Trajectories of Non-intellective Factors and their Association with Well-being in Secondary Schools in Saudi Arabia

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Trajectories of Non-intellective Factors and their Association with Well-being in Secondary Schools in Saudi Arabia

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A thesis submitted to the School of Education in partial fulfilment of the requirements for the

degree of Doctor of Philosophy

Durham University

2025

Abstract

Adolescence is one of the most important developmental stages that can shape academic and career success in emerging adulthood and contribute to stable and healthier emotional well-being. Non-intellective factors such as personality development, well-being, grit, and social-emotional-behavioural skills have a crucial role in not only academic success but also psychological resilience and emotional stability during adolescence. The relationship between these factors can be bidirectional and influenced by various momentary and contextual elements, including cultural environments, peer and family relationships, and support from academic settings such as schools. Previous research explored the interplay between these factors in Western contexts; however, evidence from Middle Eastern countries, such as Saudi Arabia, is limited. This PhD thesis aimed to examine the development and interplay of personality traits and other non-intellective factors, and academic achievement among Saudi secondary school students, a population largely underrepresented in this field.

A systematic review of 13 longitudinal studies (Chapter 4) explored how personality change during adolescence is associated with non-intellective outcomes, such as positive and negative affect. The narrative review showed that increases in Extraversion, Conscientiousness, and Emotional Stability during adolescence were consistently linked to higher well-being, while a decline in Emotional Stability was associated with increased distress and behavioural difficulties. In an empirical study (Chapter 5), a multi-method design was employed that combined a longitudinal questionnaire administered at three time points with an experience sampling method. Seven hundred and fifty seven students completed measures of personality traits, grit, social-emotional-behavioural skills, and well-being over three time points, while 399 students provided momentary data on emotions and learning experiences across an 8-day

protocol. Findings indicated that personality traits and other non-intellective factors developed dynamically over time and were shaped by situational and cultural factors, including classroom environment. Overall, the research demonstrates that personality and other non-intellective factors contribute uniquely to well-being in the Saudi context. Insights can inform educational policies supporting holistic student development under Saudi Vision 2030. Considering cultural context, future work should explore interventions to encourage adaptive personality development among adolescents.

Contents

List of Figures

List of Tables

Statement of Declaration

I declare that this work is my own. Material in this thesis has been submitted for publication which is currently in review.

Statement of Copyright

Acknowledgment

I would like to express my deepest gratitude to my supervisors, Professor Nadin Beckmann and Professor Julie Rattray, for their continuous guidance, encouragement, and insightful feedback throughout this PhD journey. Their intellectual support, patience, and belief in my work have been invaluable in shaping this thesis and my development as a researcher. I am sincerely thankful to the School of Education at Durham University for providing a stimulating and supportive academic environment, and to my colleagues, from whom I have learned a great deal throughout this process.

I would especially like to thank the generous sponsorship and support of the Saudi Ministry of Education, whose funding made this research possible. My heartfelt appreciation goes to the students, teachers, and school administrators in Saudi Arabia who participated in and supported this study. Without their cooperation and openness, this project would not have been possible.

I am profoundly thankful to my family for their endless love, patience, and encouragement. My wife, Dr. Haifa Aldhamy, has been my greatest source of strength and inspiration throughout this journey. I am also deeply grateful to my children —Mohammed, Murad, and Taim— for bringing joy, balance, and meaning to my life. Finally, my deepest thanks go to my parents, brothers, and sisters, whose unconditional love, prayers, and unwavering support have guided me at every stage of my life and education.

Chapter 1. Introduction

1.1. Overview of the Research

Educational psychology, as a discipline, seeks to understand how individuals learn, develop, and function within an educational setting. A central aim of the field is to identify the psychological and contextual variables that influence students' well-being. While cognitive abilities and academic knowledge have traditionally been regarded as primary predictors of success in school, recent decades have seen growing recognition of the importance of non-intellective factors, that is, characteristics and competencies not directly tied to cognitive ability but critical for academic engagement, persistence, and personal growth (Duckworth & Seligman, 2005; Steinmayr et al., 2019)

Non-intellective factors include a broad set of constructs such as personality traits, social-emotional behavioural (SEB) skills, and life satisfaction. These factors influence students' ability to self-regulate, adapt socially, persevere through challenges, and maintain psychological health. Meta-analytic evidence suggests that non-intellective factors contribute meaningfully to educational success, in many cases above and beyond the effects of cognitive ability (Credé, 2018; Poropat, 2009). For example, students with higher levels of Conscientiousness, Emotional Stability, and grit tend to perform better academically, participate more actively in class, and report fewer behavioural problems (Duckworth & Gross, 2014; Durlak et al., 2011).

A growing body of research has examined how personality traits, defined as relatively stable individual differences in patterns of thinking, feeling, and behaving (McCrae & Costa, 1997), develop and change during adolescence. Although traditionally viewed as stable traits, there is increasing evidence suggesting that personality traits can change, particularly during adolescence, when individuals experience important biological, psychological, and social

transitions (Bleidorn, 2015; Borghuis et al., 2020; Soto & Tackett, 2015). Understanding personality development in adolescence is critical because this period sets the stage for long-term educational and psychological outcomes. This has led to increasing interest in how such change unfolds in response to daily situational experiences.

Furthermore, within-person approaches in personality psychology have provided new insights into how individual differences fluctuate and stabilise. Rather than focusing exclusively on traits as stable differences between individuals, researchers recognise that traits are manifested in momentary psychological states that vary within individuals across time and context (Beckmann & Wood, 2017; Fleeson, 2001). This state-trait perspective offers a dynamic view of personality, highlighting how daily experiences and situational characteristics shape both immediate behaviour and long-term personality development trajectories. Investigating these within-person variations provides critical insight into how situational context influences learning, motivation, and well-being in adolescence.

Adolescence, particularly the secondary school years, is a critical developmental period during which these non-intellective factors undergo major changes. During this time, students experience heightened identity exploration, increasing autonomy, and complex emotional and social demands (Spengler et al., 2016; Steinberg & Morris, 2001). Understanding how non-intellective traits develop during adolescence is therefore vital for designing timely interventions that promote psychological resilience.

This study aims to investigate trends in personality trait development and other non-intellective factors among Saudi secondary school students, as well as their long-term effects on psychological well-being. By combining both trait- and state-based approaches to personality, this study examines the degree to which personality is stable or dynamic during adolescence and

how these developments influence students' well-being outcomes. In addition, the research examines how personality and other non-intellective factors are associated with psychological outcomes, providing an integrated view of student development.

Given the broad range of potential influences on student development, the present research intentionally focuses on individual-level psychological processes as the primary unit of analysis. The theoretical aim of the thesis is to examine the developmental trajectories of non-intellective characteristics (i.e., personality traits, personality states, SEB skills, and grit) and their longitudinal associations with well-being. As these constructs represent psychological attributes that vary both between individuals and within individuals over time, the individual level constitutes the most appropriate level of analysis for addressing questions concerning intra-individual change and developmental dynamics. This focus enables the investigation of whether changes in adolescents' non-intellective characteristics are associated with subsequent changes in well-being, a process that cannot be directly captured through higher-level institutional or sectoral variables alone.

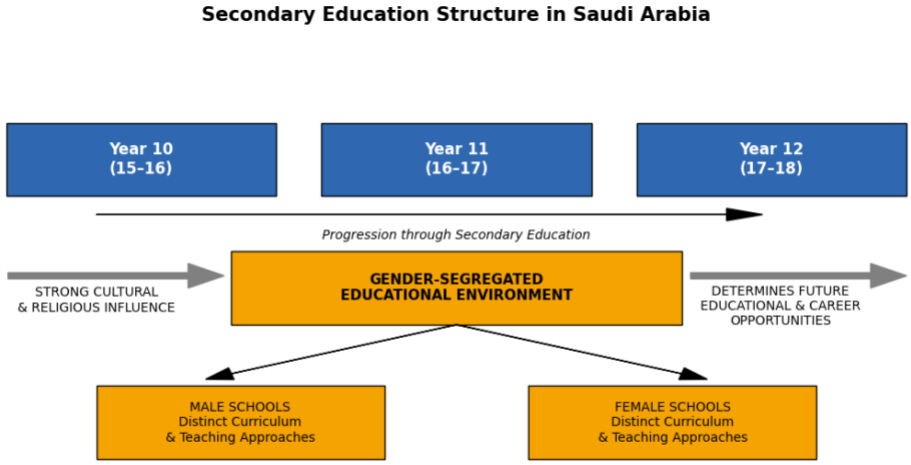
At the same time, prioritising individual-level factors reflects the applied objective of identifying malleable psychological mechanisms that may inform student-focused interventions in secondary education. While contextual influences such as school, teacher, and institutional factors remain important, the present research is designed to complement system-level investigations by clarifying the personal developmental pathways through which well-being evolves over time. Future research may extend this work using multilevel ecological designs integrating classroom- and institutional-level variables; however, isolating individual developmental processes represents a necessary first step in understanding how non-intellective factors operate during adolescence.

1.2. Context of Secondary Education in Saudi Arabia

The Saudi secondary school education system presents a unique context for studying personality development and its impact on psychological well-being and academic achievement. Educational research has consistently recognised that high academic success and psychological adaptation are shaped by the interaction between intellectual and non-intellective determinants (Marrone et al., 2024). While previous approaches focused on test scores and cognitive abilities, more recent literature highlights the key roles played by personality traits, grit, social-emotional competence, and environmental factors in predicting educational outcomes (Pellegrino et al., 2024; Setlogelo & Nyoni, 2024). This change of emphasis is especially relevant to Saudi Arabia, where education reform has been initiated under Vision 2030 with an emphasis on the all-around development of students as well as the attainment of essential 21st-century skills like critical thinking, creativity, adaptability, and emotional intelligence (Alhowail & Albaqami, 2024; Allmnakrah & Evers, 2020).

As visualised in Figure 1.1, the Saudi Ministry of Education arranges the education system within three main stages: primary (six years), intermediate (three years), and secondary (three years), and then post-secondary education, including university and vocational colleges (Alsaleh, 2019).

Figure 1.1
Saudi Secondary Education Context



Gender-segregated education is a unique element within the system, implemented from Year 4 to secondary school, following the nation's religious and cultural values (Almalki, 2022). Secondary education spans three years in duration (Years 10–12) between the ages of 15 and 18. In secondary education, students first take a general course of study before specialising in academic streams in their second and third years, which play a crucial role in determining their future education and career prospects. Academic achievement is evaluated based on cumulative Grade Point Averages (GPAs) and standardised examinations, such as the Qudrat (General Aptitude Test) and Tahsili (Achievement Test), conducted by the Education and Training Evaluation Commission. These years are of considerable academic and social importance, as performance during this period considerably determines prospects for university admission as well as future career paths. Within the high-stakes testing regime, together with cultural imperatives and reform-oriented shifts, students face high levels of academic pressure (Mancenido, 2024).

In addition, the secondary school stage is widely considered a milestone period of cognitive, emotional, and social development (Dosman et al., 2012). Adolescents at this stage undergo substantial changes in their personality, non-academic skills, and psychological adjustment, which may in turn influence their academic achievement and later success (Mahmud, 2019). In contrast to most Western education systems, where a large number of personality studies have been carried out (Ranga & Etzkowitz, 2015), the Saudi context has distinctive structural, cultural, and policy-based conditions that are expected to shape student development, such as centralised education policies, gender-segregated schooling, and a strong cultural emphasis on academic success (Matsumoto, 2019). Therefore, empirical data is needed to investigate whether similar developmental patterns hold true in the Saudi context and to what extent these contextual factors influence students' developmental trajectories.

One of the most distinctive features of Saudi secondary school education is its rigorous gender segregation, where male and female students attend separate schools, learn separate curricula, and are taught by same-gender teachers. This segregation leads to diverging patterns of socialisation that can differentially shape personality development, social-emotional competence, and motivation within educational contexts. In addition, the education system has strong cultural and religious underpinnings that influence teaching styles, students' expectations, and learning environments in ways that differ from the more autonomous and individualistic education systems prevalent in Western cultures (Algraini & McIntyre-Mills, 2019; Alharbi, 2023).

Saudi Arabia's Vision 2030 reform initiative has brought substantial revisions to the education system, focusing on updating the curriculum, embedding 21st-century competencies, and developing critical thinking and problem-solving skills (Alghamdi, 2020). Vision 2030 recognises that academic knowledge alone is insufficient; rather, fostering personal attributes

such as resilience, self-management, and adaptability is essential for preparing youth for the challenges of the future. In alignment with these goals, efforts have been made to enhance teachers' professional development initiatives, and educational technology innovations have been introduced. Additionally, subjects designed to support both teachers and students in fostering deeper learning, such as critical thinking modules, have been formally incorporated into the curriculum. However, the transition from rote learning to holistic student development remains ongoing, highlighting the need for empirical research into how such reforms influence the development of personality and other non-intellective factors, including social-emotional skills, which are critical for academic success and overall well-being. By situating this research within the Saudi secondary education environment, this study offers insight into the dynamic interplay between personality development, educational achievement, and student non-intellective outcomes in a transforming context.

1.3. Rationale for Studying Personality Change, other Non-Intellective factors, and Academic Achievement

Despite considerable investments in teachers' training programmes and after-school activities aimed at improving students' intellectual and non-intellective outcomes, the effectiveness of these initiatives remains unknown (Albaqami, 2024; Khahro et al., 2021). Saudi Arabian research has primarily been cross-sectional, providing limited evidence on the developmental patterns of non-intellective factors and their impact on student performance. Furthermore, existing research has predominantly targeted university students, thereby overlooking secondary school students, a vital stage for social-emotional and personality growth studies (Abouzeid et al., 2021; ArulJothi et al., 2016; Sharahili et al., 2024). Lastly, to date, no empirical research in Saudi Arabia has examined how students' personality and other non-

intellective factors develop over time, or how these trajectories relate to students' well-being, and exploratorily, to academic performance, particularly within the secondary school context undergoing rapid educational reform.

There are several compelling reasons for researching personality change, other non-intellective factors, and academic achievement in Saudi Arabian secondary schools. Firstly, adolescence is a critical developmental period for personality development, during which the individual undergoes major transformations in traits such as Conscientiousness and Emotional Stability. Personality traits, according to research (Brandt et al., 2019; De Vries et al., 2021), continue to develop during adolescence and can be shaped by school experiences and culture. Exploring these relationships in the Saudi context can provide valuable insights into the role that educational and cultural influences play in personality development at this critical stage.

Secondly, as much as academic achievement has always been the primary concern of education research and policy, there is an increasing acknowledgement that non-academic factors such as personality traits, grit, and social-emotional and behavioural skills can also be important determinants of students' psychological well-being and potentially academic achievement. Vision 2030's focus on developing well-rounded citizens brings to the forefront the need to examine how these non-academic characteristics develop and overlap with academic achievement. With these relationships in mind, this research will contribute to a clearer understanding of student achievement, where personality traits and cognitive aptitude are considered alongside other factors.

Thirdly, despite the growing body of international research on personality development and learning, a meaningful gap remains in understanding how these processes unfold within the Saudi Arabian context. The country's distinctive religious, cultural, and educational

characteristics can influence the development and interaction of personality traits with well-being outcomes in ways that differ from Western contexts. For instance, a rigorous focus on moral and religious education can shape the development of character traits such as Agreeableness and Conscientiousness (McCullough & Willoughby, 2009). Gender-based schooling can further influence social traits, such as extraversion and emotional expression (Evans, 2017) Strong family and societal expectations for scholastic success can also encourage grit and conscientiousness, as well as influence students' emotional well-being (Markus & Kitayama, 2014). This study aims to fill this gap by providing culturally grounded insights that can inform policy and practice in Saudi Arabia's developing education context.

1.4. Research Aims, Objectives, and Questions

This research aims to advance understanding of the relationships between personality development, other non-intellective factors, and students well-being within the Saudi Arabian secondary educational context, while academic achievement is examined as a secondary exploratory outcome. The study is structured around four key objectives that guide the investigation:

1. Synthesise existing longitudinal evidence on personality change and its relationship with well-being during adolescence through a systematic review of the literature.
2. Investigate the developmental trajectories of personality traits and other non-intellective factors among Saudi Arabian secondary school students.
3. Examine how changes in these non-intellective factors predict students' well-being and explore their associations with academic achievement.
4. Explore daily fluctuations in personality states, perceived situations, and their associations with short-term emotional well-being using an experience sampling method (ESM).

These objectives are addressed through the following research questions:

RQ1. How do secondary school students' non-intellective factors—such as personality traits, grit, social-emotional and behavioural skills, change over time, and does their well-being also change during the same period?

RQ2. To what extent do changes in these non-intellective factors predict students' well-being and to what extent are these trajectories also associated with academic outcomes?

RQ3. Is there a bidirectional relationship between changes in personality and changes in well-being during the study period?

RQ4. How do students' momentary thoughts, feelings, behaviours, and perceived situational characteristics fluctuate across daily school contexts, and how are these patterns associated with short-term well-being?

1.5. Research summary

The research questions are closely aligned with the study's objectives and methodological approach, ensuring coherence across the research design. A multi-method approach was employed involving two complementary studies. The first component was a systematic review that synthesised longitudinal evidence on the development of personality traits and their associations with adolescent well-being. The second component was an empirical longitudinal investigation with three measurement time points by combining trait questionnaires and an ESM to examine how non-intellective factors change over time and how they relate to academic and non-academic outcomes in Saudi secondary school students.

The systematic review focused on the relationship between personality change and well-being during adolescence and synthesised findings from 13 longitudinal studies published

internationally. A comprehensive search was conducted using electronic databases (e.g., ERIC, PsycINFO, EBSCOhost, Web of Science) in November 2024. Inclusion criteria targeted studies that involved secondary school-aged participants (12-19 years) and reported on longitudinal change in personality traits alongside well-being. The review found that increases in traits such as Extraversion, Conscientiousness, and Emotional Stability were consistently associated with better well-being outcomes (e.g., greater life satisfaction, reduced distress), while declines in Emotional Stability were associated with increases in internalising and behavioural difficulties. The review also highlighted the moderating role of school environment and family context, including a complex interplay between personality development and adolescents' well-being.

The second part of the thesis involved an empirical study of Saudi secondary school students, integrating both trait-level and state-level approaches. The sample included 757 students, with 494 participants completing the three phases of the data collection, allowing for examination of developmental trajectories in personality traits, grit, social-emotional-behavioural skills, and well-being. A sub-sample of 399 students also participated in an 8-day experience sampling study protocol, responding to a brief questionnaire twice a day. These assessments captured their momentary psychological states (e.g., personality states, emotions), as well as their in-the-moment perceptions of classroom situations and learning experiences during school hours.

This dual design allowed the thesis to explore both stable, long-term patterns and dynamic, within-person fluctuations in students' thoughts, feelings, and behaviours over time. The longitudinal component modelled growth in non-intellective factors and their associations with outcomes. The ESM design captured how situational context (e.g., duty, adversity, sociality) was associated with students' momentary psychological states. Together these methods provided

a multi-timescale perspective on personality and its role in learning, aligned with recent calls for integrative research in personality science and educational psychology.

As this research involved adolescents in secondary schools, particular ethical considerations were necessary. Ethical approval was granted by the Durham University Ethics Committee and subsequently by the Saudi Ministry of Education. Informed consent was obtained from both students and their parents/guardians, and confidentiality was ensured through anonymous coding procedures. Particular care was taken to emphasise the voluntary nature of participation, recognising that cultural norms of respect and obedience might make it harder for students to decline involvement. These safeguards and procedures are described in greater detail in Chapter 5.

1.6. Terminology and Conceptual Definition

The term ***non-intellective factors*** refers to individual characteristics that are not directly related to cognitive ability. In this study, these include personality, subjective well-being, grit, and social, emotional, and behavioural skills. Although personality is widely recognised as a core non-intellective factor, this thesis sometimes discusses it separately due to its central role in the research objectives and its theoretical significance. Personality is examined using the Big Five model, which includes Extraversion, Agreeableness, Conscientiousness, Openness to Experience, and Emotional Stability. It is important to note that throughout most chapters of this thesis, the term *Emotional Stability* is used instead of *Neuroticism*. However, in the systematic review chapter, the original terminology used by authors in each primary study, whether Emotional Stability or Neuroticism, *is retained* to accurately reflect the authors' wording.

Table 1.1
Key Terms and Definitions

Term	*Definition*
Personality traits	Extraversion, Agreeableness, Conscientiousness, Neuroticism (or Emotional Stability), and Openness to Experience
Emotional Stability	Calmness, resilience, and low tendency toward anxiety and negative affect; used in this study in place of Neuroticism (Wilt et al., 2017)
Extraversion	Sociability, assertiveness, and positive emotional engagement (McCrae & Costa, 1999)
Agreeableness	Trust, altruism, and cooperative orientation toward others (McCrae & Costa, 1999)
Conscientiousness	Organisation, responsibility, and goal-directed persistence (McCrae & Costa, 1999)
Openness to Experience	Curiosity, imagination, and willingness to try new ideas and experiences (McCrae & Costa, 1999)
Non-intellective factors	Psychological attributes unrelated to cognitive ability, including subjective well-being, grit, and SEB skills
Subjective well-being	A multidimensional construct comprising life satisfaction and affect (positive and negative)
Emotional well-being	Refers specifically to *positive* and *negative affect*
Grit	A non-intellective factor characterised by perseverance and passion for long-term goals
Social Emotional Behavioural (SEB) skills	Social, emotional, and behavioural competencies that support adaptive functioning, including self-management, cooperation, and resilience

1.7. Structure of the Thesis

I organised this thesis into seven chapters that progressively build an understanding of the relationships between personality development, other non-intellective factors, and well-being in adolescents.

Chapter 2 provides a comprehensive review of the literature on personality theories, personality change, and other non-intellective factors in education. It examines both trait and state approaches to personality, explores the principles of personality change, particularly during

adolescence, and reviews research on important non-intellective factors such as grit and social-emotional skills. The chapter concludes with a conceptual model that integrates personality, other non-intellective factors, and educational achievement.

Chapter 3 identifies gaps in the existing research and presents the rationale for the current study. It analyses specific gaps in personality change research, grit research, and social-emotional skills research, highlighting the lack of longitudinal studies in Saudi contexts and the need to integrate momentary and longitudinal perspectives. This chapter also justifies the two-study design and articulates the potential contributions and significance of the research.

Chapter 4 presents the systematic review (Study 1) examining personality change and well-being during adolescence. It details the methodology, results, and implications of this review, providing a foundation for understanding broader patterns in the literature.

Chapter 5 includes the empirical longitudinal study (Study 2) conducted with Saudi secondary school students. It details the methodology, including sampling, measures, design, procedures, and analyses, followed by a presentation and discussion of the findings.

Chapter 6 integrates findings from both studies and the literature review, discussing theoretical contributions, practical implications, limitations, and directions for future research.

Together, these chapters provide a comprehensive examination of personality development and its relationship with well-being other non-intellective factors and academic achievement in the Saudi educational context, contributing to both theoretical understanding and practical applications in education.

Chapter 2. Background: Personality, Personality Change, and other Non-Intellective Factors in Adolescence

2.1. Introduction

This chapter begins by defining personality and examining primary trait- and state-based models. It then substantiates principles and trajectories of personality change during adolescence, as well as the role of non-intellective factors in educational and psychological outcomes. An overview is provided of well-established tools that are widely used in studies examining personality traits and states in relation to various non-intellective factors. Attention is given to contextual and situational influences, including educational and cultural environments that shape the development and expression of personality. The Saudi secondary school context is highlighted as a relevant setting for understanding personality development in non-Western education systems. The chapter concludes by summarising key insights and outlining themes that are relevant for the empirical study of this thesis.

2.2. Theoretical Foundations of Personality

2.2.1. Defining Personality Traits

Personality lies at the core of psychological research, offering key insights into the thoughts, feelings, and behaviours that differentiate individuals and guide their interactions with the world (Costa & McCrae, 2006). Although personality has been widely studied, there is no single, universally agreed definition of the construct. Scholars conceptualise it from different perspectives, ranging from trait-based models to more situational or contextual perspectives that emphasise state-based expressions of personality. Early conceptualisations often portrayed personality as fixed and unchanging, shaped predominantly by biological predispositions.

However, contemporary research increasingly supports a dynamic view, one that recognises both the stability of core traits and the capacity for developmental change over time (Alidemi & Fejza, 2021). This evolving perspective is particularly relevant during adolescence, a period marked by rapid cognitive, emotional, and social transitions. In education settings, personality plays a critical role in shaping students' motivation, emotional regulation, and self-concept, which in turn influence learning processes and well-being outcomes (Zhang, 2024). Thus, defining personality requires acknowledging both its enduring structural components and potential for adaptation in response to environmental and developmental context.

2.2.2. Trait models of Personality

Trait personality refers to relatively stable patterns of cognition, emotion, and behaviour that distinguish individuals and persist across time and contexts. This approach has long dominated personality psychology, positing traits as broad tendencies that influence individual behaviour (Shiner, 2014). Contrary to earlier beliefs, recent longitudinal studies have demonstrated that traits exhibit both stability and change (Bleidorn et al., 2022; Brandt et al., 2022; Roemer et al., 2024). Marked personality changes have been documented across the lifespan, particularly during transitional periods such as adolescence and early adulthood (Bleidorn, 2015; Roberts & Mroczek, 2008; Specht et al., 2014).

Two types of stability are observed: rank-order consistency retaining relative positions within a group, and mean-level change - normative shifts in average trait levels over time (Roberts & Mroczek, 2008). These findings are encapsulated in the neo-socioanalytic model, which frames personality development as a dynamic negotiation between individuals and their social environments, shaped through sustained role engagement (Roberts et al., 2017).

Improvements in trait measurement have strengthened the study of personality. Over the past decade, researchers have refined trait taxonomies to better capture individual differences and their implications for educational achievement. These frameworks provide structured approaches for assessing personality across various populations and contexts.

The Five-Factor Model (FFM), also known as the Big Five, remains the most widely applied taxonomy. It categorises personality traits into five global domains: Extraversion, Agreeableness, Conscientiousness, Neuroticism (or Emotional Stability), and Openness to Experience (McCrae & Costa, 1997). Recent enhancements to the model and its measurement, such as the Big Five Inventory-2, offer improved psychometrics and greater granularity at the facet level (Soto & John, 2017). These conceptual and measurement advances have enabled researchers to apply the Big Five framework more effectively in educational contexts, where personality traits have been recognised as important predictors of academic achievement. Among the Big Five factors, Conscientiousness—reflecting persistence and organisation has consistently shown the strongest association with academic achievement among personality variables, though correlations are typically moderate in size ($r = .24$; Poropat, 2009). While intelligence generally remains the stronger correlate, Meyer et al. (2024) found the predictive effect of Conscientiousness to approach that of intelligence. Openness to Experience may predict intellectual curiosity and creative outcomes, while Agreeableness can foster interpersonal harmony and effective classroom dynamics (Montoya et al., 2017). Despite its predictive power, the trait approach has been criticised for underestimating situational variability, prompting calls for complementary state-based frameworks (Fleeson & Jayawickreme, 2015).

Cross-cultural research has established the robustness of the Big Five structure globally. Its factor structure has been confirmed across 50 nations, suggesting broad universality (McCrae

& Terracciano, 2005). Nonetheless, cultural specificity must be considered, as demonstrated by additional dimensions such as Interpersonal Relatedness in Chinese samples (Cheung, 2012).

An alternative taxonomy, the HEXACO model, adds a sixth domain, Honesty-Humility, to the traditional Five Factor Model. Developed by Ashton and Lee (2007), this model enhances predictive power, particularly in ethical domains relevant to educational integrity and group collaboration (Ashton et al., 2014; Ashton & Lee, 2008)

Education-specific personality constructs have emerged to capture traits relevant to academic success. Grit conceptualised as perseverance and passion for long-term goals, has gained prominence for its association with sustained academic effort (Duckworth et al., 2007). . Although closely related to broader personality traits of Conscientiousness, grit places stronger emphasis on long-term commitment. Academic Conscientiousness, a domain-specific variant, captures behaviours such as orderliness and classroom motivation (Soto & Tackett, 2015).

Hierarchical trait models have also gained traction. DeYoung (2015) proposed the Big Two meta-traits: Stability (Conscientiousness, Agreeableness, and Emotional Stability) and Plasticity (Extraversion and Openness). These higher-order traits provide a concise yet comprehensive view of personality's fundamental drives. Among them, Conscientiousness has consistently been associated with academic success across levels and disciplines (Poropat, 2009; Richardson et al., 2012)

Despite their utility, trait taxonomies have been criticised for their descriptive emphasis and limited explanatory scope. As a response, DeYoung's (2015) cybernetic Big Five theory integrates personality traits with neurobiological and motivational processes, conceptualising traits as patterns of goal regulation. Others contextualise traits within a broader personality framework that includes life narratives and personal values (McAdams, 2013; McAdams & Pals,

2006). However, beyond these broad traits, personality also encompasses within-person differences, situational responsiveness, and developmental plasticity, which are particularly salient during adolescence (Soto & Tackett, 2015).

In the context of adolescent development, personality is not merely a static characteristic, but a developmental system influenced by biological maturation, cognitive growth, and changing social roles (Shiner & Caspi, 2003). Thus, understanding personality requires a framework that integrates stable dispositions with dynamic change to capture how adolescents adapt to their environments and develop across time.

For the present research, personality is conceptualised using the Five-Factor Model. The five domains: Conscientiousness, Emotional Stability, Extraversion, Openness, and Agreeableness, offer a solid foundation for assessing stable individual differences and their implications for learning. These traits were measured longitudinally using the Five-Factor Model Adolescent Personality Questionnaire (FFM-APQ; Rogers & Glendon, 2018), a tool tailored for adolescent populations.

2.2.3. State Personality and Dynamic Models

Beyond stable traits, personality can be understood in terms of momentary states, the transient expression of personality traits that fluctuate across situations and over time. These personality states represent how individuals think, feel, and behave in a specific context, capturing within-person differences across time and situations (Fleeson & Gallagher, 2009; Fleeson & Jayawickreme, 2015). This integrative model allows for examination of both stability and variability in personality, capturing within-person fluctuations that trait models often overlook.

Research using ESM and other intensive longitudinal methods has substantially advanced our understanding of personality states by capturing in-the-moment data within naturalistic environments. This approach reduces retrospective bias and enhances ecological validity (Wrzus et al., 2016). Findings have revealed striking intra-individual variability in the expression of personality states (Beckmann et al., 2010; Beckmann et al., 2020). For instance, research has demonstrated that differences in a single individual's expressions of Extraversion or Conscientiousness may match or exceed inter-individual differences (Fleeson & Gallagher, 2009; Wilt & Revelle, 2022) with substantial individual differences observed in the extent of this intra-individual variability both within and across contexts (Beckmann & Wood, 2020). For instance, a student may exhibit high Conscientiousness when working independently, but their Conscientiousness may decrease when working in a group. These fluctuations are not random, as they are shaped by situational cues, emotional states, social roles, and goal relevance (Di Sarno et al., 2023). Work contexts have proven particularly informative for understanding personality dynamics, revealing how personality variability manifests differently across forms (mean levels, variability, contingencies), time scales, and contextual demands (Beckmann et al., 2021). Contextual triggers such as task demands and situational contingencies can substantially modulate these states (Minbashian et al., 2010, 2018). In particular, task-contingent Conscientiousness emerging as a meaningful unit of analysis that captures systematic within-person fluctuations in conscientious behaviour across situations, and is empirically distinct from trait-level Conscientiousness (Minbashian et al., 2010). Moreover, relationships among personality constructs may differ substantially at the within-person (state) versus between-person (trait) levels of analysis, underscoring the importance of considering both perspectives (Beckmann et al., 2010). Individual differences in affective processes further shape these

dynamic, influencing how emotional intelligence interacts with task-contingent expressions of Conscientiousness (Minbashian et al., 2018).

In educational settings, the ESM has been used to explore how classroom activities and social interaction influence the expression of personality states, which in turn affect student engagement and performance (Goetz et al., 2016). The study highlights the significance of capturing personality as it unfolds in real-time within naturally occurring settings. Building on this, recent studies have shown that student behaviour is highly fluid. For example, self-control fluctuates across academic tasks, with momentary differences closely tied to engagement and learning outcomes (Galla et al., 2014). Emotions related to homework, such as enjoyment or anxiety, also vary by subject and substantially affect student motivation and achievement (Goetz et al., 2016). Furthermore, daily diary studies have illustrated how transient emotional states such as pre-exam nervousness may mediate the relationship between traits and performance (Horstmann et al., 2021; Ziegler et al., 2019). Hence, personality states represent a fundamental shift from viewing personality as fixed characteristics to understanding it as a dynamic system of contextually-sensitive processes, with profound implications for how these are conceptualised and measured in individual differences in educational and organisational settings.

2.2.3.1. The Power of the Situation in State Personality

Situations constitute the immediate psychological and physical contexts in which individuals operate and construct meaning. Rauthmann et al. (2014) offered a multidimensional model of situations, comprising three hierarchical levels: *situational cues* (objective, observable elements), *situation characteristics* (subjective psychological impressions), and *situation classes* (broad categories of contexts). These situation characteristics (how individuals *perceive and*

appraise their surroundings) have gained prominence, underscoring a growing interest in the subjective experience of context.

Empirical evidence shows that situations exert a substantial influence on the expression of personality states. Sherman et al. (2015) estimated that situational factors account for approximately 35% of the variance in personality states, suggesting a robust, context-dependent dynamic in personality expression. Task-oriented settings, for example, are often found to develop Conscientiousness, while socially rich environments tend to elicit Extraversion. Such associations support the notion of a shared understanding of contextual demands. However, individual differences in perception and interpretation challenge this assumption of uniformity. Rauthmann et al. (2014) demonstrated that individuals interpret identical settings differently resulting in divergent personality expressions. Sensitivity to specific situational cues also varies inter-individually, creating idiosyncratic "if-then" response patterns (Sherman et al., 2015; Minbashian et al., 2010; 2018), as initially conceptualised in Mischel & Shoda (1995) Cognitive-Affective Processing System (CAPS).

In educational environments, particularly classrooms, these individualised responses to situations are consequential. Each academic subject evokes unique emotional and motivational responses, influencing how students engage with the material (Goetz et al., 2016). In the same vein, teaching styles meaningfully shape students' situational experiences by either supporting or thwarting core psychological needs, such as autonomy and competence (Guay, 2022). These contextual variations influence expressions of personality traits, such as Conscientiousness or Openness, in moment-to-moment classroom engagement.

Additionally, research has shown that the relationship between person and situation is bidirectional. Three processes through which personality and context interact are *selection*

(choosing environments compatible with one's personality), *evocation* (eliciting particular responses from others), and *manipulation* (intentionally altering environments to suit personal tendencies (Buss, 1987; Rauthmann et al., 2015; Funder, 2008). Empirically, Wrzus et al. (2016) examined these daily-life transactions but noted they could not disentangle selective, evocative, manipulative, and reactive processes in their design. These reciprocal dynamics suggest that while situations can shape personality expression, individuals also actively can shape their environments, leading to long-term personality development through the accumulation of experiences.

2.2.3.2. Situational Frameworks and Educational Application

To systematically capture the complex interplay between situational factors and personality states, several classification frameworks have emerged. The DIAMONDS model (Rauthmann et al., 2014) has become a prominent taxonomy, identifying eight situational dimensions: *Duty*, *Intellect*, *Adversity*, *Mating*, *Positivity*, *Negativity*, *Deception*, and *Sociality*. In educational contexts, dimensions such as Duty (task demands), Intellect (cognitive complexity), and Sociality (peer interaction) are particularly salient. Empirical studies demonstrated that environments high in Duty and Intellect may foster expressions of Conscientiousness and Openness, which in turn can predict higher levels of engagement and performance (Wrzus et al., 2016). Similarly, it was noted that high Duty combined with low Adversity is associated with more adaptive affect and greater academic motivation (Goetz et al., 2016).

Alternative frameworks offer additional granularity. The Situation Five (S5) model (Ziegler et al., 2019) proposes five dimensions: *Outcome Expectancy*, *Briskness*, *Cognitive Load*, *Psychological and Physical Load*, and *Lack of Stimuli*. Meanwhile, the CAPTION model (Parrigon et al., 2017) introduces dimensions such as *Complexity*, *Typicality*, *Valence*, and

Humour, broadening the psychological lens through which situations can be evaluated. These models provide differentiated insights into how individuals perceive and respond to varied situational demands, which is critical for personality-state research in academic settings.

Methodologically, tools such as the Riverside Situational Q-Sort (RSQ; Rauthmann et al., 2014; Sherman et al., 2015) and the Situational Eight DIAMONDS Scale (Rauthmann et al., 2014) have enhanced the precision of situational assessment. These instruments allow researchers to code and quantify individuals' perceptions of their environments, offering new avenues for empirical investigation into the contextual modulation of personality states.

From a theoretical standpoint, these findings converge with *trait activation theory* (Tett & Burnett, 2003) which posits that contexts differ in the extent to which they activate specific traits. Within educational settings, this implies that certain classroom formats, such as group projects are more likely to trigger traits such as Extraversion and Agreeableness, whereas independent research tasks may engage Conscientiousness and Openness. This alignment between situational affordances and trait expression not only explains state variability but also provides a potential mechanism through which personality traits may develop over time.

To sum up, understanding the relationship between situational characteristics and personality states, particularly in educational contexts, warrants both fine–grained frameworks and methodologically robust tools. As revealed in the literature, different situations activate different aspects of personality, with individuals also actively selecting and shaping their environments through reciprocal person–situation transactions. To assess students' perceptions of their situational characteristics, the DIAMONDS Situation Characteristics Scale was used. This taxonomy provides a comprehensive framework of eight continuous dimensions: duty, intellect, adversity, mating, positivity, negativity, deception, and sociality (Rauthmann et al., 2014).

Furthermore, DIAMONDS has been shown to generalise well to educational settings, where features such as task demands (duty), cognitive requirements (intellect), and social dynamics (sociality) are especially relevant to classroom experiences (Rauthmann et al., 2015). Empirically, Ketscher et al. (2025) demonstrated its utility in secondary school classrooms by linking students' DIAMONDS perceptions of STEM lessons to outcomes such as belonging and confidence.

2.2.4. Summary of Integrating Trait and State Perspectives

Contemporary personality psychology has moved beyond viewing traits as fixed characteristics to embrace dynamic models that integrate stable tendencies with contextual variability (Fleeson & Jayawickreme, 2015). Key theoretical developments include Mischel and Shoda (1995) CAPS model, which conceptualises personality as contextual "if-then" signatures, and Whole Trait Theory (Fleeson & Jayawickreme, 2015), which views traits as both behavioural summaries and underlying mechanisms with contextual plasticity.

Methodological advances in ambulatory assessment, including ESM and Ecological Momentary Assessment (EMA), have enabled real-time capture of personality states, revealing substantial within-person variability that can match between-person differences (Fleeson & Gallagher, 2009). This research demonstrates that personality expression dynamically responds to situational cues, with implications for both understanding student behaviour and potentially facilitating trait change through repeated state activation. Having established the dynamic nature of personality expression, the following section examines how these moment-to-moment fluctuations may contribute to longer-term personality development and change.

2.3. Personality Change and Development Trajectories

Although personality has long been considered relatively stable throughout the lifespan, accumulating longitudinal evidence supports the notion that personality is not fixed but changes meaningfully over time. This section reviews theoretical and empirical developments in the study of personality change, with a particular focus on adolescence as a key period of developmental change.

2.3.1. Principles of Personality Change

Personality change can be examined through three core principles—rank-order stability, mean-level change, and individual differences in change. One systematic review revealed substantial mean-level changes in traits, particularly during early adulthood, when individuals typically become more conscientious, agreeable, and emotionally stable, a pattern referred to as the maturity principle (Roberts et al., 2017). However, it was highlighted that individual trajectories vary markedly, demonstrating that personality development is neither universal nor uniform (Schwaba & Bleidorn, 2018).

Contemporary theoretical frameworks, particularly the TESSERA model (Wrzus & Roberts, 2017), conceptualise personality change as emerging through recursive cycles of situational exposure, state activation, expectation formation, and behavioural consolidation. This process is especially evident during life transitions such as educational changes, where adolescents encounter new academic demands, social dynamics, and institutional structures that can foster development in traits such as Conscientiousness and Emotional Stability (Schwaba & Bleidorn, 2018). These frameworks emphasise that sustained engagement with new roles and contexts drives long-term personality development through the accumulation of repeated everyday experiences.

Mechanisms of personality change are also theorised within both bottom-up and top-down frameworks. Bottom-up models suggest that repeated state-level experiences solidify into enduring traits of change, while top-down models emphasise a shift in self-concept or identity as the driver of change (Hennecke et al., 2014; Hudson & Fraley, 2015). These mechanisms are reflected in intervention research. Structured programmes such as cognitive-behavioural therapy, mindfulness, and social skills training can elicit measurable trait change, particularly in Emotional Stability, through repeated behavioural activation, consistent with a bottom-up pathway (Magidson et al., 2014; Roberts & Nickel, 2017). Similarly, Stieger et al. (2020) demonstrated that a two-week smartphone-based intervention effectively increased facet Conscientiousness (e.g., self-discipline) and Openness to Experience (e.g., openness to action), with changes maintained at follow-up. Olaru et al. (2023) further showed that a three-month digital-coaching intervention led to improvements in Conscientiousness, Emotional Stability and Extraversion, which were associated with enhanced satisfaction across multiple life domains, including academic outcomes and emotional well-being. On the other hand, top-down models are supported by findings from Hudson et al. (2018), who reported that individuals who believed their traits could change were more likely to increase Extraversion and emotional regulation through goal-oriented coaching intervention.

Educational interventions reflect this flexibility. Mindset interventions that encourage beliefs in the malleability of attributes (Yeager et al., 2022) and social-emotional learning programs (Taylor et al., 2017) have been shown to promote an increase in Emotional Stability and Agreeableness. These findings support the idea that classrooms are critical arenas for fostering personality development. Nonetheless, caution is warranted: personality change typically requires sustained effort, varies across individuals, and may regress without continued

support, as shown by Stieger et al. (2024), who found that some trait gains were lost over a one-year follow-up after a digital intervention.

Collectively, these theoretical and empirical advances suggest that personality traits are dynamic and responsive to both environmental input and intentional change. This dynamic view of personality provides a foundation for understanding how adolescence, a time of profound change, may serve as particularly sensitive period for personality development.

2.3.2. Personality Change in Adolescence

Adolescence, spanning roughly ages 10 to 20, represents a critical window for personality development, intersecting with meaningful academic and psychosocial transitions. This period is therefore characterised by both continuity and change, making it a particularly fertile ground for targeted personality interventions. Early adolescence is characterised by temporary declines in Conscientiousness, Agreeableness, and Emotional Stability, a pattern captured by the disruption hypothesis (Klimstra et al., 2013; Soto & Tackett, 2015). Klimstra et al. (2013) reported correlated change coefficients in the range of r= .14–.17 among these traits in adolescents, indicating modest but reliable co-occurring declines. These fluctuations are often attributed to hormonal changes, emotional turbulence, and social transitions (Klimstra et al., 2013) and commonly manifest as short-term departures from pre-adolescent trait levels. Importantly, many of these changes are transient and show partial recovery in later adolescence. Although, Emotional Stability tends to decrease, especially among females, likely reflecting heightened emotional reactivity and the onset of puberty (De Bolle et al., 2015), longer-term patterns are more complex. Despite these mean-level changes, rank-order stability remains moderate during adolescence, with correlations ranging from 0.40 to 0.60 (Roberts & DelVecchio, 2000). This

suggests that while average trait levels shift over time, individual differences remain relatively consistent, though developmental trajectories may diverge (Meeus et al., 2011).

Neurobiological developments, particularly in prefrontal regions, underpin improvements in self-regulation and emotional control, supporting increases in Conscientiousness and Emotional Stability (Blakemore & Mills, 2014). Yet, concurrently, pubertal sensitivity to emotional stimuli may heighten emotional reactivity, partly explaining temporary declines in Emotional Stability during adolescence (Haller et al., 2015).

There is substantial individual variability in personality development during adolescence, influenced by multiple contextual factors. Some adolescents follow normative paths, others exhibit accelerated growth, stagnation, or maladaptive patterns, such as decreases in Emotional Stability or Extraversion. This variability has been associated with multiple factors such as gender, pubertal timing, parenting styles, and the school environment (Hatano et al., 2023; Mabbe et al., 2019). For example, supportive educational contexts and adaptive teacher-student relationships have been shown to buffer decline in Conscientiousness and promote socio-emotional development (Soto et al., 2021).

Educational and social contexts play pivotal roles in shaping adolescent personality development through multiple pathways. School transitions also play a pivotal role, challenging adolescents to adapt to new academic and social expectations (Kiuru et al., 2020). Broader social and educational contexts also influence personality development. For instance, navigating complex peer relationships fosters interpersonal acuity and contributes to growth in Extraversion and Agreeableness (r = .15–.25;Wrzus et al., 2016).

Identity formation, outlined as a core developmental task by Erikson's (1968), has been linked to increases in Conscientiousness and Emotional Stability. Longitudinal evidence supports

this co-developmental relationship, with correlations in the range of r= .20–.30, suggesting a feedback loop between identity consolidation and personality maturation (Meeus et al., 2011).

Cognitive and self-concept development during adolescence contributes to increased personality complexity and environmental sensitivity. Adolescents also develop more nuanced self-concepts, which contributes to increased behavioural variability (Diehl et al., 2001; Lodi-Smith & Roberts, 2010). This stage is often accompanied by a temporary dip in personality stability, likely reflecting the development of self-awareness (Klimstra et al., 2010). Schools can either support or inhibit this development. Structured, supportive environments enhance adaptive personality development (Aldridge et al., 2024; Luo et al., 2023), whereas harsh or chaotic settings impede it (Aldridge et al., 2016). Cognitive maturation enables adolescents to think abstractly, plan for the long term, and adopt others' perspectives, skills that foster Conscientiousness and Agreeableness (Van der Graaff et al., 2014).

The connection between adolescent personality development and academic outcomes highlights both intervention opportunities and research gaps. Longitudinal studies have begun to connect changes in personality traits during adolescence to academic success (e.g., Deng & Luo, 2024), suggesting that developmental trajectories are related to both personality development and academic achievement. In particular, Emotional Stability has been associated with adolescents' ability to cope with school-related stress and burnout (Deng & Luo, 2024). Similarly, Conscientiousness and Openness have shown consistent longitudinal associations with subject grades across four years of secondary education, though these links reflect the stable portion of achievement rather than year-to-year changes (Spengler et al., 2016). Given this, adolescence is an opportune time for targeted personality development. Interventions such as social-emotional learning programs and identity and exploration initiatives (Taylor et al., 2017) have been

associated with traits conducive to success in school and beyond. However, important gaps remain in understanding these processes, particularly in non-Western educational contexts and in capturing real-time personality states rather than trait-level changes.

2.4. Other Non-intellective Factors in Adolescent Development

In recent years, alongside personality, increasing attention has been directed toward other non-intellective factors specifically grit, well-being and SEB skills that contribute to adolescents' success and adjustment beyond cognitive abilities. These competencies encompass attributes such as emotional regulation, social skills, self-esteem, motivation, and resilience, which support persistence, effective engagement in learning, and the development of healthy relationships. They also help students manage stress, regulate emotions, and enhance overall well-being (Diener, 2012; Diener et al., 2003; Durlak et al., 2011).

Given the breadth of non-intellective competencies identified in the literature, the present study focuses on a defined set of theoretically central constructs, selected on the basis of their conceptual foundations, availability of validated measures, and demonstrated associations with adolescent well-being. Practical considerations related to longitudinal data collection, including measurement burden and model interpretability, also informed this decision. Other related competencies, such as adaptability and self-esteem, were therefore not directly assessed, although their relevance to adolescent development is acknowledged. It is further recognised that several non-intellective constructs may reflect partially overlapping psychological processes (e.g., grit with Conscientiousness, resilience with Emotional Stability, and self-management with broader SEB competencies). Accordingly, the selected constructs are intended to represent core dimensions of adolescents' psychological functioning, while recognising that additional related competencies remain important for future integrative research examining well-being

development. The following sections provide a brief overview of each factor and its role in adolescent development.

2.4.1. Well-being

Well-being is a multidimensional construct that includes *subjective well-being (SWB), emotional well-being, and psychological well-being.* Yet, it lacks a universally accepted definition. Scholars conceptualise it in diverse ways, ranging from hedonic perspectives (pleasure, life satisfaction) to eudaimonic perspectives (meaning, purpose). In this thesis, well-being is examined primarily through subjective indicators—life satisfaction, positive affect, and negative affect—while acknowledging broader emotional and psychological dimensions. It is defined as a mix of adaptive feelings and effective functioning. This makes it particularly relevant during adolescence, a period when having control over one's life, finding purpose and maintaining adaptive relationships are critical for well-being (Huppert, 2009). High levels of well-being are associated with success across multiple domains, including effective learning, high workplace productivity, increased creativity, prosocial behaviours, and adaptive relationships (Diener, 2012; Oishi et al., 2007). Nevertheless, adolescence may present unique challenges, as hormonal, mental, and physical changes can heighten emotional sensitivity and mood fluctuations, making it harder to maintain adaptive feelings and function effectively.

Psychological well-being, which involves adaptive emotions, extends beyond emotional well-being by encompassing a broader range of life satisfaction factors, such as self-acceptance, autonomy, purpose, adaptive relationships and personal growth. Unlike emotional well-being, which focuses more on the immediate quality of emotional experiences, psychological well-being encompasses long-term fulfilment and the ability to navigate life's challenges (Dhanabhakyam & Sarath, 2023). It contributes to a sense of fulfilment and the capacity to face

life's challenges (Ryff & Keyes, 1995). Longitudinal studies have found that childhood well-being is an adaptive predictor of adult well-being (Garcia & Moradi, 2012; Richards & Huppert, 2011). These connections highlight the far-reaching benefits of maintaining high levels of well-being (Diener, 2012; Richards & Huppert, 2011). For secondary school students, fostering psychological well-being is essential for building resilience and sustaining motivation, which are vital for long-term academic and personal success.

Subjective well-being (SWB) is a multidimensional construct that comprises life satisfaction and affect (positive and negative) and is increasingly recognised as a crucial aspect in educational settings, as it directly influences students' academic engagement, motivation, and achievement. Research shows that adolescents with high SWB tend to exhibit more adaptive attitudes toward school, stronger school belonging, and better relationships with peers and teachers (Tian et al., 2016). Additionally, SWB is closely linked to personality development during adolescence. As such, fostering SWB in schools is not only vital for students' mental health but also supports educational attainment and overall development. This bidirectional relationship between personality development and SWB, as one of the non-intellective outcomes explored in this research, is further discussed in Chapter 4.

Emotional well-being during adolescence is commonly conceptualised as the balance between positive and negative affect. While emotional well-being itself typically measures through theses affective experiences, it is shaped by broader factors. Positive affect, including emotions such as joy, interest, and hope, acts as an important marker of adaptive functioning and is associated with self-esteem, intrinsic motivation, and emotional intelligence. Negative affect, such as experiences of stress, anxiety, and sadness, denotes vulnerability and psychological disturbance (Choi, 2018; Cosma et al., 2017; Ugoani & Ewuzie, 2013). These emotional states

are influenced by individual competencies and contextual factors, including peer support systems, the educational environment, and familial relationships (Jacob & Ravindranath, 2023). Although interventions such as school-based socioemotional learning initiatives and cognitive-behavioural strategies have demonstrated efficacy in enhancing emotional regulation and fostering positive affect (Oberle, 2018), systemic challenges such as poverty, trauma, and social exclusion persist in aggravating negative affect and undermining adolescent well-being (Choi, 2018; Cosma et al., 2017). Consequently, promoting emotional well-being necessitates a comprehensive approach that simultaneously cultivates individual competencies and addresses broader structural determinants.

2.4.1.1. Trajectories of Emotional Well-being among Adolescents

Longitudinal studies consistently demonstrate that positive affect tends to decline during early adolescence. Meeus et al. (2011), in a large-scale Dutch study, found a significant linear decline in positive affect. This decline has been attributed to several factors, including parent-child closeness, academic pressure, and diminished reward responsiveness (Olino et al., 2011) . However, evidence suggests substantial heterogeneity in these patterns. Adolescents with a high level of Extraversion, emotional regulation capacities, and social support often maintain stable or even increasing positive affect (Suldo et al., 2008). Such a finding highlights the importance of modelling interindividual variability. In contrast, negative affect often increases during adolescence, particularly during the transition to secondary school (Yin et al., 2024). These increases are particularly among girls, who experience greater emotional reactivity and social evaluative stress (Do et al., 2025). While some studies document a linear rise in negative affect (Klimstra et al., 2010), others suggest non-linear or curvilinear trajectories, with stabilisation or

even decline by adolescence over time (Orben et al., 2022). These patterns reflect both biological maturation and the development of social competencies.

2.4.1.2. Predictors and Moderators of Emotional Well-being Trajectories

Affective trajectories are shaped by the complex interplay of biological, relational, and contextual factors. *Gender* consistently moderates emotional development, specifically girls showing a steeper decline in positive affect and sharper increases in negative affect, suggesting that earlier pubertal onset, hormonal fluctuation, and gendered coping patterns (Keenan et al., 2014; Trentini et al., 2022). *School context* also plays a critical role, such as transitions to secondary education often reducing perceived autonomy and emotional safety, contributing to declines in positive affect and increases in negative affect (Lester & Cross, 2015; Mahmud, 2019). Contrarily, emotionally supportive classrooms and strong teacher-student relationships buffer against these affective risks (Maxwell et al., 2017). Furthermore, *peer* acceptance and high-quality friendships are associated with increases in positive affect and decreases in negative affect, whereas social isolation and bullying are linked to elevated negative affect (Bukowski et al., 2010; Reavis et al., 2015). Moreover, *family* relationships play a critical role as parental warmth promotes emotional well-being, especially during periods of regulatory vulnerability (Zhang et al., 2025).

2.4.1.3. Life Satisfaction among adolescents

Life Satisfaction is a key component of well-being and an important predictor of adaptive functioning in youth. It is a cognitive dimension of subjective well-being and equips individuals with the ability to evaluate their life experiences (Do et al., 2025). There are various desirable outcomes associated with higher life satisfaction, such as better academic performance, higher emotional intelligence, and fewer behavioural problems (Rafique & Aslam, 2020; Silva et al.,

2023; Sun & Shek, 2010). Furthermore, individuals with higher life satisfaction have been shown to demonstrate higher income and better career performance (De Neve & Oswald, 2021) , fewer mental health complications (Koivumaa-Honkanen et al., 2004), and lower risks of divorce and unemployment (Luhmann et al., 2012).

2.4.1.4. Trajectories of Life Satisfaction among adolescents

Notwithstanding the relevance of life satisfaction in healthy adolescent growth, previous research has yielded conflicting conclusions about the developmental trajectory of life satisfaction during adolescence. For instance, whilst in some European countries minimal or no change in life satisfaction was observed (Ranta et al., 2013; Salmela-Aro & Tynkkynen, 2010), others reported evidence of change, either as an increase or a decrease in life satisfaction. For example, a five-year longitudinal study in South Korea with 3,449 adolescents, employing latent growth curve modelling to track the progression of life satisfaction during adolescence (Yoo et al., 2015). The results indicated that the life satisfaction of South Korean adolescents followed an adaptive linear pattern, consistently increasing over time without marked fluctuations. A four-year longitudinal Chinese study, which included 2,427 students, revealed a decrease in life satisfaction over time (Shek & Li, 2016). Similarly, a cross-national study using data from 15 countries (N = 48, 040) found that life satisfaction decreased throughout adolescence (Casas & González-Carrasco, 2019), underscoring the variability in developmental trends and potentially challenging transition characteristics to this period.

