

# Autistic Traits and Psychological Regulation: A Conceptual Review of Pathways to Self-Directed Learning Preferences Among Boarding School Students

Mariam Zahiah Tazali<sup>1</sup>, Mohd Syazwan Zainal<sup>1\*</sup>

<sup>1</sup> Faculty of Education, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia.

\*Corresponding Author: [syazwanzainal@ukm.edu.my](mailto:syazwanzainal@ukm.edu.my)

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**Abstract:** *Self-directed learning (SDL) has become a central pedagogical expectation in secondary and post-secondary education, particularly within boarding school contexts that emphasise independence, self-management and autonomous learning routines. However, students with elevated autistic traits often encounter persistent challenges in engaging with self-directed learning environments, despite demonstrating adequate cognitive ability and academic potential. In boarding schools, difficulties in independent learning are frequently interpreted as low motivation, poor discipline or lack of effort, resulting in interventions that prioritise compliance and behavioural monitoring rather than the underlying regulatory processes shaping learning preferences. This paper is conceptual and does not report primary data. Drawing on contemporary literature related to autistic traits, psychological regulation and learning autonomy, this conceptual review synthesises evidence to examine how autistic traits influence students' preferences for self-directed learning through the mediating role of psychological regulation. Evidence across five interrelated strands which (a) autistic traits in non-clinical student populations, (b) psychological regulation demands in boarding school environments, (c) self-directed learning characteristics and expectations, (d) institutional and contextual influences in residential schooling and (e) psychological regulation as a mediating mechanism suggests that difficulties with emotional, cognitive and behavioural regulation significantly constrain students' readiness to engage in self-directed learning. Across studies, psychological dysregulation manifested through heightened stress, anxiety, cognitive overload and reduced self-management capacity emerges as a key mechanism shaping students' learning preferences. Rather than reflecting an aversion to autonomy, lower preference for self-directed learning among students with autistic traits may represent adaptive responses to regulatory demands that exceed individual coping thresholds. Building on this synthesis, the paper proposes an integrated conceptual framework positioning psychological regulation as a central pathway linking autistic traits to self-directed learning preferences in boarding school contexts. This reframing highlights the need for learning environments that align autonomy expectations with students' regulatory capacities to support sustainable, inclusive and self-directed learning outcomes.*

**Keywords:** Autistic Traits, Psychological Regulation, Self-Directed Learning, Boarding School Students, Learning Preferences, Inclusive Education

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## 1. Introduction

Self-directed learning (SDL) is widely recognised as a core competence underpinning academic success and lifelong learning, particularly within educational systems that prioritise learner autonomy, independent task management and sustained self-regulation. In residential schooling contexts, these expectations are intensified, as students must organise time, sustain study routines and regulate motivation and affect beyond structured instructional hours. Conceptually, SDL has been framed both as a dispositional orientation toward initiating learning through goal setting, strategic resource use and self-evaluation as a measurable learner attribute associated with academic performance and persistence (Lounsbury et al., 2009). Crucially, however, the capacity to enact SDL extends beyond willingness or perseverance alone; it depends fundamentally on regulatory processes that enable learners to manage cognitive load, emotional demands and behavioural constraints during sustained independent learning.

Within this framework, autistic traits provide an important neurodevelopmental lens through which variability in SDL preferences among boarding school students may be understood. Rather than being confined to clinical populations, autistic traits are dimensionally distributed across student cohorts and may shape how learners respond to autonomy demands, environmental structure and fluctuating task expectations. Emerging classroom-based evidence indicates that autism-related characteristics are meaningfully associated with patterns of engagement and self-regulatory functioning even outside diagnostic groups. For instance, self-regulation has been linked to academic learning and school engagement among children with ASD, with differences corresponding to the level of autism-related characteristics (Chen & Jahromi, 2025). Such findings suggest that autistic traits may influence not only observable learning behaviours but also students' preferences for learning arrangements that reduce regulatory strain and enhance predictability.

