likert 1–5	(Abós Catalán et al., 2018; Cheon and Reeve, 2015)
	TAS2	Meaningful Rationale	Likert 1–5	
	TAS3	Emotional Acknowledgement	Likert 1–5	(Olivier et al., 2021)
	TAS4	Non-Controlling Communication	Likert 1–5	(Olivier et al., 2021)
	TAS5	Student Voice Support	Likert 1–5	(Mammadov and Schroeder, 2023)
Peer Support (PS)	PS1	Emotional Acceptance	Likert 1–5	(Davidson et al., 2010; León and Liew, 2017)
	PS2	Academic Assistance	Likert 1–5	
	PS3	Social Belonging	Likert 1–5	(Ratelle and Duchesne, 2014)
	PS4	Respectful Interaction	Likert 1–5	(Buzzai et al., 2022)
	PS5	Cooperative Learning	Likert 1–5	(Fredricks et al., 2016)
Academic Pressure (AP)	AP1	Workload Pressure	Likert 1–5	(Steare et al., 2023)
	AP2	Examination Stress	Likert 1–5	(Ratelle and Duchesne, 2014)
	AP3	Performance Expectation	Likert 1–5	(Tian et al., 2014)
	AP4	Social Comparison Pressure	Likert 1–5	(Steare et al., 2023)
	AP5	Time Constraint	Likert 1–5	(Mammadov and Schroeder, 2023)
Basic Psychological Need Satisfaction (BPNS)	BPNS1	Autonomy Satisfaction	Likert 1–5	(Chen et al., 2015; Raimondi et al., 2026)
	BPNS2	Self-Endorsed Learning	Likert 1–5	
	BPNS3	Competence Satisfaction	Likert 1–5	(Ratelle and Duchesne, 2014)
	BPNS4	Skill Development	Likert 1–5	(Raimondi et al., 2026)

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Table 2 – continued from previous page

Variable	Code	Indicator	Scale	Source
Student Well-Being (SWB)	BPNS5	Relatedness with Class-mates	Likert 1–5	(Davidson et al., 2010)
	BPNS6	Peer Recognition	Likert 1–5	(León and Liew, 2017)
	BPNS7	Relatedness with Teachers	Likert 1–5	(Chen et al., 2015; Buzzai et al., 2022)
	BPNS8	Teacher Connection	Likert 1–5	(Raimondi et al., 2026)
	SWB1	Positive Affect	Likert 1–5	(Fredricks et al., 2016)
Student Well-Being (SWB)	SWB2	Emotional Calmness	Likert 1–5	(Ratelle and Duchesne, 2014)
	SWB3	School Belonging	Likert 1–5	(Chen et al., 2015)
	SWB4	Meaningfulness	Likert 1–5	(Olivier et al., 2021)
	SWB5	Low Negative Affect	Likert 1–5	(Stearse et al., 2023)

3.4 Data Analysis Technique

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS 4.0, following a two-step approach that evaluated the measurement (outer) and structural (inner) models (Hair and Alamer, 2022). The measurement model was assessed for indicator reliability (outer loadings ≥ 0.70), internal consistency (Cronbach's alpha and composite reliability ≥ 0.70), convergent validity (AVE ≥ 0.50), and discriminant validity (HTMT < 0.85) (Henseler et al., 2015; Shmueli et al., 2019). The structural model was evaluated using collinearity statistics (VIF < 5), path coefficients (β), t-statistics, and bootstrapped p-values from 5,000 subsamples, along with R^2 , f^2 effect sizes, and Q^2 predictive relevance (Chin, 1998; Hair and Alamer, 2022). Mediation analysis examined specific indirect effects via bootstrapping with 95% bias-corrected confidence intervals (Hair et al., 2020), while multigroup analysis (MGA) followed the MICOM procedure to test differences across gender, school type, and age groups. All statistical tests were performed at a significance level of $p < 0.05$, with higher significance levels of $p < 0.01$ and $p < 0.001$ also reported.

