Expressing who we are through what we do:

The novel concept of behavioural manifestations of personality traits and its mediating role in the trait-motivation relationship

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Abstract

Research pertaining to personality traits has largely focused on broad dimensions that define personality configurations, rather than on specific actions and behaviours that people engage in every day. While trait theorists hold the belief that individuals' personality traits predict their behaviours, there is no thorough conceptualization of behavioural manifestations of personality traits in the existing literature. The first goal of the present dissertation was therefore to conceptualize a model of behavioural manifestations of the Five Factor Model (FFM) traits. To achieve this goal, in the first article, a taxonomy of behavioural expressions of FFM traits was operationalized through the development of an instrument: the Behavioural Expressions of Traits Inventory (BETI). Results from Study 1 (N = 454) and Study 2 (N = 297) validated the proposed taxonomy by means of both exploratory and confirmatory factor analyses. The final version of the BETI comprised 30 items (6 items/subscale) that presented a clean factor structure. Concurrent validity results revealed that the taxonomy of behavioural expressions could be distinguished from FFM traits. The BETI also displayed good construct validity, satisfactory internal consistency values of all subscales, and no issues with social desirability. The second goal of this dissertation was to use this conceptualization of behavioural expressions of traits advantageously to examine an important fundamental topic: the processes at play in the associations between FFM personality traits and motivation through the lens of Self-Determination Theory (SDT). Results from emerging studies consistently revealed positive associations between beneficial FFM traits (openness to experience, conscientiousness, extraversion, and agreeableness) and autonomous motivation. Conversely, negative associations were obtained for neuroticism, a detrimental trait. The second article of this dissertation aimed to further our understanding of the associations between FFM traits and autonomous motivation by

examining two potential mediators of this relationship: behavioural expressions of FFM traits and basic psychological need (BPN) satisfaction, a well-known antecedent of autonomous motivation. Two motivation domains central to the lives of undergraduate students were examined: academics and friendship. In Study 3 (*N*=635), undergraduate students completed online questionnaires. Structural equation modelling revealed a series of direct and indirect effects, as evaluated by Sobel's test of indirect effects: (1) FFM personality traits were positively associated with their corresponding behavioural expressions; (2) behavioural expressions of beneficial personality traits (openness to experience, conscientiousness, extraversion, and agreeableness) were positively associated with BPN satisfaction (autonomy, competence, and relatedness), while neuroticism was negatively associated with BPN satisfaction; (3) BPN satisfaction was positively associated with (a) autonomous academic motivation and (b) autonomous friendship motivation; (4) behavioural expressions of personality traits mediated the relationships between their corresponding trait and BPN satisfaction; (5) BPN satisfaction mediated the relationships between behavioural expressions of personality traits and (a) autonomous academic, and (b) friendship motivation and (6) behavioural expressions of personality traits and BPN satisfaction acted as sequential mediators of the associations between personality traits and (a) autonomous academic, and (b) friendship motivation. The sequential action of behavioural expressions of traits and BPN satisfaction as processes that explain the relationship between FFM personality dimensions and autonomous motivation is a novel idea that was put to a successful empirical test herein. Taken together, this research contributes to further our understanding of the intricacies involved in the joint study of the FFM model of personality traits and motivation as conceived by SDT.

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Table of Contents

List of Tables

Article 1

Article 2

List of Figures

General Introduction

Article 1

Article 2

CHAPTER 1

GENERAL INTRODUCTION

Motivation is described as the energy and intention people have towards a goal (Ryan & Deci, 2000). It is at the forefront of research in several disciplines because of the important role it holds across life contexts. Motivation has been linked to wide-ranging desirable outcomes including academic achievement, career success, positive social relationships, and thriving mental and physical health. Indeed, cultivating motivation is one of the most sought endeavours in psychology. Thus, advancing the understanding of factors that contribute to motivation is key in order to establish more effective ways to best achieve it in its most optimal forms. One antecedent that has been found to influence motivation is personality traits. However, the mechanisms that explain this association have not been studied extensively.

Therefore, the goal of the present study was to examine two factors with the potential to mediate the association between personality traits and motivation: behavioural manifestations of personality traits and basic psychological need (BPN) satisfaction. Motivation will be examined through the lens of Self-Determination Theory (SDT), a theory of motivation which differentiates subtypes and highlights the importance of motivation quality.

Self-Determination Theory (SDT)

SDT (Deci & Ryan; 1985; 2002; 2013; Ryan & Deci, 2017) is an empirically derived theory of human motivation that posits that humans have a natural inclination for growth and that emphasizes the importance of volitional behaviour. Deci and Ryan (2002) distinguish between different types of motivation that are situated on a self-determination continuum, where self-regulation ranges from absent (amotivation) to controlled (non self-determined extrinsic motives) to autonomous (self-determined extrinsic and intrinsic motives). Autonomous motivations

involve behaving out of personal choice and offer the platform for people to express their authentic selves and values. In contrast, controlled motivations drive behaviours that are performed out of external or internal pressures and are experienced as constraining, whereas amotivation lacks incentives of any kind and evokes behavioural inertia and feelings of alienation. SDT is a macro theory that includes six sub-theories, two of them being central to the current project: Organismic Integration Theory and Basic Psychological Needs Theory.

Organismic Integration Theory (OIT)

This facet of SDT addresses the different forms that human motivation can adopt, which are divided into three main groups: intrinsic motives, extrinsic motives, and amotivation (see Figure 1).

Intrinsic Motivation

Intrinsic motivation is the first type of motivation covered by OIT and is the most self-determined form of motivation possible. This motivation type involves activities that are performed for the inherent satisfaction derived from the action. Thus, the driving forces for intrinsically motivated actions are personal interest and enjoyment. The individual will experience pleasure in the activity itself, rather than seek to bring about or avoid external outcomes associated with the behaviour. When people display intrinsic motivation, they express growth-oriented inclinations, they move autonomously towards new challenges and experiences, and they seek novel stimulation.

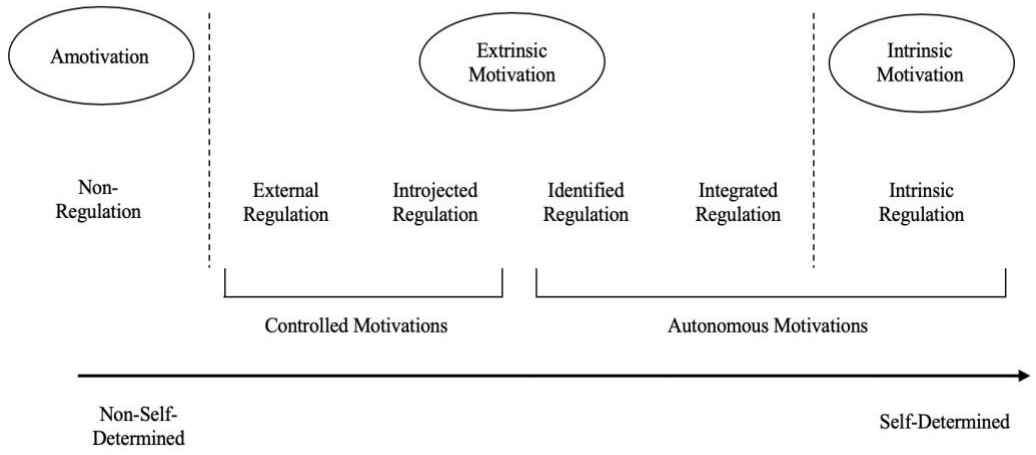
Extrinsic Motivation

In contrast with intrinsic motivation that prompts inherently pleasurable behaviours, extrinsic motivation stems from the instrumental value of actions. The driving force of extrinsically motivated behaviour is to achieve positive outcomes or to avoid negative ones. OIT

proposes that certain types of extrinsic motivation are more self-determined than others, and thus extrinsic motivation can be further categorized according to the extent to which the regulation of a behaviour is internalized. The more an individual integrates beliefs, values, and behaviours into one's own, the more self-determined motivation becomes. Based on their degree of autonomy, the four subtypes of extrinsic motives proposed by OIT are external regulation, introjected regulation, identified regulation, and integrated regulation.

Figure 1

Self-Determination Continuum (adapted from Ryan & Deci, 2017)



External Regulation. The least self-determined type of extrinsic motivation is external regulation. This type of motivation characterizes behaviours that are fully contingent upon external controls. Such behaviours are thus motivated entirely by the prospect of attaining positive outcomes or avoiding negative ones. Although external regulation is an effective way to motivate people in the short term, its controlling nature often causes individuals to engage in behaviours with little attention to effort or quality in the long-term (Ryan & Deci, 2017). Because there is no internalization of behaviour, individuals are not personally invested in the

action at all, and merely engage because of social pressures. Such behaviours are entirely regulated by the environment, and will not be maintained if external contingencies are removed.

Introjected Regulation. The regulation of introjected behaviours relies on external standards that have been partially, yet incompletely, internalized. It is a conflicted form of motivation. The person feels an internal pressure to act, yet the reasons for performing the behaviour are not recognized, nor accepted, as one's own. Introjected regulation is an internally controlling form of motivation, in that an individual feels the need to engage in an action in order to avoid negative emotions such as disappointment, anxiety, shame, or guilt, or to gratify or avoid threats to contingent self-esteem (hubris). In contrast with external regulation, introjected regulation is an intrapersonal regulation process, engineered by emotional pressure, and entails a modest improvement in self-determination because external contingencies have evolved into internal constraints. Yet, in as much as motives are driven by pressure (internal rather than external), they are qualified as non self-determined, as behaviour is neither freely performed nor self-endorsed. Moving upward on the self-determination continuum, identified and integrated regulation, described below, are conceptualized as self-determined due to their truly volitional nature.