Psychological regulation therefore emerges as a central explanatory mechanism linking autistic traits to SDL preferences in high-demand educational settings. Self-regulation encompasses the cognitive, motivational, affective and behavioural processes through which learners manage tasks and adapt to contextual demands (Byrd et al., 2020) and longstanding educational research has identified strategies such as self-monitoring, goal setting, self-instruction and self-reinforcement as critical supports for sustaining attention and adaptive learning behaviours (Harris et al., 2004). Within autism-related contexts, the effectiveness of these processes is strongly shaped by teacher practices and environmental scaffolding, which can either mitigate or exacerbate regulatory challenges in everyday routines (Veerasingam, 2024). Residential schooling may further intensify these demands through extended institutional schedules, reduced immediate adult guidance and continuous peer interaction, suggesting that students' SDL preferences may represent adaptive responses to regulatory load rather than diminished motivation. This interpretation is supported by inclusive pedagogy and intervention research demonstrating that strengthening self-regulatory processes can reduce behavioural challenges and improve school functioning among students with ASD (Scribner & Tracy-Bronson, 2024; Wan Yunus et al., 2021; Agran et al., 2010).

Taken together, these insights position psychological regulation as a plausible mediating pathway through which autistic traits shape SDL preferences in boarding school environments, reframing lower engagement in independent learning not as a deficit in discipline but as a predictable response to sustained regulatory demands (Agran & Wehmeyer, 2006; Byrd et al.,

2020; Chen & Jahromi, 2025; Veerasamy, 2024). To advance this perspective, the present conceptual paper synthesises contemporary scholarship to examine self-directed learning preferences among boarding school students through an integrated framework. The review is structured around five thematic strands: (a) autistic traits within non-clinical student populations, (b) psychological regulation demands in residential schooling, (c) characteristics and expectations of self-directed learning, (d) institutional and contextual influences shaping boarding school environments and (e) psychological regulation as a mediating mechanism linking learner characteristics to educational practices.

## **2. Thematic Synthesis of Autistic Traits, Psychological Regulation and Self-Directed Learning**

This conceptual paper adopts a thematic synthesis approach to integrate literature related to autistic traits, psychological regulation and self-directed learning (SDL) within boarding school contexts. Rather than employing a formal systematic review protocol, the synthesis draws on recent empirical and theoretical studies in educational psychology, special education and learning sciences, supported by foundational work on SDL and regulation. The literature was organised into five interrelated thematic strands: (a) autistic traits in non-clinical student populations, (b) psychological regulation demands in boarding school environments, (c) self-directed learning characteristics and expectations, (d) institutional and contextual influences in residential schooling and (e) psychological regulation as a mediating mechanism. Evidence across these strands was analysed interpretively to examine how individual traits and contextual demands interact to shape students' learning preferences, thereby supporting conceptual integration across previously disconnected research areas.

Across the literature, autistic traits are consistently associated with challenges in psychological regulation, particularly in emotion regulation, executive functioning and social cognition. Individuals with elevated autistic traits often demonstrate difficulties in managing emotional responses, increasing vulnerability to anxiety, depression and heightened affective reactivity to daily stressors (Cai et al., 2023; Ilen et al., 2024; Nagase, 2025; Sönmez & Jordan, 2025). These challenges are compounded by executive function limitations, including reduced cognitive flexibility and inhibitory control, which impair adaptive self-regulation and intensify emotional dysregulation (Conner et al., 2023; Monteiro, 2022). In social contexts, deficits in affective empathy and interpersonal emotion regulation further contribute to emotional distress and reduced social self-efficacy, reinforcing the link between autistic traits and compromised psychological well-being (Liu et al., 2024).

Within educational contexts, SDL and self-regulated learning (SRL) function as key mechanisms through which psychological regulation capacities are translated into effective learning behaviours. Personality traits such as neuroticism and extraversion significantly influence SDL orientations, with emotion regulation serving as a mediating mechanism shaping goal setting, planning, monitoring and motivational persistence (Liu et al., 2024; Hasim et al., 2025). Core SRL processes including self-control, metacognitive regulation and motivational regulation are consistently linked to academic achievement, learning persistence and feedback literacy (Parveen et al., 2023; Zhu et al., 2016; Džinović et al., 2018; Chen et al., 2025). The synthesis further highlights that educational, clinical and technology-mediated interventions supporting emotion regulation, executive functioning and self-regulatory learning skills yield positive outcomes for autistic individuals across developmental stages (Hendry et al., 2025; Ingersoll et al., 2016; Nefdt et al., 2010; Matharaarachchi et al., 2023),

while teacher competence in managing self-regulatory behaviours is crucial for fostering emotionally supportive learning environments (Ma et al., 2023; Veerasamy, 2024).

Collectively, these findings position psychological regulation as a central mediating mechanism linking autistic traits and SDL, rather than conceptualising learning difficulties as isolated cognitive or behavioural deficits. Given the fragmentation of existing research across psychological, educational and clinical perspectives, a thematic synthesis was undertaken to consolidate converging evidence on how autistic traits interact with psychological regulation and learning processes. Table 1 presents a structured overview of the dominant thematic domains, highlighting key mechanisms and their empirical support.