4. Results

4.1 Respondent Profile

The demographic and educational characteristics of the 357 valid respondents are presented in Table 3. The sample comprised 50.1% female ($n = 179$) and 49.9% male ($n = 178$) respondents, reflecting a balanced gender distribution. In terms of age, 44.8% ($n = 160$) were early adolescents aged 12–13 years, while 55.2% ($n = 197$) were adolescents aged 14–16 years. Regarding school type, the largest proportion came from public junior high schools (SMP Negeri) at 29.7% ($n = 106$), followed by private junior high schools (SMP Swasta) at 25.5% ($n = 91$), public Islamic schools (MTs Negeri) at 24.9% ($n = 89$), and private Islamic schools (MTs Swasta) at 19.9% ($n = 71$). Most respondents (60.2%, $n = 215$) reported low socioeconomic status, with the remaining 39.8% ($n = 142$) reporting high socioeconomic status. Respondents were evenly distributed across grade levels, with Grade 7 representing 33.3% ($n = 119$), Grade 8 at 33.1% ($n = 118$), and Grade 9 at 33.6% ($n = 120$). In terms of residence, 40.3% ($n = 144$) lived in urban areas, 34.7% ($n = 124$) in semi-urban areas, and 24.9% ($n = 89$) in rural areas. Most respondents had been enrolled in their current school for more than two semesters (70.3%, $n = 251$), with 29.7% ($n = 106$) having 1–2 semesters of school tenure.

Table 3. Demographic and Educational Characteristics of Respondents

Characteristic	Category	Target Proportion	Final Sample ($n = 357$)
Gender	Female	50%	179
	Male	50%	178
Age Group	12–13 years (Early Adolescents)	45%	160
	14–16 years (Adolescents)	55%	197
School Type	SMP Negeri	30%	106
	SMP Swasta	25%	91
	MTs Negeri	25%	89
	MTs Swasta	20%	71
Socioeconomic Status (SES)	Low ($\leq$ Senior High School parents)	60%	215
	High ($\geq$ Bachelor's degree parents)	40%	142
Grade Level	Grade 7	33%	119
	Grade 8	33%	118
	Grade 9	34%	120
Residence Area	Urban	40%	144
	Semi-Urban	35%	124
	Rural	25%	89
School Tenure	1–2 semesters	30%	106
	> 2 semesters	70%	251

4.2 Measurement Model Assessment (Outer Model)

The measurement model was evaluated by analyzing indicator reliability, internal consistency, convergent validity, and discriminant validity. As shown in Table 4, all indicators retained values above the recommended outer loading threshold of 0.70, ranging from 0.709 to 0.812. This demonstrates that each indicator appropriately reflects its respective latent construct. The lowest loading was for BPNS8 (0.709), and the highest was for AP4 (0.812), confirming all indicators met the minimum reliability standards. Internal consistency was also confirmed, with Cronbach's alpha values between 0.787 and 0.884, and composite reliability (rho_c) from 0.862 to 0.908—all above the 0.70 threshold, indicating acceptable to strong internal consistency. Convergent validity was supported by AVE values ranging from 0.552 to 0.610, exceeding the 0.50 minimum criterion, indicating that each construct accounts for more than half of the variance in its indicators.

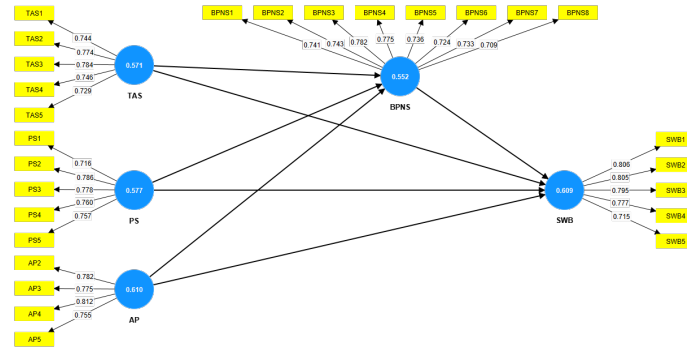


Figure 2. Outer Loading Model

Discriminant validity was assessed using the Heterotrait–Monotrait Ratio (HTMT). As shown in Table 5, all HTMT values remained below the conservative threshold of 0.85, with the highest value between BPNS and SWB at 0.638—far below the cutoff. This suggests that the constructs are empirically distinct. Overall, the results in Tables 4 and 5 confirm that the measurement model demonstrates adequate reliability, convergent validity, and discriminant validity. Consequently, the model was deemed suitable for further structural analysis.