Identified Regulation. This form of autonomous motivation occurs when an individual consciously accepts the value and importance of engaging in a given behaviour. People who have attained this degree of internalization of behaviour regulation sincerely feel that the action is personally worthwhile, and that the outcomes of the behaviour are significant. Actions are therefore performed because they are genuinely valued. In contrast with introjection, identification is an improvement in self-determination in that individuals proactively engage in a

behaviour they personally endorse, rather than reactively battling some internal conflict and resistance as they do so.

Integrated Regulation. The most self-determined form of extrinsic motivation is integrated regulation. Achieving this type of behaviour regulation for extrinsic motives is the optimal outcome of a progression that requires effort and self-reflection. In a step above identified regulation, individuals must bring values in harmony with self-identities. Integrated behaviours are not only recognized as holding value, but they align with important self-views. Therefore, part of the development of this type of self-regulation requires modifying and harmonizing beliefs and values in order to truly assimilate the behaviour. Once this is achieved, the behaviour is recognized as being an authentic part of the person, and is experienced as an expression of their self-concept. Although behaviours that are integrated are completely autonomous, they are enacted in the pursuit of personal goals, rather than for the pleasure experienced during those behaviours. This distinguishes integrated regulation from intrinsic motives, which are defined by their hedonic, rather than instrumental, nature.

Amotivation

This construct is conceptualized as a complete absence of intention and motivation to behave. This occurs when one sees no importance (i.e., either intrinsically or extrinsically) in carrying out an action, or when one has lost touch with their reasons for performing it. Thus, the amotivated individual does not believe that any pleasure will be experienced from acting, and does not foresee that any external rewards, internal values, or personal meaning, will be associated with the behaviour either. This dispiriting absence of motivation results in a complete disinterest and lack of behavioural engagement or persistence. Amotivation can be conceived as

a state of motivational crisis, and is comparable to the concept of learned helplessness (Abramson et al., 1978).

To summarize, intrinsic pleasure-driven motives are the most autonomous of the self-determination continuum, whereas extrinsic motives, although always instrumental, adopt four distinct forms that represent sequential improvements in autonomy, starting with controlled subtypes, coerced by social or emotional pressure (external and introjected regulation, respectively), and evolving towards more mature self-determined subtypes, founded on personal values and self-conceptions (identified, and integrated regulation, respectively). Although all of the aforementioned intrinsic and extrinsic motivations differ in their implied level of autonomy, and therefore in quality and vitality, they are endorsed with distinct reasons for acting. Conversely, amotivation, which defines the low end of the self-determination continuum, connotes an absence of regulation, and is devoid of any impetus to initiate or sustain behaviour.

Empirical Support

The SDT motivation continuum has been successfully applied to understanding motivation within multiple research and life domains, such as health behaviours (Fall et al., 2018; Gillison et al., 2019; Ntoumanis et al., 2021; Turner et al., 2022), organizational psychology (Battaglio et al., 2022; Fernet et al., 2020; Good et al., 2022; Howard et al., 2020), physical activity and sports (Leo et al., 2022; Lourenço et al., 2022; McDonough et al., 2022; Teixeira et al., 2020), music participation (Krause et al., 2019; López-Íñiguez & McPherson, 2020), marketing (Gilal et al., 2019; Han et al., 2023; Li et al., 2023; Qian et al., 2022) environmental behaviours (Dodds et al., 2022; Channa et al., 2022; Green-Demers et al., 1997; Tandon et al., 2020), and sexuality (Busby et al., 2022; Gravel et al., 2016; Wesche et al., 2021; Wongsomboon et al., 2022). Of particular interest in this study on young adult university

students, is motivation towards school and motivation towards friendships. These two domains were chosen for this research project due to the significance that academics and friendships likely hold in the lives of individuals within this population.

Academic Motivation. SDT has been used in a wealth of research in the area of education (Deci & Ryan, 2016; Litalien et al., 2017; Ryan & Deci, 2009). For example, Corpus and colleagues (2022) examined changes in the six subtypes of motivation in undergraduate students over the COVID-19 pandemic. The researchers found that students experienced decreases in autonomous motivation (identified and intrinsic specifically), but not controlled motivation during the pandemic.

According to SDT, students who hold more autonomous motivations towards their studies should experience more positive outcomes than those who are pursuing education with the least autonomous forms of motivation. The literature has shown this to be true. For example, Litalien and colleagues (2019) conducted a study on Canadian undergraduate university students where they used the taxonomy of behavioural regulation proposed by SDT to create motivational student profiles. They found that students with more autonomous profiles experienced more positive outcomes (i.e., vitality) and less amotivation, while those with controlled profiles showed lower levels of vitality. Similarly, autonomous academic motivation has been linked to increases in positive emotions (Bochiş et al., 2022; Hope et al., 2019), life satisfaction (Hope et al., 2019), and emotional energy and physical strength (Cece et al., 2022), while controlled motivation has been associated with decreases in well-being (Howard et al., 2021).

Studies have also shown autonomous academic motivation to be associated with higher levels of school satisfaction (Litalien & Guay, 2015, Turner, 2023), and lower levels of intentions to drop out of school (Green-Demers et al., 2013; Howard et al., 2021; Legault et al.,

2006; Litalien & Guay, 2015; Litalien et al., 2017; Vallerand et al., 1997). Similarly, autonomously motivated students are more likely to earn high course grades (Mouratidis et al., 2021; Richardson et al., 2012; Wu, 2019) and have advanced academic achievement (Hsu et al., 2019; Luginbuhl et al., 2016; Mammadov et al., 2021; Van Soom & Donche, 2014; Wu, 2019). For instance, in one study, Liu and Huang (2022) found that autonomous motivation in college students mediated the associations between psychological capital (i.e., self-efficacy, resilience, hope, and optimism) and GPA.

Moreover, autonomous motivation has been linked to higher perceived knowledge transfer (Ruiz-Gallardo et al., 2013) and academic engagement (Wu, 2019) in undergraduate students. In one study, Hsu and colleagues (2019) examined autonomous motivation in undergraduate students in online learning environments. Results revealed that autonomous motivation was associated with higher perceived knowledge transfer and learning gains across seven online courses.

Relationship Motivation. The existing literature applying SDT to understand motivations for relationships has focused on motivation within romantic relationships. The motivational types and subtypes proposed by SDT have been successfully documented in the context of couple relationships (Blais et al., 1990). Moreover, using the motivation continuum to understand couple motivation yielded results that supported the positive contribution of autonomous motivations, and the detrimental influence of controlling motivations and amotivation, to adaptive relational behaviours, positive approaches to conflict, relationship satisfaction, and couple happiness (Blais et al., 1990; Knee et al., 2005). Furthermore, Kindelberger and Tsao (2014) found that adolescents became more autonomously motivated for romantic relationships as they became older.

While these studies observed motivations for relationships more generally, Gaine and La Guardia (2009) expanded the literature by going beyond general motivation in relationships, and observing the associations between motivations for specific activities and well-being in romantic relationships. Undergraduate student participants completed questionnaires concerning general relationship motivation, as well as specific activities within the relationship (i.e., disclosure of thoughts and feelings, physical intimacy, social support, instrumental support, and life aspirations). Overall autonomous motivation towards the relationship was positively associated with well-being. Moreover, the more autonomous partners were in their engagement in specific activities, the more positive the outcomes of these activities were (e.g., higher commitment, satisfaction, intimacy, and vitality). These findings further underscore the importance of autonomy within relationships.

Thus, although the bulk of research on self-determined motivation and relationships has focused on romantic relationships (Blais et al., 1990; Gaine & La Guardia, 2009; Kindelberger & Tsao, 2014; Knee et al., 2005), there have been some initial studies in the area of motivation towards friendships. Richard and Schneider (2005) used the SDT framework to examine friendship motivation in preadolescence and early adolescence. Results of this study showed that friends had similar levels of motivation, self-determined friendship motivation was associated with less loneliness, and autonomously motivated individuals held less hostile and more prosocial goals in situations of conflict (Richard & Schneider, 2005).

Furthermore, in a study on university students, participants completed measures of attachment styles, relational self-schemas, and motivation towards the friendship with their best friend (Larabie, 2015). This study documented that the six types of motivation defined by SDT were present and relevant for motivation towards friendship in young adults. Moreover, Larabie

(2015) successfully tested a structural equations model in which secure attachment, positive relational self-schemas, and autonomous motivation towards friendship displayed bi-directional relationships, thereby demonstrating that these variables mutually influence one another.

OIT represents the core of SDT, as it proposes an exhaustive taxonomy of motivational types and subtypes that has been validated in a very large number of contexts, and that has also proved useful in determining a wide array of outcomes. Because self-determined motives are associated with beneficial outcomes, and controlled motives with detrimental ones, understanding the conditions that foster or thwart autonomous self-regulation is of central importance. Basic Psychological Need Theory focuses on this essential question.

Basic Psychological Need Theory (BPNT)

BPNT proposes that the most fundamental antecedent of self-determined motivation is the satisfaction of three basic human psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 1985; 2002; 2013). BPNT posits that autonomous motivation, and its positive outcomes, are dependent and covary according to the degree of fulfillment of these three needs (Ryan & Deci, 2017).

Autonomy

The concept of self-determination is the cornerstone of SDT and the satisfaction of the need for autonomy is therefore considered vital. In BPNT terms, autonomy is defined as the need to self-regulate one's experiences and actions (Ryan & Deci, 2017). The key to perceiving that the need for autonomy is satisfied is feeling ownership over one's behaviour and acting intentionally. When people believe that they are at the source of their behaviour, their locus of causality (i.e., locus of control) is said to be internal. The more the locus of causality is perceived as internal, the more the need for autonomy is satisfied. Conversely, the more the locus of

causality is seen as external, the more the need for autonomy is thwarted. Put simply, feeling agency fulfills the need for autonomy, whereas feeling constrained frustrates it. Whether or not an individual is entirely self-reliant for that behaviour is not a concern (Deci & Ryan, 2000). It is important to differentiate autonomy from independence. For instance, autonomy can be experienced when an individual is independent, dependent, or interdependent, based on the context, it is only indispensable that the behaviour be self-endorsed by the individual (Ryan & Lynch, 1989).