2.4.1.5. Predictors and Moderators of Life Satisfaction Trajectories

Life satisfaction can be shaped by various environmental and social factors, such as stressful life events, socio-economic status, and social relationships, amongst others. In addition, *age* is considered a potential moderating factor as individuals go through major developmental

change during adolescence. However, findings regarding age-related effects are mixed. For example, a cross-sectional study in Germany of 1,274 adolescents found that age had a detrimental effect on life satisfaction between the ages of 11 and 16 (Goldbeck et al., 2007). A similar cross-sectional U.S. study of 5,034 European American and African American adolescents aged 14–17 found no significant association between age and life satisfaction. However, a longitudinal study conducted by Willroth et al. (2021) found that life satisfaction remained stable from ages 14-17, followed by a decline from 17-21 among Mexican-origin youth, with family environment influencing both the level and rate of change. Similarly, Orben et al. (2022) analysed longitudinal data from over 37,000 adolescents across the UK and German and reported consistent declines in life satisfaction during adolescence. In the UK data, life satisfaction declined from approximately 6.09 at age 10 to 5.09 by age 24, while in the German data, life satisfaction dropped from 8.36 at age 12 to 7.35 at age 24.

Additionally, a supportive *family* environment plays a critical role in shaping life satisfaction trajectories during adolescence. Longitudinal study showed that adolescents who experience a more supportive family environment at age 14 tend to report higher average life satisfaction from middle adolescence to young adulthood (Willroth et al., 2021). Similarly, high-quality parent-child relationships were associated with higher level of life satisfaction (Moreira et al., 2021). Suggesting that emotionally supportive and nurturing family contexts can promote heathier development. Although adolescents may often seek greater independence during this period, maintaining strong family connections remains essential due to their important influence on well-being. Overall, these findings present the importance of family support in promoting stable or adaptive trajectories of life satisfaction.

In education setting, the school-related variables and adolescents were consistency associated with change in life satisfaction. Adaptive teacher-student relationship, perception of fairness, academic self-efficacy, and school belonging were main protective factors (Suldo et al., 2008; Tian et al., 2016). In contrast, academic stress, peer victimisation, and school transition were associated with reductions in life satisfaction (Kerr et al., 2011; Visscher et al., 2025). For instances, students who perceived their teachers and their school environment as supportive, reported higher and more stable level of life satisfaction over time (Bookser et al., 2021; Shapiro, 2008). Moreover, school satisfaction mediated the relationship between academic motivation and life satisfaction growth (Bookser et al., 2021; Visscher et al., 2025). Collectively, these findings suggest the life satisfaction trajectories can be shaped by cultural, rational and structural factors. Given the inconsistency across studies, further research on non-linear developmental trends during adolescence is needed.

2.4.2. Social, Emotional, and Behavioural Skills (SEB Skills)

Social, emotional, and behavioural (SEB) skills represent a fundamental domain of non-intellective factors that underpin students' academic and psychosocial development. Increasingly recognised for their predictive value beyond cognitive ability, these skills are understood as interrelated capacities essential for navigating complex social environments, regulating affective experiences, and achieving personal and collective goals.

The Collaborative for Academic, Social, and Emotional Learning (CASEL) has provided a widely adopted framework for categorising these competencies into five core areas: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (Weissberg et al., 2015). These domains facilitate the interpretation, expression, and regulation of emotions, as well as the establishment of constructive interpersonal relationships.

SEB competencies are grounded in the developmental theory of self-regulation, emotional growth, and socialisation. Social learning theory (Bandura,1986) states that children and adolescents acquire social and emotional skills through observation, modelling, and reinforcement within key environments such as home and school. Similarly, the bioecological model (Bronfenbrenner & Morris, 2006) emphasises the importance of nested systems, such as microsystems (e.g., family) and mesosystems (e.g., school), in shaping SEB trajectories over time. Contemporary frameworks such as CASEL's five-domain model classify SEB skills into: *Self-awareness, Self-management, Social awareness, Relationship skills, Responsible decision-making.*

This multidimensionality implies that SEB development may follow distinct patterns across domains, shaped by individual and contextual factors (Domitrovich et al., 2017). While the CASEL framework has been widely adopted in educational context to guide social and emotional learning, it remains primarily conceptual. In contrast, the Behavioural, emotional, and social skills inventory (BESSI; Soto et al., 2021) offers an empirically grounded model for assessing SEB competencies as measurable, domain-specific skills. BESSI includes five key domains: *Self-Management, Social Engagement, Cooperation, Emotional Resilience*, and *Innovation*. This inventory is broadly aligned with CASEL's categories yet provides a more fine-grained assessment to measure individual skills.

Building on these frameworks, empirical studies have demonstrated that emotional competencies, such as *emotion recognition and regulation*, have been shown to support learning by promoting psychological resilience, task persistence, and adaptive classroom behaviours (Gross, 2015; MacCann et al., 2020). Positive emotional states have been linked to enhanced academic performance, while negative affect has been found to interfere with cognitive

engagement (Linnenbrink-Garcia et al., 2016). Behavioural competencies, including *goal setting, impulse control, and strategic planning*, play a pivotal role in promoting academic self-regulation and sustained effort. Research has demonstrated that behavioural self-control and self-regulated learning consistently predict academic achievement across various domains (Zimmerman et al., 2014). These competencies especially social-emotional and behavioural (SEB) skills are crucial for helping students persist through academic challenges and resist distractions. *Social skills*, encompassing empathy, communication, cooperation, and conflict resolution, are essential for creating supportive classroom climates and fostering adaptive peer and teacher relationships. Strong social competencies have been associated with increased school engagement and performance (Caprara et al., 2013). Longitudinal findings further suggest that early social skills predict long-term educational and occupational success (Jones et al., 2019).

The development of SEB skills is shaped by both neurobiological maturation and environmental factors. The prefrontal cortex, which continues developing through adolescence, plays a critical role in executive function and emotional control (Blair & Raver, 2015). However, contextual influences, including parental warmth, peer interactions, and classroom climate, can also shape these competencies (Jones et al., 2019). For example, schools may serve as vital environments for cultivating SEB skills through both direct instruction and structural supports. Social-emotional learning (SEL) programmes have been shown to enhance a broad range of student outcomes, including emotional competence, prosocial behaviour, and academic achievement. A meta-analysis by Durlak et al. (2011) supports the effectiveness of SEL interventions, with effects persisting over time. Mindfulness-based strategies have also been found to enhance emotional awareness and psychological well-being (Schonert-Reichl et al., 2015).

In addition to curricula, school culture and pedagogy play a critical role in promoting these skills. Safe, responsive classroom environments that support student autonomy and resilience foster the application and internalisation of SEB competencies (Jones et al., 2019; Yeager, 2017). Measuring these skills has become increasingly sophisticated, incorporating self-report measures (e.g., Social Skills Improvement System; Gresham & Elliott, 2008), teacher ratings (e.g., Devereux Student Strengths Assessment; LeBuffe et al., 2009), and performance-based tasks (McKown, 2017).

SEB skills are closely linked to well-being outcomes contributing to Emotional Stability, relational satisfaction, and purposeful living. Longitudinal research has demonstrated that childhood SEB skills may predict adult psychological and social adjustment (Taylor et al., 2017). Interventions targeting these skills have also been shown to reduce symptoms of depression and anxiety in school settings (Durlak et al., 2011). Despite promises, implementing SEB skill development in schools presents a daunting task. Cultural variability in the expression and valuation of these skills necessitates context-sensitive approaches (Hecht & Shin, 2015). Furthermore, translational gaps between evidence-based practises and real-world educational contexts require attention to implementation fidelity and systemic alignment (Durlak & DuPre, 2008; Oberle et al., 2016).

2.4.3. Grit in Educational Success

Grit has been advanced as a critical construct within educational psychology, encapsulating the blend of passion and persistence required to pursue long-term objectives. First introduced by Duckworth et al. (2007) and further elaborated in subsequent research, grit is typically conceptualised as comprising two distinct yet interrelated components: *perseverance of effort* and *consistency of interests*. These dimensions aim to capture both an individual's capacity

to persist in the face of adversity and the sustained commitment to long-term goals. The theoretical and practical relevance of grit has since become a subject of both widespread application and critical scrutiny.

Grit has been distinguished from the broader trait of Conscientiousness by positing that grit is uniquely concerned with sustained goal pursuit over extended periods, rather than with short-term diligence or orderliness (Duckworth & Quinn, 2009). This view has been supported by longitudinal research, which illustrates that enduring success in domains such as elite education or competitive training environments often depends on relentless, effortful engagement across years, including persistence through failure (Duckworth & Gross, 2014; Duckworth et al., 2007; Eskreis-Winkler et al., 2014).

Efforts to operationalise the construct have led to the development of psychometric tools such as the 12-item Grit Scale and its condensed version, the 8-item Grit-S (Duckworth & Quinn, 2009). These self-report instruments assess how individuals endorse statements related to their approach to goals, and while demonstrating acceptable reliability and validity, have also drawn criticism for their susceptibility to social desirability bias and limitations inherent to introspective reporting. In response, alternative measurement approaches have been proposed. Behaviourally Anchored Rating Scales (BARS) and performance-based tasks have been employed to address these limitations by incorporating external raters and behavioural persistence metrics (Galla et al., 2014; Robertson-Kraft & Duckworth, 2014).

Empirical evidence suggests that grit positively correlates with academic success, although its effect size is moderate. A meta-analysis by Credé et al. (2017) identified a correlation of $r = .18$ with academic performance and $r = .24$ with school retention, with perseverance of effort emerging as a stronger predictor than consistency of interests. Notably,

these associations persisted even after controlling for Conscientiousness, albeit with reduced strength. The utility of grit in high-stakes, long-duration contexts such as military training, national competitions, and elite academic environments has also been established (Datu et al., 2016; Eskreis-Winkler et al., 2014; Jandu & and Pradhan, 2025; Tang et al., 2019).

Mechanistically, grit appears to influence educational outcomes through pathways such as deliberate practise, sustained classroom engagement, and effort regulation (Muenks et al., 2017; Wolters & Hussain, 2015). These processes highlight the importance of motivational and self-regulatory components that allow students to persist in learning despite setbacks or competing demands.

Although initially conceptualised as a relatively stable trait, emerging evidence suggests that grit can be malleable. Interventions promoting growth mindsets and purpose-oriented learning have been shown to enhance grit-like behaviours among students (Yeager et al., 2014). Educational settings that combine high expectations with emotional support, such as authoritative classrooms, also appear conducive to grit development (Howard et al., 2021). Extracurricular activities that demand long-term commitment have similarly been implicated in fostering perseverance (Duckworth & Yeager, 2015).

Nonetheless, grit has not been without critique. It has been argued that grit may be conceptually redundant with Conscientiousness (Credé, 2018), and that its measurement instruments may primarily capture effort rather than passion (Muenks et al., 2017). Moreover, critics have highlighted its potential to obscure structural inequalities by overemphasising individual effort (Ris, 2015). In response to these limitations, conceptual refinements have emerged. Duckworth and Gross (2014) have differentiated grit from self-control, suggesting that grit is uniquely aligned with long-term goal pursuit, while more recent models have introduced

flexibility as a key dimension to distinguish grit from rigid persistence (Tang et al., 2019). Contextual and momentary expressions of grit have also been examined to understand their dynamic nature (Clark & Plano Clark, 2019; Schmidt et al., 2017). Taken together, these debates illustrate that grit remains an evolving construct within personality and motivational research, and its distinctiveness continues to be empirically examined rather than assumed.

2.5. Academic Achievement in Secondary School Students

Academic achievement represents a key developmental outcome in adolescents, particularly during the secondary school year, where students begin to follow increasingly differentiated education pathways. These outcomes, assessed cumulatively through grade point average (GPA), standardised test scores, and subject-specific performance, serve as critical indicators of a student's readiness for post-secondary education, vocational training, or workforce entry. Academic performance during this stage reflects immediate educational success and shapes long-term opportunities and life trajectories (Huang, 2015). While intelligence is widely acknowledged a significant predictor of academic achievement does not fully explain the variance in student performance. It was estimated that cognitive abilities can explain between 25% and 50% of educational achievements, suggesting that other factors, such as various individual non-intellective factors, may have a meaningful impact on academic progress (Deary et al., 2007; Roth et al., 2015). Therefore, there is an increasing interest in identifying which factors other than IQ may influence academic achievement during adolescence.

Among the Big Five *personality traits*, Conscientiousness consistently predicts academic achievements (Poropat, 2009). It is related to effort, organisation, and goal-directed behaviour, critical for success in structured school environments (Spengler et al., 2016). Komarraju et al. (2011) demonstrates that Openness shows a modest positive relationship with adaptive

outcomes, with correlations typically around $r = .20$, Emotional Stability and Extraversion show mixed or weaker associations, with effect sizes generally ranging from $r = .10$ to .15, indicating smaller and less consistent effects on the measured outcomes. Longitudinal evidence further suggests that increases in Conscientiousness during adolescence contribute to academic improvement (Damian et al., 2019). Moreover, recent longitudinal studies highlight a bidirectional dynamic between personality change and academic achievement (Brandt et al., 2020; Israel et al., 2019). For example, changes across school years have been associated with change in both Conscientiousness and Extraversion. These findings suggest that personality serves as both a predictor and outcome of academic development, highlighting the need to consider personality as a dynamic asset that changes during schooling. Thus, this dynamic interplay between personality and academic outcomes warrants further exploration, which will be addressed in the discussion chapter.

Grit, defined as perseverance and passion for long-term goals, has been linked to academic success (Duckworth et al., 2007). However, meta-analytic evidence suggests that grit overlaps substantially with Conscientiousness and contributes limited incremental predictive value for academic outcomes (Credé et al., 2017). Among its components, perseverance of effort appears to be more associated with achievement than consistency of interests (Muenks et al., 2017). Longitudinal research suggests that grit is developmentally dynamic. For instance, Postigo et al. (2021) observed that grit levels tend to decline during secondary school, and this decline is often accompanied by a drop in academic performance, especially in mathematics and science. However, students who maintain high levels of grit are more likely to avoid academic failure, suggesting that grit can function as a protective factor during this period. Interestingly, other studies report increases in grit with age. For instance, Park et al. (2018) found that middle

school students showed increases in grit over time, which in turn predicted academic improvement. These findings support the view of grit as a malleable and context-sensitive trait rather than a fixed disposition.

SEB skills, such as emotional regulation, self-management, promote classroom engagement and persistence (Durlak et al., 2011). High self-regulation is associated with better academic achievement (Moffitt et al., 2011), while emotional resilience protects against academic disengagement (Bernal-Morales, 2018). These competencies change over time and can be strengthened through targeted intervention. Longitudinal studies have shown that growth in SEB skills predicts improvements in academic achievement, particularly when these skills are fostered within supportive school environments (Soto et al., 2022; Taylor et al., 2017). As teachable and dynamic traits, SEB skills serve as critical levers for promoting long-term educational success.

Subjective well-being has been increasingly recognised as an outcome of and a contributor to academic success during adolescence. Longitudinal studies have shown that increases in life satisfaction and positive affect predict greater academic motivation, engagement, and performance over time, while negative affect may hinder these outcomes by undermining concentration and persistence (Bücker et al., 2018; Datu & King, 2018; Steinmayr et al., 2019) Conversely, academic success can also contribute to improved well-being by enhancing self-efficacy, satisfaction, and optimism, supporting a bidirectional model of influence. For instance, Bücker et al. (2018) found reciprocal effects between academic achievement and life satisfaction in adolescents across multiple time points. These dynamic association are practically relevant in

secondary schools, a period marked by increasing academic pressures and emotional changes and where students' well-being are closely intertwined.

In sum, evidence suggests that academic achievement in secondary school can be shaped by various non-intellective factors such as Conscientiousness (Poropat, 2009), grit (Credé et al., 2017), SEB skills (Durlak et al., 2011), and well-being (Datu & King, 2018). These factors are not static but rather tend to change, especially during the transitional period of adolescence (Damian et al., 2019; Postigo et al., 2021). They are also influenced by various social and environmental factors such as the school environment, parental and peer relationships (Jones et al., 2019). Understanding these dynamics is critical for identifying the students' higher risk of underachievement and for designing targeted interventions that support improved academic achievements in diverse socio-economic school environments.

2.6. Context of Secondary Education in Saudi Arabia

The Saudi Arabian secondary education system, spanning grades 10 to 12 (ages 15 to 18), provides a distinctive cultural and institutional context for examining non-intellective factors and well-being during a critical period of personality and psychological development (Dosman et al., 2012). Unlike Western education systems where personality and socio-emotional development research is more established (Ranga & Etzkowitz, 2015), the Saudi context is characterised by distinct educational, cultural, and policy-based frameworks that meaningfully affect student development. One such feature is the country's highly centralised education system, which includes standardised curricula and strong governmental control over instructional content and delivery. Another defining characteristic is gender-segregated schooling, wherein male and female students attend separate institutions with distinct social dynamics and potentially

differing pedagogical approaches. This division is likely to produce divergent developmental pathways in personality and motivation, as socialisation experiences and peer interactions vary meaningfully by gender (Algraini & McIntyre-Mills, 2019; Alharbi, 2023).

Furthermore, the cultural and religious underpinnings of the Saudi educational system place a strong emphasis on academic achievement and moral instruction. Teaching methods tend to reflect a collectivist orientation, often prioritising respect for authority and group cohesion over individual autonomy and self-expression. Such conditions are likely to influence how traits such as Extraversion, Openness, and self-regulation are nurtured or constrained within the school environment. This stands in contrast to the more individualistic pedagogies prevalent in Western contexts, which are generally more conducive to fostering traits linked to personal initiative and creative exploration (Matsumoto, 2019).

In recent years, the launch of Saudi Arabia's Vision 2030 reform agenda has catalysed substantial transformation within the educational sector (Kingdom of Saudi Arabia, 2016). Education reform under Vision 2030 explicitly prioritises curriculum modernisation, the integration of 21st-century competencies, and the development of critical thinking, problem-solving, and creativity as central pillars of national human capital development (Alghamdi, 2020; Alhowail & Albaqami, 2024). These reforms are situated within a broader strategy to align educational outcomes with the demands of an increasingly diversified and innovation-driven economy. Initiatives have also focused on teacher professional development and the adoption of educational technologies (Ministry of Education, 2022). However, the transition from a predominantly content-focused model to a skills-oriented framework remains ongoing, and its implications for students' non-intellective development warrant further empirical investigation.

The secondary school years in Saudi Arabia are particularly high-stakes, as academic performance during this period largely determines students' access to higher education and future career opportunities. Within this pressure-laden environment, shaped by cultural expectations, high-stakes assessments, and systemic reforms, students must navigate important emotional and motivational challenges (Mancenido, 2024).

Figure 2.1

Key Educational Reform Initiatives Under Vision 2030

In Figure 2.1, the visual representation highlights the main educational priorities under Vision 2030, curriculum modernisation, critical thinking, teacher development, and 21st-century skills, and illustrates their connection to secondary education outcomes and students' future opportunities. It situates the current research within the broader national reform context.

2.7. Summary of Key Findings from Literature

Research on personality development and other non-intellective factors has highlighted their critical role in educational and life trajectories, while also revealing several gaps that

require further investigation. Research confirmed that personality traits, though relatively stable, undergo considerable change during key developmental phases, particularly adolescence (Roberts et al., 2017; Schwaba & Bleidorn, 2018). These changes, however, are not uniform, underscoring the importance of studying individual variability in personality development.

Personality traits and other non-intellective factors are strongly linked to not only academic performance but also various well-being outcomes (Durlak et al., 2011; Poropat, 2009). While some longitudinal research exists, there remains limited insight into the reciprocal interactions between these traits and outcomes during specific educational transitions, particularly at the micro-level of developmental change. Research increasingly demonstrates that non-intellective factors exhibit context-dependent fluctuations around individual trait levels, indicating their dynamic and situational nature (Fleeson, 2009; Sherman et al., 2015; Minbashian et al. 2010). However, few studies integrate both trait and state perspectives to examine their joint influence on educational outcomes during critical developmental periods (Beckmann et al., 2021).

Educational settings have a substantial influence on the development of non-intellective factors. Warm, structured and autonomy-supportive settings promote adaptive personality changes and psychological well-being (Chen et al., 2021; Guoxia & Yang, 2024). Despite this, most research focuses on broad classroom characteristics, with insufficient attention to the micro-level practises that shape student development. Cultural and socioeconomic contexts influence the expression and significance of non-intellective factors. While some patterns appear universal, others differ markedly across settings (Arcila-Agudelo et al., 2023; Chen et al., 2015). Yet, the predominance of research in WEIRD societies limits generalisability, calling for more culturally diverse studies and inclusive intervention models. These findings highlight the need

for longitudinal, culturally grounded, and methodologically diverse approaches to fully understand their development and impact.

Chapter 3. From theory to research design

This chapter establishes the theoretical frameworks informing the study, identifies critical gaps in the existing literature, and explains how this thesis contributes both empirically and theoretically to the field. The overarching aim is to demonstrate how this research addresses an underexplored area of adolescent development by integrating longitudinal and situational perspectives, thereby offering insights that are both academically robust and practically actionable.

3.1. Theoretical Framework Integration

Building on the comprehensive theoretical review in Chapter 2, this study employs an integrative framework that combines perspectives from personality psychology, developmental science, and educational research. The framework rests on the following key theoretical pillars:

3.1.1. Dynamic Personality Development

The understanding that personality traits, while relatively stable, undergo meaningful change during adolescence through environmental interactions and repeated state experiences. The TESSERA model (Wrzus & Roberts, 2017) provides the theoretical foundation for examining how daily experiences accumulate into longer-term trait development, particularly relevant during the transformative secondary school years.

3.1.2. Subjective Well-being

Following the hedonic tradition of well-being research (Diener et al., 1999) this study conceptualizes well-being through both life satisfaction and affective components (positive and negative affect). These elements interact dynamically with personality development during adolescence, creating reciprocal developmental pathways that warrant longitudinal investigation.

3.1.3. Grit

Grit is the ability to persevere and maintain a long-term passion (Duckworth et al., 2007). As indicated in Chapter 2 it can have moderate positive influence on adolescents' academic achievements. Considering widespread interest in its practical significance in educational settings Grit is one of the main non-intellective factors explored in the following study.

3.1.4. SEB Skills

SEB skills encompass emotion regulation, self-management, and social competence (Kankaraš & Suarez-Alvarez, 2019). They represent a core non-intellective factor in this study and are closely linked to both academic performance and well-being. Increasingly, these competencies are theoretically grounded and practically actionable, attracting growing policy interest in how they can be measured and cultivated in schools.

3.1.5. Contextual Sensitivity

This study adopts a situational perspective to understand how context influences personality and affect, as well as how it interacts with time. While the DIAMONDS framework (Rauthmann et al., 2014) serves as the primary model to conceptualise and measure situations, it is complemented by school-specific situation factors (e.g., teacher support, peer pressure) to reflect students' real-time experiences in a context-specific way. This combined approach supports a nuanced understanding of how specific features of students' educational environments influence their momentary psychological states and affective responses. Together, these theoretical perspectives enable a multi-layered investigation of personality variability and development across time, context, and in relation primarily to well-being outcomes, with academic achievement examined as a secondary exploratory outcome.

3.2. Critical Research Gaps and Limitations

Despite growing international interest in non-intellective factors, several critical gaps persist in the literature, particularly regarding adolescent development within non-Western educational contexts such as Saudi Arabia.

3.2.1. Longitudinal Evidence in Saudi Educational Context

While several cross-sectional studies have identified associations between personality traits and academic achievement in Saudi university students, especially traits such as Openness, Conscientiousness, and Agreeableness (Abouzeid et al., 2021; ArulJothi et al., 2016; Sharahili et al., 2024), developmental trajectories and their predictive relationships with educational outcomes require a comprehensive longitudinal examination. International longitudinal research has shown that personality traits are associated with academic performance across adolescence. For example, Brandt et al. (2020), using a large nationally representative sample of German secondary-school students, demonstrated that the associations between Big Five traits and academic performance varied across school subjects and educational tracks, with Conscientiousness showing particularly strong relations in academically oriented tracks. Similarly, longitudinal evidence from the Luxembourg PISA extension indicated that Conscientiousness and Openness were consistently associated with subject-specific grades across several school years, although effects on changes in achievement over time were relatively modest after controlling for prior performance (Spengler et al., 2016). However, these findings are derived primarily from European educational systems and cohorts and therefore cannot be assumed to generalise directly to Saudi educational contexts, where differences in educational structures, cultural environments, and assessment practices may influence developmental patterns. Consequently, longitudinal research examining personality

development within Saudi secondary-school settings is needed to provide contextually relevant evidence that can inform culturally responsive educational practices and student support systems.

3.2.2. Integration of Trait and State

Most of the present studies focus on either trait or state but seldom combine them. It can be seen that temporary evaluation examines personality expressions in everyday situations, which shows that personality is contingent upon situational occurrences and reflects personality as a dynamic process rather than deterministic properties (Fleeson & Gallagher, 2009). State- or context-level models clarify the situational flexibility of personality expression, whereby individuals can adjust their personality expression to be congruent with the situation or environment of the context (Sherman et al., 2015). A combination of state and trait considerations enables the interpretation of both continuity and change, a crucial problem in personality development. Thus, the integration of trait and state perspectives is essential for comprehensively examining personality development during adolescence, particularly within educational contexts where situational variability in classrooms may contribute to personality change over time.

Furthermore, there is limited research exists for understanding of how momentary experiences accumulate to inform long-term personality development and educational outcomes. Theoretical frameworks such as Whole Trait Theory (Fleeson & Jayawickreme, 2015) provide foundations for examining how momentary experiences contribute to lasting individual differences, but empirical applications in educational contexts remain limited. Perhaps most importantly, longitudinal studies tracking personality development through adolescence in Saudi Arabia are missing, an omission crucial to understanding long-term change.

3.2.3. Cultural and Contextual Considerations

The predominance of Western-derived models in personality and educational psychology raises important questions about cultural applicability in Saudi Arabia's unique context. Several culturally-specific factors require consideration:

For instance, gender-segregated schooling creates distinct socialisation experiences that may differentially influence personality development trajectories. Religious values and practices, rooted in Islamic traditions, may shape personality development through their influence on moral reasoning, social behaviour, and identity formation (Almalki, 2022). Vision 2030 educational reforms emphasising 21st-century skills and holistic student development create a changing educational landscape that may influence how non-intellective factors develop and manifest compared to previous generations.

3.3. Non-Intellective Factors Integrations

Limited research examines personality traits, grit, SEB skills, and well-being as an integrated system of non-intellective factors. These constructs are conceptually interrelated and often operate together to influence academic and developmental outcomes, yet most studies examine them in isolation., and their exploration within the Saudi education system also remains limited.

3.3.1. Integration and Study Contribution

These non-intellective factors are conceptually interrelated and often operate together to shape academic and developmental outcomes. SEB skills such as emotional regulation and perseverance may underpin expressions of grit, while personality traits and emotional well-being influence students' responses to academic and social challenges. Studying these factors together

provides a more holistic understanding of the psychological resources that support success and adaptation during adolescence, particularly in culturally unique settings such as Saudi Arabia.

This study addresses these limitations by: (A) employing longitudinal data to track non-intellective factor development over time, (B) focusing specifically on adolescents in Saudi secondary schools, (C) examining grit, SEB skills, and well-being comprehensively to understand their growth trajectories, (D) exploring their relationships with student well-being, and their exploratory associations with academic achievement within the Saudi cultural context, and (E) using culturally sensitive methodological approaches that account for the unique characteristics of Saudi educational environments.

3.4. Research Questions and Objectives

While this thesis examines multiple non-intellective factors, the primary theoretical and empirical emphasis is placed on personality (traits and states) and well-being (including life satisfaction, positive and negative affect). These constructs were prioritised in Study 1 (systematic review) due to the strong theoretical and empirical focus on the dynamic relationship between personality change and well-being outcomes. Grit, SEB skills, and academic achievement are incorporated into Study 2 (empirical study) to provide a more comprehensive and contextually grounded understanding of student development.

3.4.1. Phase One: Systematic review

1. **Research question** 1: *What do longitudinal studies reveal about the relationship between personality traits and well-being outcomes in adolescents?*
    a) Objective: To critically synthesise the longitudinal evidence linking personality development with well-being in adolescence, with particular attention to

developmental trajectories of personality, methodological limitation in existing studies, and contextual moderators such as school climate, family relationships, and life events.

3.4.2. Phase Two: Empirical investigation

2. **Research question** 2: *How do personality traits, grit, SEB skills, life satisfaction, and positive/negative affect change over time in Saudi secondary students?*
    a) Objective: To model individual developmental trajectories of non-intellective factors using growth curve modelling.
3. **Research question 3:** *Do trajectories of personality traits, grit, SEB skills, life satisfaction, and positive/negative affect predict well-being outcomes and their exploratory association with academic achievement?*
    a) Objective: To assess whether the intercept and slope of non-intellective factors are associated with students' well-being, and exploratorily with academic achievement.
4. **Research question 4:** *How do situational characteristics influence momentary personality states, emotional experiences, and well-being in daily school contexts?*
    a) Objective: To examine within-person variability using ESM data, testing the impact of situation features on momentary expressions of personality and emotional responses.
    b) Objective: To explore whether average momentary experience, as captured though ESM, are associated with longer-term change and level in personality traits and well-being across the study period.

Together, these questions enable investigation of both stable developmental trends and context-sensitive variability, providing a more comprehensive picture of how non- intellective factors shape the educational journey of adolescents.

3.5. Summary

The chapter established the rationale for investigating personality development, other non-intellective factors and academic achievement in Saudi secondary schools by identifying important gaps in longitudinal research and justifying the methodological approach employed in the study. So, the study addresses these gaps through a two-study design combining a systematic literature review and a 17-month longitudinal investigation including an 8-day ESM protocol (16 measurement occasions) for contributing to theoretical understanding and generating insights with practical implications for educational policy and practice in Saudi Arabia.

Chapter 4. Study 1- Trajectories of Personality Change and Well-being Outcomes: A Narrative Systematic Review

4.1. Introduction

This chapter presents a systematic review that synthesises longitudinal evidence on the relationship between personality development and non-intellective outcomes, with focus on well-being. The review focuses on secondary school students and explores how changes in personality over time are associated with well-being outcomes such as life satisfaction and emotional adjustment. As highlighted in the literature review (Chapter 2), adolescence is a period of considerable personality plasticity, yet longitudinal research linking personality change to well-being outcomes remains limited. While interest in non-intellective factors such as personality, motivation, and emotional health has grown, existing literature is often fragmented and lack synthesis across developmental studies. This review was therefore undertaken to address that gap and to provide a clearer picture of how personality traits change during adolescence and how they relate to well-being. The review provides an essential foundation for the empirical investigation presented in Chapter 5. The chapter outlines the objectives of the review, the methodological procedures, and the main findings, concluding with a discussion of their implications for future research, educational practice, and policy development[1].

4.2. Study Rationale

A number of studies have explored the relationships between personality traits and non-intellective outcomes during adolescence. Traits such as conscientiousness, openness, and

[1] This systematic review has been submitted for publication and is currently under peer review.

Emotional Stability have been found to be associated with educational and social outcomes (Chen et al., 2015; Spengler et al., 2016). However, the specific ways personality trajectories develop over time and how they are associated with and influence non-intellective educational outcomes have not been comprehensively studied. This systematic review aims to synthesise evidence regarding the relationship between personality change and non-intellective outcomes, specifically well-being, which involves life satisfaction and emotional well-being (positive/negative affect). This study also aims to identify potential moderators of adaptive or maladaptive personality changes and their associations with these non-intellective outcomes. In this study, the term 'outcomes' refers to the various results or consequences of schooling and education as measurable at the person level, extending beyond traditional achievement measures such as grades and test scores. The spectrum of these outcomes is broad, including developing social, emotional, and behavioural skills that contribute to overall well-being and future success. This review might provide valuable insights for researchers, practitioners, and policymakers concerned with promoting positive development, improving well-being, and supporting life satisfaction and emotional growth in adolescents within the context of secondary education.

4.3. Objectives

- To investigate the relationship between personality change and non-intellective outcomes in secondary school students.
- To identify and synthesise evidence of trajectories of personality change and development in secondary school students.
- To explore the moderating factors influencing the relationship between personality change and non-intellective outcomes in secondary school students.

4.4. Methods

4.4.1. Protocol and Search Strategy

The systematic review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses standards and checklist (Moher et al., 2009; see Appendix A). The literature search included journal articles and dissertations (including grey literature). A comprehensive search was conducted in electronic databases, including ERIC, PsycINFO, EBSCOhost, the Web of Science and grey literature, using keywords related to personality change/development, non-intellective outcomes such as well-being, life satisfaction, and emotion, and secondary schools. The initial search was carried out in November 2023, with the same search terms used again in November 2024 to identify any newly published, relevant studies. References within systematic reviews and eligible studies were searched to find additional studies meeting the inclusion criteria. The searches were limited to studies published in English, with no restriction on the year of publication.

Terms included (Personality change OR personality development OR personality malleability OR personality variability OR personality growth) AND (character* OR attitude* OR personality* OR behaviour* OR emotional) AND (well-being OR well-being OR mental health OR positive psychology OR emotion OR Life Satisfaction) AND (secondary schools OR adolescents OR students OR teenager) AND (longitudinal OR cohort OR repeat OR retest OR "retest" OR varia* OR stab* OR "pre-post" OR “pre post” OR “over time” OR change* OR prospective OR “follow up” OR “follow-up” OR “multi-wave” OR “multi wave” OR trajectory* OR track* OR trend* OR dynamic OR predict* OR progress*).

4.4.2. Inclusion and Exclusion Criteria

The searches and articles were organised and screened using the Rayan application to assist researchers in managing enormous volumes of literature by enabling title and abstract screening, allowing one to track the progress of the screening process efficiently. Inclusion and exclusion criteria are presented in Table 4.1. For the study to be selected for further reading, abstracts had to indicate that the study was longitudinal, included adolescents aged 12-19 years, were studies that examined psychometric personality (and change in personality over time) and their relationship with non-intellective outcomes (e.g., well-being) and/or the moderating factors that influence personality change and non-intellective outcomes. This age group was specifically chosen to cover the secondary school period prior to entry into tertiary education capturing a critical developmental phase. If the abstract stated that the study was longitudinal but unclear on the number of measurement points, it was chosen for further review.

The systematic review included studies with observational designs, such as cohort and prospective observational studies, all of which are longitudinal and non-experimental. This included studies that examined the relationship between personality change and non-intellective outcomes, specifically subjective well-being (e.g., life satisfaction and emotional well-being) among adolescents, longitudinal studies of students in secondary schools, studies that used validated measurement instruments to assess personality (and personality change) and the selected non-intellective outcomes. The interval between measurement points was not restricted. Only English-language studies published in peer-reviewed journal articles and doctoral dissertations were included.

Intervention studies were excluded. Additionally, cross-sectional studies and meta-analyses were not included in the review. Studies for which the full text was unavailable, and

editorials, letters, case reports and guidelines were not included. In addition, studies that presented their findings in any language other than English were excluded. Finally, in terms of outcome measure exclusions, studies that did not report the relationship between personality change and non-intellective outcomes, specifically SWB, were excluded. Inter-rater reliability was ensured through independent coding by two reviewers, with any disagreements resolved through discussion.

Table 4.1
Inclusion and Exclusion Criteria

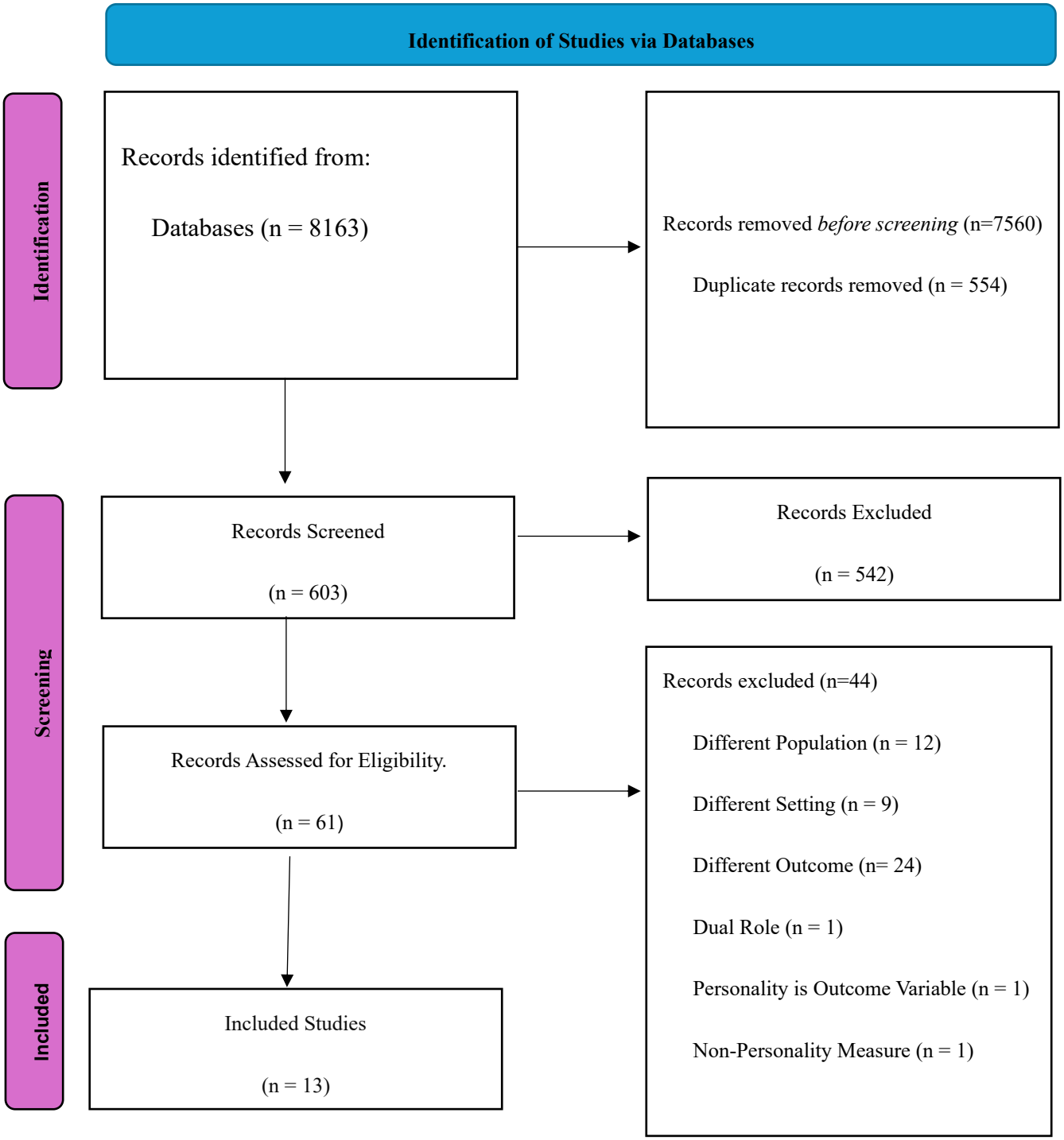
Criteria type	Inclusion Criteria	Exclusion Criteria
Study Design	Longitudinal studies, cohort studies and research that examines the relationship between personality change and non-intellective outcomes.	Cross-sectional studies that do not examine within-person personality change over time. Case reports, case series, editorials, commentaries, and conference abstracts. Medical studies.
Participants	Secondary school students, adolescents, ages 12 and 19 years	Adults, children, and studies that focus on participants outside of the 12-19 age range
Topic	Personality change, development, malleability, growth	Unrelated topics, irrelevant subjects
Variables	Personality, attitude, behaviour, emotional factors	Irrelevant variables, unrelated factors
Outcome	Well-being, mental health, life satisfaction and emotion	Irrelevant outcomes, unrelated measures
Methodology	Prospective studies, multi-wave data collection using quantitative measures	Retrospective studies, single data point studies, studies using exclusively qualitative measures
Publication	Peer-reviewed articles, academic journals	Non-academic sources, conference abstracts
Language	English language	Non-English language
Publication Year	No restrictions	

4.4.3. Study Selection Process

The titles and abstracts were initially examined for relevance by two reviewers, with 20% of the studies being independently double-coded to ensure consistency. Entire texts were then

evaluated for eligibility. Disagreements on inclusion/exclusion were solved by further discussion between the reviewers. A total of 8163 records were identified through the database search. After removing 554 duplicates, 603 records remained for title and abstract screening. Following a full-text screening by two reviewers, 542 articles did not meet the eligibility criteria. In addition, following a full-text analysis of 61 studies by two reviewers 44 studies were excluded based on ineligible population, setting, and/or outcome measures. Overall, 13 studies that provided longitudinal data on the relationship between personality change and non-intellective outcomes were included. Search records are presented in a PRISMA chart in Figure 4.1.

Figure 4.1
PRISMA Flow Chart



4.4.4. Data Extraction

The extracted data included citations (author and year), study objectives, study designs, countries, populations (sample size, age, and gender), outcomes and outcome measures, measures of personality and personality change, study results, and the theoretical frameworks used. After synthesising the data from all studies, a descriptive information form was developed. This form detailed the following: author and year of each study; personality constructs examined; factors considered; sample size; mean age or age range; and gender distribution.

The quality assessment of the included studies was conducted using the Quality Assessment 'sieve' appraisal tool (Gorard, 2024). This method evaluated the strength of research questions, the number of cases, the impact of missing data on findings, and the use of standardised, independent, and accurate measures. Each study was rated in terms of trustworthiness on a scale from 0 (low quality) to 4 (high quality). The suitability of the study design was assessed in line with the guidelines set out by Gorard (2024). For longitudinal studies, data collection needed to occur at least twice to ensure that the data could be meaningfully compared. Studies were evaluated based on participant numbers, with larger sample sizes deemed more robust, while those with substantial missing data were assessed as less robust. The quality of measurement was also considered, with higher ratings given to studies employing standardised and validated measures. Importantly, the quality assessment aimed to evaluate methodological rigor rather than to exclude studies.

4.4.5. Synthesis of Study Results

The selected longitudinal studies for this systematic review varied considerably in their personality measures, number of measurement points, statistical modelling, and assessment of outcomes; therefore, a narrative synthesis approach was employed to account for this variability.

Due to the complexity of capturing personality change and its association with non-intellective outcomes, a narrative review is well-suited for this study to explore relationships and emerging patterns that are challenging to quantify (Baumeister & Leary, 1997; Green et al., 2006). Through this method, the multifaceted nature of the longitudinal data was organised into narratives, providing a comprehensive understanding of how personality traits and trait trajectories interact with non-intellective outcomes in secondary school students. This approach allowed to investigate recurring themes, conflicting results and potential moderators.

4.5. Results

4.5.1. Study Characteristics

The characteristics of the included studies are presented in Table 4.2. Participant age across these studies ranged from 12 to 19 years, with sample sizes ranging from small cohorts (N < 200) to large-scale studies (N > 3000), and the percentages of female participants ranged from 41% to 76%. All studies collected longitudinal data, given the inclusion and exclusion criteria. The geographical locations of the studies varied, but most were conducted in Europe: the Netherlands (*N* = 3), Sweden (*N* = 2), Germany (*N*= 2), Czech Republic (*N*= 1) and Belgium (*N* = 1). The remaining studies took place in the United States (*N* = 2) and in other regions of the world: Japan (*N* = 1), and Australia *(N* = 1).

4.5.2. Quality Assessment

Assessing the quality of the included papers is crucial in systematic reviews. A quality assessment of included studies was conducted based on study design, sample size and selection, data collection methods, data analysis rigor and transparency of reporting (Gorard, 2024). A summary of the assessment is presented in the supplementary Appendix B. Almost all of the

studies had a low risk of bias. The majority of studies employed a strong ($N = 9$) or Adequate ($N = 3$) design in terms of aim, while only one study had a weak design. Regarding their scale (sample size), all studies ($N = 13$) had an adequate number of participants (>100), out of which six studies had a large number of participants (>1,000). Only one study had minimal study participants withdrawn (likely no impact on the findings). While seven studies reported some participants withdrawing, two studies had a moderate loss of participants. Three of the studies had a high amount of participants disengagement (clear impact on the results). In terms of measurement quality, all the reviewed studies employed standardised, independent, and accurate measures. The total rating of the Quality Assessment for trustworthiness indicates that two study scored as high quality (4). Six studies scored as reasonably strong (3), two studies had moderate issues (2), and three studies exhibited serious flaws (1). All 13 studies were retained to provide a comprehensive overview. Notably, three studies that received a low score (1 point) were not excluded, as their ratings reflected a high level of missing data at follow-up rather than methodological flaws, small sample sizes, or issues with measurement quality. Given the longitudinal nature of these studies, the data loss rate was considered an acceptable limitation, and all studies were included in the final analysis.

Table 4.2

Study Characteristics

Author (Year)	***Study Objectives***	***Country***	***Study design***	***Population (Age, Gender, Sample Size)***	***Personality trait measure***	***Outcome Measures***	***Relationship between personality trait and measured outcome***	***Trajectories of personality traits (If measured)***	***Moderating factors (If measured)***
(Arslan et al., 2023)	To examine whether individual differences in personality development were associated with burnout and happiness in emerging adulthood.	Belgium	Observational longitudinal cohort study that followed the same individuals over time. Data were collected at four time points: 2009, 2012, 2015, and 2018.	N_{T1} = 449 N_{T2} = 438 N_{T3} = 387 N_{T4} = 367 Age range: T1-T4= 15.82-24.82 years 56.9 % females 43.1% males,	Hierarchical Personality Inventory for Children (HiPIC)	Burnout and happiness	↑ levels of all personality dimensions (except benevolence) were associated with ↓ burnout symptoms. ↑ levels of all personality traits predicted greater happiness in emerging adulthood.	On average, adolescents became < extraverted and < emotionally stable from mid-adolescence to emerging adulthood. On average, adolescents became > benevolent, conscientious, and imaginative.	Not measured.
(Borghuis et al., 2020)	To examine Big Five personality trait stability, change, and co-development in friendship and sibling dyads from age 12 to 22.	The Netherlands	Observational longitudinal cohort study that followed the same individuals over time. Data were collected at six to seven measurement waves from ages 12 to 22 years.	N=681 M_{age}: 12-22 years Average age: 13.5 to 16.5 years. 50.6% females 49.4% males	Shortened Dutch version of Goldberg's Big Five Questionnaire	Big Five personality trait stability and change	↑ neuroticism was associated with > negative daily experiences, both negative affect and conflicts. Bidirectional relationship between within -person neuroticism and daily negative affect. ↑ than typical levels of conflict with a best	Not measured.	Not measured.

Author (Year)	*Study Objectives*	*Country*	*Study design*	*Population (Age, Gender, Sample Size)*	*Personality trait measure*	*Outcome Measures*	*Relationship between personality trait and measured outcome*	*Trajectories of personality traits (If measured)*	*Moderating factors (If measured)*
							friend showed a ↑ neuroticism over time.		
(Galla et al., 2020)	To examine the development of one dimension of mindfulness, non-reactivity to difficult inner experiences in a racially and socioeconomically diverse sample.	United States	Observational longitudinal cohort design that followed the same individuals over four waves of data collection between 2014 and 2016.	*N*=878 M_{age}: 14.7 years 59% females 41% males	Nonreactivity to Inner Experiences Subscale of the Five Facet Mindfulness Questionnaire (FFMQ)	Nonreactivity. Perceived stress, positive and negative affect	↑ initial nonreactivity was associated with ↓ perceived stress and ↑ positive affect. Increases in nonreactivity predicted subsequent ↓ stress and ↑ positive affect, but not necessarily reductions in negative affect.	Nonreactivity to inner experiences increased during adolescence.	Not measured.
(Garcia & Moradi, 2012)	To examine the relation between temperament and character with subjective well-being at two points in time over a year in an adolescent.	Sweden	Observational longitudinal cohort design that followed the same individuals at two time points over one year; one each at the beginning and end of the school year.	*N*=109 M_{age}: 16.56 years 57 males 52 females	Cloninger's Temperament and Character Inventory (TCI) Focused on Persistence and Self-directness	Subjective well-being, which encompasses life satisfaction (LS), positive affect (PA), and negative affect (NA) as key constructs	Two dimensions of temperament (novelty seeking and harm avoidance) significantly counter predicted SWB at T1. Self-directedness showed significant predictive effect on SWB at the beginning of the school year (T1). Only self-	Not measured.	Not measured.

Author (Year)	*Study Objectives*	*Country*	*Study design*	*Population (Age, Gender, Sample Size)*	*Personality trait measure*	*Outcome Measures*	*Relationship between personality trait and measured outcome*	*Trajectories of personality traits (If measured)*	*Moderating factors (If measured)*
							directedness predicted SWB at T2.		
(Hatano et al., 2023)	To identify the patterns of personality development and examine the relationship between these patterns and psychosocial functioning among Japanese adolescents.	Japan	Observational longitudinal design with data collected at four different time points over four years (from 2013 to 2016). It followed the same individuals.	N_{T1}=618 N_{T2}=438 N_{T3}=357 N_{T4}=212 M_{age}: 16 years T1-49.5% females T2-53.7% females T3-52.9% females T4-50.5% females	Japanese version of the NEO Five-Factor Inventory (NEO-FFI)	Subjective well-being, assessed through the Subjective Happiness Scale (SHS) and the Satisfaction with Life Scale (SWLS)	Vulnerable & moderate patterns showed positive changes toward maturity from middle to late adolescence. Resilient adolescents exhibited ↑ subjective well-being and ↓ psychosocial problems compared to other patterns. Over-controlled adolescents faced ↑ internalising problems, while vulnerable adolescents had ↓ subjective well-being.	Not measured.	Not measured.
(Israel et al., 2023)	To examine the longitudinal interplay between school experiences and the Big	Germany	Observational longitudinal cohort design that followed the same individuals across four measurement	*N= 3,473* *Age T1= 11.1* *Age T4=14* *Gender = 45%* female	Big Five Inventory (BFI)	Students' achievement, social relationships, and well-being in school.	↑ neuroticism was associated with ↓ positive friendships, ↓ teacher support, ↓ well-being in school, and ↓ school belonging.	Not measured.	Not measured.

Author (Year)	*Study Objectives*	*Country*	*Study design*	*Population (Age, Gender, Sample Size)*	*Personality trait measure*	*Outcome Measures*	*Relationship between personality trait and measured outcome*	*Trajectories of personality traits (If measured)*	*Moderating factors (If measured)*
	Five personality traits during adolescence.		points (grades 5-8), analysed using bivariate latent growth curve and cross-lagged panel models.				↑ extraversion was associated with ↑ achievement, > positive friendships, ↑ teacher support, ↑ well-being in school, and ↑ school belonging.		
(Kanacri et al., 2013)	To examine the development of self-reported prosociality from adolescence to early adulthood and its prediction from teacher-reported effortful control at age 13.	Italy	Observational longitudinal design with data collected at eight different time points over nine years (from 1994 to 2004). It followed the same individuals.	*N*=573 M_{age}: T1-12.98 years T2 -21.23 years 48% females 52% males	Teacher Report Form (TRF) Focused on Effortful Control (EC)	Self-reported personality (tendency to enact prosocial behaviours) and teacher-reported effortful control (dispositional regulation)	Under-controllers showed ↓ stability, fewer adolescents remained under-controllers over time.	73.5% of adolescents remained in the same personality type across the five waves. Transitions showed significant movement from over-controllers and under-controllers to resilient, indicating personality maturation over time.	Not reported.

Author (Year)	*Study Objectives*	*Country*	*Study design*	*Population (Age, Gender, Sample Size)*	*Personality trait measure*	*Outcome Measures*	*Relationship between personality trait and measured outcome*	*Trajectories of personality traits (If measured)*	*Moderating factors (If measured)*
(Lyons et al., 2013)	To explore the psychosocial mechanisms of change associated with differences in levels and linear change of adolescents' global life satisfaction across a 2-year time period.	United States	Observational longitudinal design with data collected at three different time points over two years. It followed the same individuals.	N_{T1}=1201 N_{T2}=689 N_{T3}=570 M_{age}: T1-13.81 T2-14.74 T3-15.79 years *Gender* = T1-62% T2-63% T3-64% females	Abbreviated Junior Eysenck Personality Questionnaire (JEPQR-A) Focuses on Extraversion and Neuroticism	Stressful Life Events, Child Behaviour, Life Satisfaction	Extraversion showed positive relationship with life satisfaction, unlike to neuroticism.	Not reported.	Stressful life events were negatively associated with both internalising (anxiety, depression) and externalising problems (aggression, delinquency).
(Meeus et al., 2011)	To examine the change and stability of three personality types (over-controllers, under-controllers, and resilients)	The Netherlands	Observational longitudinal cohort design with five measurement waves following the same individuals.	*T1* = 1313 *T2*= 1313 *T3*= 1293 *T4*= 1292 *T5*= 1275 *Age* = 12-20 years *Gender* = 468 boys (50.7%) and 455 girls	Short version of Big Five	Anxiety levels and the formation of intimate relationships	Resilients showed ↑ stability and ↓ levels of GAD over time. Over-controllers showed ↑ level of anxiety compared to resilients, and slower formation of intimate relationships.	Same as Kanacri et al., 2013	Not reported.

Author (Year)	*Study Objectives*	*Country*	*Study design*	*Population (Age, Gender, Sample Size)*	*Personality trait measure*	*Outcome Measures*	*Relationship between personality trait and measured outcome*	*Trajectories of personality traits (If measured)*	*Moderating factors (If measured)*
				(49.3%). This included 923 participants (70.3%) in the early-to-middle adolescent cohort and 390 participants (29.7%) in the middle-to-late adolescent cohort					
(Porubanova-Norquist, 2012)	To examine personality predictors of life satisfaction in Czech adolescents, focusing on how these predictors change over a three-year period	Czech Republic	Observational longitudinal design with two time points, following the same participants over three years.	*T1= 173* *T2= 173* *Age= 15-18* *Gender = 98 girls and 75 boys.*	Cloninger's Temperament and Character Inventory (TCI)	Life satisfaction	No significant difference was observed in life satisfaction in two groups. In 15-year-olds self-directedness, persistence, cooperativeness was positively correlated with life satisfaction, whereas harm avoidance was negatively correlated with life satisfaction. In the 18-years-old group the correlations with life satisfaction	Self-directedness increased and self-transcendence decreased at follow-up.	No differences were observed between boys and girls.