**Table 1: Summary of Thematic Synthesis**

Domain	Key Thematic Insights	Supporting Studies
Emotion Regulation	Autistic traits linked to emotional dysregulation, anxiety, depression and stress reactivity	Cai et al. (2023); Ilen et al. (2024); Nagase (2025); Sönmez & Jordan (2025)
Executive Function	Cognitive flexibility and inhibitory control shape emotional and behavioural regulation	Conner et al. (2023); Monteiro (2022)
Social Cognition	Interpersonal emotion regulation and social self-efficacy mediate mental health outcomes	Liu et al. (2024)
SDL & Personality	Neuroticism undermines SDL; extraversion supports SDL orientations	Liu et al. (2024); Hasim et al. (2025)
Self-Regulated Learning	Goal-setting, self-control and metacognition predict academic success	Parveen et al. (2023); Zhu et al. (2016); Džinović et al. (2018)
Feedback Literacy	SRL capacities support effective feedback engagement	Chen et al. (2025)
Educational Interventions	SDL and SRL interventions improve learning and behavioural outcomes	Nefdt et al. (2010); Ingersoll et al. (2016); Matharaarachchi et al. (2023)
Teacher Support	Teacher competence shapes regulation-sensitive learning environments	Veerasamy (2024); Ma et al. (2023)
Clinical Interventions	Emotion regulation training reduces emotional and behavioural difficulties	Clifford et al. (2022); Cai et al. (2023)

As illustrated in Table 1, the reviewed literature converges on psychological regulation as a central mechanism linking autistic traits to learning-related outcomes. Across domains of emotion regulation, executive function and social cognition, difficulties in regulating affective and cognitive processes consistently emerge as precursors to heightened emotional vulnerability and reduced adaptive functioning. Importantly, these regulatory challenges extend beyond mental health outcomes to shape students' engagement with self-directed and self-regulated learning demands.

## 2.1 Autistic Traits and Learning-Related Functioning in Boarding School Students

Autistic traits influence learning-related functioning among boarding school students through interacting interpersonal, regulatory and environmental pathways. Although the cited studies were conducted in non-boarding contexts, their relevance is heightened in residential schooling where demands for self-management, peer interaction and adaptation to structured routines are

intensified. Evidence indicates that autistic traits affect school adjustment partly through social processes, as difficulties in peer relationships can limit engagement and learning opportunities (Lu et al., 2024; Nenniger, 2022). In contrast, supportive student–teacher relationships serve as a protective factor, strengthening behavioural engagement and classroom participation (Blacher et al., 2014; Losh et al., 2022). Psychological regulation further mediates these effects, as challenges in emotion regulation and executive functioning can constrain task initiation and persistence despite adequate ability (Lu et al., 2024; Wittwer, 2022). Contextual conditions also play a role, with supportive physical and social environments reducing anxiety and enhancing motivation, while poor indoor environmental quality may exacerbate distress and disrupt learning behaviour (Lebenhagen & Dynia, 2024; Al Qutub et al., 2024).

For students with autistic traits to succeed, the school environment must support their specific needs. This involves two key areas. First, teachers who understand autism and can use flexible teaching strategies are essential for helping students learn and participate (McDougal et al., 2020; Perrelet et al., 2025). Second, feeling a true sense of belonging is vital for emotional health. If students feel they must hide their autistic traits to "fit in," it can cause anxiety, meaning social acceptance must be authentic, not forced (Atkinson et al., 2025). In short, the best way to support these students in a boarding school is to create an environment with predictable routines, safe relationships, sensory-friendly spaces and well-trained teachers (Hugo & Hedegaard, 2021).

To further contextualise how autistic traits and psychological regulation manifest within boarding school environments, the reviewed literature was synthesised to identify school-based factors that shape learning-related functioning. This synthesis highlights not only individual-level characteristics but also relational, environmental and institutional conditions that influence students’ capacity to engage with autonomous learning demands. Table 2 presents a thematic mapping of key factor domains, the mechanisms through which they operate and their implications for learning and adjustment in boarding school contexts.