Competence

The concept of competence has been used widely in psychology beyond SDT to describe individuals' effective interactions with their environment (Bandura, 1989; Harter, 2012; White, 1959). BPNT describes competence as the basic need to feel effectance and mastery, and it emphasizes the importance for an individual to feel proficient in the various significant aspects of their lives. Thus, the need for competence is gratified when feeling capable in one's actions, and is stunted by perceptions of inability or inadequacy (Deci & Ryan, 2002, Ryan & Deci, 2017).

Relatedness

Relating to others has also been considered crucial within the broader study of psychology (Baumeister & Leary, 1995; Bowlby, 2005; Cassidy & Shaver, 2018). In BPNT, the basic psychological need for relatedness encompasses feeling socially connected and cared for by others (Ryan & Deci, 2017). Relatedness therefore involves a sense of emotional rapport and closeness to others, as well as perceptions of belongingness to social dyads or groups. The need for relatedness is fed by emotional connection and mutual caring within meaningful relationships, by the experience of bonding with others, and by the awareness of positive social

ties (Niemiec & Ryan, 2009). Deprivation of this need occurs when perceived isolation, loneliness, estrangement, or rejection, are experienced (Deci & Ryan, 2002).

To summarize, in agreement with the fundamental notion held by the proponents of humanistic psychology that humans possess psychological needs that complement biological drives (Maslow, 1943; Rogers, 1963), BPNT postulates the presence of three basic psychological needs that act as antecedents of self-determined motivation (Deci & Ryan, 1985; 2002; Ryan & Deci, 2017). There is extensive empirical support that has documented associations between the satisfaction of the needs for autonomy, competence, and relatedness, and self-determined motivation in a wide array of contexts (please refer to Ryan & Deci, 2017, for a very exhaustive literature review on this topic). The upcoming subsections present an overview of the empirical support for the associations between BPN satisfaction and self-determined motivation for the two life domains that are relevant to this project: university studies and relationships.

Basic Psychological Needs and Academic Motivation

A wealth of research has applied BPNT to the academic domain (see Guay, 2022 for a review). For instance, in a laboratory study investigating the unique contributions of group and individual-level need satisfaction, Kelly and colleagues (2008) recruited 45 groups of four Canadian undergraduate students. The participants performed an assigned task in groups and completed self-report measures of BPN satisfaction, pleasant affect, intrinsic motivation, and performance satisfaction. Greater collective BPN satisfaction was associated with increased pleasant affect, higher intrinsic motivation, and more satisfaction with group performance. Similarly, results showed that, individually, participants with higher BPN satisfaction experienced more pleasant affect, higher intrinsic motivation, and group performance satisfaction, than did others in the group.

Moreover, extensive research has demonstrated that autonomy supportive instructors lead to increases in BPN satisfaction, which in turn enhances autonomous academic motivation and well-being (see Reeve & Cheon, 2021 for a review). For instance, Jeno and colleagues (2023) examined the associations between autonomy supportive instructors, autonomous motivation, and academic functioning in higher education students from nine institutions in Norway. Self-report data showed that autonomy support was associated with autonomous motivation, which in turn, was associated with lower dropout rates and higher vitality.

Basic Psychological Needs and Motivation Towards Relationships

The importance of basic psychological needs satisfaction has also been looked at within relationships, though this documentation is less abundant than for academic motivation (Baard et al., 2004; Przybylski et al., 2013; Xie et al., 2018).

For instance, a sample of 203 adults completed online questionnaires on BPN satisfaction, motivation, and subjective well-being for specific life domains (i.e., school, work, relationships, friends, sports; Milyavskaya & Koestner, 2011). BPN satisfaction was found to predict both autonomous motivation and subjective well-being within all observed life domains, thus displaying the importance of BPN satisfaction across different contexts, including relationships.

Moreover, Deci et al. (2006) conducted a study on 98 American undergraduate student close-friend dyads, where participants filled out a series of questionnaires on autonomy support, BPN satisfaction, and well-being within the relationship. Results showed that BPN satisfaction for one member of the dyad correlated to that of the other friend, and that perceived autonomy support within the friendship predicted basic psychological needs satisfaction and well-being.

To summarize, in accord with the extant theoretical and empirical documentation on this topic, in the present thesis, BPN satisfaction is theorized to predict both self-determined academic motivation and self-determined friendship motivation.

Personality

The study of personality is founded on the investigation of aggregates of personal characteristics, called traits, that impact how individuals think, feel, and behave. Allport (1937) was one of the first proponents of trait theory, and an abundance of researchers have followed this approach to personality (e.g., Cattell, 1990; Costa & McCrae, 1992a; Goldberg, 1990; 1992; John et al., 1991; Saucier, 1994).

Allport developed the first taxonomy of traits by identifying 4,500 personality describing words in the dictionary. Using these traits, he proposed that there is a hierarchy of traits, classifying three different types of traits that have different levels of influence over people's behaviours. According to Allport, cardinal traits are at the top of the hierarchy, as they are the most dominant and powerful over behaviours; they could be used to describe the person as a whole, such as using the word genius to describe Einstein, or the word generous to describe Mother Theresa (Allport, 1937). However, Allport proposed that most people cannot be described using only one trait, thus the second level of traits in the hierarchy, called general traits, consist of the more general characteristics of a person; these traits are used to describe most behaviours of a person, and include traits such as loyalty and honesty; all cardinal traits were hypothesized to be possessed by all people, however people would vary in the levels of the trait (Allport, 1937). The levels at which people possess the different cardinal traits is reflected in their personalities. For example, although all humans may have a tendency to want to be loyal, some people will possess the loyalty trait at a higher level, and therefore will be viewed by

others as a "loyal" person. Lastly, the bottom of Allport's hierarchy consists of secondary traits, which he described as those traits that tend to change across situations, thus these traits are more inconsistent (Allport, 1937).

The next theorist to develop a model of personality traits was Raymond Cattell in the 1940s. Cattell believed the 4,500 traits identified earlier by Allport to be too excessive for practical use in research. Therefore, Cattell was able to reduce the 4,500 traits proposed by Allport to 171 factors. In order to simplify the model of personality traits, Cattell then used factor analysis to group closely related factors together. This allowed for the model to be reduced to 16 factors, which he defined as the primary traits. These primary traits were to provide the most basic definition of an individual's personality. Furthermore, using factor analysis, these 16 factors were later condensed in order to form an even simpler model of traits, and observe personality at a higher level. It was found that the 16 primary traits consistently fit into five secondary factors, which provided a more global description of personality (Cattell & Mead, 2008). These five secondary traits included introversion/extraversion, low anxiety/high anxiety, tough mindedness/receptivity, independence/accommodation, and self-control/lack of restraint (Cattell, 1965). It was proposed that all individuals are located somewhere on a continuum for all five of these factors. In order to measure these traits Cattell devised the Cattell 16 Personality Factor Questionnaire (16PF; Cattell et al., 1970). However, many researchers had been unsuccessful in replicating the 16 factors originally suggested by Cattell.

Eysenck and Eysenck (1964) developed their own model of personality traits, claiming that Cattell's model included too many factors that overlapped with one another, which could be measured using the Eysenck Personality Inventory (EPI). They suggested that there are three dimensions to personality: extraversion/introversion, neuroticism/stability, and psychoticism.

They defined extraverts as sociable, introverts as reserved, people high on neuroticism as anxious, people high on stability as calm, and individuals high on psychoticism as impulsive and aggressive. They suggested that all personalities are a product of the combination of people's levels on these three dimensions.

Five Factor Model

Most recently, Costa and McCrae (1995) developed the most commonly accepted conceptual framework of personality traits today: The Five Factor Model (FFM) of personality. Given the abundance of less involved models comprising numerous narrow, specific traits, organizing these widespread facets into five dimensions is especially beneficial. Using factor analysis, Costa and McCrae (1995) arrived at a model that structures the wide variety of personality attributes into a hierarchical model of five broad factors: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Thus, they found that most lower order personality traits fit under one of the five broad factors of their model. The dimensions within this theory are commonly referred to as the Big Five and the acronym OCEAN is often used to represent them, and there are multiple reliable, valid, and widely used instruments to measure these traits (Costa & McCrae, 1992a; John et al., 1991; Saucier, 1994).

Openness to Experience

Openness to experience has been defined both in terms of its intellectual aspects and experiential features. From an intellectual viewpoint, an individual high on this trait is described as clever, creative, thoughtful, and cognitively flexible (Goldberg, 1990). However, other authors have put more emphasis on those facets of openness stressing features such as possessing a vivid imagination, artistic qualities, curiosity, intellectual depth, and holding more liberal views, as well as unconventional values (Costa & McCrae, 1992a). Overall, people that display low levels

of this trait have a more rigid disposition, as well as narrower mindsets and ranges of interests. Individuals low on this dimension are uncurious and adhere tenaciously to familiar attitudes, values, and behaviours. They are conventional, wary of experimentation, and generally reluctant to venture into new territory. Novel ideas, atypical emotions, and unknown environments are intimidating to them. They are thus more likely to avoid, rather than seek new experiences. Such individuals are more at ease with conformity rather than originality. They lack flexibility, are uncomfortable with the unknown, and are slow to accept and to adapt to change.

Conscientiousness

The main characteristics of conscientiousness that are consistent in the literature include orderliness, cleanliness, organization, industriousness, and perseverance. Individuals high on conscientiousness also tend to be hardworking, reliable, and to strive for achievement (Costa & McCrae, 1985; 1992a). Although these facets are all representative of proactive dimensions of the trait, it also comprises an element of self-control. Individuals high in conscientiousness are described as having good self-regulation, thus as being less prone to be impulsive or to act recklessly, and more likely to think about consequences. On the contrary, people low on conscientiousness tend to be more careless, disorganized, impulsive, as well as less punctual, diligent and ambitious (Saucier, 1994).