Author (Year)	*Study Objectives*	*Country*	*Study design*	*Population (Age, Gender, Sample Size)*	*Personality trait measure*	*Outcome Measures*	*Relationship between personality trait and measured outcome*	*Trajectories of personality traits (If measured)*	*Moderating factors (If measured)*
							were identified in self-directedness, Harm avoidance, reward dependence, cooperativeness and persistence.		
(Steinmayr et al., 2019)	To understand how mood and life satisfaction change during late adolescence and what variables may moderate these changes.	Germany	Observational longitudinal cohort design that followed the same group of adolescents over 30 months, with four measurement points from Grade 11 to Grade 13.	*T1* = 421 *T2*= 416 *T3*= 320 *T4*= 286 *Age average* 16.43 *Gender* = 476 German students, with 232 boys and 244 girls	German version of the NEO Five-Factor Inventory (NEO-FFI), specifically focusing on Neuroticism and Extraversion.	Mood and life satisfaction	Extraversion showed positive association with life satisfaction and mood. Neuroticism was negatively associated with life satisfaction and mood.	Not reported.	HISEI and gender were neither correlated with life satisfaction nor with mood at all measurement points. Intelligence was never associated with mood but displayed a small correlation with life satisfaction at T4. Students with ↑GPA at T1 showed positive association with ↑ life satisfaction. SES was not significantly associated with mood changes between groups, however, student with higher SES

Author (Year)	*Study Objectives*	*Country*	*Study design*	*Population (Age, Gender, Sample Size)*	*Personality trait measure*	*Outcome Measures*	*Relationship between personality trait and measured outcome*	*Trajectories of personality traits (If measured)*	*Moderating factors (If measured)*
									showed steady increase in their mood and students with lower SES showed u-inverted change pattern in mood.
(Winefield et al., 2015)	To explore the precursors during middlescence, of satisfaction with social support in young adulthood	Australia	Observational longitudinal cohort design with data collected at eight measurement points over ten years (2001–2012), following the same individuals from middlescence into young adulthood.	*T1*=2552 *T8*= 558 M_{age}:15.2 years 58% females 42% males	NEO-5 Personality Inventory Focused Neuroticism and Extraversion	Personality, Family cohesiveness, Parental support, Peer relationships, Victimisation/bullying, Social support	↑ neuroticism predicted poorer social support satisfaction at age 23. Extraversion did not significantly predict support satisfaction.	Not reported.	Family cohesiveness at the baseline was associated with higher satisfaction with social support at age 23.[2]

[2] Inclusion criteria were up to age 19; this study began in adolescence (Mage = 15.2) but follow-up extended to age 23.

Author (Year)	*Study Objectives*	*Country*	*Study design*	*Population (Age, Gender, Sample Size)*	*Personality trait measure*	*Outcome Measures*	*Relationship between personality trait and measured outcome*	*Trajectories of personality traits (If measured)*	*Moderating factors (If measured)*
(Winzer et al., 2021)	To examine associations and prospective effects of subjective well-being on personality traits and vice versa in a cohort sample of secondary school students in Sweden.	Sweden	Observational longitudinal design with data collected at two different time points over 15–18 months. It followed the same individuals.	*N*=446 Age range: 16–18 years 76% females 24% males	Big Five Inventory (BFI)	Subjective well-being, life Satisfaction with personality traits	↑ levels of extraversion, conscientiousness and agreeableness were associated with ↑ levels of SWB at both baseline and follow-up. ↓ levels of neuroticism were associated with ↑ levels of SWB at both time points. Neuroticism had the strongest negative association with SWB. Agreeableness had a significant prospective effect on SWB.	Not reported.	Not reported.

Note: N=Number of participants, M_{age}=Mean age, T=Time, ↑ = "higher" or "increase", ↓ = "lower" or "decrease", < = "less", > = "more".

4.5.3. Personality Change and Non-intellective Outcomes in Secondary School Student

Studies included in this review explored the relationship between personality change during adolescence and various non-intellective outcomes, including SWB, life satisfaction, burnout, interpersonal problems, perceived stress, social relationships, psychological well-being, depression and level of social support. Given that adolescence is a period of substantial personality development, these studies provide valuable insights into how evolving traits shape emotional resilience, stress management, and overall psychological well-being.

4.5.4. Personality Change and Subjective Well-Being

Seven studies explored the relationship between personality traits and SWB. The study by Arslan et al. (2023) analysed data from a Belgium study that explored personality traits and their relationship with burnout and happiness among 329 Belgian adolescents. The primary focus of the study was to explore whether changes in Big Five personality dimensions during adolescence influenced burnout and happiness at early adulthood. The authors applied the Oldenburg Burnout Inventory (OLBI) to measure exhaustion and disengagement as symptoms of burnout. In addition, life satisfaction and overall affect were measured using the Satisfaction with Life Scale (Diener et al., 1985) and the Positive and Negative Affect Scale (Watson et al., 1988). Research conducted by Porubanova-Norquist (2012) explored how personality traits (character dimensions from Cloninger's psychological model) predict life satisfaction among adolescents over three years. The study included 173 students and used Cloninger's Temperament and Character Inventory at two distinct time points: ages 15 and 18. Garcia and Moradi (2012) observed the relationship between two personality traits (temperament and character) and SWB in Swedish high school students (N = 109). Lyons et al. (2013) explored the impact of personality on life satisfaction using the Abbreviated Junior Eysenck Personality Questionnaire (JEPQR-A) and the Students' Life

Satisfaction Scale (SLSS) among 1201 US participants at three assessment points over two years. Similar research in Japan was done by Hatano et al., (2023) where personality traits and measured outcomes were observed among 618 adolescents at four data collection points during 2013 to 2015. In addition, the study by Steinmayr et al. (2019) explored whether Neuroticism and Extraversion impacted SWB among 476 adolescents in Germany. To measure SWB and personality traits over a 30-months period they used the Habitual SWB Scale (HSWBS) and the NEO Five-Factor Inventory (NEO-FFI). Finally, a study from Sweden used the Big Five inventory (BFI) to measure personality traits among 446 adolescents at two time points and observed their impact on SWB (measured by the WHO 5 Well-Being Index, WHO-5, (Winzer et al., 2021).

The studies applied various research tools to explore the relationships between personality traits and different components of SWB, such as life satisfaction, mood, subjective happiness. Despite this variability in methods as well as geographical context, the studies reported similar trends in the association of personality traits and SWB. Higher levels of all personality dimensions, except benevolence, were associated with greater happiness during emerging adulthood (Arslan et al., 2023). Additionally, milder declines in Extraversion and Emotional Stability alongside with growth in imagination, were associated with increased happiness (Arslan et al., 2023). Self-directedness, cooperativeness and persistence were positively correlated with life satisfaction in both 15-year and 18-year groups (Porubanova-Norquist, 2012). Similarly, self-directedness showed a significant predictive effect on SWB at the beginning and the end of the school year (Garcia & Moradi, 2012). Extraversion showed a positive relationship with life satisfaction in an US cohort (Lyons et al., 2013). Likewise, Extraversion and Conscientiousness were positively associated with life satisfaction and mood among Japanese and German adolescents (Hatano et al., 2023; Steinmayr et al., 2019). Additionally, Winzer et al. (2021) demonstrated that higher levels of Extraversion,

Conscientiousness and Agreeableness were associated with higher levels of SWB both at baseline and follow-up. Furthermore, Agreeableness demonstrated a prospective effect on SWB, suggesting that higher Agreeableness may be associated with an increase in subjective well-being over time (Winzer et al., 2021).

Harm avoidance, reward dependence and persistence were positively associated with life satisfaction in 18-year-old adolescents (Porubanova-Norquist, 2012). Opposing this, harm avoidance alongside with novelty seeking was found to significantly counter predict SWB at the beginning of the school year among Swedish adolescents (Mean age = 16.56 years, (Garcia & Moradi, 2012). Harm avoidance was also negatively associated with life satisfaction among Czech 15-year-olds (Porubanova-Norquist, 2012).

The studies also identified similar trends for the personality traits that showed negative correlations with SWB. In particular, increases in Neuroticism were consistently linked to decreases in SWB (Hatano et al., 2023; Lyons et al., 2013; Steinmayr et al., 2019; Winzer et al., 2021). Moreover, among the Big Five traits, increases in Neuroticism showed the strongest negative association with SWB (Winzer et al., 2021).

4.5.5. Negative Affect and Behavioural Outcomes

Four studies reported on the relationship between personality development and various negative affect outcomes, such as burnout, depression, feelings of anxiety, sadness and anger, and perceived stress level (Arslan et al., 2023; Borghuis et al., 2020; Kanacri et al., 2013; Meeus et al., 2011). With a focus on Neuroticism and daily negative affect, Borghuis et al. (2020) studied >1,000 adolescents aged 13 to 18 years. The Dutch version of Goldberg's Big Five Questionnaire was used to measure Neuroticism across multiple points, alongside with the Daily Mood Device measuring anxiety, sadness and anger every day. Further, Meeus et al. (2011) examined the relationship between three personality types (resilient, over-

controllers and under-controllers) and anxiety disorder in a large sample (N = 1313) also using the Dutch version of Goldberg's Big Five questionnaire to determine personality types.

Higher Neuroticism was associated with an increase in negative daily experience (Borghuis et al., 2020). Moreover, a bidirectional relationship was observed: increases in daily negative experiences had an impact on increased Neuroticism and vice versa (Borghuis et al., 2020). This could suggest that adolescents with higher levels of Neuroticism experience increasing in negative emotion, as their negative daily experiences reinforce neurotic tendencies, creating a vicious cycle. In addition, higher levels of most personality dimensions, except benevolence, and a slower decline in Extraversion and Emotional Stability as well as increases in imagination were associated with fewer burnout symptoms among emerging adults (Arslan et al., 2023).

Agreeableness, Conscientiousness and Openness negatively predicted aggression in study participants (Kanacri et al., 2013), suggesting that individuals with higher levels of these traits, as well as those who show increases in these traits over time, may be better equipped to manage both internalising and externalising difficulties. Further to these observations, resilient individuals showed higher levels of Emotional Stability and lower levels of generalised anxiety disorder over time (Meeus et al., 2011). This pattern suggests that resilience may serve as a protective factor against the development of anxiety symptoms during emerging adulthood, potentially through the regulation of emotional responses and enhanced coping mechanisms. On the other hand, it was reported that over-controllers demonstrated increases in anxiety and difficulties to form strong intimate relationships (Meeus et al., 2011). Together, these findings underscore the importance of personality-related traits, such as Emotional Stability and resilience, in supporting psychological adjustment and reducing vulnerability to internalising problems during adolescence and early adulthood.

4.5.6. Interpersonal Problems and Social Support

Four of the included studies observed whether personality traits affect the quality of social interactions (Borghuis et al., 2020; Israel et al., 2023; Meeus et al., 2011; Winefield et al., 2015). Borghuis et al. (2020) focused on interpersonal problems, such as conflict with the mother and a best friend, while Meeus et al. (2011) explored intimate relationships. The Negative Interaction Scale of the Network of Relationship Inventory was used to measure interpersonal conflicts (Borghuis et al., 2020). Furthermore, Israel et al. (2023) investigated how personality influenced social relationships in school, and Winefield et al. (2015) explored whether personality predicts social support in early adulthood. In relation to the relationship between personality traits and well-being in the school context, Big Five personality dimensions were studied alongside belongingness measures in 3,473 German students for four years (Israel et al., 2023). In a 10-year longitudinal study involving 558 South Australian adolescents (Winefield et al., 2015) employed the NEO-5 Personality Inventory to measure personality traits and recorded family cohesiveness, parental support, and peer relationships at six-year follow-up.

One of the studies summarised that those adolescents with frequent experiences of conflict with their best friend showed an increase in Neuroticism during the 5-year follow-up period (Borghuis et al., 2020). Similarly, higher levels of Neuroticism were also associated with fewer positive friendships, reduced teacher support, lower well-being in school, and weaker school belonging (Israel et al., 2023). Additionally, individuals with increases in Neuroticism reported lower satisfaction with social support in early adulthood (Winefield et al., 2015), suggesting that Neuroticism may have long-term effects on interpersonal difficulties.

On the other hand, higher levels of Extraversion were associated with more positive friendships –and vice versa– indicating a mutually reinforcing relationship over time.

Furthermore an increased teacher support, higher school well-being, and stronger sense of belonging (Israel et al., 2023). However, Extraversion did not significantly predict satisfaction with social support in adulthood (Winefield et al., 2015). Moreover, individuals with over-controlled personality patterns demonstrated slower formation of intimate relationships (Meeus et al., 2011), further highlighting the role of personality traits in shaping social experiences across development.

4.5.7. Trajectories of Personality Change and Development in Adolescence

Only three out of 13 papers analysed and reported on trends of personality changes over time (Arslan et al., 2023; Meeus et al., 2011; Porubanova-Norquist, 2012). Understanding the trajectories of these changes is important to interpret the findings from the above sections of this review. Overall, the trajectory of personality changes in adolescence showed both stability and change across the various characteristics. According to Arslan et al. (2023), Extraversion and Emotional Stability generally decreased as they transitioned into emerging adulthood. However, they also detected growth in benevolence, conscientiousness, and imagination, suggesting a shift toward increasing sense of responsibility and creativity.

While personality types remained largely stable for most adolescents, Meeus et al. (2011) reported that under-controllers (characterised by impulsivity and low self-regulation) demonstrated lower stability, with many transitioning toward more resilient personality types. A large portion of personality development during this transitional stage of life is reflected in this change from under-controller and over-controller types to more resilient profiles. Additionally, Porubanova-Norquist (2012) claimed that younger and older adolescents differed significantly in their levels of self-directedness and self-transcendence, emphasising the growing feeling of purpose and autonomy throughout time.

In summary, adolescence is marked by both enduring personality traits and meaningful developmental shifts. While certain traits such as Extraversion and Emotional Stability, may decrease, others, such as conscientiousness, benevolence, and mindfulness, tend to strengthen. These findings suggest a trajectory of personal growth, where emotional regulation, self-awareness, and adaptability become prominent as adolescents move toward adulthood, ultimately shaping their non-intellective outcomes in later life.

4.5.8. Moderating Factors Influencing the Relationship Between Personality Change and Non-intellective Outcomes

The relationship between personality traits and various non-intellective outcomes is often influenced by different moderating factors that either contribute or contradict this association. This section summarised the moderating factors that the included studies explored alongside the relationship between personality change and non-intellective outcomes among adolescents (Lyons et al., 2013; Porubanova-Norquist, 2012; Steinmayr et al., 2019; Winefield et al., 2015). The following key themes were examined: stressful life events, gender, socio-economic status, academic achievement and intelligence.

The findings suggested that the relationship between life satisfaction and personality traits, such as Extraversion and neuroticism, were influenced by internalising and externalising behaviours. Stressful life events were reported as moderating factors for internalising and externalising behaviours (Lyons et al., 2013). Internalising problems (anxiety and depression) mediated the relationships between personality, stressful events, and both life satisfaction level and its change over time. Externalising problems (aggression) also mediated the relationships between personality and stressful life events and life satisfaction level, but not its change over time (Lyons et al., 2013).

In terms of gender as a moderating factor, no significant differences were found in life satisfaction or mood (Porubanova-Norquist, 2012). On the other hand, Socio-Economic Status influenced mood changes – higher Socio-Economic Status was associated with a steady mood improvement over the time, while lower Socio-Economic Status showed a U-shaped pattern in mood changes (Steinmayr et al., 2019). Steinmayr et al. (2019) also examined intelligence and academic performance as moderating factors for the non-intellective outcomes including mood, life satisfaction and subjective well-being. Intelligence showed a small impact on life satisfaction and did not influence mood. However, academic grades were positively correlated with increases in life satisfaction, particularly during the follow-up period. Additionally, family relationships played a crucial role in shaping life satisfaction. A strong family bond at baseline was associated with greater increases in life satisfaction during emerging adulthood (Winefield et al., 2015). However, it is important to note that such associations may not reflect purely environmental family effects, as personality development is shaped by both genetic influences and gene–environment correlations, (e.g., Bleidorn, 2024), which may in turn relate to later well-being.

4.6. Discussion

This narrative systematic review aimed to investigate and systematically synthesise the current body of evidence regarding the association of personality change and non-intellective outcomes in secondary school students. This involved examining longitudinal studies to understand the relationship between personality change and non-intellective outcomes, such as SWB, social relationships, and internalising and externalising behaviours, which are crucial aspects of a student's overall development. Secondly, the review aimed to identify the trends of how personality traits evolve during the formative years of adolescence. Finally, moderating factors influencing the relationships between personality change and non-intellective outcomes in secondary schools were explored.

4.6.1. Personality Change and Non-intellective outcomes

This systematic review observed that the development of personality traits during adolescence is closely linked to various non-intellective outcomes, such as emotional well-being, social relationships, and resilience to stress. Understanding these connections helps clarify how self-directedness and Emotional Stability shape adolescents' ability to navigate challenges and maintain life satisfaction.

Characteristics, such as Extraversion, Conscientiousness and Emotional Stability, were significantly correlated with increases in life satisfaction and self-regulation (Hatano et al., 2023; Lyons et al., 2013; Steinmayr et al., 2019). In addition, higher levels of most personality dimensions, except for benevolence, in secondary school students were associated with greater increase in happiness and life satisfaction during emerging adulthood (Arslan et al., 2023). The observed positive relationship between Extraversion and life satisfaction is consistent with the well-established finding that extraverted individuals tend to experience more positive affect and social engagement, which are closely linked to subjective well-being (Diener et al., 1999). This result is aligned with (Hill et al., 2014) who emphasised that traits such as Extraversion and Emotional Stability significantly influence well-being trajectories across adulthood.

On the other hand, increases in Emotional instability were linked to decreases in well-being, underscoring the importance of addressing neurotic traits to support emotional health. Despite an overall improvement in well-being by the conclusion of the academic year, notable individual differences remained among German adolescents (N=476, Grades 11-13) followed over 30 months (Steinmayr et al., 2019). These findings are consistent with a broader systematic review (Dhanabhakyam & Sarath, 2023), which suggests that the relationship between personality traits and well-being is complex across different populations, particularly adults. A decrease in Emotional Stability was consistently associated

with poorer well-being, while Agreeableness appeared more sensitive to fluctuations in well-being trajectories. However, there is still a need for longitudinal studies to delve deeper into the correlation between contextual factors, such as educational settings and familial relationships, and personality traits that impact well-being over time. Understanding these dynamics can inform interventions that promote Emotional Stability and resilience in adolescents.

Traits, particularly self-directedness, are significant predictors of life satisfaction over time, emphasising the importance of fostering adaptive traits to support emotional regulation and enhance overall well-being (Garcia & Moradi, 2012; Porubanova-Norquist, 2012). Adolescents who displayed self-directed behaviours show improved stress management and resilience to everyday obstacles, leading to an increase in life satisfaction over time (Baek et al., 2023). Self-directedness encourages personal development by allowing individuals to establish goals and effectively manage daily challenges, therefore enhancing their psychological well-being. The psychobiological model proposed by Gulec Oyekcin and Gurgen (2017) supports this, indicating that self-directedness fosters adaptive coping strategies and resilience, enabling individuals to manage stress more effectively. Existing studies demonstrate the advantages of self-directedness; however, there is a lack of longitudinal studies addressing its enduring impacts in education or school settings.

Emotional instability was consistently associated with negative daily experiences, worsened social relationships, showed negative associations with life satisfaction and was the strongest predictor of decreased subjective well-being (Borghuis et al., 2020; Israel et al., 2023; Steinmayr et al., 2019; Winefield et al., 2015; Winzer et al., 2021). Individuals characterised by lower Emotional Stability exhibit greater emotional reactivity to negative events, which in turn, reinforced neurotic traits and contributes a cyclical pattern (Zuunnast et al., 2023). Emotional instability also increases vulnerability to stress, exacerbating emotional

instability and daily distress (Costa & McCrae, 2006; Lücke et al., 2024; Williams & Carlson, 2024).

Conversely, resilience acts as a protective factor, helping adolescents regulate emotions, buffer against stress, and maintain better social relationships (Haehner et al., 2023; Wright et al., 2024). While emotional reactivity in childhood can develop into Neuroticism during adolescence, particularly under stress(Kühn et al., 2020; Shiner & Caspi, 2003), higher levels of Neuroticism may, in turn, contribute to an increased frequency of daily negative experiences. This bidirectional relationship in this systematic review was observed by Borghuis et al. (2020). This body of evidence emphasises the importance of addressing Neuroticism in adolescence to mitigate negative experiences and disrupt this reinforcing cycle. This highlights the imperative necessity for proactive measures designed to cultivate emotional regulation and resilience, which may facilitate the disruption of this cyclical pattern and enhance psychological well-being.

4.6.2. Trajectories of Personality Change and Development in Secondary School Students

As identified in this review, personality traits appear to shape non-intellective outcomes, such as psychological and emotional well-being, among secondary school students. Understanding the trajectories of how personality changes during this transitional period is key to interpret the impact this period may have on individual's psychological development.

Diverse developmental trajectories, such as the vulnerable and resilient patterns reported by Hatano et al. (2023), indicate that personality change is not uniform and may be affected by individual and contextual factors, such as the educational setting. These findings align with conceptual work by Soto et al. (2021), which indicate that as adolescents age, there is a general inclination towards heightened Conscientiousness and Emotional Stability,

signifying an enhancement in social and emotional competence. Similarly, longitudinal research by Meeus et al., (2011) emphasises significant developments in resilience, alongside a decrease in over-controlled and under-controlled personality types, with 73.5% of adolescents displaying stable traits. These trajectories, particularly those correlated with improved resilience, are associated with reduced anxiety and enhanced relational outcomes, reinforcing adolescence as a critical period for emotional and psychological well-being. However, personality development is influenced by more than just resilience; factors, such as age, gender, and the broader social environment, also play a role (Arslan et al., 2023; Borghuis et al., 2020; Hatano et al., 2023). Traits such as Conscientiousness and Extraversion are associated with positive psychosocial well-being, helping adolescents navigate social challenges, while external pressures, such as academic demands, can influence personality shifts. The educational setting, therefore, plays a pivotal role in either supporting or hindering personality growth, underscoring the importance of fostering environments that promote resilience and long-term well-being.

Personality development trajectories observed by Hatano et al., (2023) align with the maturation hypothesis that suggests that development is associated with self-regulation during adolescence (Roberts, 2009). Changes in traits, such as conscientiousness, openness, and Emotional Stability, as reported by Borghuis et al. (2020), further support this trend. The significant increases in Conscientiousness and Agreeableness may stem from ongoing enhancements in effortful control during childhood (Shiner, 2014). For instance, children's ability to wait patiently or focus on tasks despite distractions are early indicators of effortful control. As they grow into adolescence, this develops into more complex behaviours, such as resisting peer pressure and managing time effectively to balance academic and social responsibilities. These increases could be propelled by further developments in one's self-regulation capacity during adolescence (Casey et al., 2008) and early adulthood (Jensen-

Campbell et al., 2002). Denissen et al. (2013) also noted that the gap between external expectations and adolescents' actual behaviours and emotions might explain temporary declines in maturity during this developmental period. Furthermore, while personality traits exhibit stability and change during adolescence, these traits are influenced by life experiences and environmental factors, such as educational transitions and social relationships (Bleidorn et al., 2022; Roberts et al., 2006). These findings were supported by Steinmayr et al. (2019), who found that mood and life satisfaction generally improved toward the end of secondary school. Moreover, traits, such as emotional instability and Extraversion, consistently correlated with these outcomes, highlighting their relevance for adolescent development.

4.6.3. Moderating Factors Influencing the Relationship Between Personality Change and Non-intellective Outcomes

The reviewed studies demonstrate that personality traits and external factors, such as parenting practices and social support, exert bidirectional influences, shaping one another in dynamic ways. For example, adolescents with high levels of Neuroticism may experience an increase in social withdrawal, further amplifying their emotional instability. Conversely, environments that foster emotional support, such as cohesive family dynamics, have been shown to act as a buffer against negative spirals, fostering resilience and positive behavioural outcomes. Although these findings provide valuable insight, additional longitudinal studies are necessary to understand the evolution of these complex interactions over time, particularly in diverse cultural, educational, and socio-economic contexts. This would offer a more comprehensive understanding of how personality development unfolds in adolescence, potentially guiding more effective, targeted interventions.

Interpersonal relationships have a significant impact on adolescent's personality development. Positive and supportive friendships were associated with increases in Emotional Stability and higher levels of Extraversion leading to enhanced emotional well-

being (Israel et al., 2023; Steinmayr et al., 2019). These findings were further supported by previous studies (Alsarrani et al., 2022; Mitic et al., 2021; Scheuplein & van Harmelen, 2022) which emphasise the significant influence of friendships on adolescents' behaviours and emotions. While growing up in the same household does not necessarily correlate with adult personality traits, older siblings are often viewed as critical socialising influences (Alsarrani et al., 2022). While supportive friendships are linked to better emotional well-being, their long-term influence on personality traits remains unclear. It is uncertain whether peer relationships shape enduring personality changes or simply support emotional health during adolescence. This highlights a gap in current research. Longitudinal studies are needed to examine how friendships influence personality over time and in different social contexts.

Parental behaviours and family dynamics are also pivotal in shaping adolescents' social and emotional development. For instance, Mabbe et al. (2019) found that adolescent personality moderates the relationship between parental psychological control and internalising and externalising behaviours. Similarly, Kanacri et al. (2013) observed that Emotional Stability is a protective factor in mitigating the impact of maternal psychological control on externalising problems. Adolescents with traits, such as low Emotional Stability or high Extraversion, may be more vulnerable to controlling parenting, leading to heightened emotional distress and problematic behaviours. In addition, literature suggests that within-person changes in perceptions of psychologically controlling parenting were associated with concurrent changes in problem behaviours, particularly among adolescents with high neuroticism, which exacerbated the negative effects on their behaviour (Mabbe et al., 2019). In contrast, effortful parental control serves as a crucial predictor of prosocial behaviour across both genders (Kanacri et al., 2013). This implies that parental practices aimed at fostering a child's effortful control, including nurturing parenting and the establishment of a

well-organised environment, may indirectly facilitate the development of prosocial behaviours.

External factors, such as social support and victimisation, also play significant roles in moderating personality outcomes. Studies consistently show that family cohesiveness and parental support are associated with greater satisfaction with social support in young adulthood, which can mitigate negative traits such as neuroticism. Reduced social support was linked to higher Neuroticism scores, pointing to the enduring impact of a supportive environment on personality development (Hatano et al., 2023; Winefield et al., 2015). Furthermore, the review underscored that external stressors, including academic pressures, interpersonal conflicts, and support like parental guidance and peer acceptance, influence personality traits and well-being (Hatano et al., 2023). Adolescents who receive consistent emotional support demonstrate greater resilience and higher life satisfaction, while those without sufficient support often experience increased emotional instability and social difficulties. These findings underscore the complex interplay between social contexts and personality development (Alsarrani et al., 2022; Mitic et al., 2021). These insights have practical implications for educational and community programs. Strengthening peer-support networks and parental guidance initiatives could enhance adolescent well-being by mitigating the negative impact of personality-related risks.

Optimistic environments, marked by supportive teacher and student relationships and belonging, enhance well-being and reduce stress (Israel et al., 2023; Steinmayr et al., 2019). Traits, such as Conscientiousness and Extraversion, thrive in nurturing settings, boosting academic success and life satisfaction These findings are further supported by Meredith and Silvers (2024), who found that emotionally supportive school environments promoted self-regulatory behaviours and adaptive functioning through increased engagement of the prefrontal cortex during social-emotional processing. This finding is consistent with Soto et

al. (2021) who argue that positive school climates can foster the development of personality traits conducive to both academic and emotional well-being.

Adolescents with higher socio-economic status were found to experience more favourable shifts in mood, pointing to the broader impact of socio-economic stability as a buffer against stress and emotional fluctuations (Steinmayr et al., 2019). This underscores the complex interplay between personality traits and external conditions, suggesting that socio-economic factors do not merely act in isolation but interact with inherent personality characteristics to shape adolescent experiences (Israel et al., 2023; Richard et al., 2024). This connection emphasises the dual role of personality and external conditions in influencing mental health outcomes. The synthesis of these findings demonstrates that interventions aiming to improve adolescent well-being should address individual personality traits and the broader social and economic context to create a supportive environment conducive to positive development.

The reviewed studies emphasise the bidirectional effects of personality traits and environmental influences, such as parenting and social support. Emotionally unstable adolescents may exhibit social withdrawal, intensifying emotional instability, whereas supportive situations, including cohesive families, help mitigate adverse effects and foster resilience. Longitudinal research is still needed to clarify these relationships over time, particularly across diverse cultural, educational, and socioeconomic contexts, to enhance targeted therapies for personality development during adolescence.

This review contributes to the field in three ways. First, it synthesises evidence on personality change trajectories during adolescence and their associations with well-being, thereby offering an integrated overview of existing findings. Second, it highlights important gaps, as most longitudinal studies have been conducted in Western contexts, with only limited evidence from Arab populations. Third, the review directly informed the design of

Study 2 by highlighting the need to examine both trait-level change and state-level fluctuations in non-Western educational contexts, while also underscoring the importance of well-being alongside academic outcomes.

4.7. Limitations of the Study

This systematic review has a few limitations that need to be considered when interpreting the findings. The identified body of literature was examined and reviewed by two researchers; however, this does not fully eliminate the risk of bias during paper selection and data extraction procedures. In addition, only papers published in English were included, eliminating potentially important work published in other languages. Risk of publication bias should also be considered, as the papers reporting on significant changes have higher chances to be published compared to those reporting null or non-significant effects (Nair, 2019).

Methodological diversity across the selected studies limits the interpretation and generalisability of the findings. The studies differed in sample sizes, research design (including frequency of measurement), and the types of instruments used. These differences limit the ability to draw consistent conclusions. In addition, generalisability of the findings is limited due to the focus on a certain age group (adolescents of 12-19 years). The findings may not apply to other age groups or populations, which restricts the broader implications of the review. Finally, only few studies reported on the potential moderating factors that could have influenced the correlation between personality change and measured outcome. Unmeasured or unaccounted-for factors could influence observed relationships and may contribute to distorted view of the subject.

Despite these limitations, the review offers insights that can inform educational practices in secondary schools. Awareness about how certain personality traits may develop and influence not only adolescent's academic performance but, perhaps more importantly,

their well-being, relationships and happiness, is crucial to create a supportive school environment that fosters positive cognitive and mental development during this transitional period of life.

4.8. Conclusion

The findings of this narrative systematic review indicate that personality traits can influence and be influenced by various non-intellective outcomes during adolescence, including well-being, social relationships and life satisfaction. While personality change trajectories overall demonstrate greater maturity and stability among secondary school students, creating supportive school environments that foster optimal personality development could greatly benefit individuals during this transitional period. The role of environmental and individual moderators, including family, social relationships, and the school environment, highlights opportunities for targeted interventions to facilitate optimal developmental trajectories in adolescents.

It should be noted that most studies included in this review were conducted in European contexts and were limited to English-language publications, which may constrain direct cultural generalisability to the Saudi Arabian context. While the underlying theoretical frameworks are widely applied across cultures, the present review is intended to provide a conceptual foundation rather than a direct contextual representation. Further longitudinal research is required to clarify these complex relationships and examine the underlying mechanisms through which environmental aspects act as moderating factors. This knowledge is crucial for educators, parents, and policymakers striving to create supportive environments that foster healthy personality development and optimal life outcomes for adolescents.

Chapter 5. Study Two – Empirical Study

5.1. Introduction and Study Objectives

This chapter presents the empirical study of this thesis, which explored the longitudinal relationships between personality traits and other non-intellective factors, such as personality, life satisfaction and well-being, among secondary school students in Saudi Arabia.

Study 1 found that personality traits, such as extraversion, conscientiousness, and emotional stability, are linked to well-being outcomes during adolescence. Neuroticism, on the other hand, is linked to decreased well-being and increased negative affect. However, the review identified gaps in existing literature, with only three of thirteen studies examining actual personality change trajectories over time. The study aimed to address these gaps by conducting a longitudinal investigation to examine non-intellective factors and their associations with well-being outcomes. It also included momentary assessment to capture daily variations in personality states and well-being. Thus, the study aimed to explore the following objectives:

1. Do personality traits, grit, social-emotional and behavioural skills, and well-being (life satisfaction, positive affect, and negative affect) show systematic change over time among secondary school students?
2. Do changes in these non-intellective factors predict subsequent differences in students' well-being and academic outcomes?
3. Are there bidirectional associations between changes in personality traits and changes in well-being outcomes over the study period?

4. How do students' momentary personality states, emotional experiences, and perceived situational characteristics fluctuate across daily school contexts, and how are these patterns associated with short-term well-being?

5.2. Methodology

5.2.1. Study Design and Procedure

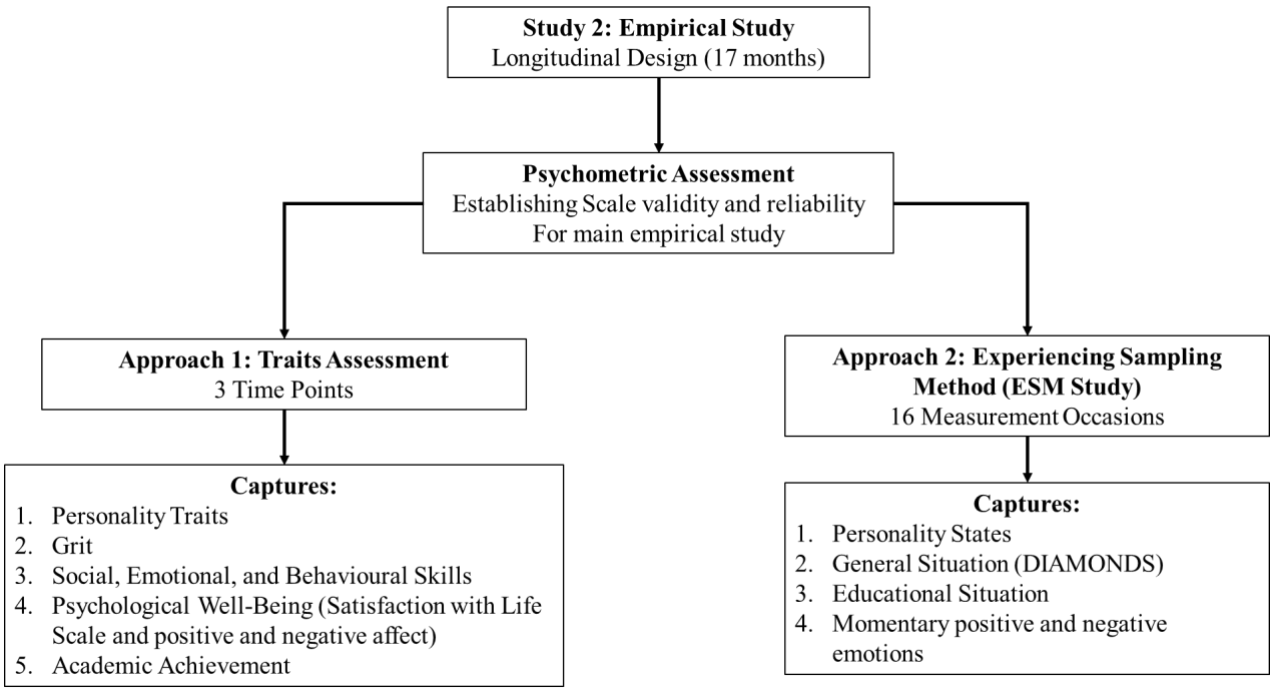
The research employed a 17-month longitudinal empirical investigation with a dual-pronged assessment approach (Figure 5.1). First, a set of established self-report instruments measuring personality traits and other non-intellective factors were administered online at three distinct time points (December 2022, September-November 2023, and March-May 2024) to capture non-intellective characteristics, including personality traits, grit, social-emotional-behavioural skills, well-being (incorporating both satisfaction with life scales and measures of positive/negative affect). Academic achievement metrics were also collected. The longitudinal design was specifically selected to track changes in students over a substantial period (17 months), enabling identification of broader patterns and developmental trajectories in personality traits, grit, well-being, and social-emotional skills. As noted by (Curran & Bauer, 2011; Luo et al., 2022), longitudinal designs are particularly suited for investigating developmental trajectories and causal relationships, allowing researchers to model both within-person changes and between-person differences over time.

Complementing this approach, the second assessment strategy implemented the ESM, consisting of 16 measurement occasions administered over two separate data collection weeks, with a three-month interval between them. Data collection occurred from Sunday to Wednesday each week, aligning with the Saudi school week, which begins on Sunday. Thursday was excluded due to high student absenteeism on that day. The ESM captured more dynamic, state-based elements, including personality states, general situational factors

(utilising the DIAMONDS framework), specific educational context details, and momentary positive and negative emotional experiences. Paper-based questionnaires were administered for ESM data collection due to restrictions on personal electronic devices in Saudi schools.

The study procedure involved several key steps. First, meetings were arranged with headteachers to establish the research protocol and confirm their willingness and capability to conduct the study in their schools. Next, each school assigned a teacher to facilitate data collection and serve as the primary point of communication throughout the study. Finally, I contacted the teacher to familiarise myself with how the study protocol was implemented in their school and to provide support throughout the data collection period. Study participants (adolescents) were asked to complete the online questionnaires (trait measures) and the paper-based momentary measures (ESM) during their school hours. To maximise compliance, trained instructors monitored data collection during the afternoons when the experience sampling was implemented.

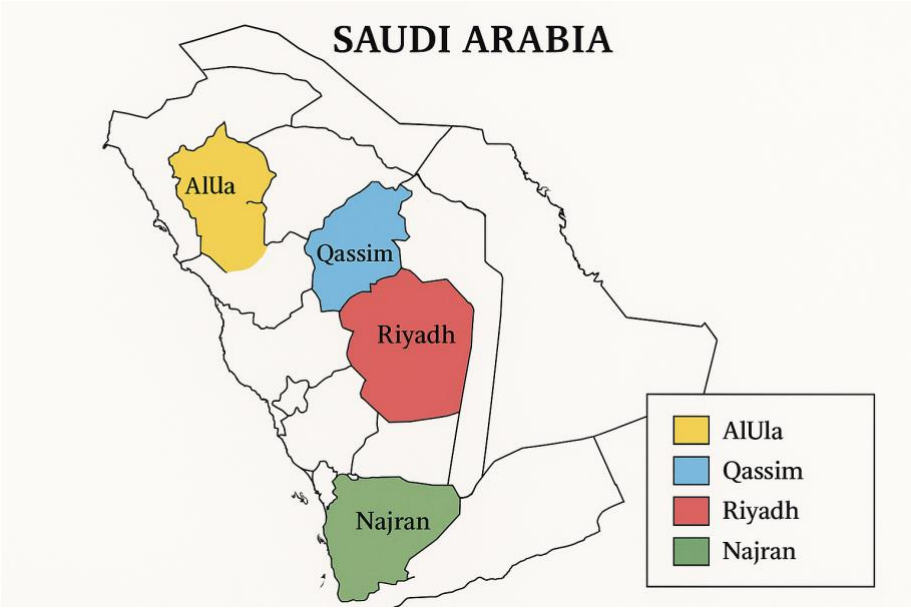
Figure *5.1*
Empirical Study Design



5.2.2. Sampling Strategy

The stratified sampling strategy was used to balance the region representation and cultural feasibility. Four schools in Riyadh, Al-Qassim, Al-Ula, and Najran were selected as they were meant to represent different socio-cultural and economic settings. The capital Riyadh is a big metropolitan environment with a diverse and rather wealthy population; Al-Qassim is a more conservative central-region location; Najran, a city in the south, reflects communities that have long experienced educational and economic disparities, although it has recently turned into a cultural heritage site; and Al-Ula, a historically underdeveloped city in the northwest, exemplifies the communities that have always had educational and economic disparities. The choice represented diversity between urban and rural areas, socio-economic classes, and cultural backgrounds and fitted feasible limitations of schools and research practices. The Education Administration Office of each region was consulted initially and the established institutional links with the schools helped in participating in the policy and ethics. On the whole, these areas have been selected to ensure the maximisation of diversity and make the areas viable.

Figure 5.2
Regions sampled for student data collection in Saudi Arabia



Ten schools were targeted for the trait questionnaire component, comprising five boys' schools and five girls' schools to ensure equal gender representation. Schools were selected based on two primary criteria: the presence of secondary school students and willingness to collaborate throughout the research process. For the more intensive ESM component, a subset of four schools (two boys' schools and two girls' schools) was selected.

The planning of sample size in this research was done by the specific analysis needs of growth curve modelling in two different methodological approaches, instead of the traditional survey research calculations. The research used two complementary methodologies: Approach 1 was trait measures at 3 time points to investigate more enduring personality changes, whereas Approach 2 applied the ESM using 16 measurement occasions to assess daily change in personality moods and well-being. The studies conducted on growth curve modelling have shown that the size requirements of a sample are based on the number of measurement occasions, the size of the effect, and the complexity of the model (Hertzog et al., 2006). In the case of longitudinal growth models, sample sizes of 100-200 participants are large enough to measure a medium-sized effect, but to measure smaller effects, the sample

size ought to be larger to offer greater stability and power (Maas, and Hox, 2005). Experience sampling designs presuppose more thought on within-person power, and it is recommended that 10-20 measurement occasions per individual can offer sufficient power to identify within-person effects (Bolger and Laurenceau, 2013). In the current research, $N = 757$ subjects were recruited to the baseline to complete the trait assessment method, and the retention rates are different across the time intervals. In the case of the ESM component, a sample of the participants had to complete several assessments per day which had enough information to carry out both between-person and within-person comparisons. This, however, is a convenience sample of the sampled schools but not a probability sample, and hence cannot be generalized to the rest of the Saudi student population. .

5.2.3. Recruitment

After obtaining permission from the Education Administration Office, I contacted headteachers using a combination of email, video calls, and personal visits to present the study's objectives, methods of data collection, and ethical considerations, including maintaining participant confidentiality and voluntariness. A contact person, usually a teacher, was designated in every participating school to provide organisational support throughout the data collection. The same person was the primary contact between the researcher and the study participants.

The recruitment plan was developed in line with the cultural aspects of the Saudi educational setting, including restrictions on male researchers visiting girls' schools. In collaboration with headteachers, designated personnel assisted with recruitment by disseminating information in schools, obtaining informed consent, facilitating data collection, and addressing any obstacles that arose. The study recruited 1st and 2nd-year secondary school students from the chosen schools. Upon successful completion of the study, students

were given volunteer certificates from the local Education Administration Office. No other incentives were offered to participants.

5.2.4. Study Materials

The current research study utilised several psychometric instruments to measure the main independent and dependent variables, including personality traits, grit, behavioural, emotional, and social skills, positive and negative emotions, and satisfaction with life. A full list of instruments is presented in Table 5.1, and the complete instruments are provided in Appendices G and H.

Table 5.1
Overview of Study Variables

Variable	Definition	Measure	Q	I/C
Personality traits	A learner's general thoughts, feelings and behaviours across the five core dimensions of personality	Five Factor Model Adolescent Personality Questionnaire (FFM-APQ) - 25 items with a 5-point Likert scale (Rogers & Glendon, 2018). Captures Conscientiousness, Emotional Stability, Extraversion, Openness to Experience, and Agreeableness.	T	I + C
Well-being	Experiences of positive and negative emotions	Positive and Negative Affect Schedule (PANAS) - 20 items with a 5-point scale (Watson et al., 1988). Measures positive affect (enthusiasm, happiness) and negative affect (anger, distress).	T	I + C
Life satisfaction	Overall satisfaction with life	Satisfaction with Life Scale (SWLS) - 5 items with a 7-point Likert scale (Diener et al., 1985). Measures subjective evaluation of life quality.	T	I + C
Grit	Perseverance and passion for long-term goals	Grit-S - 8 items with a 5-point Likert scale (Duckworth et al., 2007). Measures consistency of interest and perseverance of effort.	T	I + C
Social, emotional and behavioural skills	Non-intellective competencies related to behaviour, emotions, and social interactions	Behavioural, Emotional, and Social Skills Inventory (BESSI-20) - 20 items with a 5-point Likert scale measuring self-management and emotional resilience (Soto et al., 2022).	T	I + C
Situational characteristics	Students' momentary perceptions of classroom characteristics	Adapted items based on DIAMONDS Situation Characteristics scale (Rauthmann et al., 2014) - measuring Duty, Intellect, Adversity, Positivity, Negativity, and Sociality domains on a 5-point Likert scale.	S	I + C
State personality	Momentary manifestations of personality traits in response to situational context	Ten-Item Personality Inventory (TIPI) (Gosling et al., 2003) - paired items measuring momentary Big Five personality states.	S	I + C
Momentary emotional state	Current positive and negative emotions	International Positive and Negative Affect Schedule Short Form (I-PANAS-SF) (Thompson, 2007) - 10 items (5 positive, 5 negative) rated on a 5-point scale.	S	I + C
Educational situation perceptions	Assessment of learning environment, teacher support, and classroom dynamics	Custom items measuring perceptions of academic setting, teacher support, peer pressure, and classroom disruptions.	S	I + C
Momentary grit	Momentary assessment of perseverance and effort in classroom settings	Adapted Grit items focused on classroom context based on Grit framework (Duckworth et al., 2007).	S	I + C

Momentary satisfaction	Momentary assessment of overall daily satisfaction	Adapted life satisfaction item to measure broader emotional well-being.	S	I + C

Note: Q column indicates: T = Trait measure, S = State measure; I/C column indicates I + C = Items plus composite scores

The chosen instruments were validated for use with adolescent populations and have demonstrated reliability and validity in previous studies. Additionally, most of them have previously been translated into Arabic, except for the personality traits scale. The latter was initially developed in English and subsequently translated and adapted for use with Saudi Arabian secondary school students in this study. This has, therefore, been a crucial process, as one needed to ensure that the instrument was linguistically and culturally appropriate. A delicate translation process was undertaken to avoid a loss of meaning and to ensure that the constructs being measured were relevant within the Saudi cultural context.

The translation of the psychometric instruments was conducted in phases. First, the original English questionnaires were forward-translated into Arabic by two bilingual experts fluent in both languages. The experts were familiar with the psychological constructs that would be measured, which helped in maintaining faithfulness to the original meaning of the questions. The translation was then back-translated into English by another two bilingual experts to ensure that the meaning of the items was preserved. The back-translated version was compared with the original English version by two additional bilingual experts, and discrepancies were resolved through discussions among the research team and the experts. This structured approach, which follows the forward-backward translation method, is widely recognised for preserving semantic and conceptual integrity across languages (Klotz et al., 2023).

Translational challenges were evident in several domains when adapting the instruments for the Saudi context. These included semantic equivalence (ensuring that translated words carry the same meaning as in the source language), conceptual equivalence (verifying that concepts remain similarly understood in the Saudi setting), and idiomatic expressions (phrases without direct Arabic equivalents). Technical psychological terminology presented a particular difficulty as many terms lack direct Arabic counterparts (Shojaei,

2012). To address these challenges, I collaborated with four PhD-level linguistics experts specialising in translation studies. This collaboration enhanced both linguistic accuracy and cultural appropriateness for Saudi participants. The experts helped identify and resolve both linguistic and cultural translation issues, maintaining the instruments' intended meaning while ensuring appropriateness for the target population.

Before its final version, the translated questionnaire was administered in a small group of adolescents (*N*=21; 57% female). This was important in terms of testing the clarity and cultural appropriateness of the translated instruments (Arcila-Agudelo et al., 2023). This testing phase revealed minor issues such as unclear phrasing and culturally unfamiliar examples. Based on participant feedback, minor wording adjustments were made to improve clarity and cultural relevance. No significant changes to the structure or measurement scales were necessary.

5.2.5. Personality Trait Questionnaire

For measuring the five core dimensions of personality, such as Conscientiousness, Emotional Stability, Extraversion, Openness to Experience, and Agreeableness, the Five Factor Model Adolescent Personality Questionnaire (FFM-APQ; Rogers & Glendon, 2018), a 25-item measure, was used after translation into Arabic. The FFM-APQ has been widely used among adolescents and has demonstrated strong psychometric properties across diverse populations, including evidence of reliability in a recent study by Myers et al., (2023). It included items such as "*I like to plan ahead*" (Conscientiousness) and "*I often feel tense*" (Emotional Stability), rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Reliability estimates for the FFM-APQ showed internal consistency estimates ranging from 0.75 to 0.88 across the five factors in previous research (Rogers & Glendon, 2018). The FFM-APQ was translated and adapted for use with Saudi adolescents in this study.

5.2.6. Well-being Questionnaires

The study measured subjective well-being through two complementary instruments, including Positive and Negative affect, and Life satisfaction.

The Positive and Negative Affect Schedule (PANAS-20; Watson et al., 1988) scale's Arabic version by Narayanan et al. (2020) was utilised to measure emotional well-being, both positive affect and negative affect. Positive emotions include enthusiasm and happiness, whereas negative emotions include anger and distress. The scale demonstrated high internal consistency in previous research, with reliability reported at 0.88 for positive affect, and 0.87 for negative affect (Watson et al., 1988). Items on this scale are rated from 1, indicating "very slightly or not at all," to 5, indicating "extremely, which consisted of 20 emotion-related adjectives: ten measuring positive affect (*interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active*) and ten measuring negative affect (*distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid*).

It is acknowledged that some items within the PANAS "negative affect" scale may have adaptive meanings in educational contexts (Reeve et al., 2014). For example, emotions such as "nervous" or "alert" can reflect engagement or readiness rather than distress, particularly before academic examinations. Nevertheless, the PANAS was retained given its: (a) well-established psychometric robustness and extensive use across studies, which facilitates comparability, (b) cross-cultural validation, including Arabic-speaking populations (Mnadla et al., 2017; Narayanan et al., 2020),and (c) demonstrated theoretical grounding in capturing the affective dimensions of well-being (Watson et al., 1988). While these contextual nuances are acknowledged, the negative affect scale has consistently demonstrated validity as an indicator of psychological distress across diverse populations.

Satisfaction with Life Scale (SWLS; Diener et al., 1985), which was translated in Arabic by Abdallah (1998),was used to assess the life satisfaction of the adolescents in this study. The instrument consisted of 5 items on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Examples of the items included "*In most ways, my life is close to my ideal*" and "*The conditions of my life are excellent*." The scale demonstrated high internal consistency in previous research, with reliability reported at 0.87 (Diener et al., 1985). The SWLS has been previously validated across multiple cultural contexts (Jovanović et al., 2022; Valenti & Faraci, 2024), including in Saudi Arabia (Elsayed & Aleriani, 2024).

5.2.7. Grit

To investigate grit, this study used Grit-S measures (Grit-S; Duckworth et al., 2007), translated into Arabic by Alshammari and Alboliteeh (2022) ,which assess perseverance and passion for long-term goals. The 8-item instrument consisted of statements such as: "*I am a hard worker*" and *"I finish whatever I begin,"* and a 1 to 5 scale from strongly disagree to agree strongly. The reliability (internal consistency) of the Grit-S has been previously confirmed (Cronbach's alpha values ranged from 0.80 to 0.89) in adolescent populations (Duckworth et al., 2007) and in various cultural contexts (Abu Hasan et al., 2022).

5.2.8. Social, Emotional and Behavioural Skills Questionnaires

The Behavioural, Emotional, and Social Skills Inventory (BESSI-20; Soto et al., 2022) was used to appraise students' non-intellective competencies, such as emotional resilience and self-management (Soto et al., 2022). The 20-item instrument consisted of statements such as: "*Keep track of my promises and commitments*" and "*Speak up when I disagree with others*," and a 1 to 5 scale from Not at all well to Extremely well. In previous research, this instrument has demonstrated internal consistency with values ranging from 0.80 to 0.90 (Sewell et al., 2024). The measure has been used internationally with adolescent

populations, supporting its relevance across cultures (Napolitano et al., 2021; Pellegrino et al., 2024).

5.3. Experience Sampling Questionnaire

To collect real-time data on adolescents' psychological states and situational experiences, the experience-sampling method (ESM) was applied. Students were asked to complete ESM questionnaires twice a day (morning and afternoon) over two separate weeks using a paper-and-pencil format. The ESM questionnaire included items capturing students' momentary personality states, emotional experiences, situational perceptions (including DIAMONDS and education-specific situations), and life satisfaction. This design enabled the investigation of how daily academic and social experiences relate to fluctuations in well-being and personality at the state level. The ESM focused on the following, with respect to selected constructs:

5.3.1. DIAMONDS Situation Characteristics

The DIAMONDS framework, developed initially by Rauthmann et al. (2014), was adopted for this study. The original DIAMONDS scale has been validated in prior work (Latan et al., 2021; Moon & Ahn, 2024; Salguero et al., 2021) and has demonstrated internal consistency estimated at around 0.85.

The instrument categorised how students perceive situational characteristics in their classroom environments across eight domains: Duty, Intellect, Adversity, Mating, Positivity, Negativity, Deception, and Sociality. Students rated their agreement with how much they agreed with the statement on a 5-point Likert scale ranging from strongly disagree to strongly agree.

Six items were selected as most relevant to the secondary school context and the study's research aims. The domains "Mating" and "Deception" were omitted due to their

limited relevance in the Saudi secondary school educational context. The original generic items from each domain were specifically adapted to fit the secondary school classroom context and included: "*We worked well during lessons*" (Duty), "*The lessons were intellectually challenging*" (Intellect), *"Someone was reprimanded or criticised"* (Adversity), "*The two lessons were pleasant*" (Positivity), "*The lessons contained negative feelings (such as stress, frustration, anxiety, or guilt)*" (Negativity), and "*The lessons required social interaction*" (Sociality).

5.3.2. Educational Situation

To directly assess students' momentary experiences within the academic environment, a six-item instrument was developed, informed by evidence that educational contexts meaningfully influence personality expression and student engagement (Goetz et al., 2016; Guay, 2022; Sherman et al., 2015, as discussed in Chapter 2) . The selection of items was guided by three primary sources: (1) my professional experience as a secondary school teacher in Saudi Arabia, which highlighted recurrent classroom challenges; (2) preliminary consultations with four headteachers and six teachers from participating schools who identified common situational stressors influencing students' well-being and motivation; and (3) theoretical frameworks emphasising the importance of teacher support, peer relationships, and academic challenge in adolescent development (Wentzel & Ramani, 2016).

Specific items were chosen to capture salient educational situations representing key features of Saudi secondary classrooms. For instance, the item "*My peers forced me to do things I do not like to do*" was included based on teacher feedback indicating that peer pressure around academic behaviours (e.g., *copying homework, skipping class*) represented a meaningful stressor for students. Similarly, items addressing social isolation ("*I was left out and felt lonely*") and classroom disruption ("*The classroom was noisy and disruptive*") reflected reports of social exclusion and classroom disorder that affected engagement and

emotion. Collectively, the items targeted students' perceptions of academic challenges, teacher support, classroom atmosphere, and social interaction during the two lessons at the school day, representing their real-time learning experiences. Responses were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

5.3.3. The Ten-Item Personality Inventory (TIPI)

TIPI was initially designed to assess the participants' momentary personality states: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience (Gosling et al., 2003). The inventory includes paired items rated on 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), such as *"I see myself as an extraverted, enthusiastic"* and *"I see myself as anxious, easily upset,"* to capture fluctuations in personality states in response to situational contexts. Prior research has demonstrated an acceptable level of internal consistency and validity of the TIPI across various contexts (Thørrisen & Sadeghi, 2023), including studies conducted within Arab population in Saudi Arabia (Mohamed Taha Eid et al., 2022).