**Table 2: School-Based Factors Influencing Learning-Related Functioning Among Students with Autistic Traits in Boarding School Contexts**

<b>Factor Domain</b>	<b>What the Evidence Suggests</b>	<b>Likely Mechanism for Learning-Related Functioning</b>	<b>Boarding School–Relevant Implication</b>	<b>Key Sources</b>
Social skills & peer relationships	Students with higher autistic traits may experience peer interaction and friendship difficulties	Reduced peer support and fewer learning interactions; weaker adjustment	Structured peer-support, guided social participation, anti-isolation routines	Lu et al., 2024; Nenniger, 2022
Student–teacher relationship (STR)	High-quality STR supports behavioural engagement and classroom success	Relational safety and co-regulation increase readiness to engage	Stable mentor/housemaster–student support; relational consistency across day	Blacher et al., 2014; Losh et al., 2022
Emotion regulation	Emotion regulation difficulties can undermine adjustment and learning	Heightened stress/anxiety reduces task persistence and coping	Embed emotion-regulation supports into routines and academic mentoring	Lu et al., 2024; Wittwer, 2022

<b>Factor Domain</b>	<b>What the Evidence Suggests</b>	<b>Likely Mechanism for Learning-Related Functioning</b>	<b>Boarding School–Relevant Implication</b>	<b>Key Sources</b>
Executive function & learning prerequisites	Challenges in working memory, cognitive strategies, self-management	Difficulty initiating tasks, sustaining attention, organising learning	Scaffolded study routines, explicit strategy teaching, stepwise independence	Wittwer, 2022
School motivation & psychosocial climate	Motivation improves in supportive, understanding environments	Reduced anxiety and increased perceived safety enhance engagement	Strengthen inclusive culture among peers; reduce punitive interpretations	Lebenhagen & Dynia, 2024; McDougal et al., 2020
School belonging, camouflaging & anxiety	Belonging relates to anxiety; camouflaging may increase anxiety	Masking increases emotional load despite apparent adjustment	Promote authentic acceptance; monitor hidden distress	Atkinson et al., 2025
Physical environment & sensory/IEQ	Environmental quality (lighting, acoustics, etc.) affects behaviour	Sensory overload increases dysregulation and disrupts learning	Sensory-aware dorm/classroom design; quiet zones; environmental audits	Al Qutub et al., 2024
Inclusive education targets & partnerships	Supports often focus on varied targets; need coordinated approaches	Better alignment of supports increases participation outcomes	Multi-stakeholder support system (teachers, wardens, counsellors, families)	Perrelet et al., 2025
Inclusive schooling experiences	Inclusive environments can support participation when aligned with needs	Fit between autonomy demands and support predicts adjustment	Balance independence expectations with structured supports	Hugo & Hedegaard, 2021

Importantly, the patterns presented in Table 2 suggest that reduced engagement with self-directed learning in boarding schools may reflect regulatory overload rather than low motivation or resistance to autonomy. Factors such as emotional masking, sensory overload and executive functioning demands can increase internal cognitive and affective load, even when students appear behaviourally compliant. This highlights the risk of misinterpreting self-directed learning difficulties through purely behavioural or disciplinary lenses.

## **2.2 Psychological Regulation Demands in Boarding School Contexts**

Boarding school environments impose distinct psychological regulation demands on adolescents due to heightened expectations for independence, emotional control and adaptation to institutional routines. One central challenge arises from the tension between parental psychological control and adolescents' developmental need for autonomy. Evidence shows that excessive parental psychological control can frustrate autonomy needs and undermine psychological well-being among boarding school adolescents (Manindjo et al., 2023). This tension is particularly salient in residential settings, where physical separation from parents coincides with continued psychological influence, creating internal conflicts that require

advanced self-regulatory capacities to manage autonomy development alongside perceived parental expectations.

Emotional regulation represents a second major demand within boarding school contexts, as students must manage academic pressure, social integration and prolonged separation from home in highly structured environments. Difficulties in emotional regulation may manifest as emotional outbursts, posing risks to classroom functioning and student safety if unaddressed (Yeich & Pathak, 2025). Sleep regulation further compounds these challenges, as disrupted sleep routines and excessive technology use are associated with increased psychological distress. Empirical evidence indicates that boarding students who maintain consistent sleep routines and healthier sleep hygiene report better psychological well-being, highlighting the interdependence of emotional regulation and biological rhythms in supporting resilience (Reardon et al., 2023).