Extraversion

The extraversion dimension is one of the most explored facets of the FFM. The defining features of extraversion have evolved since early proponents described individuals high on this dimension as extraverts, who are more focused on engagement with the outer world, and those low on this dimension as introverts, who are drawn to the inner world of their own thoughts (Jung, 1921; 1971). More elaborate characteristics defining individuals high in extraversion were

proposed as this topic was expanded upon over time. Contemporary characteristics associated with extraversion encompass sociability, talkativeness, energy, gregariousness, and assertiveness (McCrae & Costa, 2008). Extraverts are also more cheerful and excitable than are introverts. They enjoy spending time in larger groups and engage in more stimulating activities with others (Costa & McCrae, 1985). On the lower end of the extraversion continuum, introverts are defined as those individuals who prefer to spend time alone or in small groups, and favour quiet, calm, solitary activities.

Agreeableness

Agreeableness refers to the valence of an individual's social behaviour. The core feature of this trait is the inclination to interact positively with others (Graziano & Eisenberg, 1997). This factor also includes characteristics related to thoughts, emotions, and attitudes. Qualities used to describe those high in agreeableness are sympathetic, warm, generous, selfless, considerate, trusting, gentle, and kind (Goldberg, 1990; McCrae & Costa, 2003). Moving in the opposite direction, those who are low on the agreeableness dimension are said to possess more negative interpersonal attributes. Such people are more confrontational and difficult, and may even be described as unpleasant, condescending, critical, skeptical, and hostile (McCrae & Costa, 2003).

Neuroticism

The factor of the FFM most strongly related to undesirable outcomes is neuroticism. Individuals high on this trait are prone to negative affects, such as anger, sadness, worry and anxiety, have poor emotional responses to threat, and dysfunctional coping strategies (Hettema et al., 2006; Widiger, 2009). Neuroticism also comprises jealousy, vulnerability, distress, and temperamental tendencies (Costa & McCrae, 1992b; Saucier, 1994). It encompassing

subthreshold psychopathological symptoms, as well as a large variety of psychopathologies, such as mood disorders, anxiety disorders, and other forms of chronic distress that exclude delusions and hallucinations (Brandes & Tackett, 2019; Ormel et al., 2004). Those low on the neuroticism continuum are described as emotionally stable. Emotionally stable people are calmer, more likely to experience positive affect, greater general well-being (e.g., Gomez et al., 2012; Wenzel et al., 2015), and to benefit from heightened specific well-being components (e.g., self-esteem, life satisfaction, and optimism), as well as lower psychopathological symptoms (Jensen et al., 2020; Schmitz et al., 2003; Sobol-Kwapinska, 2016).

The dimensions of the FFM represent the complexity and variability of personality structures (Costa & McCrae, 1985; 1992a; Goldberg, 1990; 1992). People vary from low to high on each trait dimension, as each trait is represented on a continuum depicting the extent that it is present in the individual. For instance, an individual high on extraversion would be categorized as extraverted, whereas someone low on extraversion would be labelled as introverted. Similarly, an individual low on neuroticism would be classified as emotionally stable, while an individual high on neuroticism would be considered neurotic[1]. However, many individuals are not defined by the high or low level on each dimension, but are situated somewhere in between. Therefore, the conceptualization of personality traits as continuums in the FFM permits for complex multi-dimensional personality profiles.

Empirical Support

There is a wealth of empirical research using the FFM. The seminal studies supporting its five dimensions are Costa and McCrae (1985; 1992a), Goldberg (1990;1992), John and

[1] Please note that, whereas "extraverted/introverted" and "emotionally stable/neurotic" are terms that are commonly used in the literature to refer to the poles of the extraversion and neuroticism dimensions, respectively, no such labels have been created or utilized for the other three dimensions (openness to experience, conscientiousness, and agreeableness) of the Five Factor Model.

colleagues (1991), McCrae and Costa (1987), McCrae (2000), and Saucier (1994). Since its original development, this theory of personality traits has been used extensively in psychological research including areas of study such as well-being (Anglim et al., 2020; Fan et al., 2022; Maalouf et al., 2022; Nikbin et al., 2021; Joshanloo, 2022; Shokrkon & Nicoladis, 2021), physical health (Kim, 2022; Leger et al., 2021; van Dijk et al., 2016; Wright et al., 2022), education (Abouzeid et al., 2021; Brandt et al., 2020; Cao & Meng, 2020; Kaur & Chahal, 2023; Mammadov, 2022; Meyer et al., 2019; sports and exercise (Box et al., 2019; Sutin et al., 2016; Szabo & Ábel, 2022; Zar et al., 2022), resilience (Athota et al., 2020; Haddoud et al., 2022; Khosbaya et al., 2022; Oshio et al., 2018), political views (Ahmed & Tan, 2022; Boulianne & Koc-Michalska, 2022; Freitag & Zumbrunn, 2022; Weinschenk, 2017), and social media use (Annisette & Lafreniere, 2017; Biswas et al., 2022; Khorrami et al., 2022; Kircaburun et al., 2018; Sampat & Raj, 2022).

Moreover, there is a wealth of studies replicating the FFM across cultures. The five personality traits of the FFM have been identified in individuals in China, Russia, Japan, Italy, Hungary, Turkey, and many other countries (Digman & Shmelyov, 1996; Pulver et al. 1995; Triandis & Suh, 2002; Yang et al. 1999). For example, using self-report questionnaires, Schmitt and colleagues (2008) examined personality differences between men and women using the Big Five personality traits in samples across 55 countries (N = 17, 637), including France, the Netherlands, Brazil, New Zealand, Mexico, Ethiopia, Zimbabwe, Japan, Lebanon, and Israel. The FFM has also been used to examine political views and participation across different countries, including the United States, United Kingdom, Italy, Spain, Germany, Greece, and Poland (Barbaranelli et al., 2007; Caprara et al., 2006; Carney et al., 2008; Fatke, 2019; Furnham & Cheng, 2019; Lawson & Kakkar, 2022; Vecchione & et al., 2011), as well as subjective well-

being across cultures including India, Norway, China, Romania, and Japan (Bakker et al., 2019; Otonari et al., 2012; Tanksale, 2015; Tisu et al., 2020; Zhai et al., 2013).

Behavioural Manifestations of Personality Traits

Research pertaining to traits has largely focused on broad dimensions that define personality configurations, rather than on specific actions and behaviours that people engage in every day. Although multiple individuals may be placed into the same category for levels on which they inhabit certain personality traits, they may not necessarily behave the same way all of the time. While trait theorists hold the belief that individuals' personality traits predict their behaviours, there is no thorough conceptualization of behavioural manifestations of personality traits in the existing literature.

Some previous research has made preliminary efforts to operationalize behavioural expressions of personality traits. The majority of this research is on the topic of extraverted behaviour and positive affect (see Wilt et al., 2021 for a review). Fleeson and colleagues (2002) developed a paradigm in which participants of experimental studies are asked to either "act extraverted" or "act introverted". In order to establish how to behave extraverted, participants are provided with instructions that list a few adjectives (4 to 6) that are directly lifted from the extraversion subscale of FFM measures (Fleeson et al., Study 3, 2002; Smillie et al., 2015; Sun et al., 2017; Zelenski et al., 2012; Zelenski et al., 2013). The most common use of this paradigm takes the form of a group discussion (Fleeson et al., Study 3, 2002; Zelenski et al., Study 1, 2012). The experiment is run on participants that have been preselected as having high or low trait extraversion, in groups of three (one having received the "act extraverted" instructions, and the other two having received "act introverted" or control instructions). Participants are given a

discussion topic, and affect measures are taken at various intervals, before, during, and after the discussion.[2]

The "act extraverted" paradigm has also been adapted to a fake "get to know you" interview protocol that is conducted by a confederate (e.g., Zelenski et al., Study 2, 2012). Moreover, it has been applied to imagined scenarios based on the "fake discussion" and "get to know you" protocols, with the addition of puzzle completion, crowded party, and silent library area situations (Zelenski et al., 2013). Lastly, rating the adjectives from the "act extraverted" paradigm has also been used in self-report format to measure extraverted behaviour in experience sampling method diary studies (e.g., Fleeson et al., Studies 1 and 2, 2001). This research suggests that personality traits can indeed be manifested as behaviours, however, the conceptualization of the behaviours is deficient. Moreover, leaving it up to participants to interpret the behavioural expressions presents issues with the operationalization of this paradigm.

Furthermore, the documentation of the behavioural manifestations of extraversion and its impact on positive affect inspired a single study that strived to induce behavioural expressions of the openness to experience trait. van Allen (2016) used short (15 minutes) daily writing assignments to operationalize the behavioural expression of openness to experience. The researcher developed these writing assignments with the goal of inspiring aesthetic appreciation, cognitive exploration, deep feelings, introspection, and curiosity. The experimental manipulations designed in this study do have excellent face validity. The behavioural expressions are appropriately differentiated from traits, and the manipulations are indeed likely to prompt openness to experience behaviours. However, there is an absence of conceptual

[2] In case the reader is curious about the results, acting extraverted is consistently associated with heightened positive affect, regardless of personality trait dispositions (introverted or extraverted).

framework presented to conceptualize behavioural openness to experience, and the researcher did not link the behavioural expressions to trait openness to experience.

In addition to these experimental studies, there have been some attempts to develop measures of behavioural expressions of the FFM traits. For instance, Jackson and colleagues (2010) developed a measure of behavioural indicators of conscientiousness (the Behavioural Indicators of Conscientiousness [BIC]). The instruments consist of 185 items conscientiousness (e.g., "work overtime", "clean up immediately after a meal", and "get to appointments on time"). The BIC showed clean factorial structure, adequate convergent validity, acceptable reliability, and sound ecological validity, as evaluated using a daily diary protocol.