5.3.4. Positive and Negative Affect (I-PANAS-SF)

To assess the students' emotional states at different time points, the International Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007) was used, which consisted of ten emotion-related adjectives: five measuring positive affect (*alert, inspired, determined, attentive,* and *active*) and five measuring negative affect (*upset, hostile, ashamed, nervous, and afraid*). Participants were asked to rate the extent to which they felt each emotion on a 5-point Likert scale, ranging from 1 (Very slightly or not at all) to 5 (Extremely). The I-PANAS-SF has previously been shown to be appropriate for diverse populations with high internal consistency (e.g., Cronbach's alpha = .85) and has shown factorial invariance across different cultural contexts (Karim et al., 2011).

5.3.5. Grit and Life Satisfaction Items

Grit. In line with the study's focus on grit and school performance, students were asked to rate their perseverance of effort and consistency of interests in the classroom using items such as "*I am diligent in the lessons*" - as a measure of effort - and "*I had difficulty maintaining my focus during the lessons*", as a measure of interest. These items were selected from the Grit scale (Duckworth et al., 2007) to measure state-level grit in the daily academic context. While the original Grit scale assesses trait-level perseverance and passion for long-term goals, the selected items were adapted to capture day-to-day fluctuations in students' grit-related behaviours and attitudes within the school environment. Previous ESM studies have also adopted a similar approach, when individual items were chosen from established scales to minimise participant burden while still capturing the core construct of interest (Jiang et al., 2023).

***Life satisfaction*.** Similarly to momentary grit, the following statement was adopted from The Satisfaction with Life Scale (Diener et al., 1985): "*Until now, my day is close to my ideal*", allowing measurement of students' momentary satisfaction during the school day rather than overall life satisfaction.

5.4. Ethical Considerations

Ethical approval for this study was obtained from Durham University's ethics committee on 20th July 2022 (see Appendix C). Subsequently, an application for ethical approval was submitted to the Ministry of Education in Saudi Arabia in October 2022, with final approval granted on December 5, 2022 (see Appendix D). The extended approval process was due to the remote nature of communications with authorities and the need to meet stringent ethical requirements.

Working with adolescents required particular ethical consideration due to their status as a vulnerable population. Young people aged 15-18 may experience power imbalances with adult researchers, and within the Saudi cultural context, strong norms of respect and obedience toward authority figures can make it harder for them to decline or withdraw from participation. Therefore, additional safeguards were implemented for both parents/guardians and students to ensure voluntary and informed consent (see Appendices E and F).

To maintain participant confidentiality, a unique coding system was implemented where each school received a specific code (e.g., "BC") used to generate anonymous student identifiers (e.g., "BC57"). This system ensured data could be tracked across collection points while maintaining strict privacy standards. The following ethical considerations were rigorously adhered to throughout the study to ensure the safety, dignity, and rights of all participants, particularly given the involvement of minor participants:

1. School administration and students provided written informed consent before study participation, understanding their right to withdraw at any point without consequences. However, informed consent alone does not ensure that participants feel free to decline or withdraw from research. To minimise potential pressure within school settings, participation was repeatedly described as voluntary, unrelated to academic standing, and confidential from school staff. Nonetheless, the challenge of guaranteeing truly voluntary participation remained, necessitating vigilance for signs of discomfort during the study.
2. Data collected was anonymised and stored securely on password-protected systems, in compliance with GDPR and Saudi Arabian privacy laws, ensuring participant identities were protected.
3. For ESM papers protection, the questionnaires were placed in secure storage in locked cabinets, used participant ID codes instead of names, maintained strict access

controls, ensured supervised completion, used sealed envelopes, and were securely disposed of immediately following data entry into electronic format to minimise data exposure risks.

4. Psychological safety measures were implemented to minimise distress during psychological assessments for ensuring participants' academic evaluations and teacher relationships, and establishing support mechanisms for emotional discomfort such as having school counsellors available during assessments, offering private spaces for questionnaire completion, allowing breaks when needed, conducting post-assessment debriefings, maintaining confidential access to mental health professionals, and establishing clear referral protocols for additional support services. Along with that, I also recognised the signs of distress, and participants could skip uncomfortable questions or seek support contacts throughout the study period.
5. Study participation was entirely voluntary, with students and school administrations having the right to decline or withdraw consent at any stage, without any incentives.
6. Materials, questionnaires, and ESM tools were developed in easily understandable wording by secondary school students, regarding age and culturally sensitive adaptations, using simplified language that does not offend the local norms and values.
7. Sensitive information such as students' psychological state, well-being, and personality traits was treated as confidential, with access restricted to authorised personnel and results reported only in an aggregated form.
8. The research was performed in a culturally sensitive way, based on the customs and ethics accepted in Saudi Arabia, by getting permissions from local authorities and cooperating with schools.

5.5. Data Analysis

The data analysis used descriptive and inferential statistical methods to explore the longitudinal relationships of non-intellective factors such as personality traits, grit, and social, emotional, and behavioural skills with non-intellective outcomes such as well-being (taken as life satisfaction, positive and negative affect), and academic achievement among secondary school students in Saudi Arabia. Descriptive statistical analysis was completed using SPSS 27, and the R package was used for inferential analysis. Inferential analysis involved appropriate statistical methods for longitudinal data analysis, such as linear Growth Curve Modelling (GCM), Mixed growth curve models, and Cross-Lagged Panel Models (CLPM). These methods were chosen to examine both individual changes and bidirectional changes between variables.

5.5.1. Data Cleaning and Preparation

Data cleaning and preparation were crucial initial steps to ensure the accuracy and reliability of the dataset before conducting any statistical analyses. Variables were systematically coded, and reverse-coded items were adjusted to ensure consistent alignment of responses. The dataset was then reorganised into a multilevel format to reflect the hierarchical structure of repeated measures over time and to facilitate longitudinal modelling. Raw data from all-time points were first entered into Excel and then imported into SPSS 27, where responses were meticulously reviewed for missing values, errors, duplicate entries, and invalid responses. To address missing data, Little's MCAR test was applied to determine whether the data were missing completely at random. For items with less than 5% missing data, mean imputation was used to maintain the dataset's completeness. When missing data exceeded this threshold, multiple imputation techniques were employed using R to reduce potential biases. Outliers were identified using z-scores with a threshold of ±3.29, and their influence on the results was assessed. Depending on their impact, extreme values were either

transformed or excluded. Variables were systematically coded, and reverse-coded items were adjusted to ensure consistent alignment of responses. The dataset was then reorganised into a multilevel format to support the hierarchical design of the study and facilitate advanced modelling techniques.

5.5.2. Descriptive Statistics

Descriptive analysis was conducted using SPSS 27. Measures of central tendency (mean) and variability (standard deviation) were calculated for key study variables, including personality traits, grit, emotional and psychological well-being, and academic performance. Frequency distributions were examined to identify patterns, outliers, or skewness within the data. To measure internal consistency and reliability of the data collection instruments, Cronbach's alpha was used, confirming the internal consistency of scales such as the Five-Factor Model Adolescent Personality Questionnaire (FFM-APQ) and the Short Grit Scale (Grit-S). The descriptive analysis was followed by the appropriate longitudinal statistical methods.

5.5.3. Growth Curve Modelling (GCM)

The GCM was employed using R to analyse changes in personality traits, grit, SEB skills and well-being over the 17-month study period. GCM was selected as the primary analytical approach for several compelling reasons. First, unlike traditional repeated measures analyses that compare group means at different time points, GCM allows for the examination of both intra-individual change (*how individuals develop over time*) and inter-individual differences in change (*how developmental trajectories differ between individuals*). This distinction is crucial when studying developmental processes in adolescents, where substantial individual differences in maturation rates are expected.

Second, GCM offers superior flexibility in handling missing data and unequally spaced measurement occasions, which is particularly valuable in longitudinal studies with adolescent populations where attrition and irregular attendance can be common challenges. Third, GCM enables the assessment of individual trajectories and the identification of broader developmental trends across the sample, allowing for the detection of both linear and nonlinear patterns of change.

By fitting growth curve models to the data, the study explored how variables evolved over time and identified significant patterns or differences in outcomes among participants. The model considered of both fixed effects, representing overall population trends, and random effects, capturing individual variability. Additionally, GCM facilitated the examination of both time-invariant and time-varying covariates, allowing for a more nuanced understanding of how factors such as gender, initial personality profiles, or concurrent academic experiences influence developmental trajectories.

5.5.3.1. GCM Model Fit and Assumptions

Since the main goal of this work was to analyse individual developmental trajectories rather than to compare competing theoretical models, Model fit assessment was not applied (Hayduk et al., 2007). Instead, *R*'s mixed-effects modelling framework (*lme4*) was used, which does not provide SEM-style fit indices but relies on alternative evaluation methods. The significance of fixed and random effects, residual patterns, and comparative information criteria (AIC/BIC) were used to evaluate the model's adequacy. This strategy is in line with accepted methods in the literature on multilevel modelling (Bürkner, 2017; Hoffman & Rovine, 2007).

The trustworthiness of the analytical models was ensured by a thorough evaluation of statistical assumptions. Shapiro-Wilk tests and Q-Q plots were used to assess normality, and

the results showed minor deviations for Openness to Experience (W =.98, p < .001) and negative affect (W =.96, p < .001). Breusch-Pagan tests and residual plots (e.g., BP = 6.90, p = .23) verified homoscedasticity, whereas scatterplots of the predictors and outcomes indicated linearity. With a maximum value of 1.42 for Extraversion, variance inflation factors (VIFs) remained considerably below the cautious cut-off of 5, indicating that multicollinearity was not a significant issue. Sensitivity studies were conducted to evaluate outliers that exceeded ±3.29 standard deviations (z-scores), and the results indicated that they had a minimal effect on parameter estimates. Robust estimation techniques (such as MLR in SEM-based models) were employed when necessary to account for minor violations of assumptions.

5.5.4. Cross-Lagged Panel Modelling (CLPM)

The CLPM was employed to examine the bidirectional relationships between personality traits and well-being outcomes across multiple time points. While GCM focuses on estimating individual trajectories of change, CLPM is designed to assess bidirectional, time-ordered associations between constructs. This approach is particularly suitable for exploring whether earlier levels of personality traits predict subsequent well-being outcomes and vice versa. Although CLPM does not estimate direct change scores, it provides insight into developmental processes by capturing both momentary stability and dynamic cross-lagged effects over time. This model has been successfully applied in previous longitudinal research on adolescents to explore how personality traits and psychosocial outcomes influence each other over time (Israel et al., 2023).

The CLPM analyses were conducted using the *lavaan* package in *R*. The models included autoregressive paths, representing the stability of each variable across time, and cross-lagged paths, representing the predictive influence of one variable on another at

subsequent time points. Covariances between variables at each time point were also estimated to account for concurrent associations.

5.5.4.1. CLPM Model Fit and Assumptions

Structural equation modelling (SEM) criteria were used to evaluate model fit. With a Comparative match Index (CFI) of 1.000, Tucker-Lewis Index (TLI) of 1.000, Root Mean Square Error of Approximation (RMSEA) of 0.000, and Standardised Root Mean Square Residual (SRMR) of 0.000, the results closely aligned with the data. The validity of the predicted cross-lagged correlations is supported by these values, which exceed the generally recognised thresholds for good model fit (CFI/TLI $\geq$ 0.90, RMSEA/SRMR $\leq$ 0.08; Hu & Bentler, 1999; Kline, 2023). The bidirectional hypotheses about the relationships between personality traits and well-being outcomes could be rigorously tested by this modelling approach, which also took into consideration the traits' consistency and concurrent relationships over time. By shedding light on possible directional effects that could underlie observed developmental patterns, the CLPM findings enhanced the GCM analysis.

5.5.5. Sensitivity Analyses and Robustness Checks

Sensitivity analyses and robustness checks were conducted to validate the stability and reliability of the findings. These included re-running key analyses using different data subsets and applying alternative statistical techniques to verify the consistency of the results. Sensitivity analyses tested the influence of outliers and examined whether the findings remained consistent under varying methodological conditions (Saltelli et al., 2013). Additionally, variance-based sensitivity analysis methods were considered to quantify the impact of input uncertainties on model estimates (Sobol, 2001). These procedures helped ensure that the study's conclusions were not overly dependent on specific analytical choices

or sample characteristics, thereby enhancing the credibility of the research outcomes to proceed with detailed data analysis.

5.6. Results

This section presents the findings from the longitudinal investigation into non-intellective factors, including personality traits, grit, SEB skills, and their association with well-being and academic achievement among Saudi adolescents. The results are organised in a systematic progression, beginning with preliminary analyses of the psychometric properties of the measurement instruments, followed by descriptive statistics that characterise the sample across measurement times. Then, in this section, I examine the primary research questions through growth curve model analyses and a cross-lagged model. Detailing the trajectories of personality traits and related constructs over the 17-month study period.

Specifically, the analyses explore (1) patterns of stability and change in personality traits over time; (2) associations between personality change and non-intellective factors and outcomes, including grit, well-being, and social-emotional skills; (3) bidirectional relationships between personality traits and well-being outcomes (life satisfaction, positive affect, and negative affect); (4) within-person fluctuations in thoughts, feelings, and behaviours over time, assessed via the ESM; and (5) whether these findings extend to the state level, examining if associations between personality and well-being emerge in real-time and whether mean state scores predict trait-level variables.

Throughout the chapter, tables and figures are presented to illustrate key findings, with statistical significance and effect sizes reported to contextualise the practical importance of the results. The findings presented here form the empirical foundation for the discussion and implications addressed in subsequent chapters

5.6.1. Demographic characteristics of the study participants

A total of 757 students participated at baseline. Of these, 494 students completed all three times of the trait data collection, while 399 students took part in the ESM component of the study. A subgroup of 274 students participated in both components of the study, providing data for both trait and state-level assessments. Socio-demographic characteristics, including gender, age, year of study, ethnicity, parental education and employment status, and household income, are presented in Table 5.2.

Table 5.2
Sociodemographic Characteristics of Participants

Sociodemographic Characteristics	N	%
Gender		
Male	294	38.9
Female	462	61.1
Age		
Under 15 Years	5	0.7
15 Years	158	20.9
16 Years	334	44.2
17 Years	226	29.9
18 Years	33	4.3
Year of the Study		
1	369	48.8
2	364	48.1
3	23	3.1
Section of Study		
First Year	349	46.2
General	271	35.9
Computer Science and Engineering	7	0.9
Law	60	8.5
Health and Life	4	0.5
Management	64	8.5
Ethnicity		
Saudi	676	89.7
Non-Saudi	80	10.6
Father's Education		
Secondary	350	47.4
Diploma	97	13.1
Bachelor	184	24.9
Postgraduate (Master and Above)	50	6.8
No education	58	7.8
Mother's Education		
Secondary	329	44.5
Diploma	109	14.7
Bachelor	192	26.0
Postgraduate (Master and Above)	27	3.7
No education	82	11.1
Father Employment Status		

Full Time Employed	278	37.6
Part-Time Employed	42	5.7
Self-Employment	43	5.8
Unemployed	256	34.6
Prefer not to Respond	120	16.2
Mother Employment Status		
Full Time Employed	173	23.4
Part-Time Employed	27	3.7
Self-Employment	13	1.8
Unemployed	30	4.1
Prefer not to Respond	496	67.1
Household Income in Saudi Riyal		
Less than 4000 SAR	94	12.7
4000 SAR to 6000 SAR	110	14.9
7000 SAR to 10000 SAR	83	11.2
More than 10000 SAR	176	23.8
Prefer not to say	276	37.3

Note. *N*= 756. Household income is reported in Saudi Riyal (SAR)

5.6.2. Response Rate

A total of 850 students were invited to participate in the study from diverse regions in Saudi Arabia, including Riyadh, Al-Qassim, Al-Ula, and Najran. At the baseline psychometric assessment, 757 participants completed the questionnaires, yielding an initial response rate of 89.1%. Of those who responded, 494 participants completed all three time points of data collection. This corresponds to a longitudinal retention rate of 58.1% based on the original invited sample. Participants who completed all the time points were included in the longitudinal analysis, while all baseline participants were considered for descriptive reporting.

Of the 450 students invited, 399 from four schools (2 boys' and 2 girls' schools) participated in the ESM part of the study, yielding an 88.7% response rate. Of these, 274 participants also completed the trait-based assessments, allowing for integration across both approaches. For the ESM component, which required daily inputs over two weeks, each

student completed an average of 15.9 out of 20 possible responses (*SD* = 3.2) over the two-week period. These response rates indicate satisfactory participant engagement across all phases of the research, supporting the reliability of the findings.

5.6.3. Descriptive Statistics and Preliminary Analysis

The series of chi-square analyses presented in Tables 5.3 to 5.7, revealed significant demographic distributions and associations, including age, gender, area of study, parental education and employment, and ethnicity. These findings highlight gendered patterns in academic progression, shared structural and cultural influences, and gender differences in ethnic representation, highlighting the importance of diversity and access in the educational environment.

Table 5.3
Frequencies and Chi-Square Results for Gender and Age

Age Group	Male ***N*** = 285	Female ***N*** = 446	χ^2	***p***-value
Under 15 Years	2	3		
15 Years	72	80		
16 Years	112	211		
17 Years	81	138		
18 Years	18	14		
			11.39	.022

Note. *N*= 731. χ^2 = chi-square statistic. Pearson's chi-square test used. $p < .05$

Table 5.3, presents the distribution of participants across different age groups, categorised by gender, along with the results of a chi-square analysis. The sample consisted of 731 individuals, with data segmented into age groups ranging from under 15 years to 18 years. The gender distribution varied notably across age groups, with females particularly overrepresented in the 16–17-year-old categories. The chi-square analysis, $\chi^2(4) = 11.39$, $p = .022$, indicates that gender distribution differed significantly across age groups.

Table 5.4
Frequencies and Chi-Square Results for Gender and Area of Study

Gender	First Year	2nd Year					X^2	*df*	*p*-value
		General	CS&E	Law	H&L	Management			
Male	147	115	3	7	4	16	49.87	5	< .001
Female	192	148	5	57	0	46			

Note. N=734. CS&E = Computer Science and Engineering, H&L = Health and Life. * $p < .001$

Table 5.4, presents the distribution of participants across different areas of study and year levels, broken down by gender, along with the results of a chi-square analysis. The total sample size was 734 individuals. The chi-square value ($\chi^2(5)= 49.87$, $p < .001$) indicates a highly significant difference in gender distribution across study areas and year levels. This gender imbalance across academic pathways reflects important patterns in educational choices, with notable differences in representation, particularly in specialised fields such as Law, where females were substantially overrepresented, and Health & Life Sciences, which showed a strong male predominance. These distributional differences may have implications for understanding gender-based educational trajectories and potential career pathway preferences within this student population.

Table 5.5
Frequencies and Chi-Square Results for Parents's Education

Father's Education	Secondary	Diploma	Bachelor	Postgraduate (Master and Above)	No education	X^2
Secondary	191	38	75	5	41	242.754***
Diploma	35	29	27	4	2	
Bachelor	63	35	75	6	5	
Postgraduate (Master and Above)	15	7	14	11	3	
No education	25	0	1	1	31	

Note. N= 739. * $p < .001$

Table 5.5 revealed a significant association between fathers' and mothers' education levels, $\chi^2(16) = 242.75$, $p < .001$, indicating that parental education levels were not independent within the sample ($N = 739$). The most frequent pairing was observed when both parents had secondary education (191 cases), followed by both parents holding bachelor's degrees (75 cases). Postgraduate education (Master's and above) was relatively rare, with only 11 cases where both parents reached this level. Additionally, 31 cases showed both parents with no formal education, and parents with no education rarely overlapped with higher educational categories. Cramér's $V = .29$ indicated a moderate association. Assumption checks showed that approximately 12% of expected cell frequencies were below 5 and none were below 1, suggesting that chi-square assumptions were adequately satisfied. These findings suggest clustering of similar educational attainment within families.

Table 5.6
Frequencies and Chi-Square Results for Parents's Employment

Father Employment Status	Full Time Employed	Part-Time Employed	Self-Employment	Unemployed	Prefer not to Respond	X^2
Full Time Employed	112	5	3	5	153	129.985***
Part-Time Employed	2	7	0	3	30	
Self-Employment	8	4	3	0	28	
Unemployed	43	7	6	21	179	
Prefer not to Respond	8	4	1	1	106	

Note. N= 743 * $p < .001$

Table 5.6 revealed a significant association between fathers' and mothers' employment statuses, $\chi^2(16) = 129.99$, $p < .001$, indicating that parental employment statuses were not independent within the sample (N = 743). Cramér's $V = .26$ indicated a small-to-moderate association. However, assumption checks showed that approximately 47% of expected cell frequencies were below 5 and at least one was below 1, suggesting that chi-

square assumptions were not fully satisfied. Therefore, Fisher's exact test with Monte Carlo simulation (20,000 replications) was conducted and confirmed the significance of the association ($p < .001$). Inspection of the frequency distribution suggests some clustering of similar employment statuses within families (e.g., full-time/full-time and unemployed/unemployed pairings), although the magnitude of association is modest.

Table 5.7
Frequencies and Chi-Square Results for Gender and Ethnicity

Gender	Saudi	Non-Saudi	X^2
Male	279	15	16.41^{***}
Female	382	65	

Note. N= 741 * $p < .001$

Table 5.7 presents the distribution of participants by gender and ethnicity, along with the results of a chi-square analysis. The sample consisted of 741 individuals, categorised as Saudi or non-Saudi. The chi-square test revealed a significant association between gender and ethnicity, $\chi^2 (2) = 16.41$, $p < .001$. While Saudi participants constituted the majority across both genders, the proportion of non-Saudis was substantially higher among females compared to males. This demographic pattern may reflect cultural or institutional factors affecting educational access or participation for different groups, potentially indicating different enrolment patterns or educational opportunities available to non-Saudi females in this educational context

5.6.4. Summary of Descriptive Statistics and Preliminary Analysis

This section's analysis revealed significant demographic and educational patterns. Chi-square analyses reveal notable gender imbalances across age groups, particularly among 16- and 17-year-olds, as well as in areas of study, with females being overrepresented in Law and males in Health and Life Sciences. Parental education and employment statuses show strong associations, with secondary education and full-time employment being common,

alongside a notable tendency for non-disclosure of employment status. Additionally, a significant association between gender and ethnicity highlights a higher proportion of non-Saudi females, suggesting potential cultural or institutional influences on educational participation. These findings provide a foundational understanding of the sample's demographic and educational characteristics of adolescents, setting the stage for the subsequent analysis of scale validation to explore the reliability and structure of measurement tools used in this study.

5.7. Scale Validation

Measurement validity is a critical psychometric property, referring to the degree to which an instrument accurately measures what it intends to measure. While reliability ensures consistency in measurement, validity ensures accuracy and appropriateness of the measurement. A measure can be reliable if it consistently produces the same results, but it need not necessarily be a valid measure of what it is supposed to measure (Cohen et al., 2017; Field, 2024).

This study examined the psychometric properties of the FFM-APQ measure used. Specifically, it assessed the internal validity (i.e., factorial validity) of the scales measuring Extraversion, Conscientiousness, Emotional Stability, Agreeableness, and Openness to Experience. It's important to note that the FFM-APQ measure used in this study was a previously validated instrument; that required translation into Arabic for the current study. The analysis focuses on confirming its factor structure within the specific sample rather than conducting a comprehensive validation study, which would require additional validity assessments beyond the scope of this research (Cronbach & Meehl, 1955). Given that the FFM-APQ measure was translated into Arabic for this study, it was also necessary to examine the psychometric properties of all trait measures to ensure the translated version maintained its measurement integrity within the Saudi context. This internal consistency step was

particularly important to assess the reliability for all the trait measures in the study's analyses. The internal consistency assessment helps ensure that the measurement structure is appropriate for the current sample and context. This specific aspect of validity assessment increases confidence that the instruments function as intended for this population, allowing for more meaningful interpretation of the relationships between personality traits and other variables examined in this study (as shown in Tables 5.8 - 5.11).

Table 5.8
Validity Properties for Personality Traits

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.800
Bartlett's Test of Sphericity	Approx. Chi-Square	4578.355
	df	300
	Sig.	.001

Table 5.8 presented the preliminary tests that indicated assessing the suitability of the personality traits data for factor analysis. The Kaiser-Meyer-Olkin (KMO) measure was .80, suggesting that the sampling adequacy is "meritorious," indicating the data is suitable for factor analysis as per standard criteria. Bartlett's test of sphericity was also significant, χ^2 (300) = 4578.36, $p < .001$, confirming that the correlations between variables were strong enough to proceed with factor analysis. This significant result implied that personality traits in the data are likely to cluster, making it appropriate to identify underlying factors or components.

Table 5.9
Commonalities Results of Personality Traits

	Initial	Extraction
Extraversion-1	1.000	.631
Extraversion-3	1.000	.345
Extraversion-4	1.000	.283
Extraversion-8	1.000	.609
Extraversion-12	1.000	.510
Conscientiousness-3	1.000	.441

Conscientiousness-13	1.000	.602
Conscientiousness-16	1.000	.524
Conscientiousness-18	1.000	.538
Conscientiousness-23	1.000	.445
Openness to Experience-5	1.000	.443
Openness to Experience-7	1.000	.443
Openness to Experience-9	1.000	.429
Openness to Experience-11	1.000	.597
Openness to Experience-19	1.000	.443
Emotional Stability-6	1.000	.571
Emotional Stability-10	1.000	.571
Emotional Stability-14	1.000	.496
Emotional Stability-15	1.000	.601
Emotional Stability-24	1.000	.556
Agreeableness-17	1.000	.516
Agreeableness-20	1.000	.421
Agreeableness-21	1.000	.641
Agreeableness-22	1.000	.410
Agreeableness-25	1.000	.443

Table 5.9 presents the commonalities analysis results for the Big Five personality dimensions (Extraversion, Conscientiousness, Openness to Experience, Emotional stability, and Agreeableness). The extraction values across all dimensions reveal important patterns in how well individual items represent their respective personality factors. Most items demonstrate moderate to high commonality values (above .400), indicating satisfactory shared variance with their respective factors. Notable patterns include particularly strong commonalities for certain items in each dimension, such as items 1 and 8 for Extraversion, item 13 for Conscientiousness, item 11 for Openness to Experience, item 15 for Emotional stability, and item 21 for Agreeableness. These higher commonality values suggest these items are particularly strong indicators of their respective personality dimensions. The overall pattern of commonalities supports the five-factor structure of the personality measure, though with varying levels of item strength across dimensions. The few items with lower

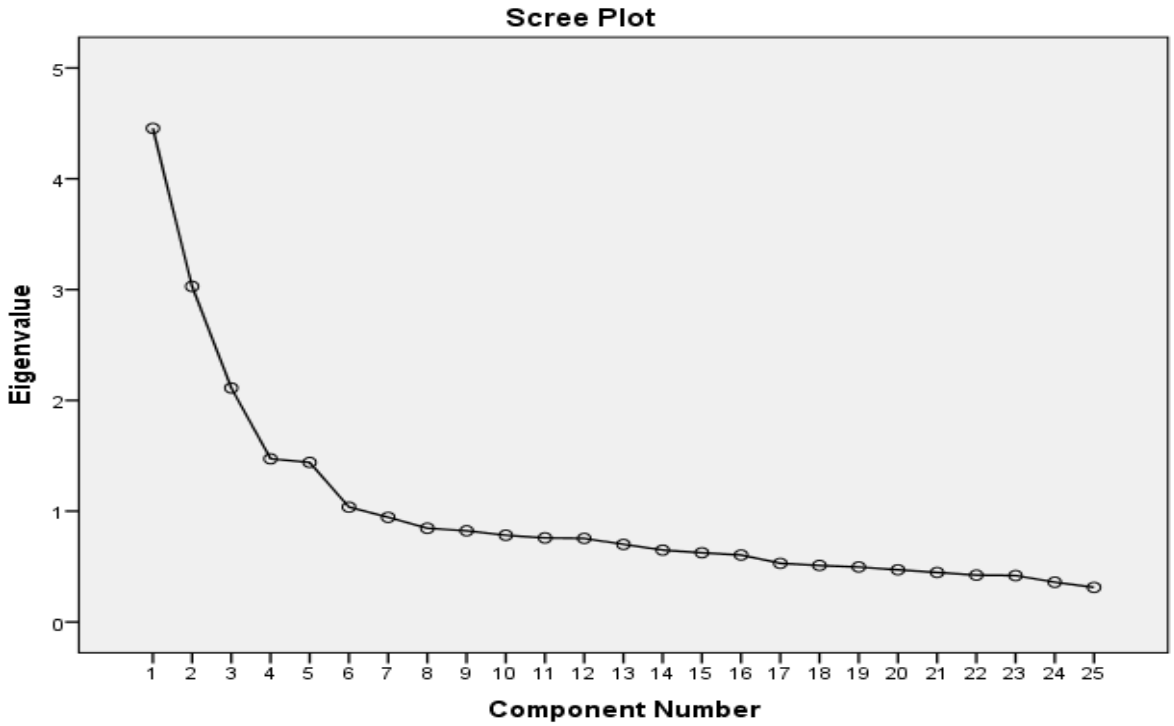
communalities (particularly item 4 in Extraversion) may warrant further attention in future research as they share less variance with their intended factors in this sample.

Table 5.10
Total Variances Explained in Personality Traits

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.455	17.820	17.820	4.455	17.820	17.820	2.857	11.429	11.429
2	3.029	12.115	29.935	3.029	12.115	29.935	2.644	10.578	22.007
3	2.112	8.448	38.383	2.112	8.448	38.383	2.478	9.910	31.918
4	1.473	5.892	44.275	1.473	5.892	44.275	2.366	9.463	41.380
5	1.440	5.759	50.033	1.440	5.759	50.033	2.163	8.653	50.033
6	1.037	4.148	54.181						
7	.945	3.779	57.960						
8	.846	3.383	61.344						
9	.823	3.292	64.635						
10	.783	3.131	67.766						
11	.759	3.036	70.802						
12	.754	3.017	73.819						
13	.700	2.801	76.620						
14	.649	2.596	79.217						
15	.625	2.500	81.717						
16	.604	2.417	84.134						
17	.529	2.117	86.251						
18	.510	2.040	88.292						
19	.496	1.984	90.275						
20	.471	1.885	92.160						
21	.447	1.787	93.948						
22	.423	1.692	95.639						
23	.419	1.676	97.315						
24	.359	1.436	98.751						
25	.312	1.249	100.000						

Table 5.10, provides insights into the total variance explained by each extracted component for personality traits, reflecting the cumulative variance captured by the factor analysis. The initial eigenvalues (also shown in Figure 5.2) show that the first five components account for 50.03% of the cumulative variance in personality traits within this dataset. After rotation, which redistributes the explained variance for more precise factor interpretation, the variance becomes more evenly distributed across the five components, while maintaining the same total explained variance. This rotation adjustment enhances interpretability by creating a more balanced distribution across components, emphasising the distinct contribution of each trait factor to the overall structure. The scree plot (Figure 5.2) further confirms that five distinct components effectively summarise the personality trait data, each capturing a meaningful portion of the overall variance.

Figure 5.3 *Components of Personality Traits*



The scree plot eigenvalues against the component numbers, showing how much variance each component explains. The steep decline in the eigenvalues for the first few components

indicates that a substantial amount of variance is explained by the initial factors. After the third component, the slope of the curve levels off significantly, forming an "elbow," which suggests that the first three components account for most of the variance in the data. Beyond this point, additional components contribute increasingly less to explaining the variance, as indicated by the eigenvalues levelling off below 1.

5.7.1. Reliability of Findings

Table 5.11 presents the psychometric properties of the scales and subscales used in the study. Personality trait scales demonstrated moderate internal consistency, with Cronbach's α ranging from .66 (Extraversion) to .78 (Emotional Stability). The overall BESSI-20 scale demonstrated high reliability (α = .87); however, some subscales, such as cooperation skills (α = .60) and emotional resilience Skills (α = .55), showed lower consistency. The GRIT scale had moderate reliability (α = .66), with higher consistency for consistency of interest (α = .71) than perseverance of effort (α = .54). PANAS subscales showed strong reliability (positive affect α = .83; negative affect α = .80), and the Satisfaction with Life Scale was also highly reliable (α = .81).

Table 5.11
Psychometric Properties for Study Scales and Subscales

Scale	M	SD	Range	Cronbach's α
FFM-APQ				
Extraversion	3.64	0.65	5-25	.66
Conscientiousness	3.76	0.72	5-25	.75
Openness to Experience	3.90	0.54	5-25	.69
Emotional stability	2.80	0.86	5-25	.78
Agreeableness	3.82	0.64	5-25	.69
BESSI-20				.87
Self-Management Skills	15.45	2.62	4-20	.69
Social Engagement Skills	13.55	11.29	4-20	.69
Cooperation Skills	15.13	6.99	4-20	.60
Emotional Resilience Skills	14.75	7.41	4-20	.55

Innovation Skills	13.85	9.01	4-20	.67
GRIT	26.35	5.06	8-40	.66
Consistency of Interest	11.48	3.56	4-20	.71
Perseverance of Effort	14.87	2.87	4-20	.54
PANAS				
Positive Affect	38.20	6.50	10-50	.83
Negative Affect	24.16	6.72	10-50	.80
SWLS	24.05	6.75	5-35	.81

Note. *N*= 756. FFM-APQ = Five Factor Model Adolescent Personality Questionnaire, BESSI-20 = Social, Emotional and Behavioural Skills Questionnaires, PANAS = Positive and Negative Affect Scale, SWLS = Satisfaction with Life Scale.

Table 5.12 summarises descriptive statistics and zero-order correlations among the main study variables. Findings revealed moderate to strong links between personality traits and social-emotional competencies. For example, Extraversion ($M = 3.64$, $SD = 0.68$) was positively correlated with Conscientiousness ($r = .38$, $p < .001$), Openness ($r = .40$, $p < .001$), and various social-emotional skills, including social engagement ($r = .54$, $p < .001$) and cooperation ($r = .48$, $p < .001$)). Unlike Soto et al. (2024), who modelled BESSI as a single-factor construct in their Study 2, the present study analysed BESSI subscales separately to better capture specific domains of social-emotional competence.

Emotional Stability ($M = 2.77$, $SD = 0.89$) showed a negative association with negative affect ($r = –.48$, $p < .001$) and a positive association with life satisfaction ($r = .23$, $p < .001$), supporting its relevance in well-being. Positive affect ($M = 3.69$, $SD = 0.72$) demonstrated significant positive associations with all adaptive traits and competencies, while negative affect ($M = 2.13$, $SD = 0.78$) was negatively associated with most variables, particularly with emotional resilience ($r = –.35$, $p < .001$) and life satisfaction ($r = –.44$, $p < .001$). Overall, the results support the protective role of personality and social-emotional skills in psychological well-being.

Table 5.12

Descriptive Statistics and Correlations of Non-Intellective Factors

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Extraversion	3.64	0.68	—													
Conscientiousness	3.67	0.72	.38**	—												
Emotional stability	2.77	0.89	.12**	.26**	—											
Openness	3.88	0.54	.40**	.37**	–.04	—										
Agreeableness	3.87	0.64	.35**	.25**	–.10**	.25**	—									
Self-Management	3.89	0.65	.32**	.70**	.29**	.36**	.23**	—								
Social Engagement	3.46	0.82	.54**	.52**	.31**	.34**	.20**	.58**	—							
Cooperation	3.76	0.66	.48**	.44**	.13**	.34**	.51**	.52**	.53**	—						
Emotional Resilience	3.69	0.68	.38**	.54**	.36**	.28**	.29**	.62**	.47**	.55**	—					
Innovation	3.53	0.74	.31**	.51**	.23**	.52**	.16**	.54**	.55**	.42**	.47**	—				
Grit	3.46	0.53	.09**	.03	–.26**	.20**	.22**	.13**	.05	.18**	.10**	.10**	—			
Positive Affect	3.69	0.72	.54**	.50**	.24**	.41**	.31**	.50**	.53**	.50**	.49**	.47**	.11**	—		
Negative Affect	2.13	0.78	–.21**	–.28**	–.48**	–.07*	–.02	–.32**	–.25**	–.21**	–.35**	–.17**	.13**	–.29**	—	
Life Satisfaction	4.75	1.38	.27**	.37**	.23**	.07*	.10**	.35**	.31**	.24**	.36**	.19**	.03	.39**	–.44**	—

Note. N= 756 *p < .05, **p < .01, ***p < .001

5.7.2. Summary of Preliminary Analysis, and Scale Validation

The subsequent factorial validation confirmed that the FFM-APQ instrument with its five subscales (Extraversion, Conscientiousness, Emotional Stability, Agreeableness, and Openness to Experience) was psychometrically sound, supported by factor analysis results showing a Kaiser-Meyer-Olkin value of .80 and a significant Bartlett's test of sphericity. The EFA supported the expected five-factor structure, demonstrating that the personality traits loaded appropriately onto their respective factors as theoretically predicted. Cronbach's alpha was 0.8 for BESSI-20 scale and ranged from .66 to .78 for personality traits, indicating high and acceptable to good reliability respectively. Moderate to strong associations were detected between personality traits, social-emotional competencies, grit, and well-being measures using.

After the demographic characteristics and psychometric properties of the study measures had been established, the primary empirical analyses addressing the four research questions were presented in the following sections. Growth curve analyses were first conducted to examine developmental trajectories (RQ1), followed by analyses exploring their predictive relationships with outcomes (RQ2), bidirectional dynamics (RQ3), and momentary fluctuations (RQ4).

5.8. Growth Curve Models for Personality, SEB Skills, Grit, and Well-Being

To address first research question, *how do secondary school students' non-intellective factors, such as personality traits, grit, and social-emotional and behavioural skills, change over time, and does their well-being also change during the same period?* These models allow for examination of both within-person change (how individuals evolve over time) and between-person differences in these trajectories. The following sections present the results for each measured construct.

Table 5.13

Growth Curve Model Results for Change in Non-Intellective Factors Over Time

Variable	Intercept (*SE*)	*p*-value (Int)	Time Effect (*SE*)	*p*-value (Time)	*F*	*P*	R^2 Marginal	R^2 Conditional	Random Effect ICC	Random Effect Test -value
Extraversion	3.64 (0.03)	< .001	0.00 (0.02)	.898	0.02	.898	0.000	0.372	0.367	.001
Conscientiousness	3.63 (0.03)	< .001	0.06 (0.02)	.003	9.15	.003	0.005	0.280	0.277	.425
Openness to Experience	3.87 (0.02)	< .001	0.02 (0.02)	.104	2.64	.104	0.001	0.226	0.225	.517
Emotional Stability	2.77 (0.04)	< .001	0.00 (0.02)	.919	0.01	.991	0.000	0.417	0.417	.001
Agreeableness	3.90 (0.03)	< .001	–0.03(0.02)	.071	3.26	.071	0.002	0.215	0.214	.849
Self-Management Skills	3.89 (0.02)	<.001	0.04(0.02)	0.13	6.15	.013	0.003	0.256	0.254	.202
Social Engagement Skills	3.37 (0.04)	<.001	0.09 (0.02)	.001	16.56	.001	0.009	0.308	0.301	.004
Cooperation Skills	3.78 (0.03)	<.001	0.02 (0.02)	0.36	0.82	0.36	0.000	0.209	0.209	0.492
Emotional Resilience Skills	3.70 (0.03)	<.001	0.02 (0.02)	0.38	0.77	0.38	0.000	0.318	0.318	0.26
Innovation Skills	3.45 (0.03)	<.001	0.09 (0.02)	<.001	17.35	<.001	0.009	0.267	0.261	.07
SEB	3.64(0.03)	< .001	0.05(0.02)	.002	9.76	.002	0.005	0.272	0.268	< .001
Consistency of Interests	3.73 (0.03)	< .001	0.06 (0.02)	.005	8.05	.005	0.005	0.206	0.203	.98
Perseverance of Effort	3.13 (0.04)	< .001	0.012 (0.02)	.635	0.23	.635	0.000	0.247	0.247	.618
GRIT	3.430 (0.022)	< .001	0.034 (0.015)	.027	4.94	.027	0.003	0.214	0.212	.266
Positive Affect	3.457 (0.033)	< .001	0.087 (0.021)	< .001	17.35	< .001	0.009	0.267	0.261	.069
Negative Affect	3.650 (0.031)	< .001	0.042 (0.020)	.041	4.18	.041	0.002	0.254	0.253	.601
Satisfaction with Life	4.722 (0.062)	< .001	0.032 (0.037)	.384	0.76	.384	0.000	0.389	0.389	.198

Note. *N*=494 SEB = Social, emotional, and behavioural skills. All models were fit using REML (formula: Outcome ~ 1 + Time + (1+ Time | Code)); most showed singular fit with no significant Time effects ($p > 0.05$);

ICC = Intraclass Correlation Coefficient; Random Effect Test p-value from LRT comparing models with/without random slopes.

A linear growth curve model was used (presented in Table 5.13), to examine changes in personality traits, social-emotional skills, affective states, and motivational factors across three time points: baseline (Time 1), after 6 months (Time 2), and after 17 months (Time 3). Each model included a fixed intercept (reflecting the estimated mean at baseline) and a fixed linear time effect (capturing the rate of change over time), along with random intercepts and slopes for participants. The models were fit using Restricted Maximum Likelihood (REML) estimation. The results showed that all intercepts were significant ($p < .001$), indicating that average baseline levels across all measured domains, personality traits, SEB skills, grit components, and well-being factors (e.g., positive and negative affect, and life satisfaction) were meaningfully above zero and above the midpoint of their respective scales.

Meanwhile, most variables show stable trajectories over time (non-significant time effects), indicating little change. However, Conscientiousness ($p = .003$), social engagement skills ($p = .001$), innovation skills ($p < .001$), SEB composite ($p = .002$), consistency of interests ($p = .005$), grit composite ($p = .027$), positive affect ($p < .001$), showed significant positive changes over time. In contrast, negative affect also changed significant over time ($p = .041$), reflecting an increase in negative emotions among the participants. Moreover, traits such as Extraversion, Emotional Stability, Agreeableness, and life satisfaction did not change significantly ($p > .05$), supporting the visual trend of stability seen in Figure 5.4. The R^2 values are generally low, suggesting small effect sizes. The random effect *ICC*s indicate moderate between-person variability, and several random effect tests were significant (e.g., Extraversion, SEB skills), suggesting considerable individual differences in trajectories.

In sum, the linear growth curve models demonstrated a mixed pattern of change and stability over the 17-month period. While most personality traits, individual social-emotional skill domains, and motivational factors remained stable, participants showed significant

improvements in multiple domains, including Conscientiousness, social engagement skills, innovation skills, the overall SEB composite, grit-related factors (consistency of interests and grit composite), and positive affect. This pattern suggests selective development in certain domains while maintaining stability in others.

Supplementary growth curve analyses examined whether developmental trajectories differed by gender by including gender-by-time interaction terms. Although some baseline gender differences were observed, there was little evidence that trajectories differed across boys and girls, with significant interaction effects observed only for Openness (p = .031) and Agreeableness (p = .017) (see Appendix E).

Figure 5.4
Trajectories of Non-intellective Factors

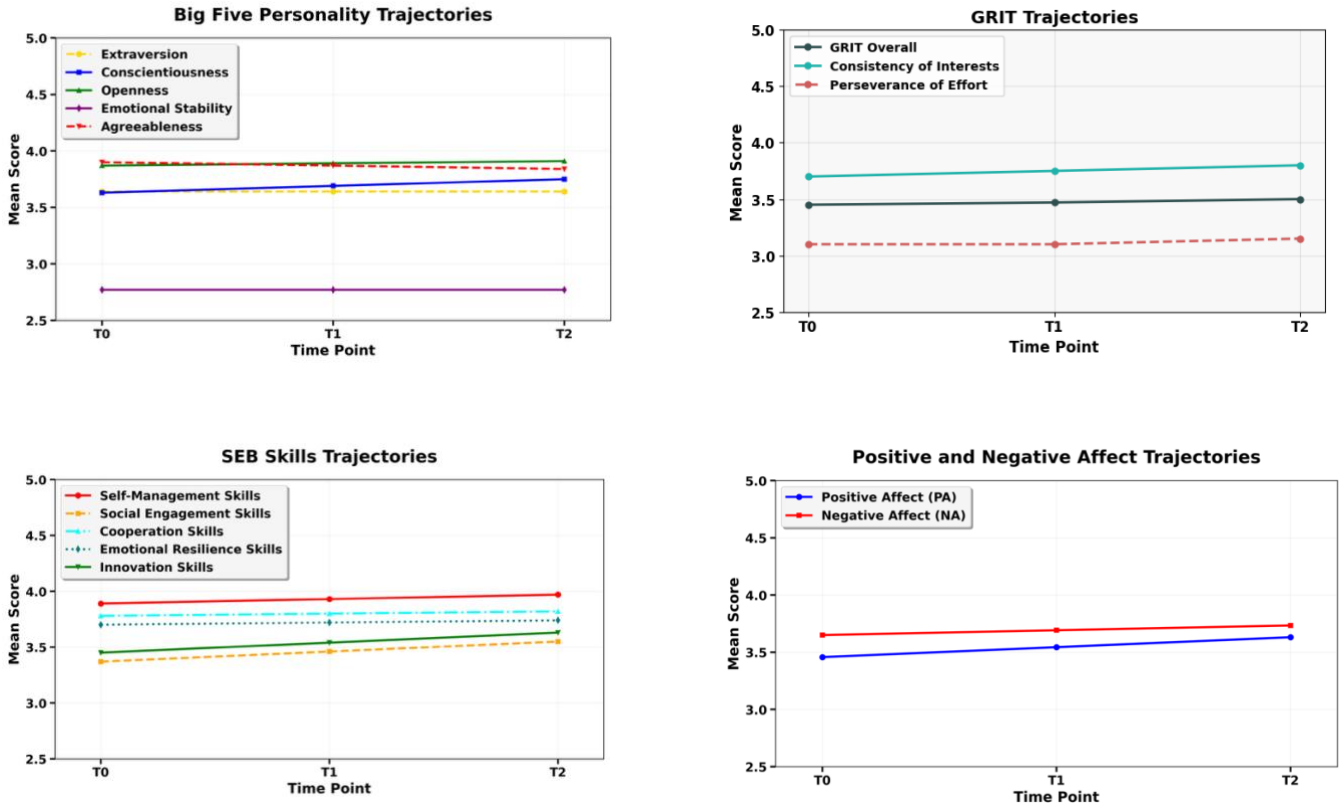


Figure 5.4 shows slight increases in Conscientiousness, grit (especially consistency of interests), SEB skills, and both positive and negative affect over time. Most traits and skills remained relatively stable, with modest upward trends. Life satisfaction remained stable, reflecting overall steady or improved well-being.

5.8.1. Summary of non-intellective trajectories

Growth trajectory models addressing the initial research inquiry elucidated both stability and developmental transformation throughout the study period. Notable increases were established for Conscientiousness (β = .06, p = .003), SEB competencies (β = .05, p = .002), and comprehensive grit (β = .034, p = .027), indicating developmental advancement in self-regulation, interpersonal skills, and persistent effort. Among the SEB subcategories, social engagement Skills (β = .09, p = .001) and innovation skills (β = .09, p < .001) exhibited the most pronounced positive trajectories, while perseverance of effort also experienced a significant increase (β = .06, p = .005).

Emotional well-being, including positive affect, manifested a significantly increased trajectory (β = .087, p < .001), whereas negative affect likewise exhibited a slight yet significant increase (β = .042, p = .041), indicating modest variations in the emotional states of students. Conversely, the preponderance of personality traits and well-being outcomes, including Extraversion, Openness to Experience, Emotional Stability, self-management,

cooperation, and life satisfaction, remained stable over time, reflecting overall developmental uniformity within these domains. Although statistically significant, the observed changes were small in magnitude; marginal R^2 values ranged from.003 to.009, indicating that time accounted for a modest proportion of variance in the outcomes. In contrast, conditional R^2 values were notably elevated (e.g., .417 for Emotional Stability and .267 for positive affect), underscoring considerable inter-individual variability.

These results are congruent with preceding research indicating that while personality traits and non-intellective factors are mainly stable during adolescence, small yet meaningful developmental variations can arise, particularly in goal-oriented and socially integrated domains. Building upon these patterns of change and stability, the subsequent series of analyses (addressing Research Question 2) will investigate how personality traits, grit, and SEB competencies predict well-being (positive affect, negative affect and satisfaction with life) and academic achievement utilising both Growth Curve and Linear Regression models.

5.8.2. Impact of Personality and Other Non-Intellective Factors on Academic and Well-being Outcomes

The above findings established a foundation of stable and developing non-intellective factors, setting the stage for the next analysis phase. This section addresses Research Question 2: *To what extent do changes in these non-intellective factors predict students' well-being and academic achievement outcomes*? Using the GCM and linear regression analysis, the study investigated how personality traits (Extraversion, Conscientiousness, Emotional Stability, Agreeableness, and Openness to Experience), grit, and SEB skills predict well-being outcomes (specifically, positive affect, negative affect, and satisfaction with life) and academic achievement.

5.8.2.1. The impact of personality, SEB, and Grit on the well-being outcomes

This section examined how individual differences in personality traits, SEB skills, and grit influence students' well-being, defined here as positive affect (PA), negative affect (NA), and life satisfaction (LS). Accordingly, a series of linear mixed-effects growth curve models (GCMs) was conducted. These models accounted for both within-person and between-person variability by separating time-varying effects (i.e., intra-individual change) from stable trait-level differences (i.e., inter-individual variation). The models were estimated separately for each well-being outcome. This approach enabled an examination of which individuals tended to report higher levels of overall well-being, as well as whether changes in predictor variables were associated with corresponding changes in well-being over time.

The impact of personality, SEB and Grit on Positive Affect outcomes. This section investigates whether changes in personality traits, grit, and SEB skills over time are associated with changes in students' positive affect. A linear mixed-effects model was used to examine both the intercepts and the interactions of each non-intellective factor with time. This approach allows for a clear distinction between stable between-person differences and dynamic within-person changes observed across time points.

Table 5.14
Linear Mixed Model Predicting Positive Affect Over Time from Traits, Grit, and SEB Skills

Predictor	Fixed Effect	Estimate (β)	*SE*	*df*	*t*	*p*	95% *CI*
Intercept	—	–0.237	0.246	771	–0.96	.336	[–0.720, 0.246]
Time	—	0.024	0.182	911	0.13	.894	[–0.333, 0.382]
Extraversion	Intercept	0.258	0.041	702	6.36	< .001	[0.179, 0.338]
	Time	0.001	0.033	963	0.02	.982	[–0.064, 0.065]
Conscientiousness	Intercept	0.004	0.045	772	0.09	.929	[–0.085, 0.093]
	Time	0.075	0.035	982	2.17	.030	[0.007, 0.143]
Emotional Stability	Intercept	0.066	0.029	712	2.29	.022	[0.009, 0.122]
	Time	–0.001	0.022	945	–0.04	.966	[–0.044, 0.042]
Openness	Intercept	0.126	0.052	763	2.41	.016	[0.023, 0.229]
	Time	–0.021	0.040	994	–0.53	.596	[–0.100, 0.058]

Agreeableness	Intercept	0.045	0.042	785	1.08	.281	[–0.037, 0.126]
	Time	0.026	0.032	956	0.82	.411	[–0.037, 0.090]
Grit	Intercept	0.085	0.046	801	1.85	.065	[–0.005, 0.174]
	Time	–0.048	0.034	984	–1.41	.159	[–0.114, 0.019]
Self-Management Skills	Intercept	0.107	0.054	787	1.99	.047	[0.001, 0.213]
	Time	–0.012	0.043	1030	–0.29	.773	[–0.097, 0.073]
Social Engagement	Intercept	0.079	0.040	756	1.98	.048	[0.001, 0.157]
	Time	0.001	0.031	1026	0.05	.963	[–0.060, 0.063]
Cooperation Skills	Intercept	0.095	0.049	794	1.93	.054	[–0.001, 0.191]
	Time	–0.004	0.037	988	–0.11	.910	[–0.077, 0.069]
Emotional Resilience	Intercept	0.066	0.046	758	1.42	.156	[–0.024, 0.157]
	Time	0.034	0.036	975	0.94	.346	[–0.037, 0.105]
Innovation Skills	Intercept	0.151	0.042	750	3.56	< .001	[0.067, 0.235]
	Time	–0.058	0.033	993	–1.76	.078	[–0.122, 0.006]

Note. N= 493. β = standardised estimate; *SE* = standard error; *CI* = confidence interval; $p < .05$, $p < .001$; R^2 Marginal = .540.

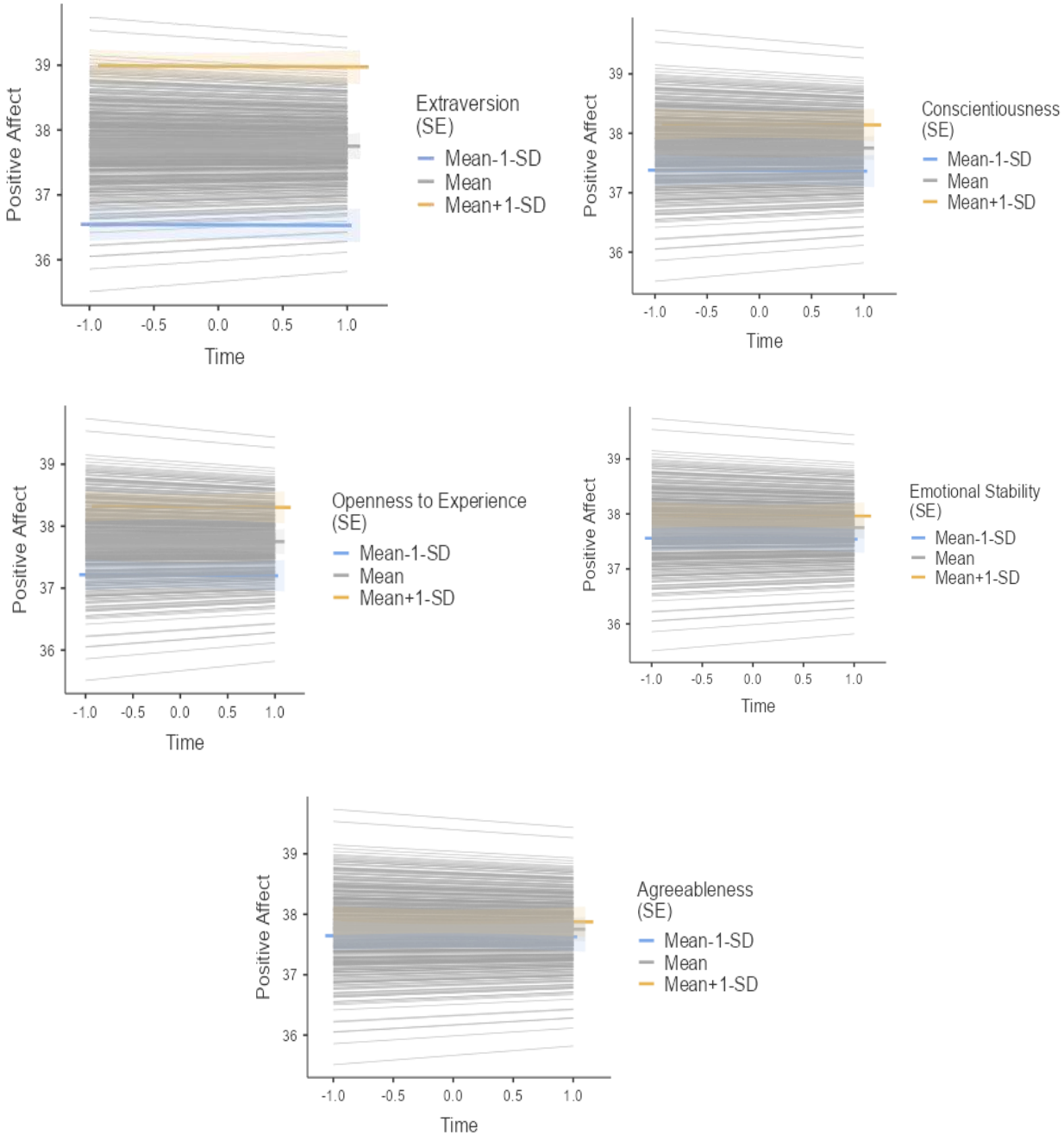
Table 5.14 presents the fixed effects from this growth curve model. Several trait-level variables significantly predicted positive affect. Specifically, higher levels of Extraversion (β = .258, $p < .001$), Emotional stability (β = .066, p = .022), Openness (β = .126, p = .016), and innovation skills (β = .151, $p < .001$) were associated with higher overall positive affect. In addition, self-management and social engagement skills were both significant ($p < .05$), indicating their relevance to students' positive emotional experiences. Out of all interaction terms tested, only the Time by Conscientiousness interaction was significant (β = .075, p = .030), suggesting that the effect of Conscientiousness on positive affect changes over time. This indicates that students who became more conscientious across the study period also reported increases in positive affect. Other interactions such as Time × Grit and Time × Innovation Skills did not reach statistical significance (p = .059 and .084, respectively).