Psychological regulation in boarding schools is also shaped by transitional, cultural and institutional influences. Students who interpret the transition to boarding school as an opportunity rather than a threat demonstrate greater psychological preparedness and well-being (Mander & Lester, 2019). Institutional culture intersects with students' cultural identities, influencing conformity, belonging and resilience (Kyei, 2025), while emotion regulation strategies themselves are culturally informed and tend to expand with age and developmental maturity (Rao & Gibson, 2019). Collectively, these findings indicate that psychological regulation in boarding school contexts reflects a complex interaction of autonomy negotiation, emotional and biological demands and sociocultural conditions operating across both academic and residential domains. Table 3 outlines the primary psychological regulation demands characteristic of boarding school environments and their implications for students' regulatory functioning.

**Table 3: Psychological Regulation Demands in Boarding School Context**

Psychological Demand	Description	Impact on Students' Psychological Regulation	Key Sources
Parental control vs. autonomy	Ongoing parental psychological control alongside expectations for independence	Autonomy frustration and reduced psychological well-being	Manindjo et al., 2023
Emotional regulation	Managing stress, frustration and emotional outbursts in school settings	Disruptions to learning and safety if regulation is weak	Yeich & Pathak, 2025
Sleep hygiene	Adaptation to residential routines and technology exposure	Poor sleep linked to higher psychological distress	Reardon et al., 2023
Transition readiness	Adjustment to new expectations and environments	Positive appraisal enhances psychological readiness	Mander & Lester, 2019
Cultural and institutional influences	Interaction between school routines and cultural identity	Resilience and sense of belonging support regulation	Kyei, 2025
Emotion regulation strategies	Developmental and cultural variation in regulation approaches	Older students show more complex adaptive strategies	Rao & Gibson, 2019

As shown in Table 3, psychological regulation demands in boarding schools are multifaceted and cumulative, requiring students to simultaneously manage autonomy expectations, emotional responses, biological routines and sociocultural adjustment. When regulatory

capacities are insufficient to meet these demands, students may experience heightened psychological distress, reduced well-being and compromised readiness for independent learning and adaptation.

### 2.3 Self-Directed Learning Preferences and Regulatory Capacity

Self-directed learning (SDL) refers to learners’ capacity to initiate, plan, monitor and evaluate their own learning processes. Although commonly associated with autonomy, flexibility and intrinsic motivation, SDL also imposes substantial demands on psychological regulation, including emotional control, cognitive flexibility, sustained attention and self-monitoring (Aljafari, 2021; Bin Abdulrahman, 2025; Lukac & Lukac, 2025). Learners with stronger regulatory capacities may experience SDL as empowering and aligned with personal goals, whereas those with regulatory vulnerabilities may find SDL overwhelming, particularly when expectations are implicit and external support is limited. For students with elevated autistic traits, preferences for more structured or guided learning may therefore reflect regulatory self-protection rather than low self-efficacy, avoidance or lack of motivation.

Regulatory capacity underpins effective engagement in SDL by supporting self-monitoring, self-evaluation, time management and strategic adjustment of learning behaviours in response to task demands (Jiang et al., 2025; Yamada et al., 2017; Seban & Urban, 2024). Learners with well-developed regulatory skills are better able to manage cognitive load, persist through challenges and adapt strategies when difficulties arise, whereas limited regulatory capacity can constrain autonomous learning even when attitudes toward SDL are positive. Empirical evidence further indicates that regulatory capacity is shaped by both individual factors, such as self-efficacy and prior learning experience and contextual supports, including teacher guidance and feedback (Miao & Shi, 2024; Sava et al., 2020).

The alignment between SDL demands and learners’ regulatory capacity has important implications for learning outcomes and educational design. Strong congruence between autonomy preferences and regulatory skills is associated with improved academic performance, deeper learning and sustained motivation (Seban & Urban, 2024; Parveen et al., 2023). Conversely, when autonomy demands exceed learners’ regulatory capacity, difficulties such as procrastination, disorientation and ineffective strategy use may emerge, particularly in less structured learning environments (Ruttan & Nordgren, 2016; Broadbent & Fuller-Tyszkiewicz, 2018). Research suggests that instructional scaffolding, intentional course design and the strategic use of digital learning tools can strengthen regulatory capacity and support more effective engagement in SDL (Li et al., 2023; Jouhari et al., 2015; Silva et al., 2024). Taken together, these findings underscore that SDL is not solely a matter of learner preference or instructional design, but is fundamentally contingent on psychological regulation—especially for students with elevated autistic traits whose engagement depends on the alignment between autonomy demands and available regulatory support. To clarify this relationship, Table 4 synthesises key dimensions of self-directed learning preferences and maps their functional role in relation to students’ regulatory capacity.