In another study, Church and colleagues (2008) developed a behaviour checklist of behaviours representative of each of the FFM traits, which they provided to participants (N = 162) to complete each day for approximately 30 days. The participants were asked to indicate whether or not they engaged in each behaviour each day (i.e., using a dichotomous yes/no response). Total behavioural scores were computed by averaging participants' responses on each dimension. The researchers effectively correlated the behavioural scores with the FFM personality traits.

Indeed, these two studies which developed behavioural measures present improvements over the "act extraverted" paradigm (Fleeson et al., 2002; Zelenski et al., 2012; 2013). These measures went beyond simply asking participants to interpret behavioural expressions from the trait adjectives presented to them. Jackson et al. (2010) and Church et al., (2008) offered actual behavioural expressions which were differentiated from traits. However, there are certain limitations with the conceptualizations and operationalizations offered in these studies. For instance, both studies lack any theoretical framework supporting their operationalizations, and

they are largely data-driven. Furthermore, the excessive number of items included in the BIC (185) presents a limitation with the practicality of the instrument for research purposes. Completing a self-report measure of this length can create issues with participant fatigue. Lastly, Church and colleagues (2008) did not present any psychometric properties supporting their scale, and the use of the dichotomous response may impact its ability to capture any nuance participants feel is needed to characterize their behavioural expressions.

Thus, existing research supports the notion of behavioural expressions of personality traits. However, all of the existing studies surrounding this phenomenon have proceeded without any conceptual framework. With the intention to address this fundamental problem, the first objective of the current project was to conceptualize and empirically validate a theoretical model of the behavioural expressions of personality traits.

Towards a Conceptualization of Behavioural Manifestations of Personality Traits

Behavioural expressions of personality traits are derived from traits, but constitute distinct psychological entities. While traits are abstract general constructs that are theorized to be stable over time (Allport, 1937; Costa & McCrae, 1985; 1992a; Goldberg, 1990; 1992; John et al., 1991), their behavioural expressions can be conceived as more concrete, more specific, and to exhibit more variability, as they are more idiosyncratic, and more susceptible to the sporadic influence of environmental factors.

Furthermore, personality traits can be thought of as central to the self-as-content, whereas behavioural expressions are akin to the self-as-process. The self-as-content can be defined as encompassing the assessments and self-descriptions individuals develop about themselves as a result of reflection and socialization throughout their lives (Moran et al., 2018). These evaluations and self-descriptions are conceived as imperative because of the desire humans have

for a consistent self-view. Therefore, individuals organize all of these self-descriptions into a coherent image of the self that constitutes how they see themselves, and thus, who they are. Similarly, personality traits are conceptualized as consistent patterns of thoughts, feelings, and behaviours (Allport, 1937). Therefore, personality traits, like the self-as-content, are static, consistent descriptions of the self.

In contrast, the self-as-process is concerned with one's present awareness (Lewin et al., 2021). It constitutes the flexible ongoing awareness of one's emotions, thoughts, and behaviours (Atkins & Styles, 2015). Therefore, like the self-as-process, behavioural manifestations are conceptualized as dynamic behavioural trends that change from moment to moment. Because one's ongoing experience rapidly changes, behavioural expressions are also more susceptible to change and thus, are more flexible than traits, which are static descriptions of the consistent self. Moreover, while personality traits are characterized by high levels of generality, abstraction, and stability, behavioural manifestations are conceptualized herein as specific, concrete, and variable. Based on these foundations, descriptions of the behavioural manifestations of each personality trait of the FFM are proposed below.

Openness to Experience

Trait openness to experience is largely defined by being reflective and deep, and having a need to enlarge one's experience (McCrae & Costa, 1997). The trait is characterized by creativity, thoughtfulness, divergent thinking, flexibility, imagination, and curiosity (Costa & McCrae, 1992a; Goldberg, 1990). Given that people high on openness to experience are interested in novelty and are generally curious, it is conceived here that in order to satisfy the curiosity, behavioural expressions of this trait include making changes to one's life, and welcoming diversity in terms of people, places, and situations. Moreover, it is plausible that

behavioural manifestations of openness would include trying new things as people with high levels of this trait are interested in gaining diverse novel experiences. Similarly, because people open to experience are flexible and open intellectually and experientially, they will be likely to engage in unusual activities and chase unknown, unique experiences in order to stimulate their minds and satisfy their need to broaden experience. Moreover, because flexibility is central to this trait, behavioural expressions are also proposed to involve changing one's schedule often, improvising one's day, and going with the flow. Given the characteristic flexibility, as well as the intellectual and philosophical components of openness, behavioural manifestations are also construed as interacting with people who are different than oneself, engaging in in-depth conversations, as well as listening to and absorbing opposing opinions and points of views. Furthermore, as a result of the imaginative and creative qualities of trait openness to experience, it is plausible that behavioural expressions include participating in novel and creative hobbies. Thus, in the current conceptualization, it is proposed that behavioural expressions of openness to experience include engaging in behaviours that take one beyond their comfort levels, chasing new experiences, trying new things, engaging in activities which broaden one's views, and participating in artistic activities.

Conscientiousness

Conscientiousness is a trait that encompasses order, cleanliness, dutifulness, achievement striving, and self-discipline (Costa & McCrae, 1985; 1992a). It is conceivable that because individuals high on conscientiousness possess these traits, they would be likely to engage in behaviours that support the presence of these adaptive characteristics. Thus, given that conscientiousness is associated with cleanliness and organization, it is plausible that trait conscientiousness would be related to behaviours such as keeping things clean and tidy.

Moreover, because conscientiousness encompasses perseverance, achievement striving, dedication, and determination, behavioural expressions of conscientiousness are construed as investing a sustained level of effort and persisting until a task is accomplished in an efficient manner. Similarly, trait conscientiousness involves being hardworking, thus in order to be hardworking, it is conceivable that people must expand maximum effort, work diligently and focus closely and attentively on their tasks. Furthermore, because being careful, organized, and systematic are features of trait conscientiousness, it is construed here that behavioural manifestations of this trait include paying attention to detail and maintaining order in one's life. Therefore, in the current conceptualization, behavioural expressions of conscientiousness include investing maximum effort, working diligently, planning tasks, paying careful attention to details, concentrating when performing tasks, and maintaining order and cleanliness in one's life.

Extraversion

Trait extraversion is defined by characteristics such as sociability, surgency, energy, talkativeness, gregariousness, excitement, and assertiveness (Goldberg, 1990; McCrae & Costa, 2008). Therefore, given that trait extraversion comprises the expression of positive emotions and high activity and energy levels, it is plausible that behavioural expressions of extraversion would include venturing into lively environments rather than choosing to stay at home alone. Moreover, because extraverts gain energy from being around others, it is conceivable that they would engage in behaviours such as choosing to be around other people rather than being alone in order to optimize their energy. Likewise, because sociability and talkativeness are central characteristics to extraversion, extraverted behaviours are likely to include going out with groups of people rather than being alone. Moreover, individuals high on trait extraversion are described as being gregarious, assertive, and bold, thus it is plausible to construe behavioural

manifestations of extraversion to include introducing oneself to others, choosing to speak up in front of people, and leading group conversations with ease. Thus, in the current conceptual framework, behavioural expressions of extraversion are defined as attending more social activities, going out with people rather than staying in alone, speaking up and leading group conversations, seeking the company of large groups of people, and choosing to be in lively environments over quiet ones.

Agreeableness

Trait agreeableness encompasses positive characteristics such as sympathy, warmth, kindness, consideration, trust, and selflessness (Goldberg, 1990; McCrae & Costa, 2003). Given that agreeableness is largely defined by pleasant interpersonal qualities, it is logical to conceive that behavioural expressions of agreeableness would be broadly defined as engaging in positive interactions with other people. Specifically, because agreeable individuals are described as being selfless, it is reasonable to construe that behavioural manifestations of agreeableness would include putting others' needs first, compromising, and accommodating others. Moreover, given that trait agreeableness is defined by kindness, generosity, sympathy and warmth, it is construed here that behavioural agreeableness involves engaging in acts of compassion, such as showing understanding to other people and their circumstances, helping people, and performing nice, thoughtful acts for others. Similarly, behavioural expressions of agreeableness are conceptualized as complementing and providing others with positive feedback. Thus, it is conceptualized herein that behavioural manifestations of agreeableness are defined as putting others needs before one's own, helping and doing nice things for others, accommodating others, and giving positive feedback.

Neuroticism

In contrast to the other four traits, neuroticism is largely described as the presence of undesirable characteristics. Attributes of neuroticism include experiencing negative emotions, such as jealousy and insecurity Costa & McCrae, 1992b; Saucier, 1994). It is also characterized by the presence of temperamental dispositions, poor responses to threat, mood swings, and has been associated with psychopathological symptoms and disorders (Brandes & Tackett, 2019; Hettema et al., 2006; Ormel et al., 2004; Slavish, 2018; Widiger, 2009). Thus, it is plausible that behavioural manifestations of neuroticism would involve behaviours that are associated with the experience of negative affect and are generally maladaptive. For instance, because neuroticism involves experiencing uneasiness, stress, and worry, it is construed that behavioural expressions include struggling with decision-making, as individuals high on neuroticism would likely worry and stress about making the wrong choice. Likewise, neuroticism is conceptualized as having an anxious disposition, therefore it is construed here that behavioural expressions of neuroticism are similar to behaviours associated with anxiety. For example, people expressing trait neuroticism may spend a lot of time fidgeting, have poor functioning as a result of their negative affect, and engage in the avoidance of tasks which are difficult and cause them distress. Thus, due to the negative emotional component of neuroticism, it is proposed herein that its behavioural expressions involve collapsing under pressure, obsessing about minor situations or concerns, and reacting negatively or inappropriately to difficult situations.