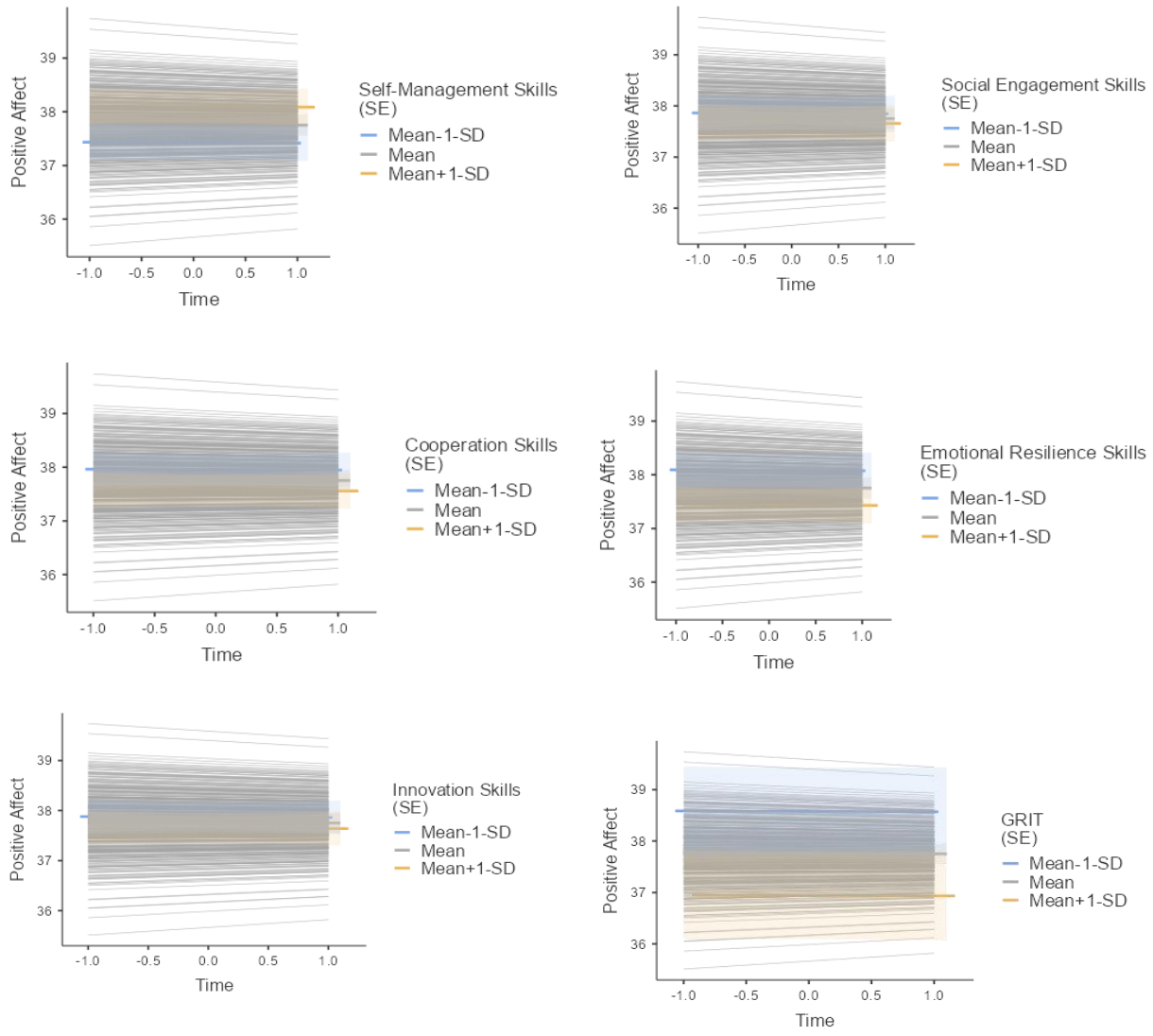
Random Effects and Model Fit. Individual differences in baseline affect and trajectories were modelled by the growth curve model by including random intercepts and slopes for time. With a negative correlation (-.60) and intercept and slope variances of .061 and

0.008, respectively, it appeared that students who reported higher positive affect in the beginning tended to exhibit smaller changes over time. With a residual variance of .224, significant within-person variability was evident. The *ICC* was .21, indicating that only 21% of the variance in positive affect was due to stable between-person differences. The model showed good explanatory power, with a marginal R^2 of .42 (fixed effects only) and a conditional R^2 of .52 (fixed and random effects), demonstrating that personality traits, SEB skills, and grit together accounted for a substantial proportion of both individual differences and changes in positive affect over time (see Figure 5.5).

Figure 5.5

The Effects of Personality Traits, SEB, and Grit on Positive Affect Over Time





Note. Random Effects are plotted by individual participants code.

These plots illustrate the associations between various psychological skills and traits with positive affect over time, measured across three time points: baseline, nine months later, and then after another six months. The x-axis labelled "Time" does not show raw time points (e.g., T1, T2, T3). Instead, it represents standardised time, where −1 approximates the baseline, 0 is around the midpoint (after 17 months), and +1 reflects the final measurement point (after a total of 17 months). The y-axis shows the predicted levels of positive affect. Each plot presents marginal means of positive affect for individuals with low (−1 SD), average (mean), and high (+1 SD) levels of the respective skill or trait. The coloured lines (blue for low, black for average, and orange for high) demonstrate that individuals with

higher levels of these psychological characteristics generally report higher positive affect throughout the study period. The trajectories remain mostly flat, indicating stability in positive affect over time, with consistent differences based on individual levels of the measured traits or skills.

The impact of personality, SEB, and Grit on the Negative Affect outcome. This section explores whether changes in personality traits, grit, and SEB skills over time are associated with changes in students' negative affect. A linear mixed-effects model was employed to examine both the intercepts and the interactions between each non-intellective factor and time. This method enables a clear distinction between stable between-person differences and dynamic within-person change.

Table 5.15
Linear Mixed Model Predicting Negative Affect Over Time from Traits, Grit, and SEB Skills

Predictor	Fixed Effect	Estimate (*β*)	*SE*	*df*	*t*	*p*	95% *CI*
Intercept	—	4.257	0.300	782	14.19	< .001	[3.669, 4.845]
Time	—	–0.096	0.220	870	–0.44	.663	[–0.527, 0.335]
Extraversion	Intercept	–0.218	0.050	718	–4.39	< .001	[–0.316, –0.119]
	Time	0.119	0.040	920	2.99	.003	[0.041, 0.197]
Conscientiousness	Intercept	0.003	0.055	785	0.05	.963	[–0.105, 0.111]
	Time	–0.036	0.042	938	–0.85	.393	[–0.119, 0.047]
Emotional Stability	Intercept	–0.271	0.035	725	–7.74	< .001	[–0.339, –0.202]
	Time	–0.055	0.027	900	–2.07	.039	[–0.108, –0.003]
Openness	Intercept	–0.014	0.064	772	–0.22	.826	[–0.139, 0.111]
	Time	–0.054	0.049	944	–1.10	.272	[–0.149, 0.041]
Agreeableness	Intercept	0.097	0.051	793	1.92	.056	[–0.002, 0.196]
	Time	–0.046	0.038	910	–1.19	.234	[–0.121, 0.029]
Grit	Intercept	0.038	0.056	811	0.69	.489	[–0.071, 0.148]
	Time	0.042	0.041	936	1.02	.306	[–0.038, 0.122]
Self-Management Skills	Intercept	–0.164	0.066	794	–2.49	.013	[–0.294, –0.033]
	Time	0.017	0.052	976	0.32	.751	[–0.085, 0.118]
Social Engagement	Intercept	0.006	0.049	764	0.13	.898	[–0.089, 0.101]
	Time	0.027	0.038	972	0.71	.477	[–0.047, 0.101]
Cooperation Skills	Intercept	0.012	0.060	802	0.20	.843	[–0.105, 0.129]
	Time	–0.072	0.045	939	–1.59	.112	[–0.161, 0.017]

Emotional Resilience	Intercept	–0.217	0.057	767	–3.85	< .001	[–0.329, –0.106]
	Time	0.068	0.043	926	1.57	.117	[–0.016, 0.152]
Innovation Skills	Intercept	0.086	0.052	760	1.67	.096	[–0.016, 0.188]
	Time	0.019	0.040	946	0.49	.625	[–0.059, 0.097]

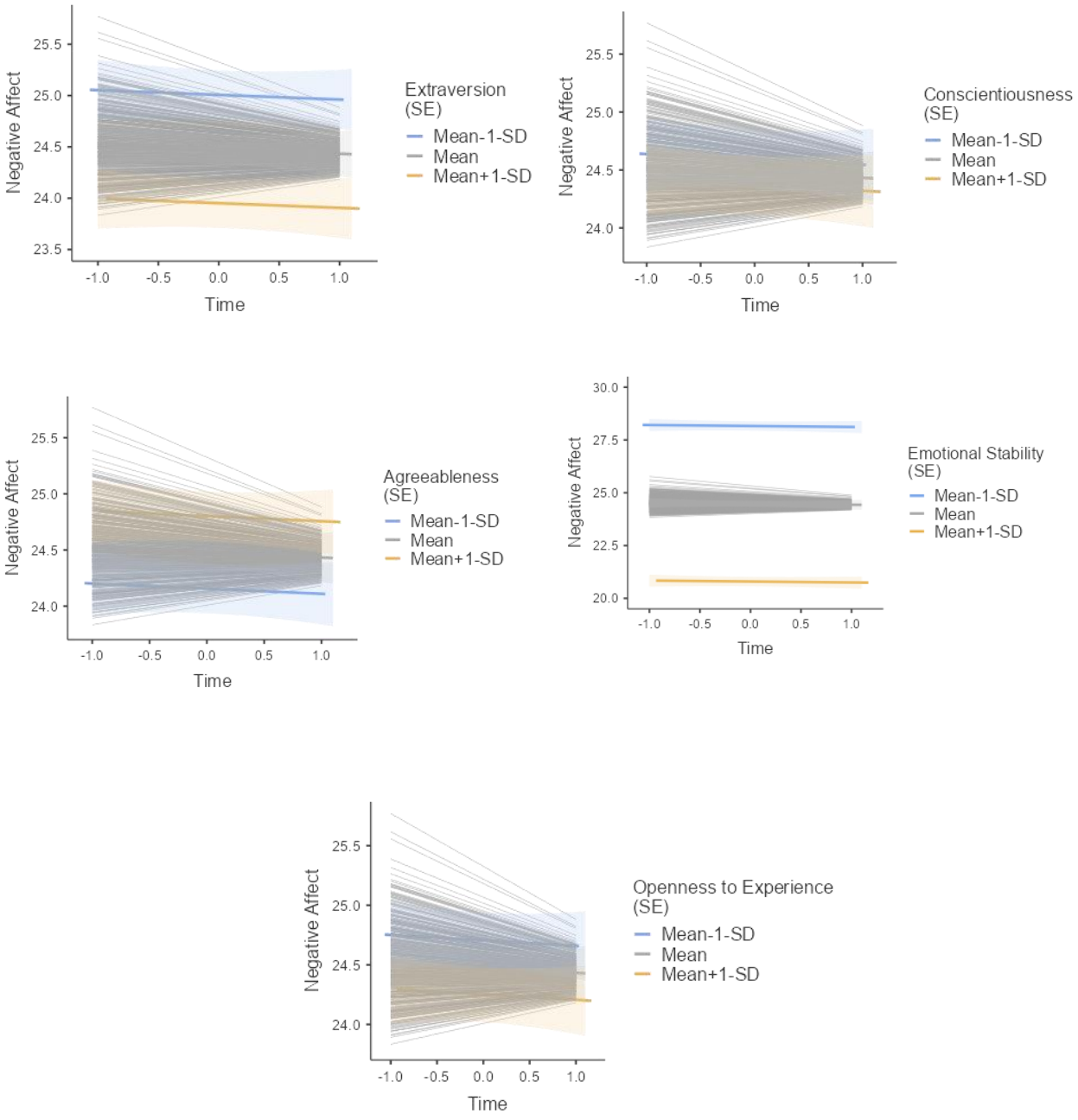
Note. N= 493. β = standardised estimate; SE = standard error; CI = confidence interval. $p < .05$, $p < .001$, marginal $R^2 = .285$, conditional $R^2 = .468$

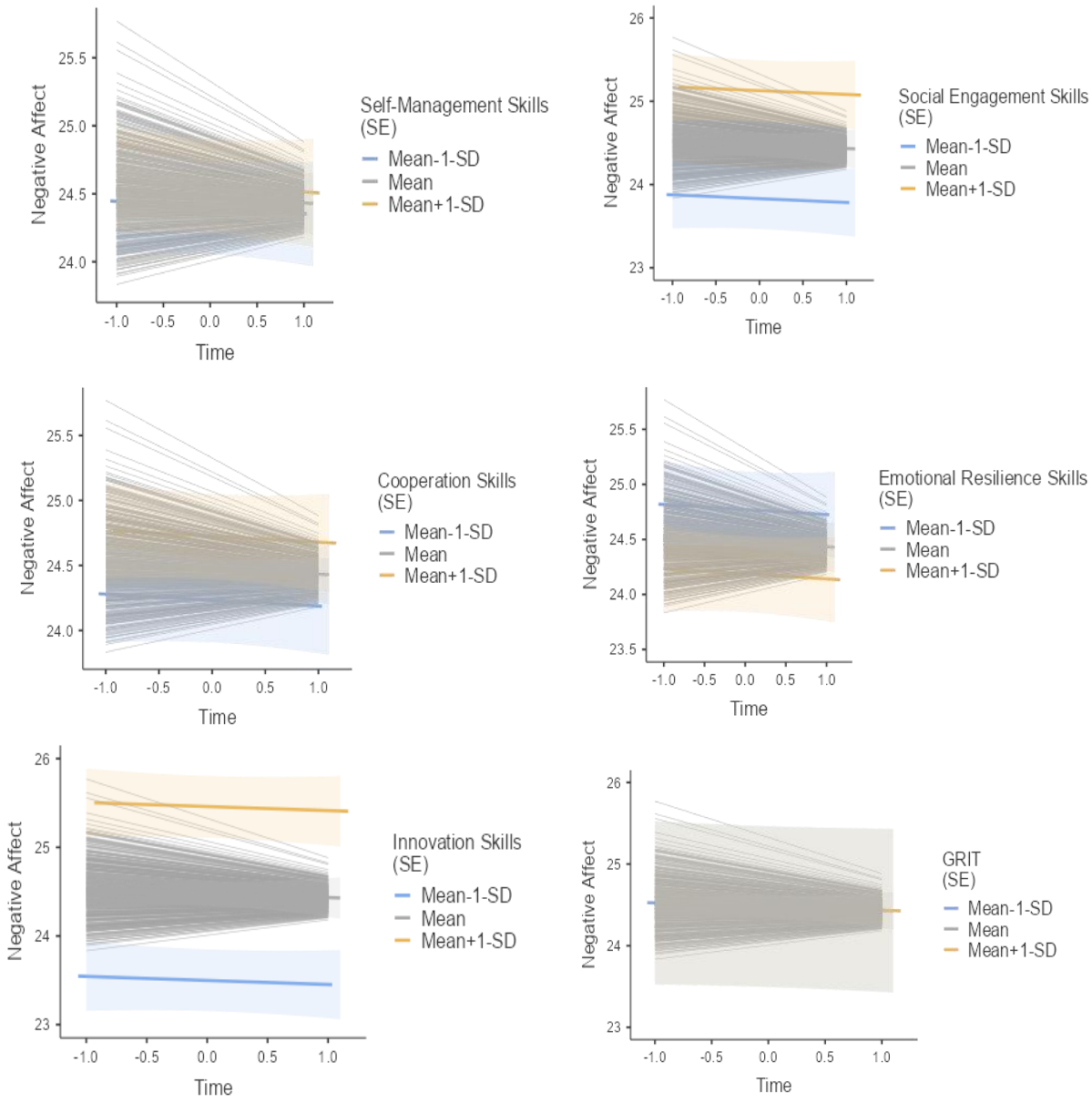
As presented in Table 5.15, students with higher Emotional Stability or stronger self-management skills experienced decreases in negative affect over time ($\beta = –.271$, $p < .001$ and $\beta = –.164$, $p = .013$, respectively). Similarly, a higher level of Extraversion was associated with a decline in negative affect ($\beta = –.218$, $p < .001$), indicating a protective trajectory. The interaction between Time and Emotional Stability was significant ($\beta = –.055$, $p = .039$), indicating that students who became more emotionally stable over the study period experienced a corresponding decline in negative affect over time. In contrast, the significant Time × Extraversion interaction ($\beta = .119$, $p = .003$) suggested that students who became more extraverted over time experienced either slower decline or relative stability in negative affect. This may reflect increased social sensitivity or exposure to emotionally demanding situations associated with greater Extraversion.

***Random Effects and Model Fit*.** Random Effects and Model Fit. To capture individual variations in the growth curve model, random intercepts and slopes were incorporated. The random intercept *SD* was 0.348, and the random slope *SD* for time was 0.069. Students with initially high levels of negative affect tended to decline more abruptly over time, while those with lower starting levels showed relatively steady or slower reductions, according to negative intercept–slope correlation (–.368). Fixed effects were responsible for 28.5% of the variance, as indicated by the marginal R^2 of .285, and .468 was the conditional R^2 value, indicating that the complete model (including random effects) explained nearly half the variance in negative affect (see Figure 5.6)

Figure 5.6

The Effects of Personality Traits, SEB, and Grit on Negative Affect Over Time





Note. Random Effects are plotted by individual code.

Figure 5.6 illustrates the effects of personality traits (Extraversion, Conscientiousness, Emotional Stability, Agreeableness), SEB skills, and grit on negative affect over time using effects plots. Each panel shows how negative affect changes with time, with the x-axis representing time (standardised from -1 to 1) and the y-axis showing negative affect levels (ranging from 20 to 27 scores). Across most traits and SEB skills, negative affect remains stable over time, with the Mean (grey) staying around 24–25 scores, and the mean-*1SD* (blue) and mean+1*SD* (yellow) bands showing slight variations. Emotional Stability exhibits a slight

decline in negative affect, with the Mean (grey) trending downward, suggesting that higher Emotional Stability reduces negative affect over time. The observed stability of negative affect reflects the non-significant main effect of time in the growth model (β = –.096, p = .663), indicating no overall change in mean negative affect across the study period. Although certain traits influenced individual trajectories, the average level remained consistent. This pattern suggests that variation in negative affect was driven by individual differences rather than a general developmental shift during the observed interval.

The impact of personality, SEB Skills, and Grit on Life Satisfaction outcome. This section examines the extent to which personality traits, grit, and SEB skills account for variation in students' life satisfaction over time. A linear mixed-effects model was employed to examine both the intercepts and the interactions between each non-intellective factor and time.

Table 5.16
Linear Mixed Model Predicting Life Satisfaction Over Time from Traits, Grit, and SEB Skills

Predictor	Fixed Effect	Estimate (β)	*SE*	*df*	*t*	*p*	95% *CI*
Intercept	—	1.333	0.556	822.82	2.40	.017	[0.243, 2.423]
Time	—	–0.301	0.398	847.92	–0.76	.450	[–1.081, 0.479]
Extraversion	Intercept	0.311	0.092	754.48	3.36	< .001	[0.129, 0.492]
	Time	–0.034	0.072	893.98	–0.48	.635	[–0.174, 0.106]
Conscientiousness	Intercept	0.416	0.102	824.89	4.07	< .001	[0.216, 0.617]
	Time	–0.027	0.076	912.64	–0.36	.718	[–0.176, 0.121]
Emotional Stability	Intercept	–0.011	0.065	761.75	–0.17	.866	[–0.139, 0.117]
	Time	0.096	0.048	873.16	2.00	.046	[0.002, 0.191]
Openness	Intercept	–0.190	0.118	811.43	–1.61	.108	[–0.422, 0.041]
	Time	–0.021	0.088	917.02	–0.24	.811	[–0.194, 0.152]
Agreeableness	Intercept	–0.041	0.093	830.75	–0.44	.661	[–0.224, 0.142]
	Time	0.020	0.069	883.93	0.29	.776	[–0.116, 0.155]
Grit	Intercept	–0.066	0.103	850.28	–0.64	.520	[–0.267, 0.135]
	Time	0.166	0.075	911.87	2.22	.027	[0.020, 0.313]
Self-Management Skills	Intercept	0.107	0.121	831.72	0.88	.381	[–0.132, 0.345]
	Time	0.109	0.094	946.33	1.15	.249	[–0.076, 0.293]

Social Engagement	Intercept	0.119	0.090	800.43	1.32	.188	[–0.058, 0.296]
	Time	0.006	0.068	941.74	0.09	.932	[–0.128, 0.140]
Cooperation Skills	Intercept	0.065	0.110	839.20	0.59	.554	[–0.151, 0.281]
	Time	–0.104	0.082	911.70	–1.27	.205	[–0.265, 0.057]
Emotional Resilience	Intercept	0.303	0.105	806.73	2.88	.004	[0.097, 0.509]
	Time	–0.041	0.078	897.86	–0.52	.601	[–0.195, 0.113]
Innovation Skills	Intercept	–0.076	0.096	799.75	–0.79	.431	[–0.265, 0.113]
	Time	–0.061	0.072	918.76	–0.85	.395	[–0.201, 0.079]

Note. N= 492. β = standardised estimate; SE = standard error; CI = confidence interval. $p < .05$, $p < .001$, marginal $R^2 = .207$, conditional $R^2 = .493$

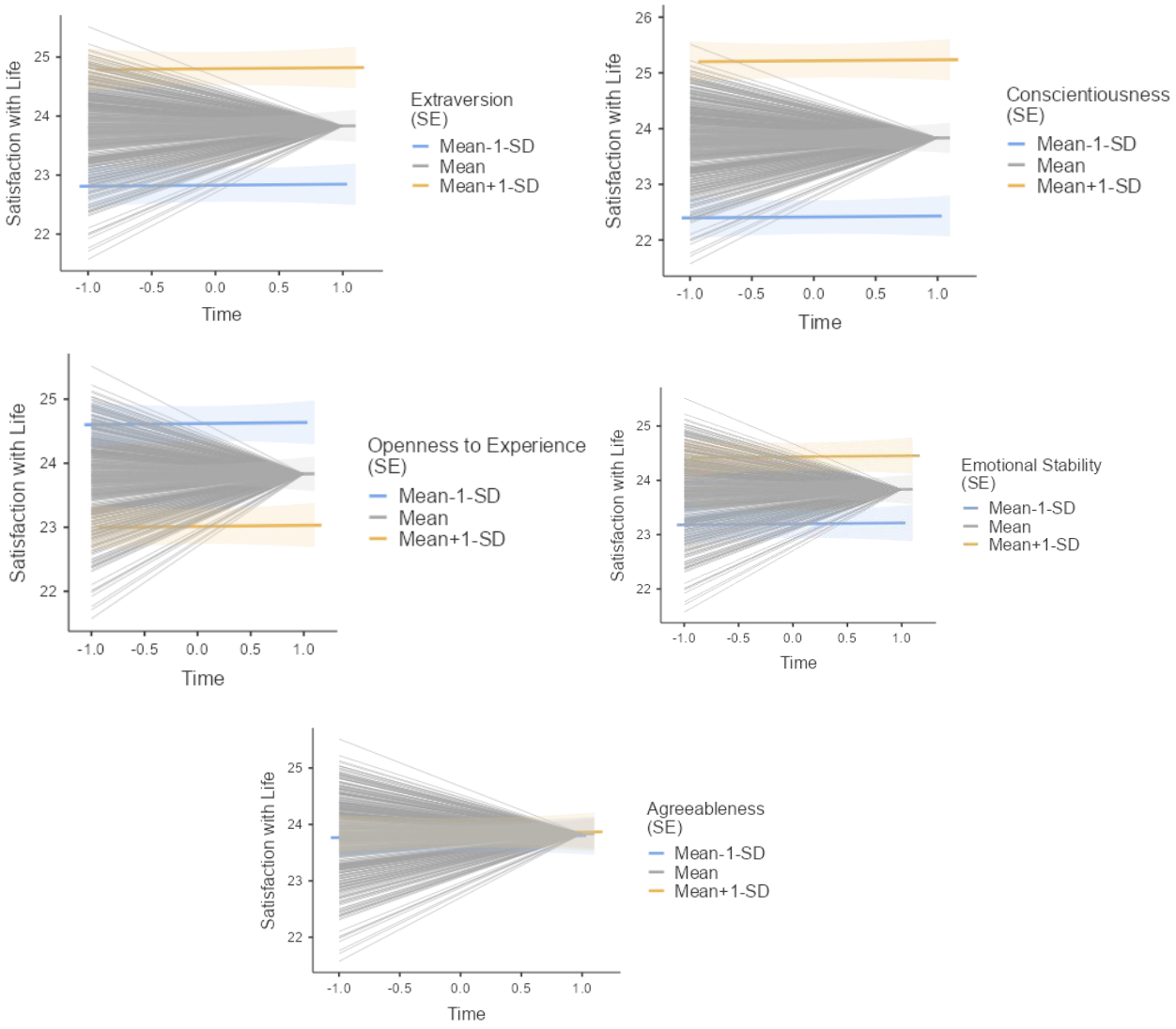
As shown in Table 5.16, several psychological characteristics were significantly associated with increases in life satisfaction over time. Specifically, students with higher levels of Extraversion ($\beta = .311$, $p < .001$), Conscientiousness ($\beta = .416$, $p < .001$), and emotional resilience skills ($\beta = .303$, $p = .004$) experienced development in life satisfaction throughout the study period. Two predictors showed a significant interaction with time, indicating that increases in Emotional Stability ($\beta = .096$, $p = .046$) were associated with gradual improvements in well-being for emotionally stable students throughout the study**.** Similarly, students with higher grit exhibited increased life satisfaction, as indicated by the Time × Grit interaction ($\beta = .166$, $p = .027$). Other time-related interactions (e.g., with self-management and cooperation skills) were not significant but might reflect more minor changes over time. Overall, the results highlight that while some traits have a steady impact, emotional and motivational factors become more important for well-being as the school year progresses.

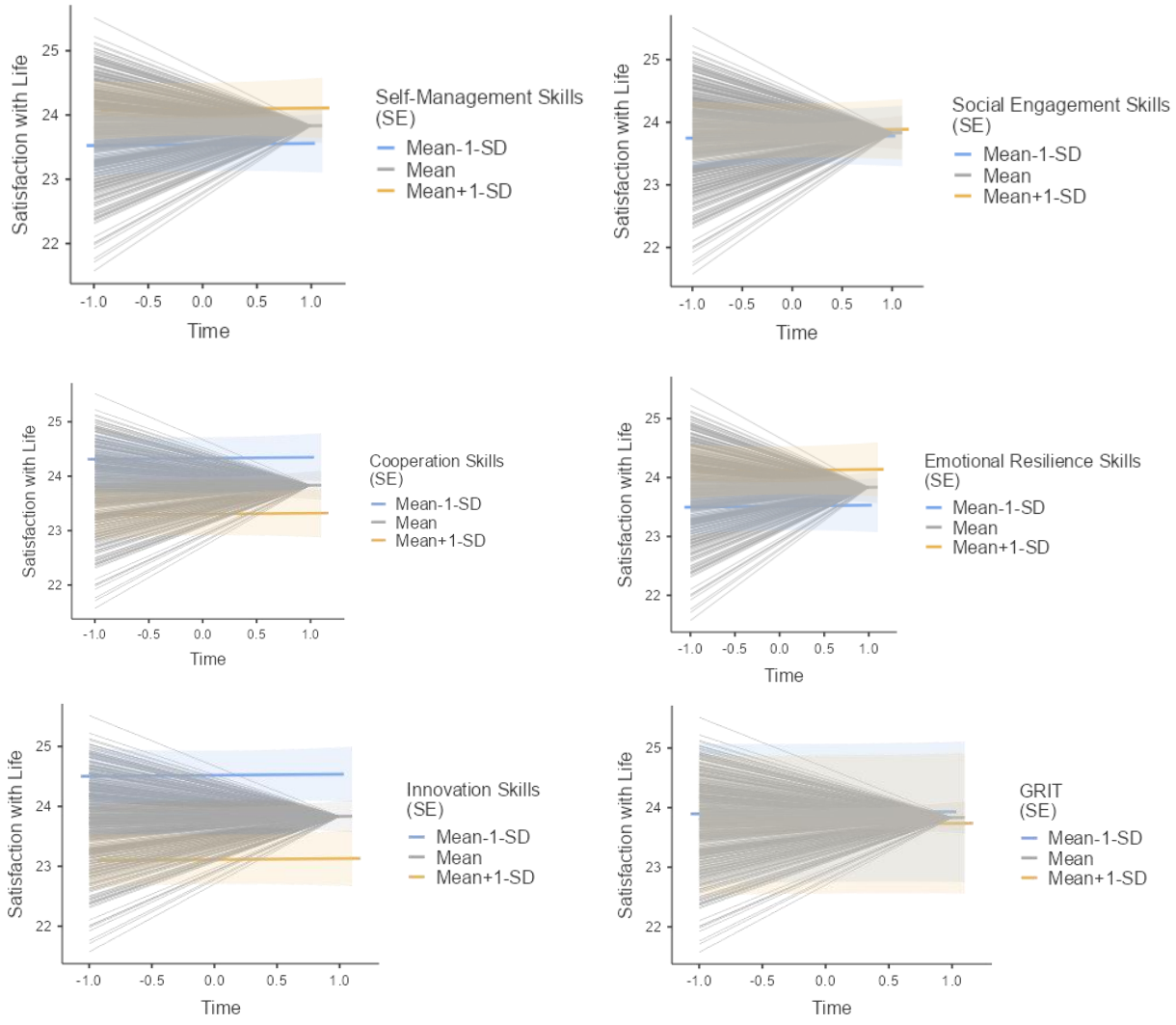
***Random Effects and Model Fit*.** With a negative intercept, slope correlation of .623, the random intercept *SD* was 0.834 and the random slope *SD* was 0.231. This implied that while students with higher initial life satisfaction stayed steadier over time, those with lower initial life satisfaction increased more. Model fit was acceptable. The marginal R^2 was .207, indicating that fixed effects explained 20.7% of the variance. The conditional R^2 was .493,

showing that the complete model (including random effects) explained nearly half of the variance in life satisfaction (see Figure 5.7).

Figure 5.7

The Effects of Personality Traits, SEB, and Grit on Satisfaction with Life Over Time





Note. Random Effects are plotted by individual participants' code.

Effects plots illustrating the influence of personality traits, SEB skills, and Grit on satisfaction over time. The x-axis represents time (standardised from -1 to 1), and the y-axis represents predicted level of life satisfaction. Each panel displays values based on a linear mixed-effects model, with shaded bands representing ±1 *SD* from the mean (Mean-1*SD* =blue; Mean =grey; and Mean+1SD yellow). Emotional Stability and grit exhibit slight upward trends over time, reflecting significant time effects. In contrast, Extraversion, Conscientiousness and emotional resilience skills predict increases in life satisfaction. Other traits and SEB skills show relatively stable trajectories, with minimal variation over time.

5.8.2.2. The impact of Non-intellective Factors on the academic achievement

This analysis examined whether changes in individual non-intellective factors could predict students' academic achievement. Growth slopes representing each student's developmental trajectory in personality traits, grit, SEB skills and well-being, were calculated using individual GCM. These slopes were then entered as predictors in a multiple regression model to estimate their contribution to final Grade Point Average (GPA)

Table 5.17
Multiple Regression Predicting Academic Achievement from Slopes of Personality Traits, SEB Skills, Grit, Positive, Negative Affect and Life Satisfaction

Predictor	Estimate (***β***)	***SE***	***t***	***p***	95% ***CI*** (Approx.)
Intercept	92.59	1.39	66.41	< .001	[89.86, 95.33]
Extraversion	–5.69	5.78	–0.98	.326	[–17.05, 5.66]
Conscientiousness	2.72	11.54	0.24	.814	[–19.91, 25.35]
Emotional Stability	–5.32	2.60	–2.05	.041	[–10.43, –0.22]
Openness	–2.35	17.96	–0.13	.896	[–37.56, 32.86]
Agreeableness	10.16	30.17	0.34	.737	[–49.06, 69.38]
Grit	8.03	10.64	0.76	.451	[–12.87, 28.93]
Positive Affect	15.58	16.12	0.97	.334	[–16.14, 47.30]
Negative Affect	–3.45	4.35	–0.79	.428	[–11.98, 5.08]
Life Satisfaction	–1.42	3.25	–0.44	.662	[–7.80, 4.96]
Self-Management Skills	–6.93	10.85	–0.64	.523	[–28.22, 14.35]
Social Engagement Skills	5.27	4.25	1.24	.216	[–3.05, 13.60]
Cooperation Skills	0.07	16.18	0.00	.997	[–31.64, 31.77]
Emotional Resilience Skills	–2.61	9.75	–0.27	.789	[–21.71, 16.50]
Innovation Skills	–5.37	7.12	–0.75	.452	[–19.36, 8.62]

Note. N= 488 R^2 = .020, F(14, 1393) = 2.050, p = .012. SE = standard error. CI = Confidence Interval.

The results of multiple regression analysis are presented in Table 5.17, showing combined effects of personality traits, SEB skills, grit, positive and negative affect, and life satisfaction on academic achievement. Academic achievement was measured using GPA, at the end of the study period, from official school records. Although the full model explained only 2% of the variance in GPA (R^2 = .020). it was significant, F(14, 1393) = 2.050, p = .012.

Notably, increases in Emotional Stability was a significant *negative* predictor of academic achievement ($\beta = –5.32$, $p = .041$), suggesting that improvement in emotional regulation over time may not translate into better academic performance. This may reflect suppressed variance or interactions with anther traits, particularly given the model's low explanatory power. None of the remaining slopes of the examined predictors (Extraversion, Conscientiousness, Openness, Agreeableness, grit, affect, life satisfaction, and SEB skills) showed significant associations with GPA.

Assumption checks indicated that the data met the requirements for multiple regression. Multicollinearity diagnostics showed no major concerns, with variance inflation factors ranging from 1.15 to 1.37, below recommended thresholds. Residual plots indicated approximate normality and homoscedasticity, and no influential outliers were detected, suggesting that the regression estimates can be interpreted with confidence.

5.8.3. Summary of Effects of Non-Intellective Factors on Well-Being and Academic Achievement

The findings confirm the relationship between students' well-being and changes in personality traits, grit, and SEB skills. However, the effects varied depending on the well-being outcome, and several distinct patterns emerged. Higher *positive affect* was significantly associated with increases in Extraversion, Openness, and innovation skills. Decreased *negative affect* was linked to higher Emotional Stability and self-management skills, while Extraversion was associated with increases in negative affect over time. *Life satisfaction* was significantly predicted by Extraversion, Conscientiousness, and emotional resilience. Overall, the findings imply that, depending on how they interact with contextual and individual factors, changes in non-intellective factors may have both positive and negative outcomes. The study also found that increases in Emotional Stability was a significant negative

predictor of academic achievement, while other traits were not significantly associated with GPA.

Having examined overall developmental trajectories and their predictive relationships with outcomes, the next analysis will address Research Question 3, that explored bidirectional relationships between changes in non-intellective factors (e.g., personality traits) and well-being across the study period, using a cross-lagged panel model to examine whether changes in personality traits influence well-being and vice versa, building on the predictive patterns established here.

5.9. Bidirectional Associations Between Well-Being and Personality Traits

CLPMs were then used to further explore the dynamic associations between personality traits and well-being. Unlike the previous growth curve models, which examined overall developmental trajectories, the CLPM approach focuses on reciprocal longitudinal relations between personality and well-being outcomes (life satisfaction, positive affect, and negative affect).

Each model included autoregressive paths for both constructs across adjacent waves, cross-lagged paths in both directions, and within-wave residual covariances. Consequently, the reported standardised β coefficients represent partial associations estimated simultaneously within the structural models, indicating whether earlier levels of one variable predict relative changes in the other after accounting for their prior stability and concurrent relationships.

Table 5.18
Autoregressive Paths Indicating Stability of Personality Traits and Well-being Outcomes Over Time

Variable	Path	*β*	*SE*	*t*	*p*	95% *CI*
Extraversion	E_T1 → E_T2	0.378	0.041	9.174	< .001	[0.297, 0.459]
	E_T2 → E_T3	0.290	0.045	6.498	< .001	[0.203, 0.378]

Conscientiousness	C_T1 → C_T2	0.326	0.047	7.006	< .001	[0.235, 0.418]
	C_T2 → C_T3	0.144	0.049	2.919	.004	[0.047, 0.240]
Openness	O_T1 → O_T2	0.275	0.045	6.124	< .001	[0.187, 0.363]
	O_T2 → O_T3	0.154	0.045	3.430	.001	[0.066, 0.242]
Emotional Stability	SE_T1 → SE_T2	0.419	0.038	11.093	< .001	[0.345, 0.493]
	SE_T2 → SE_T3	0.252	0.046	5.477	< .001	[0.162, 0.342]
Agreeableness	A_T1 → A_T2	0.214	0.045	4.713	< .001	[0.125, 0.303]
	A_T2 → A_T3	0.158	0.046	3.475	.001	[0.069, 0.248]
Life Satisfaction	LS_T1 → LS_T2	0.405	0.042	9.691	< .001	[0.323, 0.487]
	LS_T2 → LS_T3	0.351	0.045	7.831	< .001	[0.263, 0.439]
Positive Affect	PA_T1 → PA_T2	0.263	0.047	5.571	< .001	[0.171, 0.356]
	PA_T2 → PA_T3	0.152	0.054	2.816	.005	[0.046, 0.257]
Negative Affect	NA_T1 → NA_T2	0.487	0.045	10.856	< .001	[0.399, 0.575]
	NA_T2 → NA_T3	0.282	0.040	6.992	< .001	[0.203, 0.361]

Note. N = 488. β = standardised path coefficient; SE = standard error; CI = confidence interval. All paths reflect autoregressive stability from T1 to T2 and T2 to T3. All estimates were significant (p < .01), indicating moderate to high stability in traits, life satisfaction, and affect. E = Extraversion; C = Conscientiousness; O = Openness; SE = Emotional Stability; A = Agreeableness; NA = Negative Affect.

CLPM revealed moderate temporal stability across all personality traits, as indicated by significant autoregressive coefficients from T1 to T2 and from T2 to T3. These autoregressive coefficients were estimated within the full CLPMs, meaning that stability effects reflect temporal continuity after accounting for concurrent associations and cross-lagged influences between variables. As all β coefficients were below .50, the results indicate moderate rather than complete stability, suggesting scope for within-person change across the study period. Leaving room for meaningful within-person change across the study period. The autoregressive paths examined the temporal stability of personality traits, life satisfaction, and affect across three time points. All five personality traits demonstrated significant positive stability from T1 to T2 and T2 to T3. Extraversion**,** Conscientiousness**,** Openness**,** Agreeableness**,** and Emotional Stability showed moderate to strong autoregressive coefficients (e.g., β = .38 for Extraversion T1 → T2, p < .001), suggesting that students' personality traits remained relatively consistent over time. Notably**,** Emotional Stability had the strongest T1 → T2 path (β = .42, p < .001), indicating higher short-term trait stability.

In terms of well-being, life satisfaction**,** positive affect**,** and negative affect also showed significant autoregressive paths across waves. Life satisfaction showed moderate stability (β = .41 and .35, both $p < .001$), while positive affect displayed lower but still significant stability (β = .26 and .15, both $p < .01$). Negative affect demonstrated the highest stability among well-being outcomes (β = .49 and .28, both $p < .001$). These findings suggest that both personality traits and well-being indicators in adolescents exhibit meaningful continuity across the school year. Stability was stronger for some variable such as (e.g., Emotional Stability, negative affect) than for others (e.g., positive affect.)

Table 5.19
Bidirectional Associations Between Personality Traits and Positive Affect

Personality Trait	Predictor → Outcome	*β*	*SE*	*t*	*p*	95% CI
Extraversion	E_T1 → PA_T2	0.119	0.045	2.33	.05	[0.02, 0.19]
	E_T2 → PA_T3	0.082	0.048	1.85	.064	[–0.01, 0.18]
	PA_T1 → E_T2	0.070	0.046	1.55	.121	[–0.02, 0.16]
	PA_T2 → E_T3	–0.028	0.046	–0.63	.531	[–0.12, 0.06]
Conscientiousness	C_T1 → PA_T2	0.051	0.043	1.04	.297	[–0.04, 0.13]
	C_T2 → PA_T3	–0.088	0.045	–2.02	.05	[–0.18, –0.00]
	PA_T1 → C_T2	0.015	0.049	0.35	.730	[–0.08, 0.11]
	PA_T2 → C_T3	0.045	0.051	1.00	.320	[–0.05, 0.14]
Emotional Stability	SE_T1 → PA_T2	0.043	0.030	0.98	.325	[–0.03, 0.09]
	SE_T2 → PA_T3	0.089	0.031	2.41	.05	[0.01, 0.14]
	PA_T1 → SE_T2	0.088	0.050	2.35	.05	[0.02, 0.14]
	PA_T2 → SE_T3	0.012	0.057	0.28	.781	[–0.10, 0.13]
Openness	O_T1 → PA_T2	–0.051	0.054	–1.09	.278	[–0.17, 0.05]
	O_T2 → PA_T3	0.078	0.053	1.98	.05	[0.00, 0.21]
	PA_T1 → O_T2	0.088	0.037	1.98	.05	[0.00, 0.15]
	PA_T2 → O_T3	0.013	0.037	0.31	.759	[–0.06, 0.08]
Agreeableness	A_T1 → PA_T2	–0.029	0.043	–0.66	.511	[–0.11, 0.06]
	A_T2 → PA_T3	0.022	0.043	0.59	.557	[–0.06, 0.11]
	PA_T1 → A_T2	0.018	0.042	0.43	.666	[–0.07, 0.10]
	PA_T2 → A_T3	–0.013	0.043	–0.29	.770	[–0.10, 0.07]

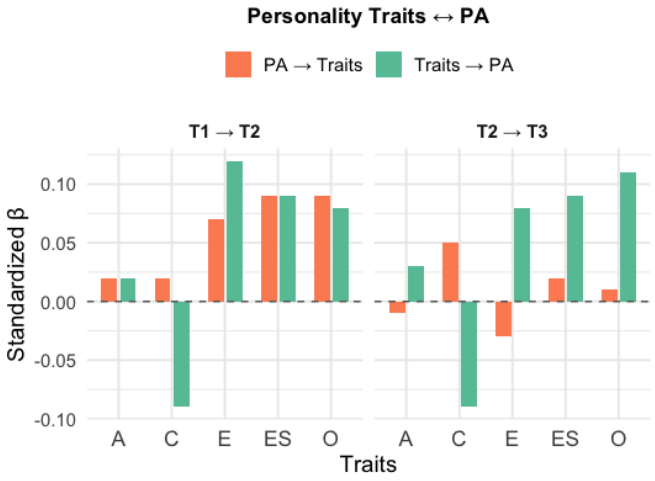
Note. $N = 488$. β = standardised path coefficient; SE = standard error; CI = confidence interval. Estimates are from CLPM examining bidirectional effects between personality traits and positive affect across three time points. E = Extraversion; C = Conscientiousness; O = Openness; SE = Emotional Stability; A = Agreeableness; PA = Positive Affect.

Cross-lagged panel analyses provided limited and inconsistent evidence of longitudinal associations between personality traits and positive affect (Table 5.19). Extraversion at T1 showed a small positive association with positive affect at T2, whereas the reverse paths were not supported, indicating an asymmetric pattern rather than clear reciprocity. Conscientiousness demonstrated a modest negative association from T2 to T3, with no evidence of a reverse effect. For Emotional Stability, positive affect at T1 was positively associated with Emotional Stability at T2, and Emotional Stability at T2 was associated with positive affect at T3, suggesting partial evidence of reciprocal associations across adjacent waves. A similar pattern was observed for Openness, with bidirectional effects emerging at different intervals, although effect sizes were small. No meaningful cross-lagged associations were observed between Agreeableness and positive affect.

Importantly, to formally evaluate whether cross-lagged paths differed in magnitude across directions, Wald tests of parameter equality were conducted for selected comparisons (i.e., personality → positive affect vs positive affect → personality). No statistically significant differences were found for Extraversion ($\chi^2(1) = 0.35$, $p = .554$), Conscientiousness ($\chi^2(1) = 0.62$, $p = .430$), Emotional Stability ($\chi^2(1) = 2.46$, $p = .117$), Openness ($\chi^2(1) = 2.59$, $p = .107$), or Agreeableness ($\chi^2(1) = 0.06$, $p = .804$). Accordingly, statistically significant paths alongside non-significant counterparts should not be interpreted as evidence of true directional differences. Overall, the findings indicate weak and non-systematic longitudinal coupling between personality traits and positive affect over the study period.

Figure 5.8

Bidirectional Associations Between Personality Traits and Positive Affect



Note. Traits abbreviations (A = Agreeableness, C = Conscientiousness, E = Extraversion, ES = Emotional Stability, O = Openness).

Figure 5.8 illustrates standardised path coefficients (*β*) from a CLPM, represent longitudinal associations between personality traits and positive affect across T1 to T2 and T2 to T3. Orange bars depict cross-lagged paths from positive affect to subsequent personality traits (PA → Traits), whereas green bars depict paths from personality traits to later positive affect (Traits → PA).

Table 5.20

Bidirectional Associations Between Personality Traits and Negative Affect

Personality Trait	Predictor → Outcome	*β*	*SE*	*t*	*p*	95% *CI*
Extraversion	E_T1 → NA_T2	0.082	0.054	1.52	.128	[–0.02, 0.19]
	E_T2 → NA_T3	0.013	0.050	0.27	.789	[–0.09, 0.11]
	NA_T1 → E_T2	0.041	0.040	1.03	.301	[–0.04, 0.12]
	NA_T2 → E_T3	–0.038	0.035	–1.08	.280	[–0.11, 0.03]
Conscientiousness	C_T1 → NA_T2	0.027	0.054	0.51	.611	[–0.08, 0.13]
	C_T2 → NA_T3	0.056	0.048	1.17	.244	[–0.04, 0.15]
	NA_T1 → C_T2	–0.109	0.043	–2.53	.011	[–0.19, –0.03]
	NA_T2 → C_T3	–0.098	0.041	–2.39	.017	[–0.18, –0.02]
Emotional Stability	SE_T1 → NA_T2	–0.042	0.043	–0.96	.335	[–0.13, 0.04]
	SE_T2 → NA_T3	–0.067	0.042	–1.59	.112	[–0.15, 0.02]
	NA_T1 → SE_T2	–0.199	0.052	–3.83	< .001	[–0.30, –0.10]
	NA_T2 → SE_T3	–0.082	0.051	–1.61	.108	[–0.18, 0.02]
Openness	O_T1 → NA_T2	–0.099	0.069	–1.44	.149	[–0.23, 0.04]

	O_T2 → NA_T3	–0.056	0.061	–0.92	.358	[–0.18, 0.06]
	NA_T1 → O_T2	0.003	0.032	0.08	.938	[–0.06, 0.07]
	NA_T2 → O_T3	–0.012	0.030	–0.41	.683	[–0.07, 0.05]
Agreeableness	A_T1 → NA_T2	0.032	0.055	0.58	.564	[–0.08, 0.14]
	A_T2 → NA_T3	0.031	0.049	0.62	.534	[–0.07, 0.13]
	NA_T1 → A_T2	0.073	0.039	1.88	.060	[–0.00, 0.15]
	NA_T2 → A_T3	–0.096	0.035	–2.75	.006	[–0.17, –0.03]

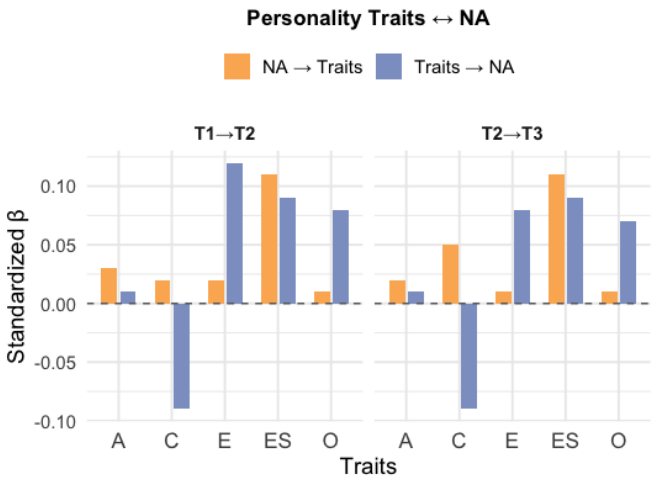
Note. $N = 488$. β = standardised path coefficient; SE = standard error; CI = confidence interval. Estimates are from cross-lagged panel models (CLPM) examining bidirectional associations between personality traits and negative affect across three time points. All paths represent effects from one time point to the next (e.g., T1 → T2 and T2 → T3). E = Extraversion; C = Conscientiousness; O = Openness to Experience; SE = Emotional Stability; A = Agreeableness; NA = Negative Affect

Results from the CLPMs indicated generally weak longitudinal associations between personality traits and negative affect (Table 5.20). There was little evidence of reciprocal relations for Extraversion, Openness, or Agreeableness, as cross-lagged paths in both directions were largely non-significant. Negative affect showed significant negative prospective associations with Conscientiousness at both transitions, with higher levels of negative affect being linked to relatively lower subsequent levels of Conscientiousness. Similarly, negative affect at T1 was negatively associated with Emotional Stability at T2, suggesting a largely unidirectional pattern in which earlier negative affect preceded lower subsequent Emotional Stability.

Furthermore, Wald test results indicated no significant differences for Extraversion ($\chi^2(1) = 0.42$, $p = .517$), Conscientiousness ($\chi^2(1) = 3.71$, $p = .054$), Openness ($\chi^2(1) = 2.03$, $p = .154$), or Agreeableness ($\chi^2(1) = 0.45$, $p = .504$). However, a significant difference was observed for Emotional Stability ($\chi^2(1) = 4.47$, $p = .035$), indicating that the path from negative affect to later Emotional Stability was significantly stronger than the reverse direction.

Figure 5.9

Bidirectional Associations Between Personality Traits and Negative Affect



Note. Orange bars signify NA-to-traits paths; blue bars signify traits-to-NA paths. Traits abbreviations (A = Agreeableness, C = Conscientiousness, E = Extraversion, ES = Emotional Stability, O = Openness).

Figure 5.9 illustrates cross-lagged associations between negative affect (NA) and personality traits across two intervals. Orange bars represent NA → traits paths, and blue bars represent traits → NA paths. Higher NA was negatively associated with later Conscientiousness and Emotional Stability, and with Agreeableness at T2 → T3, whereas paths from traits to later NA were generally small and non-significant. Overall, the pattern indicates greater statistical support for associations from NA to subsequent trait levels than for the reverse direction; however, formal equality tests indicated that this directional difference was statistically significant only for Emotional Stability, while other comparisons were not significantly different.

Table 5.21

Bidirectional Associations Between Personality Traits and Life Satisfaction

Personality Trait	Predictor → Outcome	*β*	*SE*	*t*	*p*	95% *CI*
Extraversion	E_T1 → LS_T2	–0.035	0.088	–0.39	.696	[–0.21, 0.14]
	E_T2 → LS_T3	0.003	0.097	0.03	.974	[–0.19, 0.19]
	LS_T1 → E_T2	–0.004	0.021	–0.20	.845	[–0.05, 0.04]
	LS_T2 → E_T3	–0.013	0.022	–0.58	.562	[–0.06, 0.03]
Conscientiousness	C_T1 → LS_T2	–0.072	0.093	–0.77	.439	[–0.25, 0.11]

	C_T2 → LS_T3	0.050	0.097	0.52	.605	[–0.14, 0.24]
	LS_T1 → C_T2	0.020	0.023	0.85	.396	[–0.03, 0.07]
	LS_T2 → C_T3	0.050	0.025	1.98	.048	[0.00, 0.10]
Emotional Stability	SE_T1 → LS_T2	0.168	0.062	2.73	.006	[0.05, 0.29]
	SE_T2 → LS_T3	0.032	0.068	0.47	.641	[–0.10, 0.17]
	LS_T1 → SE_T2	0.068	0.025	2.74	.006	[0.02, 0.12]
	LS_T2 → SE_T3	0.060	0.029	2.07	.039	[0.00, 0.12]
Openness	O_T1 → LS_T2	0.016	0.112	0.14	.888	[–0.20, 0.24]
	O_T2 → LS_T3	–0.036	0.116	–0.31	.757	[–0.26, 0.19]
	LS_T1 → O_T2	–0.012	0.017	–0.71	.475	[–0.05, 0.02]
	LS_T2 → O_T3	–0.015	0.018	–0.83	.407	[–0.05, 0.02]
Agreeableness	A_T1 → LS_T2	–0.170	0.090	–1.89	.058	[–0.35, 0.01]
	A_T2 → LS_T3	–0.057	0.094	–0.61	.540	[–0.24, 0.13]
	LS_T1 → A_T2	0.019	0.020	0.95	.341	[–0.02, 0.06]
	LS_T2 → A_T3	0.007	0.022	0.32	.753	[–0.04, 0.05]

Note. N = 488. β = standardised path coefficient; SE = standard error; CI = confidence interval. Estimates are from cross-lagged panel models (CLPM) examining bidirectional associations between personality traits and Life Satisfaction across three time points. All paths represent effects from one time point to the next (e.g., T1 → T2 and T2 → T3). E = Extraversion; C = Conscientiousness; O = Openness to Experience; SE = Emotional Stability; A = Agreeableness; LS = Life Satisfaction.