**Table 4: Relationship Between Self-Directed Learning Preferences and Regulatory Capacity**

Dimension	Description	Role in Self-Directed Learning	Key Sources
SDL autonomy	Learner control over goals, methods and pacing	Increases motivation and ownership of learning	Aljafari, 2021; Bin Abdulrahman, 2025

Dimension	Description	Role in Self-Directed Learning	Key Sources
Flexibility	Individualised learning paths and schedules	Supports engagement aligned with personal needs	Lukac & Lukac, 2025
Self-monitoring	Ongoing evaluation of understanding and performance	Enables adjustment of strategies	Jiang et al., 2025; Miao & Shi, 2024
Self-evaluation	Reflection on learning outcomes	Promotes continuous improvement	Jiang et al., 2025; Seban & Urban, 2024
Time management	Planning and organisation of learning activities	Prevents procrastination and overload	Yamada et al., 2017; Papamitsiou & Economides, 2019
Instructional support	Teacher guidance and course structure	Strengthens regulatory capacity for SDL	Sava et al., 2020; Jouhari et al., 2015
Technological tools	Digital platforms and learning analytics	Facilitate monitoring and flexible learning	Li et al., 2023; Papamitsiou & Economides, 2019

## 2.4 Psychological Regulation as a Mediating Mechanism

Across the literature, psychological regulation consistently emerges as a central mechanism linking autistic traits to self-directed learning (SDL) preferences. Emotional dysregulation, cognitive overload and heightened stress responses can constrain students' capacity to initiate, organise and sustain independent learning, thereby shaping preferences toward more structured or externally guided learning formats. Importantly, psychological regulation operates in dynamic interaction with institutional expectations and learning environments. Contexts that provide predictability, emotional scaffolding and graduated autonomy can enhance regulatory capacity and support more positive engagement with SDL, whereas environments that emphasise independence without adequate regulatory support may intensify disengagement. Conceptualising psychological regulation as a mediating process offers a coherent explanation for variability in SDL preferences among students with autistic traits and provides a foundation for inclusive pedagogical design that aligns autonomy with regulation.

Psychological regulation, particularly emotion regulation, functions as a core process through which individuals manage internal responses to environmental and psychological demands, shaping well-being and adaptive functioning. Emotion regulation encompasses both explicit strategies, such as cognitive reappraisal and expressive suppression and implicit processes that operate automatically outside conscious awareness. Empirical evidence shows that adaptive regulation strategies, including planning and positive reappraisal, are associated with higher psychological well-being, self-esteem and optimism, especially during developmentally sensitive periods such as emerging adulthood (Padun, 2019; Marroquín et al., 2017; Sanchez-Sanchez et al., 2025). At the same time, the effectiveness of regulation strategies varies across cultural and contextual settings, underscoring emotion regulation as a dynamic and situationally embedded process rather than a uniform individual skill.

Beyond its direct effects, emotion regulation plays a well-established mediating role in linking personal characteristics and contextual influences to psychological outcomes. Research demonstrates that self-esteem, optimism, resilience and insight frequently mediate the relationship between regulation strategies and psychological well-being across developmental stages, family contexts and educational settings (Sanchez-Sanchez et al., 2025; Shi & Gao,

2025; Ciofu et al., 2024; Aydoğdu et al., 2024; Kılıç et al., 2024; Prokhorov et al., 2024). Collectively, this body of evidence positions psychological regulation as a cross-contextual intermediary mechanism through which emotional, cognitive and environmental inputs are translated into behavioural and psychological outcomes, reinforcing its central role in intervention and educational design (Susino, 2025). Table 5 summarises representative studies that conceptualise psychological regulation as a mediating mechanism across multiple contexts.

**Table 5: Psychological Regulation as a Mediating Mechanism Across Contexts**

Context	Predictor Variables	Mediating Role of Psychological Regulation	Outcome Variables	Key Sources
Emerging adulthood	Emotion regulation strategies	Self-esteem and optimism mediate effects	Psychological well-being	Sanchez-Sanchez et al., 2025
Learning and adaptation	Cognitive reappraisal, suppression	Resilience as partial mediator	Well-being and adjustment	Shi & Gao, 2025
Personality functioning	Emotional regulation capacity	Insight as mediator	Psychological well-being	Ciofu et al., 2024
Early childhood	Social-emotional well-being	Emotion regulation mediates resilience	Behavioural problems	Aydoğdu et al., 2024
Parenting context	Parenting practices	Child emotion regulation/dysregulation	Child well-being	Kılıç et al., 2024
Educational settings	Mental self-regulation	Regulation mediates psychological states	Learning efficiency, stress	Prokhorov et al., 2024