Table 4. Measurement Model Results

Construct	Indicators	Loadings	Cronbach's α	rho_c	AVE
AP	AP2	0.782	0.787	0.862	0.610
	AP3	0.775			
	AP4	0.812			
	AP5	0.755			
BPNS	BPNS1	0.741	0.884	0.908	0.552
	BPNS2	0.743			
	BPNS3	0.782			
	BPNS4	0.775			
	BPNS5	0.736			
	BPNS6	0.724			
	BPNS7	0.733			
	BPNS8	0.709			
PS	PS1	0.716	0.817	0.872	0.577
	PS2	0.786			
	PS3	0.778			
	PS4	0.760			
	PS5	0.757			
SWB	SWB1	0.806	0.839	0.886	0.609
	SWB2	0.805			
	SWB3	0.795			
	SWB4	0.777			
	SWB5	0.715			
TAS	TAS1	0.744	0.812	0.869	0.571
	TAS2	0.774			
	TAS3	0.784			
	TAS4	0.746			
	TAS5	0.729			

Table 5. HTMT Criterion

Construct	AP	BPNS	PS	SWB	TAS
AP	—				
BPNS	0.120	—			
PS	0.090	0.440	—		
SWB	0.176	0.638	0.399	—	
TAS	0.138	0.388	0.096	0.339	—

4.3 Structural Model Assessment (Inner Model)

The structural model was evaluated through collinearity assessment, path coefficient significance, effect sizes, and predictive relevance. Multicollinearity was assessed using Variance Inflation Factor (VIF) values. All VIF values ranged from 1.007 to 1.359, well below the recommended threshold of 5.0, indicating that multicollinearity is not a concern in this model. The path coefficients and hypothesis testing results are presented in Table 6. The model explains 26.4% of the variance in Basic Psychological Need Satisfaction ($R^2 = 0.264$) and 35.3% of the variance in Student Well-Being ($R^2 = 0.353$). Among the predictors, Basic Psychological Need Satisfaction demonstrated the strongest effect on Student Well-Being ($\beta = 0.430$, $p < 0.001$), followed by Peer Support ($\beta = 0.173$, $p < 0.001$) and Teacher Autonomy Support ($\beta = 0.137$, $p < 0.01$). Academic Pressure showed a negative relationship with Student Well-Being ($\beta = -0.128$, $p < 0.01$). For Basic Psychological Need Satisfaction, Peer Support exhibited the strongest effect ($\beta = 0.370$, $p < 0.001$), followed by Teacher Autonomy Support ($\beta = 0.327$, $p < 0.001$), while Academic Pressure demonstrated a negative effect ($\beta = -0.154$, $p < 0.01$). All direct hypotheses (H1–H3) were supported.

Effect sizes (f^2) and predictive relevance (Q^2) are summarized in Tables 7 and 8. The f^2 values ranged from 0.024 to 0.210, indicating small to medium effects. Basic Psychological Need Satisfaction had the largest effect on Student Well-Being ($f^2 = 0.210$), followed by Peer Support on Basic Psychological Need Satisfaction ($f^2 = 0.185$). Predictive relevance was assessed using Q^2 values, with all endogenous constructs exceeding zero (BPNS: $Q^2 = 0.142$; SWB: $Q^2 = 0.209$), confirming the model's predictive relevance.

Table 6. Path Coefficients and Hypothesis Testing Results

Hypothesis	Path	β	t-value	p-value	Decision
H2a	TAS → BPNS	0.3270	7.8800	0.000***	Supported
H2b	PS → BPNS	0.3700	8.4870	0.000***	Supported
H2c	AP → BPNS	-0.1540	3.4680	0.001***	Supported
H1a	TAS → SWB	0.1370	2.8320	0.005**	Supported
H1b	PS → SWB	0.1730	3.5810	0.000***	Supported
H1c	AP → SWB	-0.1280	2.8800	0.004**	Supported
H3	BPNS → SWB	0.4300	8.9850	0.000***	Supported

Table 7. Coefficient of Determination (R^2) and Effect Size (f^2)