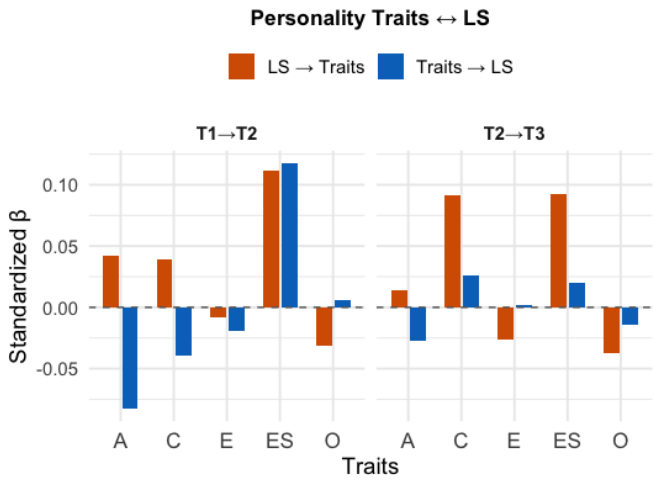
Results from the CLPM indicated limited longitudinal associations between personality traits and life satisfaction (Table 5.21). Emotional Stability showed evidence of reciprocal associations with life satisfaction, with Emotional Stability at T1 positively associated with life satisfaction at T2, and life satisfaction at both T1 and T2 positively associated with later Emotional Stability. In contrast, Extraversion and Openness showed no meaningful cross-lagged associations with life satisfaction. Conscientiousness was not associated with later life satisfaction; however, life satisfaction at T2 was positively associated with Conscientiousness at T3, indicating a unidirectional pattern.

Furthermore, Wald test results indicated no significant differences were observed for Extraversion ($\chi^2(1) = 0.11$, $p = .741$), Conscientiousness ($\chi^2(1) = 0.71$, $p = .398$), Emotional Stability ($\chi^2(1) = 2.11$, $p = .146$), Openness ($\chi^2(1) = 0.03$, $p = .857$), or Agreeableness ($\chi^2(1) =$

3.69, p = .055). These results indicate that significant paths alongside non-significant counterparts should not be interpreted as evidence of true directional differences.

Figure 5.10

Bidirectional Associations Between Personality Traits and Life Satisfaction



Note. Orange bars represent the effect of life satisfaction on personality traits (LS → Traits), and blue bars represent the effect of personality traits on life satisfaction (Traits → LS). T1→T2 and T2→T3 indicate effects between successive time points. Traits include Agreeableness (A), Conscientiousness (C), Extraversion (E), Emotional Stability (ES), and Openness (O).

Figure 5.10 illustrates cross-lagged associations between life satisfaction and personality traits across the two time intervals. Higher life satisfaction was positively associated with later Emotional Stability and Conscientiousness at specific intervals, whereas paths from personality traits to subsequent life satisfaction were generally limited. Overall, the pattern suggests greater statistical support for associations from life satisfaction to later trait levels than for the reverse direction; however, formal equality tests indicated that these directional differences were not statistically significant.

5.9.1. Summary of Bidirectional Associations

The CLPMs indicated selective and generally modest bidirectional associations between personality traits and well-being outcomes, with most cross-lagged paths being small

or non-significant. First, in terms of well-being relating to later personality, life satisfaction, and positive affect were associated with subsequent Emotional Stability. Positive affect also showed associations with later Openness at specific intervals. In contrast, negative affect was negatively associated with later Conscientiousness, suggesting a largely unidirectional pattern for this trait. Second, in terms of personality relating to later well-being, Emotional Stability showed the most consistent associations with both life satisfaction and positive affect across time points. Extraversion was associated with later positive affect, while other traits (e.g., Openness, Agreeableness, and Conscientiousness) showed limited or no cross-lagged associations with well-being outcomes. Overall, the findings suggest modest and selective longitudinal coupling between personality and well-being, with evidence of partial reciprocity primarily involving Emotional Stability. Importantly, formal equality tests indicated that most directional differences were not statistically significant, with the exception of the negative affect-Emotional Stability association, therefore statistically significant paths alongside non-significant counterparts should not be interpreted as evidence of reliable differences in magnitude.

5.10. Experience Sampling Measures (ESM)

To address Research Question 4, *"How do students' momentary experiences, such as their thoughts, feelings, behaviours, and perceived situational characteristics, relate to long-term changes in traits, well-being, and academic achievement?"*, a subsample of 399 students from the original cohort participated in the ESM procedure. Students reported on their momentary psychological states and situational perceptions twice daily over eight school days, spanning two non-consecutive weeks. This approach captures within-person variability in real time, offering a dynamic perspective that complements the trait-level analyses reported in earlier sections.

The following tables present descriptive statistics for the ESM variables, including *state measures* of well-being, personality (Big Five dimensions), grit, situational characteristics (DIAMONDS), and educational situations, to facilitate understanding of the central tendency, variability, and shape of the distributions. The use of this information is critical for establishing the basis of reliability in the data, identifying potential outliers, and informing later analyses to ensure a sound basis for interpreting relationships and effects in the research.

Table 5.22
Descriptive Statistics for ESM Variables

Construct	Variable	*M*	*SD*	Min	Max	Skew	Kurtosis	*CCI*
Big Five State Personality	State Extraversion	3.01	0.72	1.00	5.00	-0.05	0.24	0.04
	State Agreeableness	4.01	0.80	1.00	5.00	-0.65	0.15	0.08
	State Conscientiousness	4.03	0.88	1.00	5.00	-1.00	1.02	0.06
	State Emotional Stability	3.63	0.89	1.00	5.00	-0.45	-0.25	0.03
	State Openness	3.80	0.91	1.00	5.00	-0.57	-0.02	0.06
State well-being	Positive Affect	3.39	0.89	1.00	5.00	-0.24	-0.27	0.06
	Negative Affect	1.90	0.77	1.00	5.00	1.03	1.15	0.08
	Life Satisfaction	3.49	1.24	1.00	5.00	-0.41	-0.85	0.03
State grit	Grit	3.69	0.83	1.00	5.00	-0.40	0.09	0.05

Situational Characteristics (DIAMONDS)	Duty	3.86	1.08	1.00	5.00	-0.91	0.33	-
	Intellect	3.02	1.19	1.00	5.00	-0.07	-0.81	-
	Adversity	2.03	1.25	1.00	5.00	0.95	-0.31	-
	Positivity	3.37	1.18	1.00	5.00	-0.30	-0.72	-
	Negativity	2.36	1.31	1.00	5.00	0.58	-0.83	-
	Sociality	3.45	1.14	1.00	5.00	-0.51	-0.47	-
Educational Situations	Struggled Understanding	0.00	1.23	-3.27	6.81	1.03	2.78	-
	Teacher Support	0.00	1.23	-2.88	3.31	0.07	-0.83	-
	Comfort Asking for Help	0.00	1.17	-3.40	2.64	-0.35	-0.60	-
	Peer Pressure	0.00	0.97	-1.88	3.64	1.25	1.37	-
	Noisy Classroom	0.00	1.25	-3.00	3.33	0.47	-0.51	-
	Social Isolation	0.00	1.08	-2.36	3.62	0.91	0.29	-

Note. $N = 399$. *M* = mean; *SD* = standard deviation; Min = minimum; Max = maximum; Skew = skewness; Kurtosis = kurtosis. Values represent aggregated descriptive statistics across all ESM occasions. State variables (personality, well-being, grit, affect) are momentary measures that vary both within and between persons; therefore, intraclass correlations (*ICCs*) are reported for these variables only. Situational characteristics (DIAMONDS) and educational experiences are treated as time-varying predictors, and *ICCs* were not estimated for them.

All study ESM variables are described in Table 5.22, the average scores of the students' momentary personality states were moderate to high, with means ranging from 3.01 (Extraversion) to 4.03 (Conscientiousness). Positive affect ($M = 3.39$, $SD = 0.89$) tended to be higher than negative affect ($M = 1.90$, $SD = 0.77$), which was increased in part by a few students reporting high negative affect. Moderate variability was demonstrated by life satisfaction ($M = 3.49$, $SD = 1.24$) and state grit ($M = 3.69$, $SD = 0.83$). Situational characteristics of DIAMONDS had different prevalence and severity, with Duty and Positivity ranking higher compared to Adversity or Negativity. The educational situation variables were person-mean centred and had means close to zero, confirming they were well centred. Altogether, the variability and distribution of the variables were acceptable, which suggested their appropriateness in further multilevel analyses.

Next, to analyse the occasion-based measurement of changes in personality conditions and well-being measures, linear mixed-effects models have been employed. This analysis can

help investigate the stability and variance of constructs like Extraversion, Agreeableness, Conscientiousness, Emotional Stability, Openness, positive affect, negative affect, life satisfaction, as well as grit across time.

5.10.1. Changes in Personality States, Grit, and Well-Being Across Time

By using linear mixed-effects models, it has been examined how personality states, well-being, and grit states changed over time. This method was chosen to account for repeated measurements within individuals across 16 time points, capturing both within-person change and between-person variability. It allowed to test whether these psychological states remained stable or shifted during the daily academic routine, providing insight into their short-term dynamics in naturalistic school settings.

Table 5.23
Change in Personality States and Well-being States Over Time

Variable	Fixed Effect	Estimate	*SE*	*df*	*t*	*p*
Extraversion	Intercept	3.011	0.021	3223	140.48	< .001
	Time	–0.001	0.004	5561	–0.33	.742
Agreeableness	Intercept	3.972	0.025	2389	161.40	< .001
	Time	0.008	0.004	5548	1.82	.068
Conscientiousness	Intercept	4.057	0.027	2667	151.40	< .001
	Time	–0.006	0.005	5552	–1.21	.228
Emotional Stability	Intercept	3.627	0.026	3401	139.09	< .001
	Time	0.000	0.005	5562	0.07	.941
Openness	Intercept	3.831	0.028	2791	139.41	< .001
	Time	–0.008	0.005	5554	–1.54	.123
Positive Affect	Intercept	3.404	0.027	2689	125.89	< .001
	Time	–0.004	0.005	5553	–0.76	.450
Negative Affect	Intercept	1.898	0.024	2377	80.45	< .001
	Time	0.001	0.004	5542	0.28	.777
Life Satisfaction	Intercept	3.491	0.037	3394	95.41	< .001
	Time	0.000	0.007	5560	–0.003	.997
Grit	Intercept	3.726	0.025	2926	150.59	< .001
	Time	–0.008	0.005	5554	–1.71	.087

Note. N = 399. Estimates are fixed effects from linear mixed-effects models predicting mean-level change over time in personality states, well-being outcomes, and grit. Time was modelled as a continuous variable (centred at baseline); SE = standard error.

Table 5.23, shows results from linear mixed-effects models of changes in personality, affect, life satisfaction, and grit states over 16 measurement occasions, i.e. repeated measures taken twice a day for eight school days. Random intercepts were included in each model to control for subject-level variation in baseline levels. Among the personality states, none showed statistically significant change over time. Although small directional trends were observed—for example, a slight increase in Agreeableness and decreases in Openness—these effects fell short of conventional significance thresholds, indicating overall relative short-term stability in these states.

For well-being outcomes, positive affect, negative affect, and life satisfaction showed no significant variation by occasion, with all occasion effects being non-significant ($p > .40$). This indicates that students' momentary emotional states and life satisfaction did not vary significantly across the sampled periods. Individually, these results suggest that specific psychological states might exhibit minor fluctuations over brief timescales, but most constructs under investigation did not change across the ESM occasions (see Figure 5.11).

Figure 5.11
Personality States Over Time

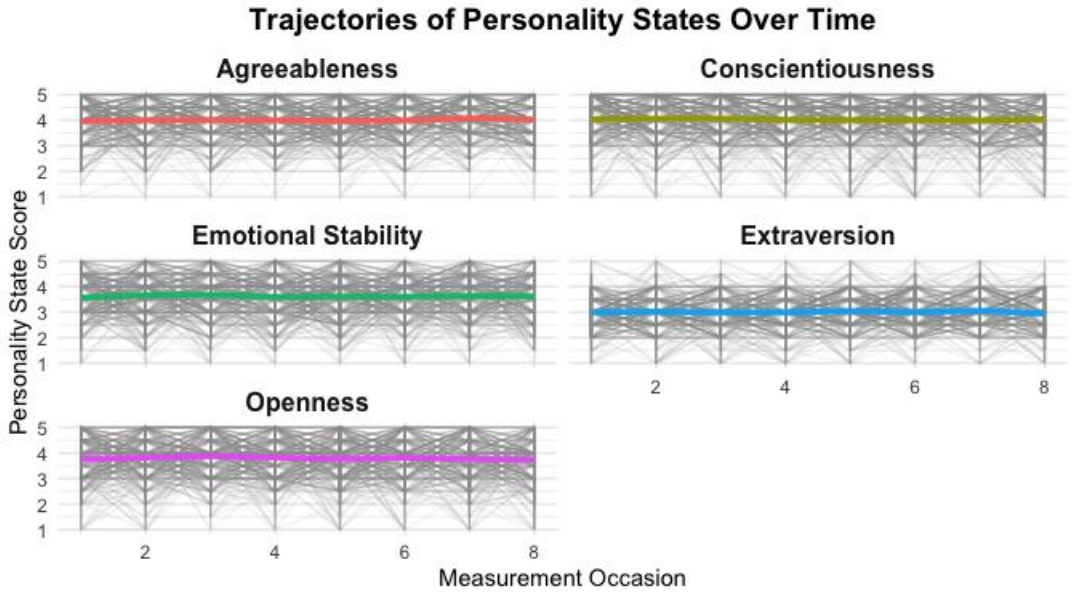


Figure 5.11 illustrates how five personality states changed across different time points. Grey lines represent individual scores while bold colours indicate group-level means. Within-person fluctuations were detected, while group level-means remained relatively stable over time.

5.10.2. Personality States as Predictors of Well-Being

The prediction of changes in emotional and cognitive well-being across 16 repeated measures has been assessed by mixed effects models of the momentary personality states of students. The selection of models was based on identifying the more subtle effects, where the relationships between state fluctuations of Extraversion, Conscientiousness, and Emotional Stability, and variations in affective parameters of positive, negative affect, and life satisfaction, will be in real-time.

Table 5.24
Mixed Model Predicting Students' Positive Affect from Personality States

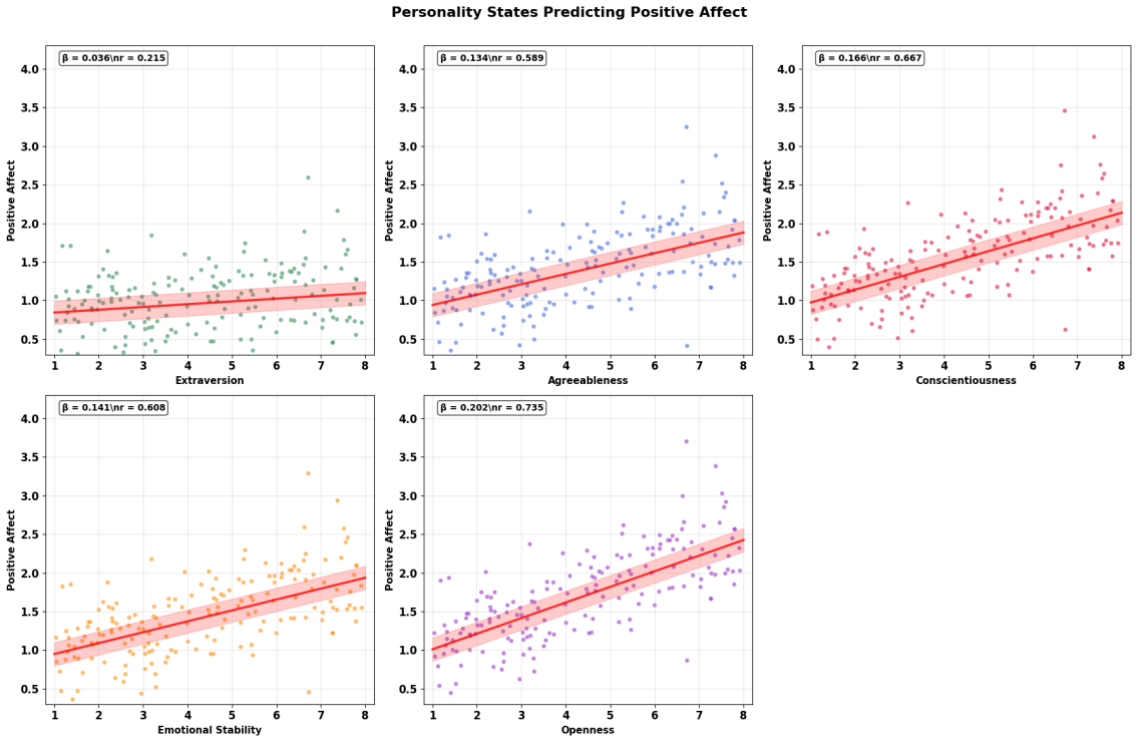
Variable	Estimate	*SE*	*df*	*t*	*p*	95% CI
Intercept	0.808	0.103	2586	7.84	< .001	[0.61, 1.01]
Time	–0.001	0.006	3833	–0.08	.939	[–0.01, 0.01]

Extraversion	0.036	0.021	2870	1.77	.078	[–0.00, 0.08]
Agreeableness	0.134	0.021	2599	6.43	< .001	[0.09, 0.17]
Conscientiousness	0.166	0.020	2831	8.48	< .001	[0.13, 0.20]
Emotional Stability	0.141	0.017	2873	8.32	< .001	[0.11, 0.17]
Openness	0.202	0.019	2823	10.82	< .001	[0.17, 0.24]

Note. N = 399. Estimates are from a mixed-effects model predicting positive affect from personality states. SE = standard error; CI = 95% confidence interval.

This GCM analysis, presented in Table 5.24, examined whether within-person fluctuations in personality states predicted changes in momentary positive affect during the study period. Results indicated that increases in Openness (β = .202, p < .001), Emotional Stability (β = .141, p < .001), Conscientiousness (β = .166, p < .001), and Agreeableness (β = .134, p < .001) were each associated with corresponding increases in positive affect. In other words, when students experienced above-average levels of these states, they also reported higher positive affect. By contrast, State Extraversion did not show a significant association with positive affect (β = .036, p = .078).

Figure 5.12
Personality States Predicting Positive Affect



Each panel in Figure 5.12 presents a scatter plot with a regression line illustrating the within-person association between personality states and positive affect. Openness and Conscientiousness showed the strongest positive slopes, followed by Emotional Stability and Agreeableness, whereas Extraversion displayed a flat, non-significant slope.

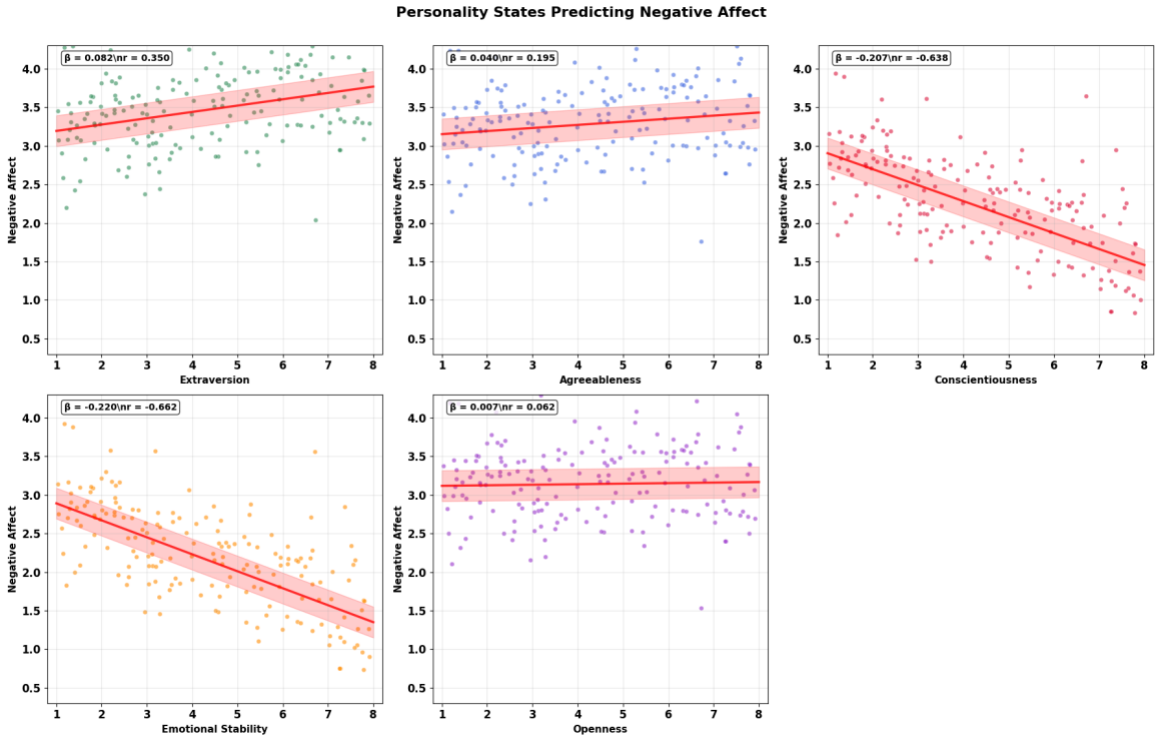
Table 5.25
Mixed Model Predicting Students' Negative Affect from Personality States

Variable	Estimate	SE	df	*t*	*p*	95% CI
Intercept	3.110	0.097	2703	32.20	< .001	[2.92, 3.30]
Time	–0.003	0.006	383	–0.52	.602	[–0.01, 0.01]
Extraversion	0.082	0.019	2857	4.30	< .001	[0.04, 0.12]
Agreeableness	0.040	0.020	2841	2.05	.041	[0.00, 0.08]
Conscientiousness	–0.207	0.018	2895	–11.41	< .001	[–0.24, –0.17]
Emotional Stability	–0.220	0.016	2877	–14.01	< .001	[–0.25, –0.19]
Openness	0.007	0.017	2878	0.42	.678	[–0.03, 0.04]

Note. N = 399. Estimates are from a mixed-effects model predicting negative affect from personality states. SE = standard error; CI = 95% confidence interval.

This GCM analysis, presented in Table 5.25, examined whether momentary fluctuations in personality states predicted students' negative affect across repeated assessments. Results identified that increases in Conscientiousness (β = –.207, p < .001) and Emotional Stability (β = –.220, p < .001) were strongly associated with decreases in negative predictors. In contrast, increases in Extraversion (β = .082, p < .001) and Agreeableness (β = .040, p = .041) were significantly associated with higher levels of negative affect, although the slopes were relatively modest. Openness did not show a significant association with momentary negative affect (β = .007, p = .678). Figure 5.13 illustrates these associations with scatter plots and regression lines for each personality state and momentary negative affect.

Figure 5.13
Personality States Predicting Negative Affect



Each panel in Figure 5.13 presents a scatter plot with a regression line illustrating the within-person association between personality states and negative affect. Emotional Stability and Conscientiousness showed the strongest negative slopes, indicating lower negative affect, while Extraversion and Agreeableness showed small positive slopes. Openness displayed a flat, non-significant slope.

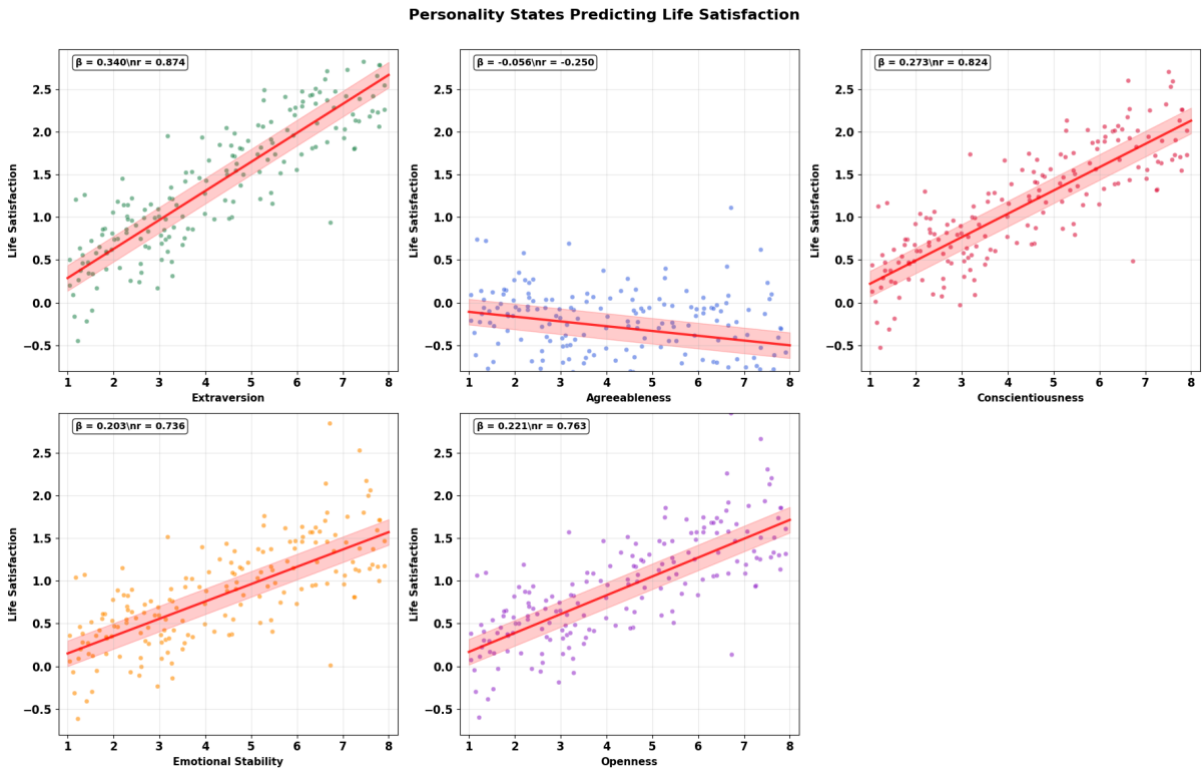
Table 5.26
Mixed Model Predicting Students' Life Satisfaction from Personality States

Variable	Estimate	SE	df	*t*	*p*	95% CI
Intercept	–0.053	0.150	2578	–0.35	.723	[–0.35, 0.25]
Time	0.010	0.009	3851	1.10	.274	[–0.01, 0.03]
Extraversion	0.340	0.030	2868	11.34	< .001	[0.28, 0.40]
Agreeableness	–0.056	0.030	2627	–1.84	.066	[–0.11, 0.00]
Conscientiousness	0.273	0.029	2837	9.57	< .001	[0.22, 0.32]
Emotional Stability	0.203	0.025	2874	8.20	< .001	[0.15, 0.25]
Openness	0.221	0.027	2834	8.09	< .001	[0.17, 0.27]

Note. N = 399. Estimates are from a mixed-effects model predicting life satisfaction from personality states. SE = standard error; CI = 95% confidence interval.

This GCM analysis, presented in Table 5.26, examined whether momentary fluctuations in personality states predicted students' life satisfaction across repeated assessments. Results indicated that increases in Extraversion (β = .340, p < .001), Conscientiousness (β = .273, p < .001), Emotional Stability (β = .203, p < .001), and Openness (β = .221, p < .001) were each associated with higher momentary life satisfaction. In other words, students experienced greater satisfaction during times when they expressed these states more strongly than usual. Agreeableness showed a small, non-significant negative slope (β = –.056, p = .066). Neither time (β = .010, p = .274) nor the intercept was significantly associated with life satisfaction.

Figure 5.14
Personality States Predicting Life Satisfaction



Each panel in Figure 5.14 presents a scatter plot with a regression line illustrating the within-person association between personality states and life satisfaction. Extraversion

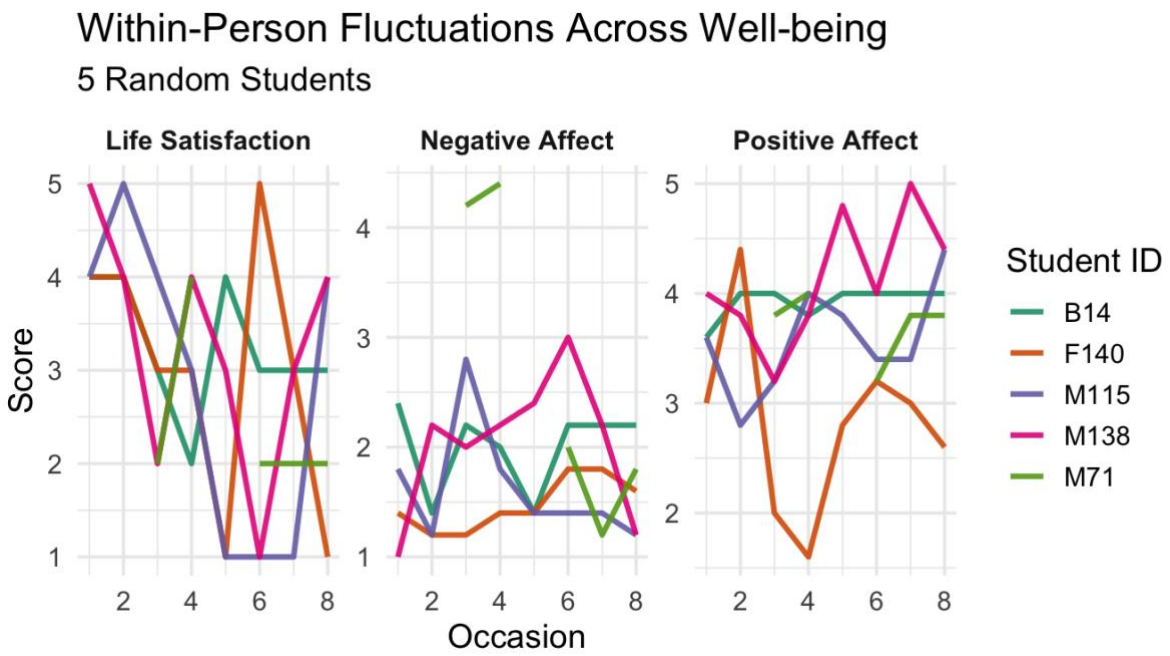
showed the strongest positive slope, followed by Conscientiousness, Openness, and Emotional Stability. Agreeableness displayed a flat, non-significant slope.

5.10.3. Summary of Within-Person Fluctuations in Personality States Predicting Well-Being

The developmental trajectories of various personality states, which are the configuration of trends within individuals across 16 points of measurement, were examined to determine how within-person fluctuations in different personality states were linked to the psychological and subjective well-being of the students. The model included random intercepts and slopes, which were considered to account for individual differences in baseline levels and slopes of well-being over time. The analysis revealed that students with higher ratings on Extraversion, Conscientiousness, Emotional Stability, and Openness states over time also exhibited higher levels of positive affect and life satisfaction at the same moment. On the contrary, higher scores on Conscientiousness and Emotional Stability states were linked to lower levels of negative affect. These results suggest that momentary increases in these personality states were concurrently associated with lower negative affect during the same measurement occasions. Additionally, the analysis of growth curves revealed that negative affect increased slightly with increases in state Extraversion and state Agreeableness among students, whereas negative affect showed no significant association with state Openness. Overall, such results suggest that momentary fluctuations in personality states were associated with students' affective experiences.

Figure 5.15

Within-Person Fluctuations in Well-being Across Eight Days for Five Students



This figure 5.15, illustrates within-person fluctuations in well-being for five randomly selected students across 16 measurement occasions, collected over eight days (twice per day) using ESM data. Rather than relying on a single final score, well-being was captured repeatedly to reflect each student's moment-to-moment emotional experience. The outcomes include Positive Affect, Negative Affect, and Life Satisfaction. Each coloured line represents a student's score trajectory over time, showing how well-being states rise and fall within individuals. Some students displayed relative stability (e.g., B14 in Positive Affect), while others showed substantial variability (e.g., M138 in Negative Affect), reflecting emotional reactivity to daily experiences. This descriptive visualisation supports the use of GCM to investigate how fluctuations in personality states relate to short-term changes in well-being, focusing on intraindividual dynamics rather than static between-person differences.

5.11. Situational Characteristics (DIAMONDS)

To continue investigating the dynamic nature of personality, this section examines how students' situational appraisals, as assessed with the DIAMONDS framework, contribute to changes in personality states. Mixed-effects models were used to predict each personality state based on situational attributes and their interactions with time. This analysis aims to identify which situational characteristics are most closely associated with within-person differences in personality expression across the 16 ESM occasions. Table 5.29 reports the output of these models.

Table 5.27

Mixed-Effects Models Predicting Personality States from Situational Characteristics (DIAMONDS) and Their Interactions with Time

Predictor	Fixed Effect	Extraversion			Agreeableness			Conscientiousness			Emotional Stability			Openness		
		β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Time	-	0.038	.022	.087	–0.00	.023	.922	–0.037	.026	.150	–0.03	.026	.240	0.014	.027	.618
Duty	Intercept	0.063	.021	.003	0.182	.022	.001	0.194	.025	.001	0.087	.025	.001	0.190	.026	.001
	Time	0.002	.004	.588	–0.00	.004	.721	0.005	.005	.309	0.010	.005	.054	–0.01	.005	.053
Intellect	Intercept	–0.01	.018	.436	0.037	.019	.053	–0.024	.021	.259	–0.02	.022	.264	–0.04	.023	.124
	Time	0.004	.004	.267	0.001	.004	.735	0.002	.004	.596	–0.00	.004	.540	0.004	.004	.404
Adversity	Intercept	0.066	.016	.001	–0.10	.018	.001	–0.045	.020	.020	–0.04	.020	.066	–0.06	.021	.006
	Time	–0.01	.003	.068	0.005	.003	.142	0.006	.004	.141	0.009	.004	.015	0.003	.004	.415
Positivity	Intercept	0.118	.021	.001	0.083	.022	.001	0.033	.025	.176	0.112	.025	.001	0.092	.026	.001
	Time	–0.01	.004	.026	0.003	.004	.470	0.002	.005	.643	–0.00	.005	.968	0.003	.005	.520
Negativity	Intercept	0.007	.018	.715	–0.05	.019	.009	–0.082	.021	.001	–0.12	.022	.001	–0.00	.023	.915
	Time	–0.01	.004	.030	0.002	.004	.563	0.0003	.004	.936	0.005	.004	.256	0.001	.004	.791
Sociality	Intercept	0.019	.019	.301	–0.05	.020	.021	0.063	.022	.005	0.091	.022	.001	0.065	.024	.006
	Time	0.001	.004	.865	–0.00	.004	.275	–0.005	.004	.287	–0.01	.004	.071	–0.01	.005	.331

Note. N= 399. β = standardised fixed-effect estimate; *SE* = standard error. The top "Time" row shows overall within-person change across occasions. For each DIAMONDS predictor, the "Intercept" row shows the main effect, and the "Predictor × Time" row shows its interaction with time. $p < .05$ are considered significant.

Table 5.27, presents results from mixed-effects models examining how momentary situational characteristics, based on the DIAMONDS taxonomy, predict fluctuations in students' personality states and whether these associations vary over time. Significant main effects were observed for several DIAMONDS dimensions, indicating that specific situational characteristics consistently elicited particular personality expressions. For example, situations high in Duty were strongly associated with elevated levels of Agreeableness, Conscientiousness, Emotional Stability, and Openness (*ps < .001*), suggesting that when students perceived a setting as demanding responsibility or structure, they responded with more compliant, organised, emotionally regulated, and intellectually curious behaviours. Similarly, Positivity was positively associated with all personality states except Conscientiousness, most notably with Extraversion (β =.118, $p < .001$), Emotional Stability (β =.112, $p < .001$), and Openness (β = .092, $p < .001$), reflecting a general tendency to express adaptive states in emotionally pleasant environments.

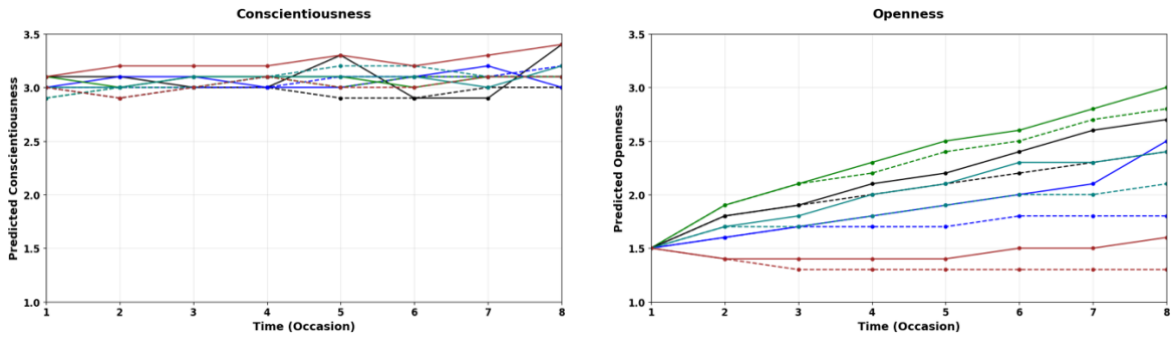
In contrast, Adversity and Negativity were negatively associated with multiple states. High levels of Adversity predicted lower Agreeableness (β = –.10*,* $p < .001$), Conscientiousness (β = –.045, p = .020), and Openness (*β = –0.06, p = .006*), suggesting that stressful or threatening settings reduced students' capacity for cooperation, persistence, and cognitive openness. Negativity was also negatively associated with Conscientiousness (β = –.082, $p < .001$), Emotional Stability (β = –.12, $p < .001$), and Agreeableness (β = –0.05, p = .009), indicating that unpleasant or conflictual contexts may elicit more disorganised or reactive responses. Sociality was positively associated with Conscientiousness, Emotional

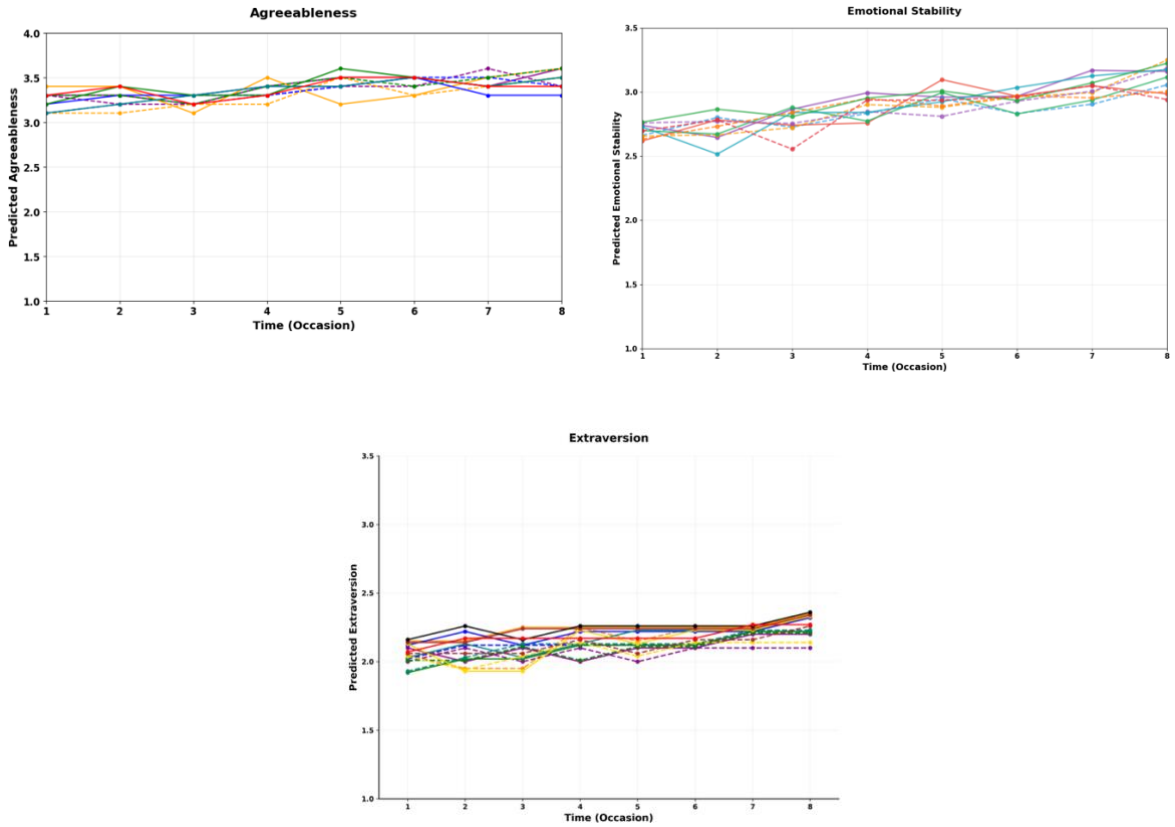
Stability, and Openness (*ps* < .01), aligning with the view that socially engaging environments foster more regulated and open behaviours.

The interaction terms with Time mostly failed to reach significance, indicating that the effects of these situational characteristics remained relatively stable across the repeated assessments. However, a few interactions suggest potential time-dependent modulation. For example, the interaction between Adversity and Time significantly predicted Emotional Stability (β = .009, p = .015), suggesting that as time progressed, students may have become less emotionally reactive in adverse situations. A negative interaction was also observed between Positivity and Time in predicting Extraversion (β = –.01, p = .026), hinting at a possible decline in the energising effects of pleasant settings over repeated exposures. Overall, the findings demonstrate that students' personality expressions are meaningfully shaped by the nature of the situations they experience, with emotionally positive and duty-bound contexts fostering more adaptive states, while negative or stressful environments tend to diminish them. These situation-state associations remained generally consistent over time, reinforcing the idea that personality states are responsive to momentary situational appraisals within daily academic life (see Figure 5.16).

Figure 5.16

Predicted trajectories of personality states as a function of situational characteristics





Note. Coloured lines represent situational predictors from the DIAMONDS framework: Duty (dark blue), Intellect (teal green), Adversity (firebrick red), Positivity (orange), Negativity (yellow), and Sociality (purple). Solid lines with circular markers. (●) indicate high levels of each situational characteristic; dashed lines with square markers (■) indicate low levels.

Figure 5.16 illustrates the predicted trajectories of five personality states, Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness, across eight measurement occasions, modelled as a function of situational characteristics (DIAMONDS). Each coloured line represents a different combination of situational influences, capturing the within-person changes over time. The visual patterns suggest relative stability in Extraversion and Conscientiousness, with slight upward trends for Agreeableness and Emotional Stability, indicating that these traits gradually increased in response to recurring situational demands. Most notably, Openness displayed marked variability, with several trajectories showing steep increases, suggesting a heightened responsiveness to specific contexts. The diversity of slopes across all panels reflects how

personality expressions are shaped dynamically by situational characteristics, affirming the interaction between person and context in momentary personality state expression.

5.11.1.1. Educational Situations and Personality States

After conducting the overall situational analysis using the DIAMONDS framework, a more focused set of models was employed to explore how more specific educational situations, which typically arise through everyday school-day experiences, predict momentary expressions of personality states. These educational situations include students' encounters with academic struggles, support from teachers, comfort in asking for help, peer pressure, classroom distractions, and social isolation. The objective was to examine the dynamic manner in which school-level environmental factors influence students' expressions of personality over time. The following table summarises the fixed effects from mixed-effects models predicting each personality state using variables of educational context and their interaction with time.

Table 5.28

Mixed-Effects Models Predicting Personality States from Educational Situations and Their Interactions with Time

Predictor	Fixed Effect	Extraversion			Agreeableness			Conscientiousness			Emotional Stability			Openness		
		β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Time	-	0.002	.004	.600	0.009	.005	.052	–0.001	.005	.777	0.006	.005	.204	–0.005	.006	.419
Struggled with Understanding	Intercept	–0.023	.018	.203	–0.049	.020	.013	–0.090	.021	.001	–0.079	.021	.001	–0.069	.022	.002
	Time	–0.00	.004	.401	0.01	.004	.146	0.000	.004	.922	0.005	.004	.200	0.007	.004	.123
Teacher Support	Intercept	0.062	.019	.001	0.03	.020	.195	0.028	.022	.198	0.101	.022	.001	0.118	.023	.001
	Time	–0.002	.004	.646	–0.01	.004	.117	0.000	.004	.999	–0.01	.004	.067	–0.010	.005	.022
Comfort Asking for Help	Intercept	0.100	.019	.001	0.10	.021	.001	0.107	.023	.001	0.134	.022	.001	0.035	.023	.137
	Time	–0.006	.004	.100	–0.008	.004	.051	–0.000	.005	.919	–0.006	.004	.216	–0.005	.005	.311
Peer Pressure	Intercept	0.024	.023	.299	–0.132	.025	.001	–0.114	.027	.001	0.008	.027	.759	–0.118	.028	.001
	Time	–0.001	.005	.868	0.012	.005	.024	0.011	.005	.036	0.015	.005	.005	0.003	.006	.635
Noisy Classroom	Intercept	0.059	.018	.001	0.036	.019	.061	0.054	.021	.009	0.026	.020	.196	0.152	.022	.001
	Time	–0.002	.003	.483	0.000	.004	.956	0.002	.004	.592	0.000	.004	.919	0.005	.004	.213
Social Isolation	Intercept	–0.025	.020	.219	–0.051	.022	.019	–0.124	.023	.001	–0.197	.023	.001	–0.139	.024	.001
	Time	0.006	.004	.145	–0.004	.004	.381	–0.000	.005	.957	–0.008	.005	.081	0.003	.005	.468

*Note***.** $N = 399$. β = standardised fixed-effect estimate; SE = standard error. The top "Time" row shows overall within-person change across occasions or interaction effect. For each educational predictor, the "Intercept" row shows the between-person effect, and the "Predictor × Time" row shows its interaction with time. p-values < .05 are considered significant.

The findings presented in Table 5.28, reveal how various educational situations shape students' momentary expressions of personality states and how these effects evolve over time. Notably, struggling with understanding during class was significantly associated with lower levels of Agreeableness, Conscientiousness, Emotional Stability, and Openness. These associations suggest that cognitive difficulties may lead to decreased cooperation, focus, emotional regulation, and curiosity in students during moments of academic challenge. Although the interaction with time for this variable was non-significant across states, the consistent negative intercepts indicate a persistent dampening effect of academic struggle on adaptive personality expressions.

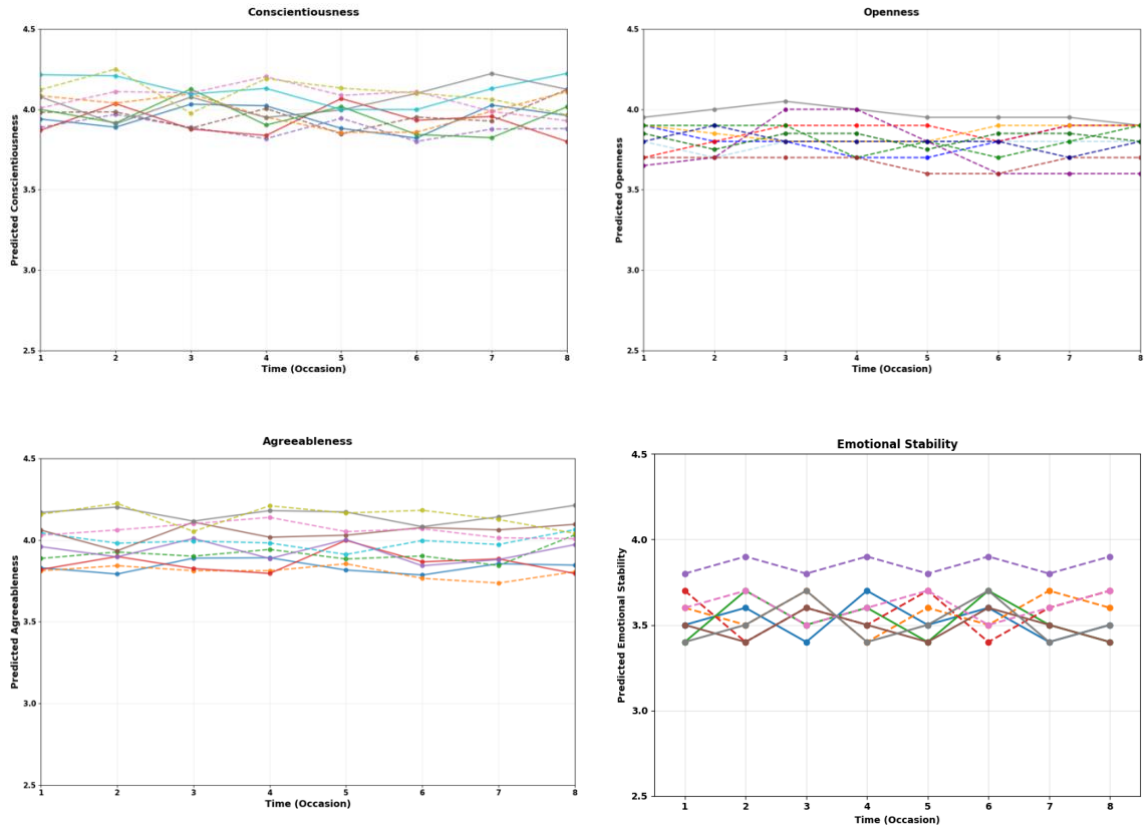
Teacher support was positively associated with Extraversion, Emotional Stability, and Openness states, emphasising the critical role of instructional warmth and responsiveness in eliciting sociable, emotionally resilient, and intellectually engaged behaviours. However, the interaction between teacher support and time was significant only for Openness (β = –.010, p = .022), implying that while support may initially boost students' openness, its influence may decline slightly over repeated exposure. Similarly, students who reported greater comfort in asking for help showed significantly higher levels of Extraversion, Agreeableness, Conscientiousness, and Emotional Stability, underscoring that classroom environments that normalise help-seeking can cultivate a broader range of adaptive personality expressions.

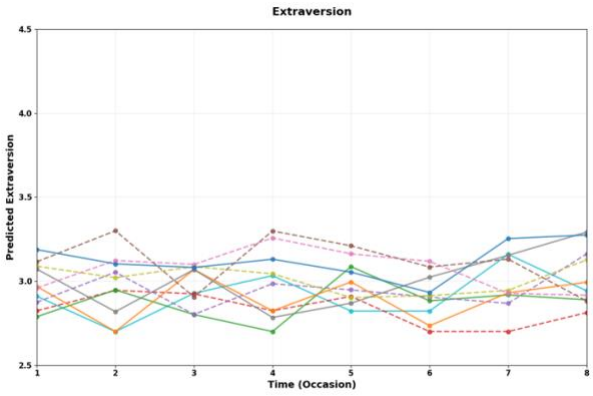
Peer pressure was negatively related to Agreeableness, Conscientiousness, and Openness, indicating that coercive or competitive peer environments suppress interpersonal harmony, task focus, and openness to experience. Yet, the time interactions for this predictor revealed positive slopes for Agreeableness (β = .012, p = .024), Conscientiousness (β = .011, p = .036), and Emotional Stability (β = .015, p = .005). A noisy classroom was positively associated with Extraversion and Openness at the within-person level, indicating that more extraverted and open students may find stimulation in chaotic environments. However, this

setting had no significant moderating effects over time, suggesting its influence on personality expressions remained stable across measurement occasions.

Lastly, social isolation exhibited robust negative associations with Agreeableness, Conscientiousness, Emotional Stability, and Openness. These effects support the understanding that feelings of isolation can suppress emotional balance, cooperation, goal-directed behaviour, and intellectual engagement. Although most of the time interactions were non-significant, the negative trend in Emotional Stability (β = –.008, p = .081) hints at a potential cumulative toll of social isolation on students' Emotional Stability.

Figure 5.17
Predicted trajectories of personality states as a function of educational situation characteristics





Note. Coloured lines represent six educational situational characteristics: Struggled with Understanding (crimson red), Teacher Support (forest green), Comfort Asking for Help (deep sky blue), Peer Pressure (orange red), Noisy Classroom (slate grey), and Social Isolation (medium purple). Solid lines with circular markers (●) represent high levels of the educational characteristic, while dashed lines with square markers (■) represent low levels.

Figure 5.17 illustrates the predicted trajectories of students' personality states across 16 measurement occasions as influenced by various educational situational characteristics. Overall, the personality states appeared relatively stable over time, with minimal fluctuations in individual trajectories, particularly for Extraversion and Agreeableness. In contrast, greater individual-level variability was observed in Conscientiousness and Emotional Stability, suggesting that these traits may be more susceptible to situational influences such as peer pressure, classroom noise, and social isolation. Openness showed moderate dispersion, with some students exhibiting upward or downward trends depending on the classroom context, such as teacher support or struggling with understanding material. The coloured lines represent individual students, highlighting that although personality states appear stable on average, within-person fluctuations across occasions are evident.

5.11.2. Predictive Role of Momentary States in Trait Development

To determine the influence of momentary states and time on trait-level variables, a multivariate growth curve model is used to investigate whether average momentary experiences (state means from ESM) predict long-term traits and outcomes across three-time points.

Table 5.29
Multivariate GCM Predicting Trait-Level Variable from Time and Mean States score

Trait	Predictor	*B*	*SE*	*z*	*p*	*β*
Extraversion	Time	0.020	0.029	0.702	.482	0.025
	Mean State E	-0.064	0.084	-0.764	.445	-0.022
Agreeableness	Time	-0.023	0.027	-0.856	.392	-0.030
	Mean State A	0.051	0.067	0.758	.449	0.024
Conscientiousness	Time	0.068	0.030	2.304	.021	0.080
	Mean State C	0.056	0.064	0.867	.386	0.026
Emotional Stability	Time	0.004	0.038	0.116	.907	0.004
	Mean State ES	0.240	0.101	2.371	.018	0.078
Openness	Time	0.049	0.024	2.071	.038	0.072
	Mean State O	†0.092	0.053	1.719	.086	0.053
Positive Affect	Time	0.065	0.031	2.12	.034	0.074
	Mean State PA	0.160	0.076	2.12	.034	0.071
Negative Affect	Time	0.009	0.032	0.29	.776	0.010
	Mean State NA	0.525	0.092	5.70	< .001	0.189
Life Satisfaction (SWLS)	Time	0.049	0.061	0.800	.423	0.028
	Mean State LS	0.139	0.125	1.105	.269	0.039
Grit	Time	0.050	0.022	2.23	.026	0.078
	Mean State Grit	0.076	0.067	1.14	.255	0.040

Note. N = 274. "Mean State" refers to the person-level mean of momentary personality states assessed via experience sampling (ESM). Time was modelled as a linear trend across three waves. B = unstandardised estimate; SE = standard error; z = Wald z-statistic; p = significance level; *β* = standardised coefficient.