To summarize, personality theories focus on dimensions that are defined by combinations of attributes called traits. The Five Factor Model of personality (Costa & McCrae, 1985; 1992a; Goldberg, 1990; 1992; John et al., 1991) is the conceptual framework that is currently the most central and influential within this area of the psychological literature. There is ample empirical

evidence to support the Five Factor Model of personality. Furthermore, the empirical evidence that supports this model extends to numerous studies on very diverse cultural samples. The most current definitions of personality include the notion that people's behaviours are influenced by personality traits (Allport, 1937; Costa & McCrae, 1995). Traits are therefore thought to drive people's behaviours and ways of interacting with others and the world. This phenomenon is named herein: "behavioural manifestations of personality traits".

The purpose of the first article of this thesis will be to document the validity of the conceptualization of behavioural expressions of personality traits developed above. This initial goal is central to the current research project and vital to its subsequent objectives.

The second article of this thesis will put to the test a network of associations between the concepts examined herein. The full explanation of the reasoning behind this model will be detailed in a further section, once all the relevant information has been covered. However, at this point, it is useful to identify our conceptual viewpoint regarding the association between traits and their behavioural expressions. That is, personality traits are theoretically expected to predict their behavioural expressions, because they constitute dynamic materialisations that allow individuals to concretely manifest who they are by performing actions that embody their sense of self.

Linking Personality Traits and Motivation

Up to this point, the core sections of this introduction presented the theoretical underpinnings of the two main concepts examined in this thesis: Personality traits as conceptualized by the FFM and autonomous motivation, as conceived by SDT. An overview of supporting empirical studies was also offered. FFM and SDT are at the forefront of personality and motivation research, respectively. Moreover, the quantity of empirical work on both topics is

substantial and has evolved over half a century. Until recently, those two flourishing research traditions have developed independently. Auspiciously, an emerging research trend has been striving to connect them.

The research that directly assessed the full array of associations between FFM traits and self-determination is in a preliminary state. However, based on partial use of FFM traits, SDT concepts, or alternative conceptual bases, a host of research on very diversified themes found intriguing associations between personality traits and motivation.

For instance, Kesenheimer and colleagues (2023) found relationships between trait benign masochism, sensation seeking, and social and external motives for cycling. Schneider (2011) reported that trait needs for arousal and trait interest in cultural experiences were central components of motivation towards adventure tourism. Trait innovativeness was associated with two-screen viewing motivation (Shim et al., 2017). Jang (2012) observed interesting patterns of association between FFM traits and public service motivation components (policy making, self-sacrifice, compassion, and commitment to public interest). Proactive personality and FFM traits predicted safety motivation in work supervisors, whereas trait cautiousness and trait morality predicted safety motivation and behaviours in workgroup members (Buck, 2012). Extraversion and conscientiousness were linked to work motivation (Kelsen & Liand, 2019). Conscientiousness, extraversion, and agreeableness were related to motivation to improve work through learning (Ng & Ahmad, 2018). Agreeableness and extraversion were predictive of motivation to transfer learning (as positive facilitators in work mobility settings; Schroeder, 2020). Extraversion, sociability and dynamism traits were associated with motivation towards learning games in elementary school (Trajkovik et al., 2018). Extraversion and neuroticism were identified as elements of flow and intrinsic academic motivation in university students.

Beneficial FFM traits were positively, and neuroticism negatively, associated with intrinsic goal orientation in mathematics in high school students. A study was even performed to evaluate whether personality traits were successful predictors of motivation to undergo body modifications (e.g., piercings; Beddow, 2019), although the results were inconclusive.

The previous paragraph illustrates how possible links between personality traits and motivation is a topic that is rapidly gaining momentum and interest among researchers. Yet, as stated previously, research that appraised associations between all FFM traits and self-determined motivation is in its infancy. It was possible to gather information to this effect in a small subset of pioneering studies.

Two studies obtained a logical pattern of correlations between beneficial FFM traits and academic self-determined motivation (positive associations for openness to experience, conscientiousness, extraversion and agreeableness, and a negative association for neuroticism; Komarraju et al., 2011; Mammadov et al., 2021). A study on self-determined exercise motivation yielded a similar pattern of association. Moreover, this pattern held when controlling for the influence of gender, age, and the other four traits (Ingledew et al., 2004). Finally, in a longitudinal study, Audet and colleagues (2021) examined the Big Five personality traits and autonomous and controlled motivation subtypes in undergraduate students during the shift to online learning due to the Covid-19 pandemic. Results showed that openness to experience was associated with increased intrinsic motivation, conscientiousness was associated with increased identified motivation, and neuroticism was associated with increased controlled motivation. These results are congruent with those of the studies reported in the previous paragraph, which consistently revealed positive associations between openness to experience, conscientiousness,

extraversion, and agreeableness with autonomous motivation, and negative associations between neuroticism and autonomous motivation.

Linking Personality Traits and BPN Satisfaction

A few studies have begun exploring the relationship between personality traits and BPN satisfaction. For instance, Jin and Kim (2017) examined the relationships between grit, BPN satisfaction and well-being. They predicted that people higher in grit would be more effective in creating environments that support their BPNs. Findings showed that grittier people had higher levels of satisfaction for autonomy and competence. In a similar study, Jiang and colleagues (2020) found that people with grittier personalities better gratified their needs which, in turn, fostered better well-being.

Previous research has also explored the relationships between the FFM personality traits and BPN satisfaction. In one study, Bratko and colleagues (2022) found that neuroticism was negatively, while extraversion was positively, associated with all three needs. Results also showed positive associations between agreeableness, autonomy and relatedness, as well as between conscientiousness and competence. Similarly, Volodina and colleagues (2019) explored BPN satisfaction in two contexts: vocational training school and the workplace. The researchers found positive associations between openness to experience, conscientiousness, extraversion, and agreeableness with all three needs, and negative associations between neuroticism and the satisfaction of all three needs in both contexts. Consistent patterns of associations have been found in prior studies on the Big Five and BPN satisfaction (Andreassen et al., 2010; Nishimura & Suzuki, 2017; Simsek & Koydemir, 2013).

Towards a Model of FFM Traits, Behavioural Expressions, BPN Satisfaction, and Self-Determined Motivation

As indicated earlier, the ultimate goal of this dissertation is to devise and test an integrative model that relates FFM traits, behavioural expressions of FFM traits, BPN satisfaction, and self-determined academic and friendship motivation. The previous sections of this chapter provided a literature review of the building blocks of this model. The current section defines how and why the individual elements of this model are expected to influence one another.

Firstly, because they represent enduring personal dispositions that are developed over the course of one's life and because they are concepts characterized by high levels of generality and abstraction, FFM traits (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) are theorized to constitute the incipient variables of the model.

Secondly, because they unfold naturally from personality traits and allow their materialization in the physical and social environment in the form of self-congruent actions, it is anticipated that behavioural expressions of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism, will follow personality traits and will be positively associated with their corresponding trait.

The third association is of crucial importance, as it provides the connection between FFM traits and SDT concepts. Because behavioural expressions of traits impact one's inner and outer experiences, it is theorized that they can foster (for beneficial traits) or hinder (for neuroticism) BPN satisfaction. Indeed, such behaviours can have need specific consequences (e.g., openness to experience on the needs for autonomy and relatedness, conscientiousness on the need for competence, agreeableness on the need for relatedness). However, from an overall perspective, such behaviours are expressions of the self, which endows them with the potential to alter one's

perception of agency and mastery over the environment. As behavioural expressions of traits often directly or indirectly take place in social contexts, they can also affect one's perceptions of belonging and relational experiences. Behavioural manifestations of traits are therefore said herein to translate personality dispositions into tangible actions that provide (for beneficial traits) or deprive (for neuroticism) the person from opportunities for BPN satisfaction. Specifically, behavioural manifestations of openness to experience, conscientiousness, extraversion, and agreeableness are theorized to be positively, and neuroticism negatively, associated to BPN satisfaction.

Finally, in line with SDT's theoretical assertion that BPN satisfaction predicts motivation, and in agreement with the abundant empirical literature that supports this notion, BPN satisfaction is conceptualized as an antecedent of academic and friendship self-determined motivation, these latter two constructs being the utmost outcomes of the model.

Overview of Articles, Goals, and Hypotheses

Article 1

The objective of this article, comprised of 2 studies (N = 454) and (N = 230), was to develop and test a theoretical model of the behavioural manifestations of personality traits derived from the FFM of personality. On the basis of the conceptual information provided by this new theoretical framework, an instrument, the Behavioural Expressions of Traits Inventory (BETI), was devised to operationalize the behavioural manifestations of Openness to experience, Conscientiousness, Agreeableness, Extraversion, and Neuroticism. These five dimensions of behavioural manifestations of traits were expected to display a sound factorial structure, acceptable discriminant validity with their corresponding traits, suitable associations supporting their construct validity, low socially desirable responding, and satisfactory internal consistency.

Article 2

The second goal of this thesis was to test a model integrating FFM personality traits, the novel taxonomy of behavioural manifestations of personality traits developed and validated in Article 1, BPN satisfaction, and academic and friendship motivation. The article written for this purpose is composed of a single large sample study (N = 635).

In line with the conceptual exposition of the previous section, the expected network of associations between the variables under study comprises the following hypotheses (see Figure 2).

(1) Personality traits will be positively associated with their corresponding behavioural expressions;

(2) Behavioural expressions of the personality traits of openness to experience, conscientiousness, extraversion, and agreeableness will be positively associated with BPN satisfaction (autonomy, competence, and relatedness), while neuroticism will be negatively associated with BPN satisfaction;

(3) BPN satisfaction will be positively associated with (a) self-determined academic motivation and (b) self-determined friendship motivation.