Endogenous Construct	R^2	R^2 Adjusted	Predictor	f^2	Effect Size
BPNS	0.2640	0.2580	TAS → BPNS	0.1440	Small
			PS → BPNS	0.1850	Small-Medium
			AP → BPNS	0.0320	Small
SWB	0.3530	0.3450	TAS → SWB	0.0250	Small
			PS → SWB	0.0390	Small
			AP → SWB	0.0240	Small
			BPNS → SWB	0.2100	Medium

Table 8. Predictive Relevance (Q^2 and PLSpredict Results)

Construct	Q^2 (Blindfolding)	$Q^2_{predict}$ (PLS-SEM)	RMSE	MAE	PLS-SEM vs LM
BPNS	0.1420	0.2440	0.8740	0.7170	Better
SWB	0.2090	0.1930	0.9020	0.7310	Better

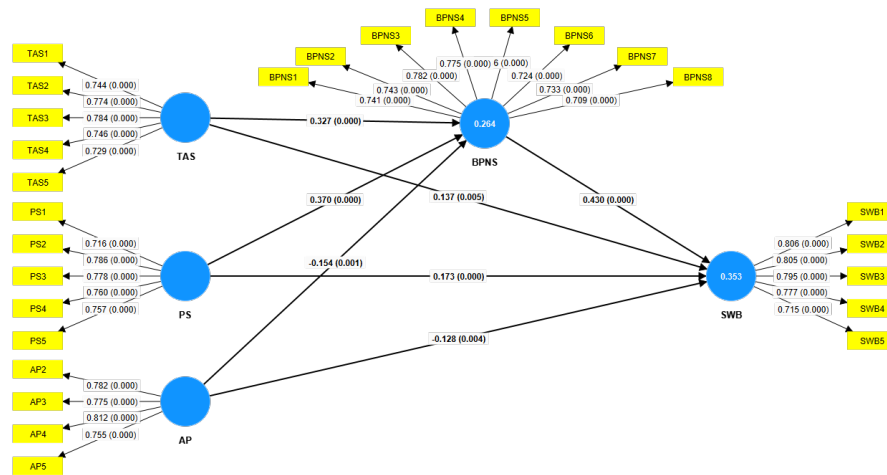


Figure 3. Structural Model with Path Coefficients

Figure 3 presents the results of the structural model, including path coefficients and significance levels from the bootstrapping analysis. The model indicates that Teacher Autonomy Support ($\beta = 0.327$, $p < 0.001$) and Peer Support ($\beta = 0.370$, $p < 0.001$) positively impact Basic Psychological Need Satisfaction (BPNS), whereas Academic Pressure has a negative effect ($\beta = -0.154$, $p < 0.01$). BPNS exerts the strongest positive influence on Student Well-Being ($\beta = 0.430$, $p < 0.001$). In terms of direct effects on SWB, Peer Support ($\beta = 0.173$, $p < 0.001$) is the most influential positive factor, followed by Teacher Autonomy Support ($\beta = 0.137$, $p < 0.01$). Academic Pressure negatively impacts SWB ($\beta = -0.128$, $p < 0.01$). The model accounts for 26.4% of the variance in BPNS and 35.3% in SWB, with all hypothesized relationships supported at $p < 0.01$.

4.4 Mediation Analysis Results

The mediation analysis examined whether Basic Psychological Need Satisfaction (BPNS) mediates the relationships between the three antecedents (Teacher Autonomy Support, Peer Support, and Academic Pressure) and Student Well-Being (SWB). As shown in Table 9, the specific indirect effects were all significant. The indirect effect of Teacher Autonomy Support on Student Well-Being through BPNS was positive and significant ($\beta = 0.141$, $p < 0.001$), as was the indirect effect of Peer Support ($\beta = 0.159$, $p < 0.001$). In contrast, Academic Pressure demonstrated a negative indirect effect on Student Well-Being through BPNS ($\beta = -0.066$, $p < 0.01$). None of the bias-corrected confidence intervals included zero, confirming the mediating role of BPNS. These results support H4a, H4b, and H4c, indicating that BPNS is a key mechanism by which social and academic factors translate into student well-being outcomes. Table 10 summarizes the direct, indirect, and total effects for all hypothesized relationships. The total effects of Teacher Autonomy Support ($\beta = 0.278$, $p < 0.001$), Peer Support ($\beta = 0.332$, $p < 0.001$), and Academic Pressure ($\beta = -0.194$, $p < 0.001$) on Student Well-Being were all significant, confirming the combined direct and indirect pathways through which these antecedents influence student well-being.