Table 5.29 presents findings from a multivariate growth curve model examining how trait-level variables were predicted by time, and the person-level means of corresponding momentary personality states collected through experience sampling. Among the Big Five traits, significant positive effects of time were found for Conscientiousness ($\beta = .080$, $p = .021$) and Openness ($\beta = .072$, $p = .038$), indicating that these traits increased slightly over the study period. Emotional Stability was significantly predicted by the average momentary state of Emotional Stability ($\beta = .078$, $p = .018$), suggesting that students who generally

experienced higher levels of Emotional Stability in daily life also reported higher trait-level Emotional Stability. In contrast, other traits, such as Extraversion and Agreeableness, showed no significant association with either time or their corresponding mean state scores, implying relative stability and a weaker links between state and trait levels. For well-being outcomes, Positive Affect increased significantly over 17 months (β = .074, p = .034) and was also positively predicted by its mean state score (β = .071, p = .034), highlighting the coherence between daily emotional experiences and overall affective disposition. Negative affect, while not changing over time, showed a strong positive association with its mean state (β = 0.189, p < .001), indicating that momentary distress was a reliable indicator of trait-level negativity. Grit also exhibited a significant increase over time (β = 0.078, p = .026), but its association with mean state grit was not significant. Life Satisfaction showed no significant change or association with its momentary counterpart, suggesting trait-level satisfaction remained relatively stable and was less tied to daily variations. Collectively, these results suggest that certain personality traits and well-being indicators, particularly Conscientiousness, Openness, Emotional Stability, positive affect, and grit, are sensitive to developmental changes over time and are aligned with individuals' aggregated state experiences.

5.12. Summary of all Key Findings

Results from this longitudinal study showed some significant patterns of non-intellective factor development among secondary students as captured in Table 5.30.

Research Question 1 showed that although the majority of personality traits remained relatively stable across time, several non-intellective factors exhibited meaningful developmental changes. In particular, Conscientiousness, social engagement skills, and innovation skills showed significant positive growth, which suggests that these traits and skills continue to mature throughout adolescence. The marked increase in positive affect and

modest increase in negative affect revealed that students' emotional lives become more complex rather than uniformly more positive across time.

Research Question 2 examined significant predictive associations between non-intellective factors and well-being outcomes. The models accounted for considerable variance in positive affect (54%), negative affect (46%), and life satisfaction (49%). Emotional Stability emerged as a robust longitudinal predictor, significantly reducing negative affect and enhancing life satisfaction over time. Moreover, traits such as Extraversion and Conscientiousness and SEB skills, particularly self-management and innovation, were significantly associated with positive emotional experiences. In contract, academic achievement showed limited associations with non-intellective factors, with the model explaining only 2% of the variance.

Research Question 3 yielded strong evidence for bidirectional links between personality and well-being. Notably, Emotional Stability showed reciprocal effects with both life satisfaction and positive affect, while Openness and positive affect were also bidirectionally linked. The cross-lagged effects suggest that personality and well-being mutually influence one another over time, challenging traditional unidirectional models and supporting dynamic systems models of personality development.

Research Question 4 generalised these findings to momentary experience, showing that the associations between personality and well-being function not just at the level of traits but also in real-time, context-dependent manners. The experience sampling data indicated that situational features are related to personality state expressions, and specific educational situation characteristics, such as teacher support and social isolation, are associated with students' psychological functioning.

Table 5.30
Summary of Research Findings

Research Question	Analysis Focus	Key Variables	Main Findings / Effects	Significance (p-value)	Notes / Effect Size
RQ1	Growth Curve Models: Change Over Time	Personality Traits (Extraversion, Conscientiousness, Openness, Emotional Stability, Agreeableness), SEB Skills, Grit, Well-being (Positive/Negative Affect, Life Satisfaction)	Conscientiousness, social engagement, innovation skills, consistency of interests showed significant positive change over time. Most personality traits showed no significant time effect. - PA and NA increased significantly and Life Satisfaction showed minor or no change.	Several < .05 for Time effect (e.g., Conscientiousness *p*= .003, Social Engagement *p*= .001	ICCs indicate moderate between-person variance. Time effects small but meaningful.
RQ2	Impact on Positive Affect Over Time	Personality Traits, SEB Skills, Grit	Extraversion, Emotional Stability, Openness, and multiple SEB skills positively predicted PA change over time. Conscientiousness showed a significant positive time effect.	Most predictors Extraversion and innovation *p* < .001.	Model explains ~54% of marginal variance (R^2 Marginal=0.54).
RQ2	Impact on Negative Affect Over Time	Personality Traits, SEB Skills, Grit	Emotional Stability, self-management and emotional resilience Skills reduce NA. However, NA increased over time among extraverted students	Emotional Stability p < .001.	Model explains ~29% (marginal) and 47% (total) variance (R^2 Marginal = .285, Conditional R^2 = .468).
RQ2	Impact on Satisfaction with Life Over Time	Personality Traits, SEB Skills, Grit	Extraversion, Conscientiousness, and emotional resilience positively predict LS.	Most predictors *p* < .01.	Model explains ~21% of marginal variance (R^2 Marginal=0.207).
RQ2	Impact on Academic Achievement	Personality Traits, SEB Skills, Grit	Emotional Stability significantly predicted achievement in a negative dictation. Most other factors non-significant.	Emotional Stability *p* = .041, (R^2 = .020).	Low overall model fit

RQ3	Bidirectional Associations ↔ = Bidirectional → = Unidirectional	Cross-lagged Panel Models: Personality Traits and Well-being	• Emotional Stability ↔ LS • Emotional Stability ↔ PA • Openness ↔ PA • NA → Emotional Stability • NA → Conscientiousness • PA → Openness • Extraversion → PA • Conscientiousness → ↓ PA • LS→ Conscientiousness	Multiple significant cross-lagged effects $p < .05$	Demonstrates bidirectional and unidirectional relationships between personality and well-being.
RQ4	Experience Sampling Measures	Momentary personality states, state well-being, state grit, situational characteristics (DIAMONDS), educational situational characteristics	Personality states predict momentary well-being. Situational characteristics (Duty, Positivity, Adversity) influence personality states. Educational situations (Teacher Support, Comfort Asking Help, Social Isolation) affect personality states.	Multiple significant effects $p < .05$ and $p < .001$	Within-person effects demonstrate dynamic relationships in real-time contexts.

Note. LS = Life Satisfaction; PA = Positive Affect; NA = Negative Affect. Significant effects ($p < .05$). R^2 Marginal = variance explained by fixed effects; R^2 Conditional = fixed + random effects. ↔ = bidirectional; → = unidirectional; ↓ = negative effect.

5.13. Discussion and Conclusion

This discussion synthesises the empirical findings presented in this chapter and situates them within existing theoretical frameworks and research literature. The analyses addressed four primary research questions that examined: (1) systematic change in non-intellective factors over time, (2) their predictive relationships with student outcomes, (3) bidirectional associations between personality traits and well-being, and (4) momentary fluctuations in personality states within school contexts. The discussion is structured accordingly, beginning with developmental trajectories, followed by predictive relationships, reciprocal dynamics between personality and well-being, and daily state-level influences. Each section connects empirical findings to theoretical frameworks while highlighting implications for understanding adolescent development in the Saudi educational context.

5.13.1. Non-intellective Factors Dynamics Over Time

This section examines the developmental trajectories of non-intellective factors including personality traits, grit, SEB skills, and well-being across the study period, The growth curve model analyses revealed clear patterns in personality development during secondary school years. In the current study, Conscientiousness emerged as the most developmentally active trait, showing significant positive change over time, which aligns with developmental psychology theories suggesting that adolescents gain greater self-regulatory capacities (Pellegrino et al., 2024; Roberts & Mroczek, 2008). In contrast, Extraversion, Emotional Stability, Agreeableness, and Openness to Experience remained stable. This stability reflects meta-analytic findings that personality in adolescence is marked more by continuity than change (Roberts & Mroczek, 2008; Specht et al., 2011).

SEB skills demonstrated modest but statistically significant increases, particularly in social engagement and innovation skills. These findings support the idea that such SEB

competencies are more responsive to school and social environments than global trait (Durlak et al., 2011; Taylor et al., 2017). Grit also showed a slight increase, mainly through consistency of interests rather than perseverance of effort. This suggests that adolescents may develop clearer interests and commitments over time (Credé, 2018; Robertson-Kraft & Duckworth, 2014). Finally, while positive and negative affect increased, life satisfaction remained stable. This pattern suggests that adolescents may experience greater emotional intensity and variability as they mature, while their cognitive evaluations of life satisfaction remain relatively stable (Orben et al., 2022). Overall, these patterns indicate selective malleability in social and self-regulatory factors.

5.13.2. Non-Intellective Factors and Well-Being: Differential Relationships

Having established the nature of change, this section explores whether these trajectories are associated with students' well-being. The analysis revealed patterns linking non-intellective factors to well-being outcomes. In the present study, Extraversion was the strongest predictor, positively associated with positive affect and life satisfaction, and negatively with negative affect. However, slope effects indicated that negative affect increased over time among extraverted students. Emotional Stability was strongly associated with reduced negative affect and increased life satisfaction, These findings reinforce its central role in emotional regulation and resilience against distress (Lahey, 2009; Ormel et al., 2013; Widiger & Oltmanns, 2017).Conscientiousness was positively associated with life satisfaction and linked to increases in positive affect over time, suggesting that developing self-regulation supports adolescent well-being (de Moor et al., 2023; Soto et al., 2021). Additionally, several SEB skills were significantly associated with well-being. Innovation skills showed a modest positive association with positive affect, consistent with evidence that creativity enhances emotional engagement (Cullen et al., 2024). Self-management and emotional resilience were associated with reduced negative affect, while

emotional resilience also linked to greater life satisfaction, consistent with studies highlighting its protective role in adolescent adjustment (Taylor et al., 2017). These findings underscore the importance of regulatory skills as teachable contributors to emotional well-being, beyond stable traits (Durlak et al., 2011)

5.13.3. Bidirectional Relationships Between Personality and Well-Being

The analysis examined whether personality functions both as a predictor and an outcome of students' affective experiences over time. In the present study, several significant bidirectional associations were identified between personality traits and students' well-being. Emotional Stability showed the most consistent pattern, with reciprocal links to life satisfaction and positive affect, and vulnerability to negative affect. These findings highlight the centrality of Emotional Stability in students' emotional adjustment (Anglim et al., 2020; Wright & Jackson, 2022). Extraversion was related to higher positive affect, but no reciprocal association was detected. This pattern indicates that while extraverted students tend to experience greater positive emotions, these experiences are not linked to changes in their level of Extraversion (Anglim et al., 2020).

Openness was linked to positive affect but did not predict well-being, indicating that emotions may influence Openness more than Openness influences emotions (Wilt & Revelle, 2022). Negative affect was associated with decreases in Conscientiousness, suggesting adolescents experiencing more distress may struggle with organisation and self-control. Conscientiousness appeared more reactive to emotional stress than predictive of well-being. Finally, no bidirectional effects were found between Agreeableness, suggesting it was less reactive to emotions. Overall, Emotional Stability was the leading personality trait that showed bidirectional interactions with well-being, highlighting the value of examining traits individually over time. Taken together, these findings demonstrated that the

interplay between personality and well-being is selective rather than general, varying by trait.

5.13.4. Experience Sampling Insights

Daily fluctuations in personality states and their situational predictors within school contexts are examined, emphasising how classroom environments relate to short-term variations in students' states and well-being. The experience-sampling analyses also indicate concurrent associations between personality states and well-being. Increases in Conscientiousness, Emotional Stability, and Openness states were associated with higher positive affect and greater life satisfaction. Conscientiousness and Emotional Stability states were linked to decreases in negative affect.

Situational characteristics were related to personality states. Duty corresponded with increases in Conscientiousness and Emotional Stability states, while adversity was linked to decreases in Agreeableness and Openness states. Over time, adversity was associated with decreases in Emotional Stability states, and the link between positivity and Extraversion weakened. This reflects broader evidence that personality states fluctuate systematically with situational characteristics (Sherman et al., 2015; Beckmann et al. 2021). Educational situations showed similar patterns. Teacher support and comfort in asking for help were associated with increases in most states. Moreover, social isolation, peer pressure and struggling to understand material were linked to decreases. These findings suggest that supportive environments may enhance adaptive personality expression (Wrzus et al., 2016). Finally, only mean Emotional Stability states were associated with their corresponding trait. Mean levels of Conscientiousness, Openness, positive affect, and grit were observed across the study period, supporting models suggesting that momentary experiences can shape longer-term development (Borghuis et al., 2017).

5.13.5. Study Aims in Light of Findings

Aim 1 focused on synthesising longitudinal evidence regarding personality change and well-being during adolescence, revealing that Conscientiousness, Emotional Stability, and Extraversion impact well-being outcomes. The systematic review indicated a gap in research on personality change over time, leading to a longitudinal study in Saudi Arabia to address this. Aim 2 examined non-intellective factors among Saudi secondary school students, showing selective developmental changes, particularly in Conscientiousness, social engagement, and innovation skills, while other traits remained stable. Aim 3 explored how these changes predict well-being and academic achievement, finding that non-intellective factors significantly predicted well-being but had minimal impact on academic performance. Aim 4 investigated daily fluctuations in personality states and their association with emotional well-being, demonstrating situational responsiveness in personality expressions influenced by environmental factors. The integration across aims presents comprehensive evidence of personality malleability, well-being associations, and the complex dynamics of adolescent development within the Saudi educational context, addressing previous research gaps.

5.14. Conclusion

This longitudinal study supports both selective change and stability in personality and well-being across secondary school years. Findings favour differential developmental models, with Conscientiousness emerging as the most responsive traits and highlight the complexity of bidirectional links between personality and well-being.

The combination of longitudinal analyses of traits with intensive experience sampling provides a multilevel understanding of personality functioning that acknowledges between-person differences and within-person processes. These results suggest that fostering adaptive

personality development and supportive educational environments may yield modest benefits for students' well-being, while only limited effects on academic achievement. The contributions of the study to knowledge of personality development, dynamics of well-being, and their implications for education set the stage for further research and practice focused on facilitating best possible development during the important secondary school period. The demonstration of developmental plasticity in certain areas, along with the identification of key environmental factors, holds promise for interventions that support positive developmental outcomes during this formative period. A broader synthesis of these findings together with evidence from the systematic review (Study 1) is presented in the next chapter, which integrates insights from both studies to provide a comprehensive understanding of personality change and well-being within the Saudi educational context.

Chapter 6. Discussion and Conclusion

6.1. Introduction

Adolescence is a period of rapid physiological, cognitive, and socio-emotional development (Lerner et al., 2016), making it a critical stage for examining non-intellective factors and their associations with educational and well-being outcomes. Personality research increasingly recognises that traits show both stability and variability across contexts and time (Beckmann & Wood, 2020), with such dynamics influencing workplace behaviour (Beckmann et al., 2021; Minbashian et al., 2010) and emotional processes (Minbashian et al., 2018), suggesting similar mechanisms may apply in educational settings. Drawing on a longitudinal design, this study employs growth curve modelling and cross-lagged panel analysis to investigate the stability and change of personality traits, grit, social-emotional skills, and well-being among Saudi secondary school students. The analyses address four research questions: (1) systematic change in non-intellective factors over time, (2) predictive relationships between these factors and student outcomes, (3) bidirectional associations between personality traits and well-being, and (4) daily fluctuations in personality states and emotional experiences within school contexts. Findings reveal patterns of both stability and change, with some traits showing consistency while others display meaningful development in response to environmental and educational influences. Overall, the study contributes to understanding personality development during adolescence and highlighted the importance of accounting within-person variability differences when designing educational strategies to enhance student well-being.

6.2. Descriptive and Preliminary Outcomes

The chi-square analyses revealed clear demographic associations that highlight the social structuring of students' non-intellective trajectories. Gender intersected significantly

with age, with females overrepresented at ages 16–17, consistent with prior Saudi findings that girls outperform boys academically (Elsayed et al., 2022), a pattern explained by resource-based theories such as filter-empowerment (Stoeger et al., 2022) and resource gain spirals (Hobfoll et al., 2018).Gender also influenced study pathways, with females strongly represented in Law but absent in Health and Life Sciences, while males were more evenly distributed, reflecting structural sorting into tracks of differing prestige (Alothman et al., 2024; Svoboda et al., 2016) . Parental education showed strong interdependence, with secondary-level attainment most common, while higher education was less frequent, echoing evidence that resource-rich families provide stronger learning environments that reinforce non-intellective development (Yang et al., 2024).Similarly, parental employment statuses were significantly aligned, with non-disclosure common, reflecting cultural sensitivities and distinct economic dynamics in Saudi families (Alqarawi et al., 2025; Syed et al., 2018). Gender also intersected with ethnicity, with higher proportions of non-Saudi females than males, potentially reflecting migration or access patterns (Alothman et al., 2024).Taken together, these associations suggest that positioning shaped by gender, family background, and school context plays a central role in structuring students' educational and non-intellective trajectories.

6.3. Scale Validity and Reliability Outcomes

The Big Five personality measure demonstrated adequate psychometric properties with acceptable to good reliability coefficients and confirmed factor structure adequacy (Costa et al., 2019; Soto & John, 2017). Correlational analyses revealed expected associations between personality traits and other study variables, with Conscientiousness and Extraversion showing positive relationships with social-emotional skills (Soto et al., 2024) ,and Emotional Stability demonstrating negative associations with negative affect and positive relationships with well-being indicators, consistent with Trait-Congruent Affect Theory (Caprara et al.,

1989). These preliminary findings provide confidence in the measurement quality for addressing the main research objectives.

6.4. RQ1: Longitudinal Changes in Personality and Non-Intellective Factors

The growth-curve results revealed that all non-intellective factors showed meaningful initial differences across individuals, but displayed a mixed pattern of change and stability over the 17-month study period. Students began the study with distinct starting levels of personality, grit, SEB skills, and well-being, and while some traits remained stable, others showed significant positive development. Specifically, Conscientiousness ($p = .003$), social engagement skills ($p = .001$), innovation skills ($p < .001$), SEB composite ($p = .002$), consistency of interests ($p = .005$), grit composite ($p = .027$), and Positive affect ($p < .001$) demonstrated significant improvements, while negative affect showed a significant increase ($p = .041$). This selective development pattern suggests that within the context of Saudi secondary schools, some individual differences in non-intellective traits are malleable over an extended period, while others remain relatively stable. These findings reveal a dynamic pattern of selective change in non-intellective factors during adolescence, with the two academic years capturing meaningful developmental trajectories that demonstrate both stability and malleability across different domains.

6.4.1. Personality Trajectories During Adolescence

The most significant finding was the substantial increase in Conscientiousness over the two academic years ($\beta = 0.06$, $p = .003$), indicating meaningful developmental growth in adolescents' self-regulatory capacities. This result provides compelling evidence that personality traits, specifically those related to effortful control and responsibility, can change during adolescence, supporting contemporary views of trait malleability in youth

development. This finding aligns with a growing body of longitudinal research. For example Klimstra et al. (2010) conducted a three-wave study over six years and found moderate rank-order stability alongside mean-level increases in Conscientiousness, Agreeableness, and Emotional Stability in Dutch adolescents (ages 12–18). Similarly, Meeus et al.(2011), in a multi-waves panel study of youth aged 12–24, demonstrated that increases in Conscientiousness and Agreeableness and decreases in Neuroticism. Soto and Tackett (2015) observed increases in Conscientiousness, Agreeableness, and Openness over a 10-year longitudinal study of participants aged 10–20 years. Bleidorn (2015) also documented age-related mean-level increases in Openness, Agreeableness, and Conscientiousness among German adolescents (ages 11–18).

Critically, the current study extends this evidence to the Saudi context, demonstrating that personality development during adolescence follows similar maturational patterns across cultures. In contrast, other personality traits demonstrated stability: Extraversion showed no significant change (β = .00, p = .898), Emotional Stability remained stable (β = .00, p = .919), and Agreeableness showed a non-significant decline (β = –.03, p = .071). This selective pattern of change suggests that while some personality domains are malleable during adolescence, others represent more temperamentally rooted traits that remain stable during this developmental period.

6.4.2. Grit Development Over Time

The present study provides evidence that grit is a developmentally malleable construct. Significant improvements were observed in consistency of interests (β = .06, p = .005) and in the overall grit composite (β = .034, p = .027), highlighting the potential for change in adolescents' sustained motivation and goal-direction behaviour. This is particularly noteworthy when considered alongside the observed increase in Conscientiousness, as both constructs reflect overlapping aspects of long-term self-regulation and goal persistence. These

findings align with prior research. For example, Duckworth and Quinn (2009) found that grit exhibited moderate rank-order stability (r ≈ .68 over a year) while also showing developmental change—particularly in perseverance of effort. Similarly, Tang et al. (2019) using a three-wave study over two years and demonstrated that grit (both facets) increased across time, with grit trajectories significantly predicting math and language achievement. Muenks et al. (2017) also found evidence of within-person change in grit across three waves over two academic years, with increases in perseverance linked to improved academic outcomes.

Taken together, these studies suggest that a two-year developmental window may be sufficient for detecting meaningful change in motivational constructs, supporting the view that grit can develop over time rather than remain highly stable. Notably in the present study, perseverance of effort showed minimal change (β = .012, p = .635), indicating that different facets of grit may develop at different rates during adolescence.

6.4.3. Well-being Trajectories Over Time

The study revealed a complex and distinctive pattern of well-being development that diverges from international research reporting adolescent well-being declines. Both positive affect (β =.087, p < .001), and negative affect significantly increased (β = .042, p = .041), and life satisfaction remained stable (β =.032, p = .384). This pattern contrasts markedly with international longitudinal findings. For example a three-wave longitudinal study following 665 youth, ages 9-17 found positive affect declined and negative affect increased over time (Griffith et al., 2021). Similarly, a multi-wave cohort (grade 6-12; mean age ≈12–18) reported positive affect declines, with girls showing earlier increases in negative affect (Abitante et al., 2022) . Life satisfaction also typically decreases during adolescence: UK and German adolescents aged 10–15 experienced a significant decline over three years (Orben et al., 2022). A large cross-national study found life satisfaction declined over time from ages

10–16, particularly among girls (Daly, 2022). In addition, A five-year follow-up study of Canadian students aged 10-18 showed decreases in life satisfaction and positive affect, alongside increases in negative affect (Casas & González-Carrasco, 2020).

The maintenance of life satisfaction and the increases in positive affect in this Saudi sample suggests potentially protective cultural or contextual factors that buffer against the typical adolescent decline in subjective well-being reported internationally. The simultaneous increase in both positive and negative affect may reflect the emotional complexity and intensity characteristic of adolescent development. Culture may play a critical role: In Saudi Arabian's collectivist context, strong emphasis on family reputation and social approval can heighten adolescents' sensitivity to others' evaluations (Markus & Kitayama, 2014). Young people may prioritise maintaining others' feelings and social harmony over their own emotional needs, which can amplify reactivity in daily school life. Peer acceptance, teacher feedback, and perceived social standing can strongly shape emotions. Approval and support may intensify positive affect, whereas criticism, exclusion, or perceived disapproval can elevate negative affect—helping to explain the parallel increase observed in both forms of affect.

6.4.4. SEB Skills Trajectories During Adolescence

Within the SEB domains, the composite SEB score (β =.05, p = .002), social engagement skills (β =.09, p = .001), and innovation skills (β =.09, p <.001) showed significant increases over the study period. In contrast, self-management skills, cooperation skills, and emotional resilience skills remained stable. This mixed pattern within SEB skills indicates that certain social-emotional competencies are more malleable and responsive to developmental experiences during secondary school than others.

The longitudinal evidence supports the potential for SEB skill development in adolescence. For example, Schoon and Duckworth (2012) demonstrated that self-regulation and behavioural control, core elements of SEB skills, followed positive developmental trajectories during adolescence. Similarly, Denham et al. (2012) have reported that certain SEB domains, particularly prosocial behaviour and self-regulation skills, improve across the secondary school years. Evidence from intervention studies further underscores the malleability of SEB skills: a randomized controlled trial of the MindUp program by Schonert-Reichl et al. (2015) found students receiving intervention demonstrated significant gain in empathy, emotional control, and prosocial behaviour relative to control groups.

The significant improvements observed in social engagement and innovation skills might suggest that the secondary school environment provides sufficient developmental opportunities for growth in these specific competencies, perhaps through increased peer interactions, collaborative learning, and opportunities for creative problem solving. In contrast, other SEB domains (e.g., cooperation skills, emotional resilience) may require more targeted intervention or longer developmental timeframes to show measurable change.

6.4.5. Between-Person Differences and Developmental Patterns

The consistent between-person differences observed across all models suggest that students entered the study with clear and meaningful individual variations in non-intellective factors. These between-person differences likely reflect the accumulation of prior developmental experiences, including family background, early education, and peer influences, which helped establish students' initial personal resource profiles. From a resource-based perspective (Hobfoll et al., 2018), non-intellective factors serve as enduring personal resources that students carry into academic contexts. The human capital literature emphasises that early-formed skills and dispositions form essential foundations for later achievement (Heckman et al., 2006). In this study, for example, several traits such as

Extraversion , Emotional Stability and Agreeableness displayed strong between-person differences across students that remained stable over time.

Building on this, Conservation of Resources (COR) theory (Hobfoll, 1989; Hobfoll et al., 2018) conceptualises personality, grit, and well-being as personal resources that individuals strive to protect and develop. The development observed in Conscientiousness, specific SEB skills (e.g., social engagement and innovation skills), grit, and positive affect suggests active resource accumulation during adolescence, while other domains such as Extraversion, Emotional Stability, and life satisfaction remained stable. This pattern reflects differentiated developmental processes across factors and supports the view that adolescence is a dynamic developmental period characterised by selective personality change (Roberts et al., 2006; Soto et al., 2021),with some traits showing malleability while others demonstrate stability. From a social-cognitive perspective (Bandura, 1997), the secondary school environment likely provided mastery experiences and developmental challenges that promoted growth in malleable self-regulatory and social-emotional domains, even in the absence of explicit interventions.

Overall, the pattern of selective stability and change observed in non-intellective factors during adolescence aligns with current developmental literature while revealing important domain-specific differences. This is consistent with the comprehensive meta-analysis by Bleidorn et al. (2022), which demonstrated that personality development follows predictable patterns across the lifespan. The findings also highlighted the importance of early interventions to address entrenched disparities in foundational individual differences (Durlak et al., 2011; Taylor et al., 2017).

6.4.6. Developmental Patterns in the Saudi Context

The mixed pattern of developmental changes and stability offers insights into adolescent development in this Saudi context, highlighting selective growth across different non-intellective factors. Increases in Conscientiousness and grit may reflect Saudi cultural values that prioritise perseverance, responsibility, and long-term goal achievement. These self-regulatory and motivational constructs align closely with the broader educational reform goals of Vision 2030, which prioritise the development of well-rounded citizens capable of persistence, responsibility, and long-term goal pursuit. Secondary school experiences shaped by Vision 2030 reforms appear to reinforce these traits, which are central to the national agenda of cultivating well-rounded, goal-driven citizens. Similarly, growth in social engagement and innovation skills aligns with Saudi Vision 2030's educational reform goals, emphasise creativity and adaptability. This suggests that policy initiatives are fostering targeted social-emotional competencies essential for thriving in a rapidly changing knowledge-based economy.

In contrast, the stability observed in other personality traits (e.g., Extraversion, Emotional Stability, Agreeableness) may reflect cultural factors that provide consistent social expectations and support systems. These enduring influences maintain stability in core temperamental characteristics while allowing growth in self-regulatory and social-emotional domains. Traditional social support networks, strong family ties, and enduring cultural values likely play a protective role, reinforcing stability in these core traits while shaping other developmental pathways. Finally, the unique well-being profile-marked by increased positive and negative affect alongside stable life satisfaction, suggests that Saudi adolescents may experience emotional complexity without overall well-being declines often reported internationally. This pattern likely reflects cultural protective factors, including cohesive social support systems and value-driven educational contexts.

Educators and policymakers can reliably identify students' initial strengths and developmental needs, while recognising that some domains (e.g., Conscientiousness, certain SEB skills, and grit components) may continue to develop over extended periods. This suggests that educational strategies should focus on fostering change in more malleable domains, while also supporting students in managing relatively stable traits that might otherwise hinder their development or academic success.

6.4.7. Summary and Conclusions

The findings provide the first longitudinal evidence of non-intellective factor development in Saudi Arabia. The results demonstrate that non-intellective factors are dynamic rather than fixed during adolescence. Moreover, personality, motivational, and social-emotional development during this period, follow domain-specific rather than uniform patterns. Self-regulatory traits (Conscientiousness and grit) and specific social-emotional competencies show particular responsiveness to secondary school experiences. From a practical perspective, these results indicate that sustained educational experiences can promote growth in key areas such as self-regulation, social-emotional competence, and motivation, while recognising that some personality traits serve as relatively stable foundations upon which other change occurs. Educational assessment and intervention planning should therefore consider the domain-specific nature of non-intellective factor development. Finally, this study expands the limited evidence base on adolescent development in Arab contexts and highlights individual differences in developmental trajectories. Future research should examine longer developmental periods and investigate the mechanisms underlying the selective patterns of change and stability observed across different non-intellective domains.

6.5. RQ2: Predictive Role of Changes in Traits and Skills on Outcomes

This study investigated the extent to which changes in non-intellective factors specifically, personality traits (Extraversion, Conscientiousness, Emotional Stability, Agreeableness, and Openness to Experience), SEB skills, and grit predict students' well-being and academic achievement. Utilising mixed growth curve models and multiple regression analyses, the findings provide a clear understanding of how these psychological constructs influence key student outcomes over time. The results highlight the significant role of certain personality traits and SEB skills in shaping well-being, while their impact on academic achievement appears limited.

6.5.1. Non-Intellective Factors → Well-Being

The ***positive affect*** analysis revealed that several personality traits and SEB skills were significantly predicted positive affect, with the growth curve model demonstrating substantial explanatory power. At the between-person level, higher levels of Extraversion (β = .258, p < .001), Emotional Stability (β = .066, p = .022), Openness (β = .126, p = .016), and Innovation Skills (β = .151, p < .001) were associated with increased positive affect. Additionally, between-person differences self-management skills (β = .107, p = .047) and social engagement skills (β = .079, p = .048) were both significant predictors of positive affect.

These results align with widely established research on personality and well-being, as well as contemporary longitudinal studies examining the relationships between personality and affect (Anglim et al., 2020; Wilt & Revelle, 2017). The trait-level effects of Extraversion and Emotional Stability predicting positive affect are consistent with Soto and Tackett (2015) 10-year longitudinal study of US adolescents, which similarly identified these traits as key predictors of positive emotional outcomes. The significant trait-level role of Extraversion and

Openness aligns with Klimstra et al.(2010) three-wave study of Dutch adolescents, which found these traits consistently linked to positive affect trajectories. It has been suggested that Extraversion, characterised by sociability and enthusiasm, is consistently associated with higher positive affect due to extraverts' engagement in rewarding social interactions (Steel et al., 2008).

Regarding changes over time, only one significant interaction emerged, the significant Time × Conscientiousness interaction ($\beta = 0.075$, $p = .030$), suggests that increases in Conscientiousness over time were associated with higher positive affect. This supports developmental perspectives on personality-affect relationships (Bleidorn, 2015; Specht et al., 2011). Notably, although Conscientiousness did not show a significant trait-level effect on positive affect ($\beta = 0.004$, $p = .929$), its interaction with time indicates that this trait's influence on emotional well-being strengthens as students' progress through their academic journey. All other personality traits and SEB skills showed non-significant time interactions, indicating their effects on positive affect remain stable over time rather than changing developmentally. Openness to Experience, though less frequently linked to affect, correlates with positive emotions in contexts valuing creativity and novelty (Joshanloo & Jovanović, 2020).

The significant between-person effects of self-management skills and social engagement skills in predicting positive affect are supported by Muenks et al. (2017) three-wave study of US middle school students, which found that self-regulation and perseverance predicted positive emotional outcomes. Similarly, in the between-person findings for innovation skills parallel Tang et al. (2019) research on Chinese adolescents, where grit trajectories predicted positive affect and subjective well-being over a two-year period. The importance of self-management skills at the between-person level aligns with Salmela-Aro

and Tynkkynen (2010) findings that self-regulation and academic engagement supported emotional well-being in Finnish students.

The substantial explanatory power of the growth curve model (marginal $R^2 = .42$ for fixed effects; conditional $R^2 = .52$ for fixed and random effects) demonstrated that personality traits and SEB skills together account for meaningful individual differences and developmental changes in positive affect, supporting integrative approaches to understanding well-being (Jayawickreme et al., 2012; Kern et al., 2016). The non-significant direct effects of some personality traits in the regression model may be due to their overlap with other predictors, reducing their unique predictive power when examined simultaneously (Anglim et al., 2020; Van der Linden et al., 2017).

The ***negative affect*** analysis revealed that several personality traits and SEB skills were significantly associated with negative affect at the within-person level. Students with higher Emotional Stability ($\beta = –.271$, $p < .001$), higher Extraversion ($\beta = –.218$, $p < .001$), stronger self-management skills ($\beta = –.164$, $p = .013$), and greater emotional resilience ($\beta = –.217$, $p < .001$) experienced significantly lower negative affect overall. Conversely, no personality traits or SEB skills showed significant positive associations with between-person negative affect, with non-significant effects observed for Agreeableness ($\beta = 0.097$, $p = .056$), innovation skills ($\beta = .086$, $p = .096$), grit ($\beta = .038$, $p = .489$), cooperation skills ($\beta = .012$, p = .843), and social engagement ($\beta = .006$, $p = .898$).

The growth curve model demonstrated substantial explanatory power with a marginal R^2 of .285 (fixed effects) and conditional R^2 of .468 (fixed and random effects). The strong negative relationship between Emotional Stability (low Neuroticism) and negative affect is well-documented, as individuals low in Emotional Stability are more prone to anxiety, anger, and depression (Lahey, 2009; Ormel et al., 2013; Widiger, 2017). These findings align with prior studies demonstrating that higher Emotional Stability predicted lower levels of negative

affect and subsequent declines across adolescence (Meeus et al., 2011; Soto & Tackett, 2015). The significant between-person differences for Emotional Stability suggest that emotionally stable students started with lower negative affect and maintained more adaptive level over time, supporting developmental theories of emotional regulation (Gross, 2015; Zimmerman et al., 2014).

The between-person protective effect of Extraversion against negative affect aligns with contemporary research, which showing that extraverts experience fewer negative emotions due to their optimistic outlooks and social engagement (Lucas et al., 2008; Soto & Tackett, 2015; Steel et al., 2008). Similarly, the significant protective role of self-management skills at between-person level is supported by prior research demonstrating that self-regulation predicts lower negative emotions in school settings (Muenks et al., 2017; Tang et al., 2019). The negative relationship between self-management skills, emotional resilience, and negative affect reinforces their function as protective factors against psychological distress, likely operating through enhanced emotional regulation, management capabilities, and social support (Musekamp et al., 2017).

Life satisfaction was significantly associated with several personality traits and SEB skills at the between-person level. Adolescents with higher levels of Extraversion ($\beta = 0.311$, $p < .001$), Conscientiousness ($\beta = .416$, $p < .001$), and emotional resilience ($\beta = .303$, $p = .004$) reported greater life satisfaction, suggesting that these characteristics provide an initial buffer for well-being during secondary school. By contrast, developmental change over time was observed for Emotional Stability ($\beta = .096$, $p = .046$) and grit ($\beta = .166$, $p = .027$). Students who become more emotionally stable or perseverance over the study period exhibited substantial growth in life satisfaction, even after controlling for individual differences at the start of the study. This underscores the developmental nature of well-being enhancements and the value of cultivating these traits within educational contexts. This

pattern highlights the dynamic nature of well-being development in secondary school students and suggests Emotional Stability and grit become increasingly salient as academic and social demands intensify. Notably, several other predictors (Openness, Agreeableness, and the remaining SEB skills such as self-management), were unrelated to life satisfaction at the baseline or over time (all $p > .05$). This non-significance is informative, indicating that not all adaptive traits equally shape the trajectory of adolescent well-being.

These findings extend prior longitudinal research demonstrating that Extraversion, Conscientiousness, and Emotional Stability predict adolescent well-being (Meeus et al., 2011; Soto & Tackett, 2015). However, the current results refine this evidence by showing that effects of Extraversion and Conscientiousness are largely static, while developmental gains are driven by improvements in Emotional Stability and grit. The significant Time × Grit effect closely mirrors findings by Park et al. (2018) and Tang et al. (2019), who identify grit as a critical time-dependent factor fostering sustained improvements in life satisfaction and engagement. Similarly, the protective role of Emotional Stability aligns with research showing that self-regulation and adaptive coping buffer against well-being declines during school transitions (Salmela-Aro & Tynkkynen, 2010).

Conceptually, these results suggest that initial well-being in adolescence is predicted by Extraversion and Conscientiousness, but longer-term improvements hinge on the development of emotional regulation (Emotional Stability) and perseverance (grit). This underscores the importance of school-based interventions that strengthen these more malleable traits, practically as adolescents face escalating academic and social pressures.

6.5.2. Practical Implications for Non-Intellective and Well-Being

Across all well-being outcomes (life satisfaction, positive affect, and negative affect), these findings have important implications for educational practice and policy in Saudi

Arabia. First, integrating Social-Emotional Learning (SEL) programmes into schools can directly support the strategic objectives of Saudi Vision 2030, which prioritise well-being alongside academic achievement (Al-Mwzaiji & Muhammad, 2023). Fostering emotional stability, grit, and self-management-factors consistently associated with higher life satisfaction, greater positive affect, and lower negative affect—will strengthen students' psychological health and prepare them to navigate future academic, social, and professional challenges (Durlak et al., 2011; Taylor et al., 2017). Second, interventions must be culturally responsive. Traits such as Emotional Stability and Extraversion may be expressed differently in Saudi society, where social norms emphasise modesty and emotional control. Culturally responsive programmes that acknowledge these dynamics are therefore more likely to engage students effectively. Third, the increasing national attention on mental health underscores the need to expand school-based mental health infrastructure. Findings indicate that emotional resilience and self-management can protect against psychological distress and enhance well-being, highlighting the need for improved counselling services in schools, training teachers to provide emotional support, and expanding mental health education to reduce stigma and encourage help-seeking among students (Kamel et al., 2020). Finally, internationally established developmental frameworks related to personality, SEB skills, and grit are meaningful and applicable within the Saudi cultural and educational landscape (Muenks et al., 2017; Yang et al., 2024). However, the limited longitudinal psychological research in Saudi Arabia highlights the pressing need for greater investment in local developmental studies. Future research should evaluate which interventions most effectively enhance overall well-being.

In summary, promoting social-emotional competencies, particularly Emotional Stability, grit, and self-management through targeted policies and culturally attuned interventions is essential for nurturing adolescent well-being. By directly addressing the

factors linked to multiple well-being outcomes, these initiatives can advance emotional health, educational reform, and youth empowerment in line with Saudi Vision 2030.

6.5.3. Non-Intellective Factors→Academic Achievement

Turning to academic achievement, the multiple regression analyses showed that only Emotional Stability demonstrated a significant negative association with academic achievement ($\beta = –5.32$, $p = .041$), with the overall model explaining 2.0% of the variance ($R^2 = .020$, $p = .012$). This finding indicates that students with greater improvements in Emotional Stability over time showed slightly lower academic achievement, which represents an unexpected result that diverges from theoretical expectations. Given the small effect size and low explained variance, it is also possible that this unexpected association reflects a Type 1 error and should therefore be interpreted with caution. This finding also diverges from some previous research suggesting positive links between emotional regulation and academic performance (Mega et al., 2014; Richardson et al., 2012). All other personality traits and SEB skills showed non-significant associations with academic achievement, including Extraversion ($\beta = –5.69$, $p = .326$), Conscientiousness ($\beta = 2.72$, $p = .814$), Grit ($\beta = 8.03$, $p = .451$), and various SEB skills. This unexpected result may be due to specific academic achievement measure used (GPA in this Saudi context), potential suppressor effects where multiple predictors may mask individual relationships, or the timing of measurement relative to when these traits might influence academic outcomes.

These findings align with research showing that while personality traits can predict academic outcomes, their effects are often modest and context-dependent (Poropat, 2009).The lack of significant associations may reflect the complex interplay between individual characteristics and educational contexts, where the influence of personality traits on academic achievement varies depending on measurement approaches, cultural contexts, and specific academic demands.

From a Self-Determination Theory perspective (Deci & Ryan, 2000), the limited effects of traits such as grit on academic achievement may reflect the importance of intrinsic motivation over mere persistence. The theory suggests that autonomous motivation and competence satisfaction are more crucial for sustained academic engagement than persistence alone, which may explain why grit showed non-significant effects on achievement in this study. With academics, non-intellective factors appear to play a supplementary role, with the predominant position held by cognitive factors (Roth et al., 2015). This is consistent with higher-order models of academic performance that position cognitive ability, personality, and motivational variables as moderators or mediators (Ackerman & Heggestad, 1997; Ziegler et al., 2012).

The limited predictive power of personality traits and SEB skills for academic achievement aligns with meta-analytic evidence. Credé et al. (2017) found that grit shows modest effects in academic contexts when controlling for cognitive variables, consistent with the non-significant effect observed here ($\beta = 8.03$, $p = .451$). While Conscientiousness is typically the strongest personality predictor of academic performance (Richardson et al., 2012), its effects remain smaller than cognitive abilities (Poropat, 2009). However, this does not diminish the importance of non-intellective factors for other crucial outcomes.

The current study demonstrates that these same traits significantly predict well-being outcomes, emotional regulation, and social functioning, outcomes that are valuable in their own right and may contribute to long-term educational success through indirect pathways. Academic achievement as measured by grades represents only one dimension of educational success, whereas personality traits and SEB skills appear more directly relevant to students' overall development, mental health, and adaptive functioning. Therefore, educational interventions targeting personality traits and social-emotional skills remain valuable, but their benefits may be better understood through their effects on well-being, motivation, and social

adjustment rather than direct academic performance. This suggests a complementary rather than competing relationship between cognitive and non-intellective factors in supporting comprehensive student development.

6.6. RQ3: Bidirectional Relationships Between Personality Traits and Well-Being

6.6.1. Overall Stability Patterns

The cross-lagged panel model analyses revealed that well-being indicators demonstrated relatively greater stability than personality traits over the study period. Students who reported higher life satisfaction and positive affect at T1 were more likely to maintain these levels at subsequent measurements, while personality traits showed relatively more variability across time points. The rank-order stability coefficients for life satisfaction (r = .68) and positive affect (r = .62) exceeded those for most personality traits, indicating consistent individual differences in well-being over time. These stability patterns align with longitudinal research documenting moderate to high stability in adolescent well-being measures. Gómez-López et al. (2019) found similar stability coefficients for life satisfaction (r = .65) across a 12-month period in Spanish adolescents, while Winzer et al. (2021) reported comparable patterns for positive affect in German youth. The observed stability suggests that interventions targeting student well-being must work against a backdrop of enduring dispositions and set points, potentially requiring sustained and multi-component approaches to achieve meaningful change.

6.6.2. Positive Affect: Multiple Bidirectional Associations

Positive Affect and Extraversion. Positive affect demonstrated unidirectional relationships with Extraversion across multiple time points. Extraversion at Time 1 significantly predicted increased positive affect at Time 2 (β = .119, $p < 0.01$ = .05), with a marginal effect observed from Time 2 to Time 3 (β = .082, p = .064). However, no significant bidirectional effects were detected, as positive affect did not significantly predict subsequent changes in Extraversion. The findings indicate that higher extroversion was associated with modest subsequent difference in positive affect, but positive emotional experiences do not

reciprocally enhance extraverted behaviours. These findings are partially consistent with established research on Extraversion, affect relationships. Lucas et al. (2008) documented prospective effects of Extraversion on positive affect in adult samples. Moreover, extraverted individuals often seek out social situations that enhance positive feelings (Steel et al., 2008; Wilt & Revelle, 2017).

Positive Affect and Conscientiousness. A significant negative relationship emerged between Conscientiousness and positive affect. Conscientiousness at T2 predicted a decrease in positive affect at Time 3 (β = –.088, p = .05), while no significant reverse effects were observed. This counterintuitive finding may indicate that higher levels of Conscientiousness are linked to slightly lower subsequent positive affect, possibly reflecting the stress and effort associated with increased self-discipline and goal pursuit. One possible explanation is that greater task focus and performance demands may coincide with reduced momentary positive affect, highlighting the complex and context-dependent relationship between Conscientiousness and emotional outcomes. These interpretations are consistent with literature suggesting that goal pursuit and high personal standards can sometimes be accompanied by short-term emotional cost (Richardson et al., 2012; Steel et al., 2008).

Positive Affect and Emotional Stability. Positive affect showed partial bidirectional associations with Emotional Stability. Emotional Stability at T2 predicted increase in positive affect at T3 (β = .089, p = .05), while positive affect at T1 predicted increase in Emotional Stability at T2 (β = .088, p = .05). However, the reciprocal relationship was not maintained across all time points, as PA_T2 → SE_T3 was non-significant (β = .012, p = .781). These findings indicate modest and time-specific reciprocal associations rather than consistent mutual change. This pattern aligns with broaden-and-build theory and empirical findings on emotion-stability relationships. Positive emotions have been shown to expand psychological resources and build resilience (Nguyen & Fredrickson, 2017; Schaefer & Drewes, 2013;

Tugade & Fredrickson, 2004). Additionally, strong concurrent associations between Emotional Stability and positive affect in adolescent samples have been reported (Arslan et al., 2023). These findings may be particularly relevant for understanding how emotional experiences and regulatory tendencies co-develop during adolescence within the Saudi cultural context.

Positive Affect and Openness. Openness also demonstrated bidirectional associations with positive affect. Openness at T2 predicted an increase in positive affect at T3 (β =.078, p = .05), while positive affect at T1 predicted an increase in Openness at T2 (β = .088, p = .05). These associations suggest that the link between Openness and positive affect may operate within specific developmental windows rather than reflecting stable reciprocal processes. This pattern is consistent with longitudinal evidence showing associations between Openness and positive affect in adolescence (Klimstra et al.,2010). One possible explanation is that individuals higher in Openness may be more likely to engage in novel experiences that coincide with positive emotions, which may lead to broadening of cognitive and experiential sensitivity via positive emotional states consistent with broaden-and-build theory (Christensen, 2020; Fredrickson, 2001).

Meanwhile, Agreeableness showed no significant cross-lagged associations with positive affect, indicating limited evidence of longitudinal coupling between this trait and positive emotional experiences in the present sample. This observation conflicts with part of the literature that has posited weak correlations between Agreeableness and positive feelings; however, it is consistent with other research suggesting that Agreeableness tends to show weaker and less consistent associations with affect than Extraversion and Emotional Stability (Steel et al., 2008).

6.6.3. Negative Affect: Unidirectional Scarring Effects

Negative affect demonstrated primarily selective unidirectional effects on personality development, where three significant unidirectional effects emerged from the cross-lagged panel analyses.

Negative Affect → Conscientiousness. Higher levels of negative affect at T1 predicted a decline in Conscientiousness at T2 (β = –.109, p = .011), and negative affect at T2 also predicted a further decrease in Conscientiousness at T3 (β = –.098, p = .017). Conversely, Conscientiousness showed no significant predictive effects on subsequent negative affect indicating a clear unidirectional association. This finding aligns with theoretical models suggesting that negative emotions can undermine self-regulatory capacity and goal-directed behaviour over time (Javaras et al., 2012). Persistent negative affect may deplete cognitive resources needed for Conscientiousness behaviours such as planning, persistence, and self-discipline (Bedder et al., 2024). The consistent effect across both time intervals suggests that negative emotions create a gradual erosion of conscientious behaviours, possibly through increased procrastination and reduced motivation for effortful tasks (Liu et al., 2023).

Negative Affect → Emotional Stability. Higher negative affect at T1 significantly predicted a decrease in Emotional Stability (i.e., an increase in Neuroticism) at T2 (β = –.199, p < .001). However, this effect was not maintained from T2 to T3 (β = –.082, p = .108), indicating that the association appears time-specific rather than persistent across intervals. This pattern is consistent with stress sensitisation models, which propose that repeated exposure to negative emotions can increase emotional reactivity and reduce stress tolerance (Ormel et al., 2013). The time-limited nature of this effect may reflect developmental processes whereby adolescents gradually develop better emotional regulation strategies, or it

could indicate that the most vulnerable period for emotional stability change occurs earlier in the developmental sequence (Meeus et al., 2011).

Negative Affect → Agreeableness. Repeated exposure to negative affect at T2 was associated with a reduction in Agreeableness at T3 (β = –.096, p = .006), potentially reflecting diminished social harmony and tolerance. Interestingly, there was a marginally significant effect from T1 negative affect to T2 Agreeableness (β = .073, p = .060), though this did not reach conventional significance levels. Agreeableness showed no significant predictive effects on negative affect. This pattern may reflect the interpersonal consequences of sustained negative emotional experiences. Persistent negative affect can lead to increased interpersonal conflict, reduced empathy, and greater social withdrawal, ultimately eroding agreeable behaviours and attitudes (Lahey, 2009). The delayed emergence of this effect (only significant from T2 to T3) suggests that social personality changes may require more sustained exposure to negative emotions compared to other traits, consistent with research showing that interpersonal traits change more slowly than emotional traits (Sahi et al., 2025). These findings are broadly consistent with longitudinal evidence and affect-driven personality change theory (Borghuis et al., 2020; Ormel et al., 2013; Wrzus & Roberts, 2017), which propose that sustained emotional experiences can contribute to gradual changes in personality traits, particularly those linked to emotional regulation and self-regulation. Overall, these findings suggest a selective unidirectional association in which negative affect precedes modest changes in Agreeableness, rather than a pervasive or reciprocal pattern.

In the Saudi educational context, these selective associations highlight the importance of early emotional support and stress reduction programmes. The cultural stigma around mental health issues may exacerbate negative effects by preventing students from seeking help. Thus, the selective nature of these associations indicates that negative affect was linked to subsequent changes in Conscientiousness, Emotional Stability, and Agreeableness but not

Extraversion or Openness, suggesting that negative emotions may particularly undermine traits related to self-regulation, emotional control, and social cooperation, which are highly valued in collectivistic cultures such as Saudi Arabia.

6.6.4. Bidirectional Relationships: Emotional Stability and Life Satisfaction

The clearest reciprocal pattern emerged between Emotional Stability and life satisfaction. Emotional stability at T1 significantly predicted higher life satisfaction at T2 (β = .168, p = .006), while life satisfaction at both T1 and T2 significantly predicted later Emotional Stability (β = .068, p = .006; β = .060, p = .039, respectively). Students who were initially more emotionally stable reported increases in life satisfaction later, and conversely, those with higher initial satisfaction became more emotionally stable over time.

Life Satisfaction and Conscientiousness's Unidirectional Effects. Evidence of a unidirectional association emerged between life satisfaction and Conscientiousness. Life satisfaction at T2 predicted an increase in Conscientiousness at T3 (β = .050, p = .048), while no significant effects were observed from Conscientiousness to life satisfaction. Additionally, life satisfaction at T1 did not significantly predict Conscientiousness at T2 (β = .020, p = .396). This pattern suggests that well-being may facilitate the development of self-regulatory traits, but conscientious behaviours do not necessarily enhance life satisfaction in this sample.

This bidirectional pattern for Emotional Stability aligns with findings from large-scale longitudinal studies. Research has consistently shown bidirectional relationships between Emotional Stability and well-being indicators. For instance, Emotional Stability predicts life satisfaction, while positive life experiences enhance emotional regulation over time (Ormel et al., 2013) . Similarly, a meta-analysis found that individuals with greater Emotional Stability report higher life satisfaction and that positive life experiences contribute to emotional resilience (Steel et al., 2008). In the Saudi educational context, this effect may be especially

important because academic pressure and social expectations can heighten stress, making Emotional Stability vital for maintaining life satisfaction and for building resilience against cultural pressure. Moreover, this has practical implications, suggesting that well-being programmes could also strengthen students' self-regulatory behaviour and academic engagement (Borghuis et al., 2020).

The unidirectional effect of life satisfaction on Conscientiousness aligns with studies suggesting that positive emotional states can enhance motivation and self-regulatory capacity, though this relationship appears to be less robust and more context-dependent than the Emotional Stability-life satisfaction cycle (Richardson et al., 2012). By contrast, all other effects were non-significant, suggesting that no longitudinal associations were observed between life satisfaction and Extraversion, Openness, or Agreeableness in this sample.

6.7. RQ4: Dynamic relationships between states and well-being

6.7.1. Non-Intellective States: Within-Person Fluctuations

The findings revealed significant within-person fluctuations in personality states across the 16 timepoints, demonstrating meaningful dynamic patterns beyond random measurement error. Specifically, students showed considerable variability in their moment-to-moment expressions of Conscientiousness, Openness to Experience, and Extraversion throughout the eight-day study period. These fluctuations showed systematic patterns, with some students remaining stable and others showing pronounced daily shifts.

These results align with recent empirical studies reporting similar within-person variability. Sherman et al. (2015) found that college students' personality states fluctuated significantly across situations, with within-person standard deviations often exceeding 1.0 on standardised measures. Similarly, Fleeson and Gallagher (2009) demonstrated that individuals varied considerably in their moment-to-moment personality expressions, with some participants showing ranges spanning nearly the entire personality spectrum within a single week. Extending this evidence, subsequent research indicates that inter-individual differences in intra-individual variability are systematic and observable across multiple contexts (Beckmann & Wood, 2020). Moreover, the form, time, and context of variability have been shown to play a critical role in shaping the dynamics of personality states in everyday life (Beckmann et al., 2021).

The magnitude of within-person fluctuations observed in this study supports the Whole Trait Theory, which posits that personality traits are best understood as distributions of states rather than fixed characteristics. This dynamic perspective suggests that personality expression is a continuous process of adaptation to situational demands, particularly relevant in the Saudi educational context where students navigate diverse academic and social

situations throughout their school day. The observed heterogeneity—some students displaying stability while others fluctuated strongly—suggests differences in how academic structures and social environments shape personality expression. However, these conclusions should be interpreted with caution due to the relatively short eight-day observation window.

6.7.2. Personality States and Well-Being

Momentary well-being in the current study, comprising life satisfaction, positive affect, and negative affect, showed no systematic temporal trends, indicating that students' daily well-being was largely stable and shaped by within-person fluctuations in personality states rather than linear change over the eight-day period. Distinct yet convergent patterns emerged across well-being components: such as, positive affect was most strongly predicted by Openness ($\beta = .202$, $p < .001$), followed by Conscientiousness, Emotional Stability, Agreeableness, while Extraversion showed no significant association. Furthermore, negative affect was primarily reduced by Emotional Stability ($\beta = –.220$, $p < .001$), along with Conscientiousness ($\beta = –.207$, $p < .001$), with small positive associations for Extraversion and Agreeableness, and no significant role for Openness. Moreover, life satisfaction was most strongly predicted by Extraversion ($\beta = .340$, $p < .001$), followed by Conscientiousness, Openness, and Emotional Stability , whereas Agreeableness showed no meaningful association.

These patterns largely align with state-level personality research. Prior studies have shown that Extraversion and Emotional Stability are reliable state-level predictors of daily well-being (Nasello et al., 2023; Talić et al., 2022) and that Conscientiousness becomes particularly adaptive in structured academic contexts by promoting organisation and goal-directed behaviour (Magee & Biesanz, 2019). Personality states fluctuate meaningfully across time and contexts, and that task-contingent Conscientiousness in particular predicts adaptive outcomes (Beckmann et al., 2021; Minbashian et al., 2010). Openness also emerged

as a key driver of momentary positive affect, consistent with experimental evidence that expressing curiosity and intellectual engagement enhances daily positive emotion (Allen & Zelenski, 2018). Similarly, emotional processes underlying conscientious behaviour are context-sensitive (Minbashian et al., 2018), and cross-level interactions between Emotional Stability and Conscientiousness highlight that well-being outcomes depend on dynamic person-situation transactions (Beckmann et al., 2010) The unexpected small positive links between Agreeableness and Extraversion with negative affect may reflect contextual strain in academic interactions, where socially engaged students also encounter peer or task-related stressors.