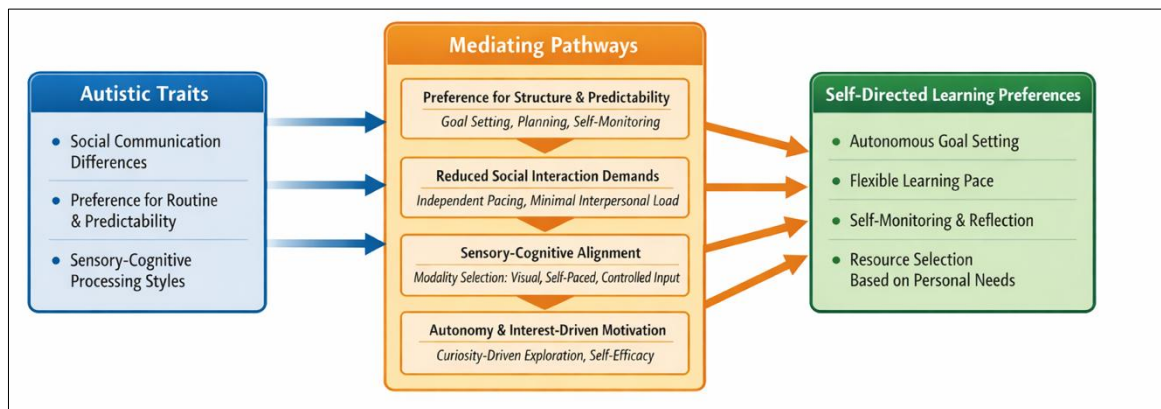
Importantly, the cross-contextual patterns summarised in Table 5 lend theoretical support to conceptualising psychological regulation as a central pathway linking learner characteristics and contextual demands to self-directed learning preferences. In structured environments such as boarding schools, where autonomy expectations are high and support is distributed across multiple systems, regulatory capacity may determine whether students experience autonomy as empowering or overwhelming.

### 3. Conceptual Integration: Pathways from Autistic Traits to Self-Directed Learning Preferences

Drawing on a synthesis of neurocognitive, behavioural and educational literature, this paper proposes an integrated conceptual framework to explain how autistic traits shape preferences for self-directed learning (SDL). Autistic traits, which are distributed along a continuum within the general population, are associated with distinct social, cognitive and sensory profiles that influence how individuals engage with learning environments (Yaxu et al., 2020; Young et al., 2015; Romero-Martínez et al., 2016). Empirical evidence indicates that individuals with elevated autistic traits tend to prefer predictability, routine and reduced social demands, while experiencing challenges in interpersonal communication and social reciprocity, rendering highly social and teacher-directed instructional formats less optimal for this group (Zhao et al., 2019; Jin et al., 2022).

Accordingly, the integrated conceptual model presented in Figure 1 positions autistic traits as antecedent characteristics influencing SDL preferences through interrelated pathways,

whereby preferences for structure and routine function as cognitive-behavioural drivers aligned with SDL processes such as goal setting, planning and self-monitoring (Nuri & Marsigit, 2019; Parkes, 2022), reduced social interaction demands operate as a contextual affordance enabling autonomous and self-paced engagement (Aljafari, 2021; Pemberton & Cooker, 2012) and sensory perceptual processing differences further reinforce SDL preferences by allowing learners to select materials and modalities that match individual sensory profiles, including visual formats and controlled sensory input (Warren et al., 2025; Chen et al., 2022; Otermans et al., 2025).



**Figure 1: Integrated Conceptual Model of Pathways from Autistic Traits to Self-Directed Learning Preferences**

The model illustrates how autistic traits encompassing social communication differences, preference for structure and sensory cognitive processing styles influence self-directed learning preferences through reduced social interaction demands, enhanced autonomy and alignment with individual learning modalities. SDL is conceptualised as an adaptive learning preference that supports engagement and motivation when learning environments accommodate neurodiverse profiles. Crucially, the model conceptualises SDL not merely as an instructional choice but as an adaptive learning preference emerging from the interaction between autistic traits and learning demands. Autonomy-supportive SDL environments allow learners to pursue curiosity-driven exploration and personal interests, which may enhance engagement and motivation among individuals with higher autistic traits (Poli et al., 2024; Leong et al., 2019). Moreover, SDL frameworks that emphasise learner control and self-efficacy may mitigate anxiety and enhance learning satisfaction regardless of autistic trait levels (Bignold & Budd, 2024). By situating SDL preferences as context-sensitive adaptations rather than deficits, the proposed model integrates neurodevelopmental diversity into contemporary learning theory and provides a coherent framework for designing inclusive, autonomy-supportive learning environments.