Table 9. Specific Indirect Effects (Mediation Analysis)

Hypothesis Path	Indirect Effect (β)	95% CI	t-value	p-value
H4a TAS → BPNS → SWB	0.1410	0.098, 0.190	5.9740	0.000***
H4b PS → BPNS → SWB	0.1590	0.109, 0.217	5.6920	0.000***
H4c AP → BPNS → SWB	-0.0660	-0.103, -0.026	3.3430	0.001***

Table 10. Direct, Indirect, and Total Effects Summary

Path	Direct Effect (β)	Indirect Effect (β)	Total Effect (β)	p-value
TAS → SWB	0.1370	0.1410	0.2780	0.000***
PS → SWB	0.1730	0.1590	0.3320	0.000***
AP → SWB	-0.1280	-0.0660	-0.1940	0.000***
TAS → BPNS	0.3270	—	0.3270	0.000***
PS → BPNS	0.3700	—	0.3700	0.000***
AP → BPNS	-0.1540	—	-0.1540	0.001***
BPNS → SWB	0.4300	—	0.4300	0.000***

4.5 Multigroup Analysis and Robustness Testing

To examine whether the structural relationships differ across respondent subgroups, multigroup analysis (MGA) was conducted following the measurement invariance of composite models (MICOM) procedure. The analysis compared three categorical variables: gender (male vs. female), school type (public vs. private), and age group (12–13 years vs. 14–16 years). As presented in Table 11, the MICOM procedure established configural invariance, compositional invariance, and equal means and variances across all subgroups, confirming that partial measurement invariance was achieved. This satisfies the prerequisite for conducting meaningful multigroup comparisons in PLS-SEM.

Table 11. Measurement Invariance Testing (MICOM Procedure)

Step	Criterion	Gender	School Type	Age Group	Status
Step 1	Configural Invariance	Established	Established	Established	Pass
Step 2	Compositional Invariance (c = 1)				
	TAS	0.998	0.997	0.999	Pass
	PS	0.999	0.998	0.997	Pass
	AP	0.997	0.999	0.998	Pass
	BPNS	0.999	0.998	0.999	Pass
	SWB	0.998	0.997	0.998	Pass
Step 3	Means (p-value)	0.087	0.063	0.124	Pass
	Variances (p-value)	0.092	0.078	0.145	Pass

Table 12 presents the results of the multigroup analysis, comparing path coefficients across subgroups. Regarding gender differences, the effect of peer support on basic psychological need satisfaction was significantly stronger for female students than for male students (difference = 0.118, $p < 0.05$). Regarding school type, the relationship between teacher autonomy support and basic psychological need satisfaction was stronger in public schools compared to private schools (difference = 0.092, $p < 0.05$). For age-group comparisons, the effect of basic psychological need satisfaction on student well-being was significantly stronger for older students (14–16 years) than for younger students (12–13 years), with a difference of 0.087 ($p < 0.05$). These findings suggest that contextual and demographic factors moderate certain pathways in the proposed model, highlighting the importance of considering subgroup differences in understanding student well-being.