Cultural context provides a critical interpretive lens. The prominence of Conscientiousness and Openness in predicting life satisfaction and positive affect likely reflects Saudi educational values that emphasise discipline, structured study, and intellectual curiosity. Students who frequently activate these states, for example, through organised routines (Conscientiousness) or engagement with new ideas (Openness), appear to experience greater momentary well-being, underscoring the dynamic, state-like nature of well-being and the benefits of culturally aligned personality expression.

These findings carry practical implications. Interventions that encourage adaptive state activation—such as structured routines to foster Conscientiousness and activities that stimulate curiosity to promote Openness, could enhance adolescent well-being in demanding educational environments. Supporting students in modulating their personality states may therefore represent a feasible pathway for improving both affective and cognitive dimensions of daily well-being.

6.7.3. Situational Predictors of Personality States

Personality states expression was systematically shaped by both general situation (DIAMONDS) and specific educational situation characteristics, shown clear and theoretically coherent patterns. Across the study period, students' personality states fluctuated primarily in response to duty, socially supportive, and stressful environments, while temporal trends were largely modest. Notably, consistent with prior findings (e.g., McCabe & Fleeson, 2016; Sherman et al., 2015), duty and positivity were the most influential dimension, through cultural contrasts with recent Western studies (Kritzler et al., 2024) suggest possible moderation by educational and social context.

Structured and supportive contexts. Students reflect duty and teacher support consistency elicited adaptive states, particularly Conscientiousness and Emotional Stability, with complementary increases in Openness and Agreeableness These findings align with Situational Affordance Theory (Rauthmann et al., 2014) and with evidence that structured, suppurative environments encourage goal-directed and emotionally regulated behaviours (Magee & Biesanz, 2019). Positivity and sociality similarly enhance Extraversion and Openness consistent with Broaden-and-Build Theory (Fredrickson, 2001), which posits that environments expand behavioural repertoires and promote resource building. However, small declines in Extraversion over repeated exposures suggest habituation, implying that positive interventions may require periodic renewal to maintain engagement.

Stressful and socially adverse contexts. Adversity, negativity, peer pressure, and social isolation exerted clear suppressive effects on Conscientiousness, Agreeableness, and Emotional Stability, while occasionally triggering short-term increases in Extraversion, likely reflecting assertive coping or help-seeking. social isolation was linked to the strongest reduction in Conscientiousness, Emotional Stability and Openness. Over time, Emotional

Stability tended to rise under adversity, suggesting gradual resilience building, whereas Extraversion declined in persistently negative contexts, reflecting cumulative strain.

These patterns align with stress and coping models (Folkman, 2013) and confirm that states-level personality expression is sensitive to micro-dynamics of classroom life. Consistent with prior work (Martin et al., 2014; Rauthmann et al., 2014), negative peer influences and academic struggles eroded adaptive personality states, while comfort seeking buffered these effects.

Practical and cultural implications. The convergence across general situations and educational situations reflect both universal situational mechanism and cultural specificity. In the Saudi context, environments emphasising discipline, structured learning, and intellectual engagement appear particularly effective at fostering Conscientiousness, Emotional Stability, and Openness, traits valued in academic success.

Practically, these findings suggest that classroom interventions can promote adaptive personality expressions by:

1- Enhancing structured routines and teacher support to promote Conscientiousness and Emotional Stability.
2- Incorporating novel and intellectually engaging activities to sustain Openness and positive affect.
3- Managing peer dynamics and academic challenges to minimise the suppressive effects of adverse and negative contexts.

Overall, these results underscore the dynamic and context-sensitive nature of personality states, demonstrating that well-designed academic environments can actively shape students' adaptive behavioral and emotional profiles.

6.7.4. From States to Traits: Aggregated Patterns

Comparisons of mixed growth curve model results revealed selective patterns of state-trait correspondence. Aggregated personality states showed selective state-trait coupling. Emotional Stability states significantly predicted trait-level (β = .240, p = .018), whereas Extraversion, Agreeableness, Conscientiousness, and Openness showed no meaningful state-trait correspondence. In contrast positive affect (β =.160, p = .034) and negative affect (β = .525, p < .001) aligned with their trait-level counterparts, indicating that emotional functioning exhibits greater state-trait alignment than other personality dimensions.

These findings partially support the density distribution model (Fleeson, 2001), which conceptualises traits as statistical summaries of recurring states. However, the selective pattern observed here mirrors recent evidence that short-term state variability tends to be systematic and stable, yet only weakly predictive of trait-level change (Beckmann et al., 2021; Beckmann & Wood, 2020). For example, Beckmann et al. (2021) demonstrated that variability in Conscientiousness and Neuroticism remained consistent across weeks and contexts but contributed minimally to long-term trait change, suggesting that only certain recurrent state patterns consolidate into enduring dispositions. Similarly, Wrzus and Roberts (2017) proposed the TESSERA framework, which emphasises that repeated state expressions may shape traits only when they are frequent, emotionally salient, and reinforced by environmental conditions—a process that may explain why affective states, but not behavioural or cognitive ones, aggregated more clearly in the present study.

From a developmental perspective, this pattern aligns with research showing that emotional regulation stabilises earlier in adolescence than exploratory and self-regulatory tendencies (Bleidorn et al., 2021; Soto & Tackett, 2015). In collectivist cultural contexts, such reinforcement may further strengthen affective consistency while constraining the variability required for traits such as Openness and Conscientiousness to stabilise.

For the Saudi educational context, these findings suggest that dynamic, state-level personality monitoring may be more informative for understanding student adaptation than static trait measures. Educational interventions that foster adaptive state activation such as promoting Emotional Stability and positive affect during stressful academic contexts may not only improve immediate well-being but also facilitate gradual consolidation of adaptive traits over time (Beckmann et al., 2021; Wrzus & Roberts, 2017) These observed patterns reinforce the importance of situationally responsive interventions that target state activation (e.g., enhancing Emotional Stability in stressful settings) to support immediate well-being and longer-term personality development.

6.8. Synthesis findings from study 1 and study 2

The current study provides an integrative understanding of how non-intellective factors are related to the development of adolescent well-being and academic achievement by combining insights from the systematic review (Study1, Chapter 4) with longitudinal trait-level development and momentary state-level dynamics from the empirical study Study2, Chapter 5), which addressed these gaps through longitudinal data from Saudi secondary school students. The systematic review demonstrated that personality traits are consistently associated with well-being outcomes during adolescence, with traits such as Conscientiousness and Emotional Stability consistently associated with positive developmental outcomes (Hatano et al., 2023; Steinmayr et al., 2019; Winzer et al., 2021). Building on this foundation, the empirical longitudinal growth curve models revealed selective developmental trends, with increases in Conscientiousness, SEB skills, grit, and positive affect while negative affect remained stable.

Well-being outcomes were differentially associated with non-intellective factors. Extraversion, Emotional Stability, Openness, and Innovation Skills were positively associated with positive affect, while Emotional Stability, Extraversion, Self-Management, and

Emotional Resilience were linked to lower negative affect. Life satisfaction was predicted by Extraversion, Conscientiousness, and Emotional Resilience Skills, with dynamic effects showing that Emotional Stability and grit became increasingly important over time . These findings align with longitudinal evidence that higher levels of Extraversion and Conscientiousness are associated with greater life satisfaction, whereas lower Emotional Stability is related to poorer well-being (Israel et al., 2023; Steinmayr et al., 2019; Winzer et al., 2021). For academic achievement, only Emotional Stability showed a significant negative association with GPA.

Cross-lagged panel analyses revealed complex unidirectional and selective bidirectional associations between personality traits and well-being outcomes. Emotional Stability showed bidirectional relationships with life satisfaction and positive affect. Moreover, positive affect demonstrated bidirectional relationships with Openness. Negative emotional experiences were negatively related to Conscientiousness, Emotional Stability, and Agreeableness, indicating that these traits were sensitive to negative affective experiences without reciprocal effects. This is consistent with Borghuis et al. (2020), who found that higher daily negative affect was associated with increases in Neuroticism over time.

Experience sampling measurements indicated meaningful within-person fluctuations in personality states, with situational variables playing essential roles in shaping personality expression. Duty-oriented and positive environments were linked to adaptive personality expression, while peer pressure, social isolation, and academic struggles had negative effects. Comparable findings from the systematic review showed that adolescents embedded in supportive school and peer environments developed higher well-being and lower Neuroticism (Israel et al., 2023; Winefield et al., 2015). Notably, only Emotional Stability showed significant state-trait coupling among personality dimensions, whereas both positive and negative affect demonstrated significant state-trait relationships.

. Collectively, these results indicate that non-intellective factors are dynamic and malleable during adolescence, and that their variation is meaningfully related to well-being. By integrating evidence across the systematic review (Study 1) and the empirical study (Study 2), this thesis demonstrates that both long-term trait trajectories and short-term state dynamics jointly linked to patterns of adolescent well-being and academic outcomes. Together, these findings suggest that understanding adolescent development requires attention to both enduring traits and momentary states (Arslan et al., 2023; Hatano et al., 2023; Winzer et al., 2021).

6.9. Implications

6.9.1. Implications for Theoretical Development

The dynamic developmental patterns observed in this study contribute several important insights to theoretical models of adolescent development, personality, and well-being. The significant improvements in Conscientiousness, grit components, and social-emotional skills challenge stage-based developmental theories that assume uniform stability during middle adolescence (e.g., Steinberg, 2014), a position inconsistent with findings from Klimstra et al. (2009) showing mean-level trait change in Emotional Stability and Agreeableness across adolescence. Instead, the results support developmental perspectives that account for domain-specific malleability, where certain self-regulatory and motivational constructs show particular responsiveness to educational experiences while temperamental traits remain more stable.

The substantial developmental changes in Conscientiousness and grit are particularly significant for educational psychology, as these constructs represent key mechanisms through which students develop academic engagement and long-term goal pursuit. This finding

supports theoretical frameworks emphasising the developmental plasticity of self-regulatory capacities during adolescence.

The unidirectional scarring effects of negative affect on personality development represent a significant theoretical contribution, demonstrating that emotional experiences may contribute more to personality development than previously acknowledged. The consistent finding that negative affect predicted decreases in Conscientiousness, Emotional Stability, and Agreeableness without reciprocal effects supports theoretical frameworks emphasising bottom-up personality development through repeated experiential consolidation.

The integration of experience sampling data with trait-level assessments bridges state and trait conceptualizations of personality. The domain-specific state-trait coupling observed (significant only for Emotional Stability among personality traits) supports whole trait theory (Fleeson & Jayawickreme, 2015), suggesting that the density distribution model may apply differentially across personality domains, with emotional regulation showing greater integration across temporal levels than other personality characteristics.

6.9.2. Implications for Policy and Practice

The dynamic developmental changes observed across the study period have important implications for educational policy and practice. The significant improvements in Conscientiousness, grit, and social-emotional skills suggest that middle adolescence represents a period of substantial malleability in self-regulatory and motivational constructs, indicating that interventions targeting these domains may be particularly effective during this developmental window.

These developmental improvements, although small in effect size, indicate that non-intellective factors can show meaningful change across multiple domains over relatively short periods. While the underlying mechanisms remain unclear, these changes may reflect a

combination of maturational processes, school experiences, and contextual influences. The 17-month timeframe proved sufficient for detecting meaningful changes, suggesting that educational policies should take account of the fact that some developmental changes unfold gradually and may only become detectable over extended periods of observation. The differential relationships between specific non-intellective factors and well-being outcomes offer useful insights for designing targeted intervention approaches. The prominence of Emotional Stability as a consistent predictor of well-being suggests that interventions aimed at strengthening emotional regulation should be prioritised within school settings. Evidence from SEL programmes, mindfulness-based interventions, and cognitive-behavioural skills training indicates that these approaches can improve students' emotion regulation, reduce internalising symptoms, and enhance psychological resilience (Durlak et al., 2011; Taylor et al., 2017; Zenner et al., 2014). Embedding structured SEL curricula within secondary education (focusing on emotional awareness, coping strategies, and adaptive stress management) may therefore represent a practical pathway for supporting well-being trajectories identified in this study. The strong associations between social-emotional skills and positive affect, combined with their significant developmental improvements, suggest that these domains may be particularly promising for supporting positive psychological functioning.

The findings also provide a clearer rationale for strengthening peer-support networks and parental engagement initiatives. Peer mentoring programmes, structured group activities, and teacher-facilitated advisory systems can foster supportive social climates that buffer the effects of emotional distress (Wentzel et al., 2016). At the family level, workshops or guidance programmes that equip parents with strategies to support adolescents' emotional development (such as promoting open communication and adaptive coping) may reinforce these protective processes across contexts (Soto et al., 2021). Together, these approaches

reflect an ecological perspective, recognising that emotional stability develops through ongoing interactions between individual characteristics and supportive environments.

For academic achievement, the limited and counterintuitive predictive utility of non-intellective factors (including the negative association with Emotional Stability) suggests that cognitive abilities and instructional quality remain primarily determinants of educational success. Educational policies should maintain balanced approaches that support non-intellective development for well-being benefits while recognising their limited direct impact on academic outcomes.

The unidirectional scarring effects of negative affect on personality development highlight the critical importance of early identification and intervention for students experiencing persistent emotional distress. The consistent finding that negative emotions predicted deterioration in Conscientiousness, Emotional Stability, and Agreeableness supports proactive mental health approaches that prevent emotional distress from undermining broader personality development (Ormel et al., 2013).

These implications align closely with Saudi Arabia's Vision 2030 emphasis on enhancing quality of life and promoting holistic student development. Integrating social-emotional competencies into national curricula, expanding access to school-based counselling services, and providing teacher training on student well-being provide a basis for translating these findings into policy action (Kankaraš & Suarez-Alvarez, 2019). By prioritising emotional well-being alongside academic outcomes, educational reforms can support the development of resilient, adaptive learners who are better equipped to contribute to the broader societal goals articulated within Vision 2030.

6.10. Strengths and Limitations

Strengths: One of the strongest points of this research was its multi-method longitudinal design, which both captured trait-level developmental changes and state-level variability at multiple time points. By combining the conventional survey approach with ESM, the study offered complementary insights into adolescent development on different time scales. This approach addresses the limitations commonly found in single-method studies within developmental science, providing a richer and more dynamic portrayal of adolescent growth.

The comprehensive battery of assessments, including personality traits, social-emotional competencies, grit, and various measures of well-being, enabled a nuanced examination of the complex interrelationships among these constructs. Importantly, the inclusion of multiple non-intellective constructs such as grit and social-emotional skills highlights critical facets of adolescent development beyond cognitive ability, emphasizing the holistic nature of growth during this period.

Methodologically, the study makes an important contribution by integrating sophisticated analytical techniques such as growth curve modelling, cross-lagged panel analysis, and multilevel modelling applied to experience sampling data. This innovative analytical framework allows for the disentanglement of within-person versus between-person effects, as well as contemporaneous, lagged, and recursive associations, while properly accounting for the nesting structure of longitudinal repeated measures. The use of ESM for assessing personality states, well-being states, and grit states provides ecologically valid, real-time data that capture moment-to-moment fluctuations in adolescents' psychological experiences, offering insights that traditional retrospective measures often miss.

Furthermore, the study advances understanding by incorporating situational predictors through the DIAMONDS framework alongside education-specific situational predictors within the ESM design. This integration situates adolescent states within diverse situational environments, elucidating how contextual factors influence their development. The cultural relevance of the sample, aligned with national educational priorities such as Vision 2030, also distinguishes this research. By focusing on a novel population that has been underrepresented in past literature, the findings gain enhanced generalisability and practical importance, particularly within the local educational and cultural landscape.

Together, these strengths underscore the study's contribution by applying established theoretical perspectives with methodological innovation and cultural contextualisation, thereby advancing understanding of adolescent development in under-researched settings.

Limitations: Despite these strengths, several limitations must be acknowledged in interpreting the results. First, the reliance on self-report measures across all constructs introduces potential method bias, including social desirability effects and reference group effects, which can artificially inflate correlations between variables and distort the apparent strength of developmental relationships. Multi-informant approaches incorporating teacher, parent, and peer perspectives would provide more robust assessments of non-intellective factors, particularly for challenging behaviours that are difficult to self-evaluate accurately.

Second, sample attrition and missing data patterns present challenges for longitudinal interpretation. While the study maintained reasonable participation rates across timepoints, systematic dropout patterns may have biased results if students who withdrew differed systematically from those who remained. Missing data mechanisms, particularly if related to personality states or well-being levels, could have affected the validity of growth curve estimates and between-person comparisons.

Third, the limited academic achievement data collected only at the end of the study restricts understanding of personality-achievement relationships. Multiple academic indicators throughout the study period would have provided better insight into these dynamic relationships. Academic performance should ideally be measured through multiple indicators such as semester reports, yearly achievement records, and continuous assessment data to capture the dynamic relationship between personality states and educational outcomes. The single-point academic measure may have obscured important patterns of change and development that occur throughout the academic year.

Fourth, the eight-day ESM period, while intensive, captured meaningful state fluctuations but may benefit from extension. The study captured within-day patterns through twice-daily measurements (morning and afternoon), but future research might benefit from more frequent sampling or extended sampling periods.

Fifth, the sample characteristics limit generalisability to broader adolescent populations. Without detailed demographic information, whether the findings apply equally across different socioeconomic, cultural, and educational contexts remains unclear. Previous research has documented substantial cultural and contextual influences on personality development and well-being relationships, suggesting potential boundary conditions for the observed patterns. For instance, Klimstra et al. (2013) demonstrated that personality trait development in adolescence varies systematically across cultures depending on socioeconomic indicators such as education and economic prosperity which highlighted that findings from one cultural setting may not seamlessly extend to others

Finally, the analytical approaches, while sophisticated, primarily focused on linear relationships and mean-level changes, potentially overlooking more complex developmental patterns such as threshold effects, or diary-based daily transitions., or divergent

developmental trajectories among subgroups. Person-cantered approaches such as latent class growth analysis might reveal distinct developmental typologies not captured by variable-cantered methods. Future research should incorporate these analytical approaches to better understand the heterogeneity in personality development patterns among Saudi adolescents.

6.11. Future Directions

Several specific directions for future research emerge based on the limitations identified in this study. These directions address methodological constraints, conceptual gaps, and contextual considerations that would enhance the understanding of non-intellective factors in adolescent development.

6.11.1. Extending Measurement Timeframes to Capture Developmental Transitions

The dynamic developmental changes observed suggest that meaningful personality development occurs during middle adolescence, but future research should implement extended longitudinal designs that span critical educational transitions. Extending follow-up beyond the final year of secondary school into the transition to university or early career life would be particularly valuable, as post-school periods typically bring increased autonomy and responsibility that may trigger additional developmental changes. Such designs would address the current finding that middle adolescence might represent a period of relative stability between more dynamic developmental phases. Although the longitudinal research has been performed over a long period of time tracing the personality development during the educational transitions in the Western region, the same is very missing in Saudi Arabia and the Middle East region in general. Due to the peculiar cultural, educational, and social patterns of transition in Saudi society, with various expectations of autonomy, family engagement in career decisions, and gender-specific sequences, the replication and expansion

of such longitudinal methods in the Saudi setting could be critical information on whether the patterns of Western development can be generalized to other cultural setting.

6.11.2. Incorporating Multi-informant Assessment Approaches

The reliance on self-report measures across all constructs represents a substantial methodological limitation of the current study. As noted earlier, incorporating multi-informant perspectives from parents, teachers, and peers would be particularly valuable for understanding the unidirectional scarring effects observed between negative affect and personality traits as this would help to determine whether effects reflect actual behavioural changes or self-perception biases. This approach would address concerns about common method variance (i.e., the artificial inflation of relationships between variables due to shared measurement characteristics, such as response style biases or social desirability effects when all data come from the same source and method) that may influence the current findings.

6.11.3. Investigating Contextual Moderators of Trait-Outcome Relationships

In this study, the modest associations between non-intellective factors and academic achievement suggest that contextual factors may moderate these relationships. Future research should systematically examine how classroom climate, assessment practices, and cultural values influence the expression and outcomes of personality traits in educational settings. For example, the counterintuitive negative relationship between Emotional Stability and academic achievement suggests that contextual factors may moderate trait-outcome relationships. Future research should examine how classroom climate and cultural values influence personality trait expression in educational settings. Because, if studies will compare schools with different pedagogical approaches (e.g., traditional versus project-based learning), then these could help clarify how educational contexts shape the functional

significance of different personality traits. This direction addresses the limited generalisability of these current findings across diverse educational settings.

6.11.4. Integrating Biological and Environmental Perspectives

The dynamic developmental changes observed raise questions about underlying mechanisms driving personality malleability during adolescence. Integrating biological measures with psychological assessments would develop more comprehensive developmental models. The strong unidirectional relationship observed between negative affect and Emotional Stability could benefited if future research will integrate biological measures (e.g., pubertal development, stress hormones, genetic markers, heart rate variability, and sleep parameters) with psychological and social assessments to develop more comprehensive models of adolescent development. Recent research has shown that it is possible to include physiological indicators of the ecological momentary assessment (ESM) paradigms. The review by Lui et al. (2022) on the ways the Apple Watch can measure physiological measures that are applicable to mental health (including HRV, heart rate, sleep) and its potential for developmental research was mentioned. Moreover, Fitbit devices were combined with daily diaries, which were used by Menghini et al. (2023) to record mood and sleep/heart rate patterns among insomniac adolescents, indicating the feasibility of the combination of wearable technology and real-time mood assessments. Likewise, Jafarlou et al. (2022) demonstrated the predictability of affect trajectories across time using wearables and phone sensors on a population of college students, which demonstrates the potential of multi-modal physiological data on affective development. .

6.11.5. Refining Experience Sampling Methodologies

While ESM data provided valuable insights into day-to-day fluctuations in psychological states within this Saudi secondary school context, future research in similar

Arab educational settings should refine ESM protocols to capture specific contextual factors relevant to this population (e.g., cultural expectations around academic achievement, family pressures, religious observances, gender-segregated schooling dynamics) that might explain state fluctuations among Arab adolescents. Additionally, while extensive ESM studies with multiple daily prompts over several weeks exist in Western contexts, future research should adapt these intensive longitudinal approaches specifically for Saudi secondary school settings, considering cultural factors such as prayer times, family obligations, and educational schedules that may influence optimal sampling timing and frequency for this population. This approach would address the limitations in the current understanding of how momentary experiences contribute to trait development specifically within Arab educational contexts, building upon existing ESM research while accounting for unique cultural and educational factors.

Moreover, technological innovations offer promising avenues to complement self-report data. For example, wearable biosensors. such as those measuring electrodermal activity, heart rate, and skin temperature, have been effectively used to detect stress emotional states (Aristizabal et al., 2021). The integration of such biosensors with mobile applications enables continuous and objective monitoring of physiological indicators. A notable example is the MIT MoodMeter, which combines wrist-worn sensors (e.g., the Empatica E4) with self-report data to track daily fluctuations in stress and mood (Sano & Picard, 2013).

By pursuing these specific research directions in educational contexts, future studies can address the methodological and conceptual limitations of the current investigation while building on its strengths to advance the understanding of adolescent development across multiple levels of analysis. These approaches would help clarify when and how non-intellective factors change during adolescence, how these changes relate to important

developmental outcomes, and how educational practices might be optimised to support positive developmental trajectories.

6.12. Conclusion

The evidence on the developmental change in non-intellective variables such as personality factors, grit, socio-emotional behavioural (SEB) skill, well-being and academic performance in secondary school students provided by this research project incorporating a systematic review and longitudinal study with a specific study of the development of adolescents in a Saudi cultural setting. The results suggest trended developments, where Conscientiousness, consistency of interests, grit, social engagement skills, innovation skills, SEB skills, positive affect, and negative affect have improved meaningfully, and negative affect has also increased. These findings indicate both flexibility and constancy in other areas throughout adolescence, which indicate the impact of educational and cultural environment in accordance with the idea of Saudi Vision 2030, which focuses on perseverance, innovation, and well-being.

This research has three important contributions. First, non-intellective factors show selective developmental patterns in the adolescence period with some areas turning out to be highly developed as others remain constant. Second, the factors can be used as a valuable predictor of well-being outcomes but not academic achievement, which indicates their usefulness in enhancing student mental health and social-emotional growth. Third, systematic review evidence combined with empirical findings show culturally-specific developmental patterns applicable in education practice in Arab settings.

The study makes contributions to developmental psychology because it shows that the patterns of personality and social-emotional development of adolescents have cultural patterns. In educational practice, the results can imply that interventions that aim at the

development of social-emotional learning can be most effective when the outcomes of well-being and self-regulation are prioritized instead of focusing on academic achievement directly, and the importance of cognitive skill development and social-emotional support should also be noted to achieve academic success. Being a pioneer study in the development of non-intellective factors among Saudi Arabian students, the study forms the empirical foundation of grasping the social-emotional development of adolescents in the Arab educational setting.

The future studies need to examine the processes of selective developmental patterns as well as the creation of culturally responsive interventions that will promote student well-being and the purpose of educational reform.

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Appendices

Appendix A

A Systematic Review Protocol

Title: Trajectories of Personality Change and Non-Intellective Outcomes in Secondary Schools: Protocol for a Systematic Review

Background

Several studies have explored the relationships between personality traits and non-intellective outcomes during adolescence. Traits such as conscientiousness, openness, and emotional stability have been found to be associated with educational and social outcomes (Chen et al., 2006; Haider & von Stumm, 2022; Spengler et al., 2013). However, the specific ways personality trajectories develop over time and how they are associated with and influence non-intellective educational outcomes have not been comprehensively studied. This systematic review aims to synthesise evidence regarding the relationship between personality change and non-intellective outcomes, specifically well-being, which involves life satisfaction and emotional well-being (positive/negative affect). This study also aims to identify potential moderators of positive or negative personality changes and their association with these non-intellective outcomes. In this study, the term 'outcomes' refers to the various results or consequences of schooling and education as measurable at the personal level, extending beyond traditional achievement measures such as grades and test scores. The spectrum of these outcomes is broad, including developing social, emotional, and behavioural skills that contribute to overall well-being and future success. This review might provide valuable insights for researchers, practitioners, and policymakers concerned with promoting positive development, improving well-being, and supporting life satisfaction and emotional growth in adolescents within the context of secondary education.

Objectives

- To investigate the relationship between personality change and non-intellective outcomes in secondary school students.
- To identify and synthesise evidence of trajectories of personality change and development in secondary school students.

- To explore the moderating factors influencing the relationship between personality change and non-intellective outcomes in secondary school students.

Methods

- ***Search strategy*:** A comprehensive search will be conducted in electronic databases, including ERIC, PsycINFO, EBSCOhost and the Web of Science, using keywords related to personality change/development, non-intellective outcomes such as well-being, life satisfaction, and emotion, and secondary schools. The search will be limited to studies published in English, with no restriction on publication year.
- ***Study selection*:** Two reviewers will independently screen the titles and abstracts of the studies identified on the basis of the inclusion criteria. The full text of potentially relevant articles will be assessed for eligibility. Any discrepancies between the reviewers will be resolved through discussion or with a third reviewer.
- ***Data extraction***: Two reviewers will independently extract data from the studies included using a predefined form. The extracted data will include the study design, sample size, measures of personality change, and the selected non-intellective outcomes and the statistical methods used.
- ***Quality assessment***: Two independent reviewers will conduct a quality assessment of each included study using the 'sieve' of trustworthiness appraisal tool (Gorard, 2024). This tool is designed to evaluate the overall credibility of research based on the quality of research design, sample size and selection, data collection methods, and analytical rigor, and transparency of reporting.
- ***Data synthesis***: A narrative synthesis will be conducted to summarise the findings of the included studies. If feasible, a meta-analysis will be conducted to estimate the pooled effect sizes of the association between personality change trajectories and non-intellective outcomes in secondary schools.
- ***Subgroup analysis***: A subgroup analysis will be conducted to determine the moderating factors that may influence the relationship between personality change trajectories and non-intellective outcomes in secondary schools.

Population

A population of secondary school students, aged 12 to 19 years, will be studied.

Data Collection

Studies identified from the database search will be evaluated for inclusion according to predetermined inclusion and exclusion criteria.

Inclusion criteria

Studies with non-observational designs will be included, specifically cohort studies, case-control studies, and prospective observational studies, all of which are longitudinal and non-experimental in nature. In addition, systematic reviews will be incorporated into our analysis to provide a comprehensive overview of relevant research. Additionally, we will search the reference lists within these systematic reviews in order to locate additional studies meeting our inclusion criteria.

Study design

- Research that examines the relationship between personality change and non-intellective outcomes specifically well-being, life satisfaction, and emotionality among adolescents.
- Longitudinal studies of students in secondary schools
- Studies that use validated measurement instruments to assess personality (and personality change) and the selected non-intellective outcomes.
- Quantitative and mixed-method studies that include psychometric measures.
- Non-medical study.
- A study that examines non-intellective outcomes and personality.

Participants

- Students between the ages of 12 and 19 who attend secondary schools.

Measures, including outcome measures

- Psychometric personality (and change in personality over time) and their relationship with non-intellective outcomes.
- Non-intellective outcomes (e.g., well-being)
- Moderating factors or contextual factors that influence personality change and non-intellective outcomes.

Language and publication date

- Studies published in English.

Publication type

- Articles published in peer-reviewed journals and doctoral dissertations.

Exclusion criteria

Studies that do not have the full text will be excluded from the study. However, abstracts presenting full findings will be included, while editorials, letters, case reports and guidelines will not be included. In addition, studies that present their findings in any language other than English will be excluded.

Excluded study designs

- Cross-sectional studies that do not examine within-person personality change over time.
- Case reports, case series, editorials, commentaries, and conference abstracts.
- Medical studies.

Excluded participants

- Studies that focus on participants outside of the 12- to 19-year age range.

Outcome measure exclusions

- Studies that do not report on the relationship between personality change and non-intellective outcomes, specifically well-being, life satisfaction and emotionality.
- Studies that do not use validated psychometric instruments to measure personality and non-intellective outcomes.

Language and publication date exclusions

- Studies published in languages other than English.

Publication type exclusions

- Non-peer reviewed publications, such as books, book chapters and unpublished reports

Table 1: Inclusion and Exclusion Criteria

Criteria type	Inclusion Criteria	Exclusion Criteria
Study Design	Longitudinal studies, cohort studies and research that examines the relationship between personality change and non-intellective outcomes.	Cross-sectional studies that do not examine within-person personality change over time. Case reports, case series, editorials, commentaries, and conference abstracts. Medical studies.
Participants	Secondary school students, adolescents, ages 12 and 19 years	Adults, children, and studies that focus on participants outside of the 12-19 age range
Topic	Personality change, development, malleability, growth	Unrelated topics, irrelevant subjects
Variables	Personality, attitude, behaviour, emotional factors	Irrelevant variables, unrelated factors
Outcome	Well-being, mental health, life satisfaction and emotion	Irrelevant outcomes, unrelated measures
Methodology	Prospective studies, multi-wave data collection using quantitative measures	Retrospective studies, single data point studies using qualitative measures
Publication	Peer-reviewed articles, academic journals	Non-academic sources, conference abstracts
Language	English language	Non-English language
Publication Year	No restrictions	

Search Strategy

The search strategy and keywords will be used to identify relevant studies for a systematic review of personality change over time in secondary schools.

Database search

The following databases will be searched:

- Web of Science. https://www.webofscience.com/wos/woscc/basic-search
- Scopus. https://www-scopus-com.ezphost.dur.ac.uk
- ERIC – Education Resources Information Centre. https://eric.ed.gov
- EBSCOhost Research Platform, EBSCO. ERIC, PsycINFO, British Education Index）https://www.ebsco.com/products/ebscohost-research-platform

Keywords

- EBSCOhost Research Platform, EBSCO. ERIC, PsycINFO, British Education Index）

  TI title: (Personality change OR personality development OR personality malleability OR personality variability OR personality growth)
  AND AB abstract: (well-being OR wellbeing OR mental health OR positive psychology OR emotion OR Life Satisfaction)
  AND TI title: (longitudinal OR cohort OR repeat OR retest OR “re-test” OR varia* OR stab* OR “pre-post” OR “pre post” OR “over time” OR change* OR prospective OR “follow up” OR “follow-up” OR “multi-wave” OR “multi wave” OR trajector* OR track* OR trend* OR dynamic OR predict* OR progress*)
- Scopus:
  Article title, Abstract, keywords: (Personality change OR personality development OR personality malleability OR personality variability OR personality growth)
  AND Article title, Abstract, keywords: (character* OR attitude* OR personality* OR behaviour* OR emotional)
  AND Article title, Abstract, keywords: (well-being OR wellbeing OR mental health OR positive psychology OR emotion OR Life Satisfaction)
  AND Article title, Abstract, keywords: (secondary schools OR adolescents OR students)
  AND Article title, Abstract, keywords: (longitudinal OR cohort OR repeat OR retest OR “re-test” OR varia* OR stab* OR “pre-post” OR “pre post” OR “over time” OR change* OR prospective OR “follow up” OR “follow-up” OR “multi-wave” OR “multi wave” OR trajector* OR track* OR trend* OR dynamic OR predict* OR progress*)
- Web of Science
  Topic: (Personality change OR personality development OR personality malleability OR personality variability OR personality growth)
  AND topic: (character* OR attitude* OR personality* OR behaviour* OR emotional)
  AND topic: (well-being OR wellbeing OR mental health OR positive psychology OR emotion OR Life Satisfaction)
  AND topic: (secondary schools OR adolescents OR students OR teenager)

AND topic: (longitudinal OR cohort OR repeat OR retest OR “re-test” OR varia* OR stab* OR “pre-post” OR “pre post” OR “over time” OR change* OR prospective OR “follow up” OR “follow-up” OR “multi-wave” OR “multi wave” OR trajector* OR track* OR trend* OR dynamic OR predict* OR progress*)

- ERIC (Education Resources Information Center)
  Title, Abstract, Keywords: (Personality change OR personality development OR personality malleability OR personality variability OR personality growth)
  AND Title, Abstract, Keywords: (character* OR attitude* OR personality* OR behaviour* OR emotional)
  AND Title, Abstract, Keywords: (well-being OR wellbeing OR mental health OR positive psychology OR emotion OR Life Satisfaction)
  AND Title, Abstract, Keywords: (secondary schools OR adolescents OR students)
  AND Title, Abstract, Keywords: (longitudinal OR cohort OR repeat OR retest OR “re-test” OR varia* OR stab* OR “pre-post” OR “pre post” OR “over time” OR change* OR prospective OR “follow up” OR “follow-up” OR “multi-wave” OR “multi wave” OR trajector* OR track* OR trend* OR dynamic OR predict* OR progress*)

Research article screening

As part of the screening process, Rayan application will be used with all the identified studies to remove duplicates. The titles and abstracts of all potentially relevant studies, as identified by the search criteria, will be screened by the first reviewer so that studies that do not clearly meet the inclusion criteria can be excluded. A second reviewer will also review the titles and abstracts to determine whether any of the excluded studies do warrant full-text screening.

A full-text screening will be performed following the abstract and title screening. Two reviewers will perform this step independently. After this step, the studies will be classified into three categories: included studies, excluded studies and studies requiring additional information (missing data) to determine their eligibility for inclusion. The final assessment of bias risk will be presented in tables based on the results from five domains: selection, attrition, reporting and others.

Any disagreement between the two reviewers about the eligibility of a full-text article will be resolved by discussion between them. A third reviewer may be called upon if the reviewers are

unable to arrive at an agreed decision. Flow diagrams will be used to summarize the search results, including the inclusions, exclusions and reasons for the exclusions.

Expected Outcomes

A comprehensive synthesis of evidence on personality changes and the selected non-intellective outcomes in secondary schools will be presented in this systematic review. Considering these findings, the purpose of this study is to identify moderating factors that may facilitate the development of positive personality traits and non-intellective outcomes among adolescents in secondary education.

Ethics

As this study will take the form of a systematic review, ethical approval is not required.

Appendix B

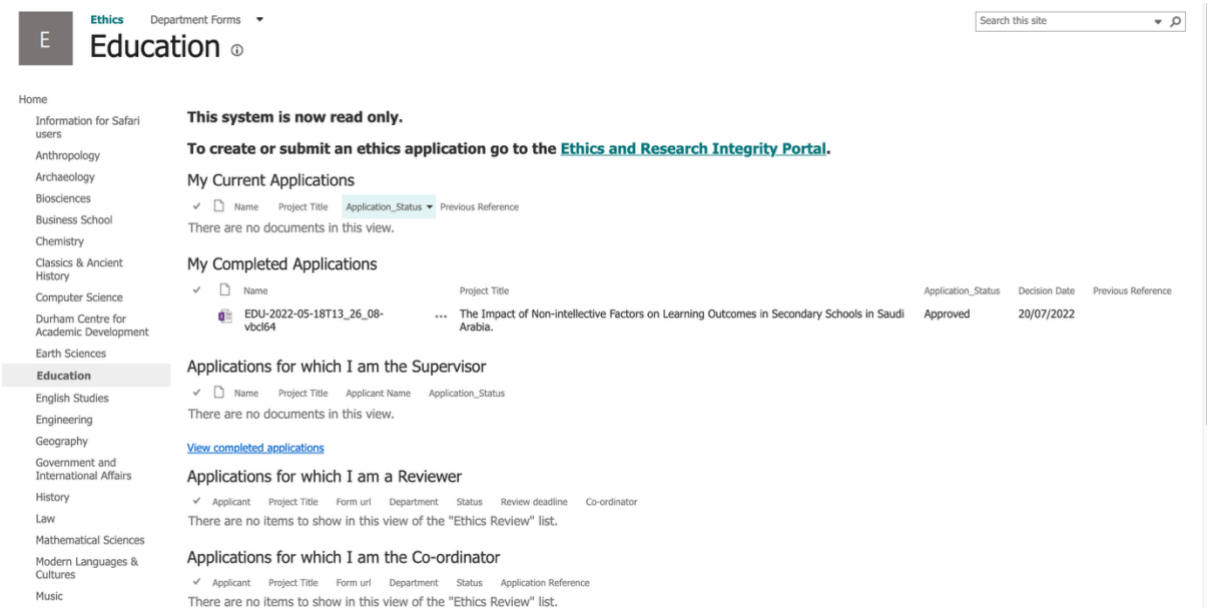
Quality Assessment of Selected Studies Using the 'Sieve' Appraisal Tool (Gorard, 2024)

Study	*Design*	*Scale*	*Missing Data*	*Measurement Quality*	*Rating*
(Arslan et al., 2023)	Strong design for longitudinal study	Adequate (449 - 367)	Attrition of 82 participants from 449 (18.3%); classified as Some. Possible impact on findings	Standardised, independent, accurate	3
(Borghuis et al., 2020)	Strong design for longitudinal study	Large 1,046	Attrition varied by measure: 19.2% for neuroticism and 37.2% for assessment bursts; classified overall as High	Standardised, independent, accurate	3
(Galla et al., 2020)	Strong design for longitudinal study	Large 1,657	Minimal missing data; attrition percentage not explicitly reported but described as small. Missing data handled using full information maximum likelihood (FIML). Classified as Minimal	Standardised, independent, accurate	3
(Garcia & Moradi, 2012)	Adequate design for longitudinal study	Adequate 109	Missing data ranged between 10–20%; impact on findings minor. Classified as Low	Standardised, independent, accurate	3
(Hatano et al., 2023)	Strong design for the research question	Adequate (618 -212)	High attrition; 70.4% data loss between T1 and T4, with clear impact on findings. Classified as High.	Standardised, independent, accurate	1
(Israel et al., 2023)	Strong design for the research question	Large (2,801 – 2,596)	Attrition rate of 39% across all waves; some missing data with moderate impact. Classified as Moderate	Standardised, independent, accurate	3
(Kanacri et al., 2013)	Strong design for longitudinal study	Adequate Adequate	Attrition rate of 32–42% (dropout across waves); moderate impact	Standardised, independent, accurate	2

			on findings. Classified as Moderate		
(Lyons et al., 2013)	Adequate design for longitudinal study	Large (1201 - 570)	Attrition of 631 participants (T1–T3); high level of missing data with clear impact on findings. Classified as High	Standardised, independent, accurate	1
(Meeus et al., 2011)	Strong design for longitudinal study	Large 1,313 - 1,275	Attrition rate of 1.2% across waves; minimal missing data with little to no impact on findings. Classified as Minimal	Standardised, independent, accurate	4
(Porubanova-Norquist, 2012)	Weak design for longitudinal study	Adequate 173	Missing data not explicitly reported. The study notes a modest sample size from a specific population (major city in Czech Republic), which may limit generalizability. Classified as Not Reported	Standardised, independent, accurate	2
(Winefield et al., 2015)	Strong design for longitudinal study	Adequate (421 – 289)	Attrition rate of 32–42% across waves; moderate missing data with some impact on findings. Classified as Moderate	Standardised, independent, accurate	3
(Winzer et al., 2021)	Strong design for longitudinal study	Large (2552 – 558)	Attrition rate of 87% across waves; high level of missing data with clear impact on findings. Classified as High	Standardised, independent, accurate	1
(Winzer et al., 2021)	Adequate design for longitudinal study	Adequate (446 – 283)	Attrition rate of 38% by Time 3; moderate missing data with some impact on findings. Classified as Moderate	Standardised, independent, accurate	2

Appendix C

Durham University Ethical Approval – School of Education Ethics Committee



Appendix D

Saudi Ministry of Education Ethical Approval–Education Policy Research Centre Ethics Committee

المملكة العربية السعودية
وزارة التعليم
وكالة التخطيط والتطوير

وزارة التعليم
Ministry of Education

الرقم : ٤٤٠٠٥٤٢٤٨٦
التاريخ: ١٤٤٤/٥/٧
المشفوعات:

الموضوع: تسهيل مهمة الباحث/ عبدالله بن محمد الحويل

سعادة مدير التعليم بمحافظة الرس وفقه الله
سعادة مدير التعليم بمحافظة العلا وفقه الله
سعادة مدير التعليم بمحافظة عنيزة وفقه الله

السلام عليكم ورحمة الله وبركاته

إشارة إلى الطلب الوارد إلينا بتاريخ ١٤٤٤/٥/٤ هـ عن طريق البريد الإلكتروني بشأن طلب تسهيل المهمة البحثية لطالب الدكتوراه بجامعة (Durham) في بريطانيا / عبد الله بن محمد الحويل، والذي يقوم بإعداد بحث بعنوان " تأثير العوامل غير الفكر يه وتأثيرها على التحصيل الدراسي والراحة النفسية " ، واستكمالاً لمتطلبات الدراسة فإن الباحث يرغب في تطبيق أداة البحث المرفقة (استبانة) على طلاب المرحلة الثانوية لديكم.

آمل من سعادتكم التكرم بالتوجيه لاستيفاء البيانات المطلوبة من قبل العينة المستهدفة، علماً بأنه قد تم فحص أداة الاستبانة ولا يوجد ما يمنع من تطبيقها.

رابط الباركود:

وللاستفسار يمكن التواصل مع الباحث على البريد الإلكتروني:
abdullah.m.alhowail@durham.ac.uk

وتقبلوا تحياتي، ، ،

مدير عام مركز بحوث سياسات التعليم

أ.د. عادل بن صلاح عبدالجبار

Appendix E

Supplementary Growth Curve Models Examining the Role of Gender

Variable	Time (β)	*p*	Gender (β)	p	Time × Gender (β)	*p*
Extraversion	0.02	.448	−0.12	.065	−0.03	.373
Conscientiousness	0.08	.014	0.02	.707	−0.03	.435
Emotional Stability	−0.05	.177	−0.36	< .001	0.08	.090
Openness	0.07	.007	0.11	.017	−0.07	.031
Agreeableness	0.02	.439	0.16	.004	−0.09	.017
Grit	0.05	.061	0.09	.039	−0.02	.491
Self-Management Skills	0.06	.057	−0.01	.887	−0.02	.623
Social Engagement Skills	0.08	.031	−0.25	< .001	0.02	.646
Cooperation Skills	0.05	.110	−0.09	.143	−0.05	.202
Emotional Resilience Skills	0.01	.677	−0.17	.007	0.01	.845
Innovation Skills	0.09	.006	0.03	.621	−0.01	.785
Positive Affect	0.06	.072	0.05	.439	−0.03	.477
Life Satisfaction	−0.00	.973	−0.22	.088	0.06	.469

Note. β = standardised estimate. Models include random intercepts and slopes for participants. Gender coded 1 = boys, 2 = girls. $N = 494$.

Appendix F

Parents/guardians Consent Form

Durham University
School of Education

Consent Form

To be completed by parents/guardians

Dear Parent,

I am contacting you to obtain your consent for your son/daughter to take part in my research study. The study aims to:

- To determine changes over time among secondary students' achievement due to their personality traits.
- To determine changes over time among secondary students' well-being due to their personality traits.
- To determine how momentary thoughts, feelings, and behaviours (and changes therein) relate to longer-term changes in traits, achievement, and well-being.

I agree for my son/daughter …….. (name) to take part in the study titled "The Impact of Non-Intellective Factors on Learning Outcomes in Secondary Schools in Saudi Arabia."

I confirm that I have read and understood the information sheet for the above study. My son/daughter has had the opportunity to consider the information, ask questions, and have these answered satisfactorily.

I agree to my son/daughter participate in the study ☐

I disagree to my son/daughter participate in the study ☐

Name _____

Signature _____

Date _____

Appendix G

Student Consent Form

Durham University
School of Education

Consent Form

To be completed by Student

Dear student,

I am contacting you to obtain your consent as a participant to take part in my research study. The study aims to:

- To determine changes over time among secondary students' achievement due to their personality traits.
- To determine changes over time among secondary students' well-being due to their personality traits.
- To determine how momentary thoughts, feelings, and behaviours (and changes therein) relate to longer-term changes in traits, achievement, and well-being.

My name is ……. I agree to participate in the study on The Impact of Non-Intellective Factors on Learning Outcomes in Secondary Schools in Saudi Arabia.

I confirm that I have read and understand the information sheet for the above study. I will have the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

I agree to participate in the study ☐

I disagree to participate in the study ☐

Name _____

Signature _____

Date _____

Appendix H

Trait Measurement Questionnaires

Traits Measurements

My dear student, I would like to take this opportunity to thank you for taking the first step toward participating in this study which aims to examine how secondary students' achievement and well-being change over time, and how such change relates to their personality traits and their day-to-day experiences at school.

- Please note that your participation is voluntary, and you can withdraw at any-time you want without any explanation

- All the information you provide will remain confidential and will not be seen by anyone except the research team. Furthermore, we will not ask you for any personal information; we will ask you to choose a confidential code.

- If you accept the invitation, you will get:
1- A personal report on your personality and how it evolved and changed over time.
2- A free consultation is available.
3- A volunteer certificate from Durham University.

For further information please feel free to contact me at:

Email: abdullah.m.alhowail@durham.ac.uk

○ Agree

○ Disagree

Section one: Demographic

Construct: Student's background characteristics

Question No.	Question	Answer
1	Age	Age 14, 15,16,17,18 or 19 20
2	Gender	1. Male 2. Female 3. Non-binary 3. other 4. Prefer not to respond
3	Section of study (science/arts)	1. First year 2. General 3. Computer science and engineering 4. Law 5. Health and Life 6. Management
4	Ethnicity (Saudi/non-Saudi)	1. Saudi 2. Non-Saudi

Section two: Family background characteristics

Question No.	Question	Answer
6	Father education	1. Secondary 2. Diploma 3. Bachelor 4. Postgraduate (master and above) 5. No education
7	Mother education	1. Secondary 2. Diploma 3. Bachelor 4. Postgraduate (master and above) 5. No education
8	Father employment status	1. Full time employed 2. Part time employed 3. Self-employment 4. Unemployed 5. Prefer not to respond
9	Mother employment status	1. Full time employed 2. Part time employed 3. Self-employment 4. Unemployed 5. Prefer not to respond
10	Household income in Saudi Riyal	1. less than 4000 SAR 2. 4000 SAR to 6000 SAR 3. 7000 SAR to 10000 SAR 4. More than 10000 SAR 5. Prefer not to say

Section three: Personality Traits

Construct: *Personality Traits (Big Five Inventory – Short Form; BFI-S)*
Instructions: On this questionnaire, you will find a series of statements describing your typical thoughts, feelings, and behaviours. Please read each statement carefully and decide how much you agree or disagree with it.
Indicate your response using the following scale:
5 = Strongly agree 4 = Agree 3 = Neutral (neither agree nor disagree) 2 = Disagree 1 = Strongly disagree
Please answer all statements, even if you are not completely sure of your response.

N	Items	Strongly disagree	Disagree	Neutral (neither agree nor disagree)	Agree	Strongly agree
1	…always thinks about other people's feelings (A)					
2	…will put others' needs before my own (A)					
3	…likes to help others (A)					
4	…is considerate of others (A)					
5	…gives things to others (A)					
6	…is easily annoyed (N)					
7	…gets snappy over little things (N)					
8	…can get annoyed at the smallest of things (N)					
9	…is moody a lot of the time (N)					
10	…is quite anxious a lot of the time (N)					
11	…is very sociable (E)					
12	…is very outgoing (E)					
13	…always has something to talk about (E)					
14	…will always be the one to say, "Let's do something" (E)					
15	…has more friends than other people do (E)					
16	…has lots of ideas (O)					
17	…is inventive (O)					
18	…knows about a lot of things (O)					
19	…is very inquisitive (O)					
20	…is rather curious (O)					
21	…organises themselves well (C)					
22	…manages their time well (C)					
23	…can stay focused on a task (C)					
24	…always has a plan (C)					
25	…sets goals for myself (C)					

Section Four: Social–Emotional and Behavioural Skills

Construct: *The Behavioural, Emotional, and Social Skills Inventory – 20-Item Short Form (BESSI-20; Soto et al., 2022)*
Instructions: Below is a list of activities and behaviours you might do. For each one, select the response that best indicates how well you can do that activity.
For example, how well can you follow the instructions for an assignment?
Remember, how well you can do something may differ from how often you do it or how much you enjoy doing it.
Rate how well you can do each activity using the response options provided

N	Items	Not at all well	Not very well	Pretty well	Very well Extremely well	Extremely well
1	Plan out my time.					
2	Lead a group of people.					
3	Understand how other people feel.					
4	Calm down when I'm feeling anxious.					
5	Understand abstract ideas.					
6	Concentrate on a task.					
7	Express my thoughts and feelings.					
8	See the good in people.					
9	Keep a positive attitude.					
10	Come up with new ideas.					
11	Keep track of my promises and commitments.					
12	Start a conversation.					
13	Cooperate with other people.					
14	Control my temper.					
15	Create art.					
16	Work toward my goals.					
17	Speak up when I disagree with others.					
18	Get along with people.					
19	Find reasons to feel good about myself.					
20	Learn about other cultures.					

Section Five: Grit

Construct: *Short Grit Scale (Grit-S; Duckworth & Quinn, 2009)*
Instructions: This questionnaire includes statements about your attitudes toward long-term goals. Please indicate how much each statement is like you using a 5-point scale (1 = Not at all like me to 5 = Very much like me).

N	Items	Very much like me	Mostly like me	Somewhat like me	Not much like me	Not like me at all
1	New ideas and projects sometimes distract me from previous ones.					
2	Setbacks don't discourage me.					
3	I have been obsessed with a certain idea or project for a short time but later lost interest.					
4	I am a hard worker.					
5	I often set a goal but later choose to pursue a different one.					
6	I have difficulty maintaining my focus on projects that take more than a few months to complete					
7	I finish whatever I begin.					
8	I am diligent.					

Section Six: Positive and Negative Affect

Construct: *Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988)*
Instructions: This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and mark the response that best indicates to what extent you have felt this way during the past few weeks.
Use the following scale to record your answers:
1 = Very slightly or not at all 2 = A little 3 = Moderately 4 = Quite a bit 5 = Extremely

Indicate the extent you have felt this way over the past week.	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Interested					
Distressed					
Excited					
Upset					
Strong					
Guilty					
Scared					
Hostile					

Enthusiastic					
Proud					
Irritable					
Alert					
Ashamed					
Inspired					
Nervous					
Determined					
Attentive					
Jittery					
Active					
Afraid					

Section Seven: Life Satisfaction

Construct: Satisfaction with Life Scale (SWLS; Diener et al., 1985)

Instructions: Below are five statements reflecting general satisfaction with your life. Please read each statement carefully and indicate how much you agree or disagree using the 7-point scale provided below.

1 = Strongly disagree 2 = Disagree 3 = Slightly disagree 4 = Neither agree nor disagree 5 = Slightly agree 6 = Agree 7 = Strongly agree. Please respond honestly and thoughtfully to each item.

No.	**Items**	Extremely satisfied	Satisfied	Slightly satisfied	Neutral	Slightly dissatisfied	Dissatisfied	Extremely dissatisfied
1	In most ways life is close to my ideal.							
2	The conditions of my life are excellent.							
3	I am satisfied with my life.							
4	So far, I have gotten the important things I want in life.							
5	If I could live my life over, I would change almost nothing.							

Appendix I

Experience Sampling Measures Questionnaire

Student's code:

Construct: States — Personality, Emotions, and Situational Experiences

Instructions: Below are several statements describing your emotions, experiences, and self-perceptions during the last two lessons. Please read each statement carefully and indicate how much you agree or disagree using the following scale:

1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree

N	In the last two lessons	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	We worked well during lessons.					
2	The lessons were intellectually challenging					
3	Someone was reprimanded or criticised					
4	The two lessons were pleasant					
5	The lessons contained negative feelings. (Such as stress, frustration, anxiety, or guilt)					
6	The lessons required social interaction					
7	I had difficulty maintaining my focus during the lessons today					
8	I am diligent in the lessons					
9	I struggled to understand the course material.					
10	I received constructive feedback and support from my teacher.					
11	I felt comfortable approaching my teacher for help.					
12	My peers pressured me to engage in behaviours that I dislike.					
13	The classroom was noisy and disruptive during the lessons.					
14	I felt socially isolated and excluded.					
15	Until now my day is close to my ideal.					

Part 2 – Personality States

Instructions: Please indicate how much you agree or disagree with each statement describing how you see yourself right now.

N	How do you see yourself right now	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Right now, I see myself as: extraverted, enthusiastic.					
2	Right now, I see myself as: critical, quarrelsome.					
3	Right now, I see myself as: dependable, self-disciplined.					
4	Right now, I see myself as: anxious, easily upset.					
5	Right now, I see myself as: open to new experiences, complex.					
6	Right now, I see myself as: reserved, quiet.					
7	Right now, I see myself as: sympathetic, warm.					
8	Right now, I see myself as: disorganised, careless.					
9	Right now, I see myself as: calm, emotionally stable.					
10	Right now, I see myself as: conventional, uncreative.					

Part 3 – Current Feelings

Instructions: Below is a list of feelings and emotions. Please indicate to what extent you feel each emotion right now, using the following scale:

1 = Very slightly or not at all 2 = A little 3 = Moderately 4 = Quite a bit 5 = Extremely

NO	I felt	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1	Upset					
2	Hostile					
3	Alert					
4	Ashamed					

5	Inspired					
6	Nervous					
7	Determined					
8	Attentive					
9	Afraid					
10	Active					