#### 4. Discussion and Implications

This conceptual synthesis advances understanding of self-directed learning (SDL) preferences among students with elevated autistic traits by reframing learning preferences as context-sensitive regulatory adaptations rather than fixed individual dispositions. Rather than attributing SDL preferences solely to learner motivation or instructional design, the proposed framework conceptualises learning preferences as emerging from the interaction between autistic traits and students' psychological regulation capacities within structured residential school environments. Autistic traits related to social communication differences, preference for predictability and sensory-cognitive processing styles shape how students respond to

heightened academic, social and self-management demands, particularly in boarding school contexts where autonomy and routine expectations are intensified.

Across the integrated strands of literature, psychological regulation emerges as a central mechanism linking autistic traits to SDL preferences. In socially intensive and highly structured learning environments, students with elevated autistic traits may experience increased emotional and cognitive regulatory demands, making SDL behaviours—such as self-paced learning, autonomous goal setting and independent resource selection—adaptive strategies for reducing regulatory load and sustaining engagement. This perspective challenges deficit-oriented interpretations that frame independent learning as avoidance or disengagement and instead positions SDL as a functional regulatory response that supports psychological equilibrium and learning continuity under high-demand educational conditions.

#### **4.1 Directions for Future Research**

Future research is needed to empirically examine the conceptual pathways proposed in this model, particularly the mediating role of psychological regulation between autistic traits and SDL preferences. While existing studies have documented associations between autistic traits, emotion regulation and learning behaviours, few have explicitly tested mediation models within residential or boarding school contexts. Quantitative studies employing structural equation modelling or longitudinal designs would be particularly valuable in examining how regulatory capacities shape the stability or variability of SDL preferences over time.

Further research should also incorporate multidimensional measures of SDL that extend beyond behavioural indicators to include emotional and cognitive components of learning regulation. Mixed-methods approaches may provide deeper insight into students' lived experiences of autonomy, regulation and learning preference formation, thereby enhancing the ecological validity of SDL research among neurodiverse populations. Comparative studies across educational settings may further clarify how institutional structure moderates the relationship between autistic traits and SDL preferences.

#### **4.2 Implications for Educational Practice and Research**

The conceptual perspective advanced in this paper has important implications for educational practice, particularly in boarding school and residential learning environments. By framing SDL preferences as regulatory adaptations, educators are encouraged to interpret autonomous or independent learning tendencies not as disengagement or resistance, but as signals of students' efforts to manage psychological and sensory demands. While structured routines and teacher guidance remain essential, their effectiveness may be enhanced when paired with flexibility, learner choice and opportunities for self-paced engagement.

Educational practices that support psychological regulation such as predictable learning structures, reduced unnecessary social demands and autonomy-supportive instructional design may better align with the learning needs of students with elevated autistic traits. From a research standpoint, the framework highlights the need to integrate psychological regulation into models of SDL and learning preference formation, moving beyond generic learner-centred approaches toward neurodiversity-informed educational design.

## 5. Conclusion

This conceptual paper advances understanding of self-directed learning (SDL) preferences among students with autistic traits by reframing SDL as a context-dependent regulatory adaptation rather than a fixed learning style or a direct motivational outcome. By synthesising evidence across neurocognitive, psychological and educational domains, the paper positions psychological regulation as a central mechanism linking autistic traits to students' learning preferences. This reframing enables a more nuanced interpretation of variability in SDL engagement, particularly among cognitively capable students whose learning behaviours are shaped by heightened regulatory demands rather than diminished motivation or autonomy. The proposed conceptual model integrates individual autistic traits, regulatory processes and institutional learning demands to provide a coherent explanation for why preferences for SDL may emerge differently in structured, high-demand educational settings such as boarding schools. By situating SDL within a regulatory framework, the paper underscores the need for inclusive educational approaches that align autonomy expectations with students' regulatory capacities, thereby supporting emotional balance, sustainable engagement and meaningful participation in learning for neurodiverse students.

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## Conflict of Interest Statement

The author declares that there are no conflicts of interest regarding the publication of this study.

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