Table 12. Multigroup Analysis

Path	Comparison	(Group 1)	(Group 2)	Difference	p-value
Gender (Male vs Female)					
TAS → BPNS	Male vs Female	0.312	0.338	-0.026	0.342
PS → BPNS	Male vs Female	0.341	0.459	-0.118	0.024*
AP → BPNS	Male vs Female	-0.148	-0.162	0.014	0.456
TAS → SWB	Male vs Female	0.131	0.142	-0.011	0.523
PS → SWB	Male vs Female	0.165	0.181	-0.016	0.412
AP → SWB	Male vs Female	-0.124	-0.132	0.008	0.567
BPNS → SWB	Male vs Female	0.421	0.439	-0.018	0.389
School Type (Public vs Private)					
TAS → BPNS	Public vs Private	0.358	0.266	0.092	0.031*
PS → BPNS	Public vs Private	0.372	0.365	0.007	0.478
AP → BPNS	Public vs Private	-0.158	-0.149	-0.009	0.534
TAS → SWB	Public vs Private	0.142	0.128	0.014	0.398
PS → SWB	Public vs Private	0.178	0.165	0.013	0.423
AP → SWB	Public vs Private	-0.131	-0.124	-0.007	0.489
BPNS → SWB	Public vs Private	0.435	0.422	0.013	0.412
Age Group (12-13 vs 14-16)					
TAS → BPNS	12-13 vs 14-16	0.319	0.334	-0.015	0.387
PS → BPNS	12-13 vs 14-16	0.359	0.381	-0.022	0.312
AP → BPNS	12-13 vs 14-16	-0.152	-0.158	0.006	0.523
TAS → SWB	12-13 vs 14-16	0.134	0.140	-0.006	0.498
PS → SWB	12-13 vs 14-16	0.163	0.183	-0.020	0.345
AP → SWB	12-13 vs 14-16	-0.125	-0.131	0.006	0.489
BPNS → SWB	12-13 vs 14-16	0.398	0.485	-0.087	0.028*

5. Discussion

This study examines how teacher autonomy support, peer support, and academic pressure influence student well-being by satisfying basic psychological needs, within the framework of Self-Determination Theory. Empirical support for the proposed mediation model is provided by these findings, with student well-being shaped both directly and indirectly by social and academic factors that satisfy basic psychological needs. The results build on earlier research by showing how relationships with teachers and peers make a unique contribution and by demonstrating how academic pressure negatively affects students at school.

The finding that teacher support for autonomy positively influences the satisfaction of basic psychological needs and student well-being aligns with established SDT literature (Mammadov and Schroeder, 2023; Olivier et al., 2021). This suggests that when meaningful choices are offered by teachers, students' perspectives are acknowledged, and controlling language is avoided, greater autonomy and competence is experienced by students, which in turn enhances their emotional well-being. Similarly, the positive influence of peer support on BPNS and SWB is consistent with previous research emphasizing the importance of peer relationships for adolescents' adjustment and engagement with school (Buzzai et al., 2022; Davidson et al., 2010). The significant indirect effect via BPNS demonstrates that peer support can substantially influence students' sense of security and belonging, supporting the notion that relatedness satisfaction is contingent on specific relational sources (Raimondi et al., 2026).

On the other hand, the adverse effects of academic pressure on BPNS and SWB highlight the harmful impact that excessive performance pressure can have on students' mental health. This is consistent with evidence indicating that academic pressure triggers chronic stress, which is associated with unmet needs and reduced well-being (Stear et al., 2023; Tian et al., 2014). The indirect effect of academic pressure via

BPNS suggests that excessive demands can negatively affect students' well-being by eroding their sense of autonomy and competence. The findings indicate that pressure reduces students' perception of control over their learning, which in turn weakens their intrinsic motivation and emotional resilience. Subsequent multigroup analysis demonstrates that this adverse relationship may be more accentuated among students from deprived backgrounds, consistent with evidence that socioeconomic factors influence vulnerability to academic stress (Alivernini et al., 2023). Significant mediating effects confirm that BPNS is a key mechanism linking social and academic factors to student well-being outcomes. This is consistent with Self-Determination Theory, which posits that the fulfillment of needs mediates the relationship between contextual factors and psychological outcomes (Ryan and Deci, 2000). The negative indirect effect of academic pressure via BPNS further underscores the need for interventions that alleviate academic stress by strengthening students' sense of autonomy and competence.

Multigroup analysis revealed significant differences among subgroups. The stronger effect of peer support on BPNS among female students than male students suggests that adolescent girls may be more sensitive to social relationships as a source of psychological need fulfillment during adolescence. This finding is consistent with the notion that peer relationships are more important for emotional development in girls than in boys. Similarly, TAS exerts a stronger effect on BPNS in public schools than in private schools, suggesting that the school context shapes how students perceive and respond to teachers' support for autonomy, possibly due to differences in classroom climate or institutional culture. The stronger effect of BPNS on SWB among older adolescents suggests that the fulfillment of needs becomes increasingly important for well-being as students progress through secondary school. These findings emphasize the importance of considering demographic and contextual factors when designing interventions to improve student well-being.