Within the model composed of direct effects outlined above, the following mediating (indirect) effects are hypothesized.

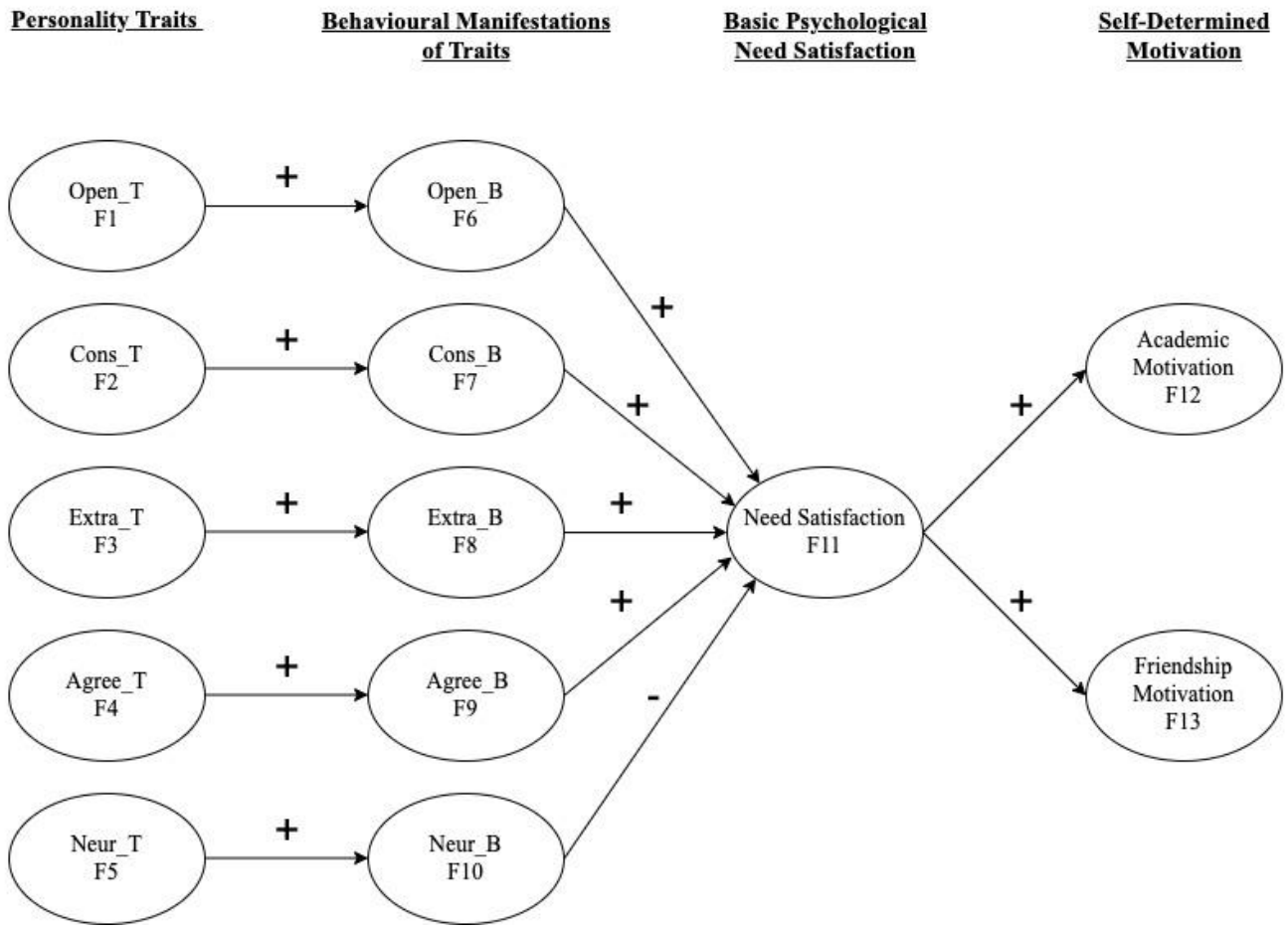
(4) Behavioural expressions of personality traits will mediate the relationships between their corresponding personality traits and BPN satisfaction;

(5) BPN satisfaction will mediate the relationships between behavioural expressions of personality traits and self-determined (a) academic and (b) friendship motivation;

(6) Behavioural expressions of personality traits and BPN satisfaction will act as sequential mediators of the associations between personality traits and (a) self-determined academic motivation, as well as (b) self-determined friendship motivation.

Figure 2

Hypothesized Model



Notes. Open_T = trait openness to experience; Cons_T = trait conscientiousness; Extra_T = trait extraversion; Agree_T = trait agreeableness; Neur_T = trait neuroticism; Open_B = behavioural manifestations of openness to experience; Cons_ B = behavioural manifestations of conscientiousness; Extra_B = behavioural manifestations of extraversion; Agree_B =

behavioural manifestations of agreeableness; Neur_B = behavioural manifestations of neuroticism; Need Sat = basic psychological need satisfaction; academic = self-determined academic motivation; Friendship = self-determined friendship motivation

CHAPTER II

ARTICLE 1

Title: A conceptualization and validation of behavioural manifestations of the Five Factor Model personality traits

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Contributions: The first author conceptualized the study, devised the method, collected the data, performed the analyses, and wrote the article. The second author provided overall feedback and technical information for analysis when required.

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Abstract

Behavioural manifestations of personality traits are a novel area of inquiry. However, the isolated studies that pertain to this topic are data-driven and devoid of theoretical foundations. The goal of the current study was therefore to develop and validate a conceptual model of behavioural manifestations of personality traits, as defined by the Five Factor Model of personality. To achieve this, the conceptual model of behavioural manifestations developed herein was operationalized in the form of a self-report questionnaire: The Behavioural Expressions of Traits Inventory (BETI). The initial version of the BETI was tested by means of an exploratory factor analysis (Study 1; N = 454), and it was revised and refined based on results. The factorial structure of the final version of the BETI (30 items; 6 items/subscale) was tested using confirmatory factor analysis in Study 2 (N = 230), and its psychometric properties were established (construct, concurrent, and discriminant validity, N = 246). Results of this study present important fundamental and applied implications, as this novel conceptualization is liable to be useful for researchers and clinicians who are interested in behaviours driven by personality traits.

Keywords: Five Factor Model, personality traits, behavioural manifestations

A conceptualization of behavioural manifestations of the Five Factor Model personality traits

Decades of research have been devoted to personality theory, which encompasses the study of individuals' thoughts, feelings, and behaviours (Allport, 1937; Costa & McCrae, 1985; 1992a; Goldberg, 1990; 1992; John et al., 1991; Jung, 1921; 1971). A central model within the study of personality is trait theory (Allport, 1937; Costa & McCrae, 1995). Costa and McCrae (1995) developed the most commonly accepted conceptual framework of traits: The Five Factor Model (FFM) of personality. Using factor analysis, Costa and McCrae (1995) arrived at a model that structures the wide variety of personality attributes into a model of five broad factors: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism.

The dimensions of the FFM are proposed to best embody the complexity and variability of personality configurations (Aslan et al., 2021; Breu & Yasseri, 2022; Costa & McCrae, 1985; 1992a; Goldberg, 1990; 1992). Each trait is depicted by a continuum that represents the degree to which it is present. People are thus theorized to vary from low to high on each trait dimension. For example, someone high on extraversion would be labelled as extraverted, whereas someone low on extraversion would be labelled as introverted. Likewise, an individual low on neuroticism would be labelled as emotionally stable, while an individual high on neuroticism would be labelled as neurotic.[1] However, many individuals will not be defined by either the high or low level on each dimension, but will rate somewhere in between for the trait. The conceptualization of personality traits as continuums in the FFM of personality therefore allows for rich and sophisticated multi-dimensional profiles.

Behavioural Manifestations of the FFM Traits

Generally, trait theorists hold the belief that individuals' personality traits contribute to their behaviour. However, the current literature does not offer a thorough conceptualization of behavioural manifestations of personality traits. Although research on this topic is limited, there is preliminary evidence that this notion has merit.

There have been attempts in previous research to operationalize the behavioural manifestations of the FFM personality traits in isolated experiments. The main studies to this effect pertain to the incipient literature on extraverted activities and positive affect (please refer to Wilt et al., 2021, for a review). This research has consistently relied on variations of a unique paradigm, which was devised by Fleeson and colleagues (2002). Specifically, participants are asked to 'act extraverted' or 'act introverted', and are provided with instructions that list a few adjectives that are directly lifted from the extraversion subscale of FFM measures (Fleeson et al., Study 3, 2002; Smillie et al., 2015; Sun et al., 2017; Zelenski et al., 2012; Zelenski et al., 2013). While this research puts forth the notion that personality traits can be manifested as behaviours, the conceptualization underlying this idea is largely absent, and its operationalization is questionable. That is, the 'act extraverted' paradigm leaves the interpretation of extraverted behaviours up to the participants. While they are given cursory explanations of what extraversion is, these adjectives describe the extraversion trait rather than its behavioural expression.

Moreover, van Allen (2016) operationalized the behavioural expression of openness to experience in the form of short (15 minutes) daily writing assignments, designed to engage aesthetic appreciation, cognitive exploration, deep feelings, introspection, and curiosity. Though the experimental manipulations devised to produce these behavioural expressions of openness to experience have excellent face validity (i.e., behaviours are distinguished from traits and are

indeed likely to elicit openness to experience behaviours), and are much more elaborate and sophisticated than those of the 'act extraverted' paradigm, no conceptual framework linking the trait of openness to experience to the operationalization of its behavioural expression is offered.

Experiments that introduced the notion of behavioural manifestations of personality traits are limited to extraversion and openness to experience. A thorough review of the literature yielded no similar information pertaining to the other three traits of the FFM (i.e., conscientiousness, agreeableness, and neuroticism). However, two other studies attempted to devise measures to evaluate behavioural manifestations of personality traits.