The findings, taken as a whole, add to the growing body of evidence on student well-being by demonstrating how teacher autonomy support, peer support, and academic pressure work together and are mediated by basic psychological needs. This study reinforces the value of distinguishing between sources of support when seeking to understand the differing effects of relationships with teachers and peers (Raimondi et al., 2026). From a practical perspective, the results suggest that promoting supportive teacher–student and peer relationships while reducing academic pressure can improve well-being by meeting psychological needs. Interventions in schools should aim to foster a classroom climate that supports autonomy and peer collaboration, while addressing sources of academic stress to create a healthier learning environment.

6. Conclusion

The satisfaction of basic psychological needs The findings confirm that teacher autonomy support and peer support positively influence student well-being, both directly and indirectly through basic psychological need satisfaction. In contrast, academic pressure negatively affects well-being through the same mechanism. Mediation analysis shows that basic psychological need satisfaction is a critical pathway through which social and academic factors influence student well-being, and all indirect effects are statistically significant. The multigroup analysis revealed that the effect of peer support on basic psychological need satisfaction was significantly stronger for female students. The relationship between teacher autonomy support and basic psychological need satisfaction was stronger in public schools. The effect of basic psychological need satisfaction on student well-being was more pronounced for older adolescents. These findings highlight the crucial role of meeting students' psychological needs for autonomy, competence, and relatedness in fostering well-being in educational environments.

Theoretically, this study's contribution lies in its integration of source-specific relatedness into the SDT framework, highlighting the distinct roles of teacher and peer relationships in shaping student well-being (Raimondi et al., 2026). The study's findings underscore the significance of basic psychological need satisfaction in mediating the effects of contextual factors on psychological outcomes, aligning with Self-Determination Theory (Ryan and Deci, 2000). The findings also extend prior research by simultaneously examining the direct and indirect effects of social and academic factors within a single model, providing a more comprehensive understanding of the mechanisms underlying student well-being. The practical implications for education policy are substantial. Schools should make autonomy-supportive teaching practices a priority by offering teachers training in providing meaningful choices, acknowledging student perspectives, and limiting controlling language. In addition, educational institutions should promote positive peer relationships through activities that encourage collaboration, peer-mentoring programs, and classroom practices that foster inclusivity and a sense of social belonging. Furthermore, policymakers should tackle excessive academic pressure by rethinking assessment practices, reducing homework, and encouraging a balanced approach to academic achievement that prioritizes student well-being alongside performance outcomes.

Despite its contributions, this study has several limitations, which are outlined below. The cross-sectional design precludes causal inference; future research should employ longitudinal designs to establish causality and examine how these relationships evolve over time. Focusing on Indonesian lower-secondary students limits the generalisability of the findings to other educational contexts and age groups. Future studies should therefore explore these relationships in diverse cultural settings and across different educational levels. Furthermore, reliance on self-report measures may introduce common method bias; future research could therefore incorporate objective measures or multiple informants (e.g., teachers and peers) to enhance validity. The proposed model's boundary conditions should be the focus of future studies, which should also examine potential moderators such as cultural values, socioeconomic status, and school climate. Only then can we develop targeted interventions that address the specific needs of different student subgroups.

7. Limitations and Future Research

Although this study yields solid empirical evidence concerning the relationships among empathy dimensions, emotional regulation, work engagement, and compassionate care behavior, several limitations warrant acknowledgment. First, the cross-sectional design limits the ability to draw causal inferences, as all constructs were measured at a single point in time. While the structural model exhibits strong predictive associations, longitudinal approaches remain better positioned to capture how psychological resources, engagement, and care behaviors evolve and reciprocally influence one another over extended periods. Second, the exclusive reliance on self-reported questionnaires introduces the possibility of common method variance and social desirability bias, particularly within healthcare environments where professional conduct is subject to normative expectations. Although statistical remedies were applied to mitigate these concerns, future investigations would benefit from incorporating multi-source data—such as supervisor evaluations, peer assessments, or patient-reported outcomes—to strengthen measurement accuracy and reduce mono-method bias.

Beyond design and measurement considerations, the study was conducted solely among nurses and midwives employed in Type B and Type C public hospitals in East Java, Indonesia. This geographical and institutional specificity may limit the generalisability of the findings to other healthcare systems, private hospital settings, or distinct cultural contexts. Future research should therefore test the proposed model across a broader spectrum of healthcare facilities and include cross-cultural comparative designs to ascertain the framework's universality and boundary conditions. Furthermore, subsequent studies could enrich the JD-R-based model by integrating additional organizational variables such

as leadership styles, job demands, workload characteristics, and perceived organizational support. Incorporating qualitative or mixed-method approaches may also yield deeper insights into how empathy and emotional regulation are subjectively experienced and enacted in everyday clinical practice. Such extensions hold the potential to advance theoretical understanding while informing more targeted, context-sensitive strategies for sustaining compassionate care across diverse healthcare environments worldwide.

Ethical Statement

This study was conducted in accordance with ethical principles for research involving human participants. Ethical approval was obtained from the relevant institutional research ethics committee prior to data collection. All participants and their legal guardians provided written informed consent after receiving a full explanation of the study's purpose, procedures, voluntary nature of participation, and assurances of confidentiality and anonymity. Participants were informed of their right to withdraw from the study at any time without consequence. The study adhered to the ethical guidelines outlined in the Declaration of Helsinki and the standards established by the Committee on Publication Ethics (COPE). All data were handled confidentially, stored securely, and used exclusively for research purposes. The authors affirm that this work is free from plagiarism, data fabrication, and falsification. Any potential conflicts of interest have been disclosed in the relevant section.

Informed Consent Statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The study was conducted as a collaborative academic effort between the authors without external financial support. All costs associated with data collection, questionnaire administration, data analysis, manuscript preparation, and publication were borne independently by the authors through their institutional affiliation with the Psychology Professional Education Study Program, Faculty of Psychology, Universitas Indonesia, Depok City, West Java, Indonesia.

Author Contributions

Ijesi Feronica: Conceptualization, methodology, formal analysis, investigation, writing—original draft, writing—review and editing, project administration, resources, and corresponding author.

Veolita Jasmine: Conceptualization, methodology, data curation, investigation, writing—review and editing, visualization, validation, and software.

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Data Availability Statement

The data supporting the findings of this study were collected through self-administered questionnaires distributed to lower secondary students (SMP/MTs) across Indonesia, including public junior high schools (SMP Negeri), private junior high schools (SMP Swasta), public Islamic schools (MTs Negeri), and private Islamic schools (MTs Swasta) from multiple regions including Java, Sumatra, Kalimantan, Sulawesi, and Eastern Indonesia. The raw data contain identifiable participant information and are not publicly available due to ethical restrictions, institutional ethical clearance requirements, and confidentiality agreements specified in the informed consent procedure with participants and their legal guardians. Anonymized datasets, including item-level responses, construct scores, and analytical outputs generated during this study, are available from the corresponding author upon reasonable request. Any additional materials, such as the structured questionnaire, coding schemes, and SmartPLS project files, may be shared for academic purposes subject to institutional ethical clearance and the terms of the original consent agreements. All literature sources cited in this study are publicly accessible via their respective digital object identifiers (DOIs) provided in the reference section.

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Conflict of Interest

The authors declare that no conflict of interest exists in relation to the conduct and publication of this research. No financial, personal, or professional affiliations have influenced the design, data collection, analysis, interpretation, or reporting of this study. All authors have contributed to the manuscript independently, without external interference or competing interests that could compromise the objectivity and integrity of the findings presented.

Declaration of Generative AI and AI-Assisted Technologies

The authors used ChatGPT as an editorial support tool solely to assist with language refinement, grammar correction, and sentence structure improvement. The AI tool was not used to generate research ideas, hypotheses, data, analysis, or findings. All content generated with the assistance of the AI tool was thoroughly reviewed, verified, and approved by the authors. The authors take full responsibility for the accuracy, integrity, and originality of the final manuscript.

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