Jackson and colleagues (2010) developed an instrument to evaluate the occurrence of behavioural manifestations of the conscientiousness personality trait, the Behavioural Indicators of Conscientiousness (BIC) scale. A list of 185 items was devised as indicators of conscientiousness (e.g.,"used a planner to schedule the day's events", "work or study long hours", and "complete the projects I start"). In a series of three studies, (N = 1128, 841, and 54, respectively), the BIC displayed a clean factorial structure, adequate convergent validity, acceptable reliability, and sound ecological validity, as evaluated using a daily diary protocol.

Also, in a daily diary study, Church and colleagues (2008) put together a behaviour checklist comprising items for each trait of the Five Factor Model. These researchers asked participants (N = 162) to fill out this checklist for approximately 30 days, indicating whether they engaged in the described behaviour or not (using a yes/no scale). Participants' averages on each dimension were calculated over 30 days, and these were successfully correlated with the Five Factor Model traits.

The research conducted by Jackson and colleagues (2010), and Church and colleagues (2008) are an improvement over the experiments that used the 'act extraverted' paradigm

(Fleeson et al., 2002; Zelenski et al., 2012; 2013), because these researchers actually proposed behaviours that represent manifestations of personality traits, instead of leaving this up to the participants' interpretation. However, both of these projects (Jackson et al., 2010; Church et al., 2008) are data-driven, and no theoretical elaboration in support of the operationalization of the behavioural manifestations of personality traits is articulated. In addition to this absence of conceptual foundations, two noteworthy difficulties should also be mentioned: the large number of items in the BIC (185 items; Jackson et al., 2010) is excessive for the purpose of this instrument and impractical; and the behaviour checklist concocted by Church and colleagues (2008) is evaluated on a dichotomous scale and its psychometric properties are unknown.

Therefore, although initial endeavours suggest that behavioural manifestations of personality traits are a promising novel area of inquiry, research on this topic has thus far proceeded without the benefit of conceptual underpinnings. With the intention to address this fundamental problem, the goal of this study was to develop and empirically test a theoretical model of the behavioural expressions of personality traits.

Towards a Conceptualization of Behavioural Manifestations of Personality Traits

Personality traits can be thought of as key elements of the self-as-content. This notion can be defined as the aggregation of self-descriptions that are acquired during human development, through socialization and self-reflection, as people learn to organize this information to create a consistent sense of who they are (Moran et al., 2018). In contrast, behavioural manifestations of personality traits are construed here as important aspects of the self-as-process. Whereas the self-as-content consists of static attributes, the self-as-process is defined by its dynamic features, such as behavioural trends (Atkins & Styles, 2015). The self-as-process emphasizes the awareness of experiences that are occurring in the moment (Lewin et al., 2021). Personality traits can be

described as concepts that are characterized by high levels of generality, abstraction, and stability. Conversely, their behavioural manifestations are considered herein to be specific, concrete, and more variable. On the basis of the above conceptualization, definitions of the behavioural manifestations of each personality trait of the FFM are proposed below.

Openness to Experience

Openness to experience is a trait that includes creativity, thoughtfulness, flexibility, imagination, and curiosity (Costa & McCrae, 1992a; Goldberg, 1990). Because people who are open to experience are curious, it is plausible to conceive that they would engage in inquisitive behaviours, such as trying new things, welcoming diversity, and visiting new places. In addition, because they tend to be intellectual and thoughtful, it is likely they will engage in more philosophical thinking and in-depth conversations with others whose ideas differ from their own. Another key aspect of this personality trait is flexibility. Thus, it is conceivable that flexible actions, such as improvising schedules and going with the flow would be carried out by individuals who are highly open to experience. Because such individuals are imaginative, it is logical to expect that they would engage in more activities of creative nature. Therefore, in the current study, the behavioural manifestations of openness to experience are conceptualized as trying new things, chasing novel experiences, engaging in intellectual conversations with people who are different from oneself, expressing a willingness to improvise one's schedules and life situations, and engaging in creative and artistic hobbies.

Conscientiousness

This trait is defined by the presence of cleanliness, organization, perseverance, hard work, and reliability (Costa & McCrae, 1985; 1992a). Thus, it is possible to construe that conscientious individuals will engage in behaviours that reflect these features. For example, trait

perseverance would likely involve investing a sustained level of effort and persisting until the job is done well. Likewise, in order to be considered hardworking, people must work diligently and focus. Moreover, central features of conscientiousness are being careful, organized, clean, and systematic. It is thus logical to conceive that behaviours tied to trait conscientiousness include paying attention to detail and keeping things clean. Therefore, the behavioural manifestations of conscientiousness that are proposed here are a combination of these behaviours: investing maximum effort, paying careful attention and planning tasks, as well as maintaining order and cleanliness in one's life.

Extraversion

Characteristics associated with extraversion include sociability, talkativeness, energy, gregariousness, excitement, and assertiveness (Goldberg, 1990; McCrae & Costa, 2008). Therefore, because extraverted individuals are social, talkative and energetic, it is reasonable to conceive that behaviours associated with extraversion would involve social interactions with other people and becoming energized when around others. Similarly, given that a key component of extraversion is assertiveness and talkativeness, it is plausible to theorize that extraverted people would be comfortable speaking to others and would situate themselves in social environments where they can be around other people. Accordingly, it is possible that extraverted behaviours would include introducing oneself to others and talking in front of large groups of people with ease. For this reason, extraverted behaviours are herein conceptualized as attending social activities, going out rather than staying in, speaking in group conversations, seeking the company of large groups of people, and choosing to be in lively environments over quiet ones.

Agreeableness

Agreeableness is largely conceptualized as positive interpersonal attributes, with characteristics of trait agreeableness including sympathy, warmth, generosity, selflessness, consideration, trust, and kindness (Goldberg, 1990; McCrae & Costa, 2003). Thus, it is probable that these favourable traits would be connected to positive actions when interacting with others. For example, because agreeable individuals are endowed with sympathy and warmth, it is reasonable to presume that actions such as accommodating others, helping out, and interacting harmoniously are enacted by agreeable individuals. Likewise, in order to be kind, one must engage in acts of benevolence. Because agreeableness is defined by the qualities of kindness, consideration and generosity, it is logical that agreeable people be expected to compromise and show understanding. Therefore, behavioural manifestations of agreeableness are defined here as putting others needs before one's own, helping and doing nice things for others, accommodating others, and giving positive feedback.

Neuroticism

Neuroticism is defined by unfavourable attributes that are largely related to insecurity, negative affect, temperamental dispositions, poor coping and response to threat, and psychopathological symptoms and disorders (Brandes & Tackett, 2019; Hettema et al., 2006; Ormel et al., 2004; Slavish et al., 2018; Widiger, 2009). Distress and worry are also features of neuroticism (Costa & McCrae, 1992b; Saucier, 1994). Therefore, it is sensible to construe that the behaviours that accompany trait neuroticism would be fundamentally maladaptive. Furthermore, as neuroticism is essentially defined as trait anxiety, it is conceivable that actions generally associated with anxiety, such as fidgeting a lot, having trouble functioning because of negative emotions, and avoiding anxiety-inducing tasks, represent behavioural manifestations of

neuroticism. Hence, it is proposed herein that behaviours prompted by the above undesirable emotional features are enacted by individuals who behave neurotically. Specifically, behavioural manifestations of neuroticism are conceptualized here as reacting ineffectively or inappropriately to negative events, overanalyzing situations, struggling to make decisions, obsessing over minor incidents or concerns, and collapsing under pressure.

Overview of Studies

The primary objective of the current research was to devise an operationalization of a conceptual model of the behavioural manifestations of the FFM (Costa & McCrae, 1985; Goldberg, 1990; 1992; John et al., 1991; McCrae, 2000; Saucier, 1994). We therefore aimed to develop and perform an empirical evaluation of an instrument designed to represent the behavioural manifestations of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism, named the Behavioural Expressions of Traits Inventory (BETI). The goal of Study 1 was to develop, trim, and test the initial operationalization of the model of behavioural manifestations of personality traits using an exploratory factor analysis (EFA) with an item reduction focus. Items of the BETI were revised and refined based on the results of this EFA. In Study 2, the final version of the BETI was tested anew using a confirmatory factor analysis (CFA). Several complementary psychometric properties (construct, concurrent, and discriminant validity) were also evaluated.

Study 1

Method

Participants and Procedure

Undergraduate university students (N = 454) were recruited through the University of Ottawa's Integrated System of Participating in Research (ISPR). The sample consisted of 344 women, 103 men, and one participant who was gender non-conforming, ranging between 17 and

59 years of age (M_{age} = 19.81, SD = 2.98).[2] Among the participants, 43% identified as Caucasian, 24% as Asian, 10% as Black, 1% as Indigenous, 1% as Latinx, and 21% identified as other ethnicities. Sixty-six percent of participants were single, 31% were in a committed relationship, and 1% were married.

Participants were asked to complete an online questionnaire through a link on the ISPR platform where they were directed to the Qualtrics website. All participants completed the questionnaire in English. Students were compensated with one percent course credit for their participation.

Measure

The online questionnaire distributed in this study consisted of demographic questions and the initial pool of items included in the Behavioural Expressions of Traits Inventory.

Behavioural Expressions of Traits Inventory (BETI)

The authors developed the BETI to measure the behavioural manifestations of the Five Factor Model (FFM). An initial pool of 70 items was created to represent the behavioural manifestations of openness to experience (16 items), conscientiousness (14 items), extraversion (14 items), agreeableness (13 items), and neuroticism (13 items). Participants were asked to rate how frequently they perform the behaviours described by the items on a scale ranging from *never* (1) to *frequently* (7). The 70 items were randomized within the questionnaire. Examples of items include “I exchange ideas with people that have views that are radically different from mine” (openness to experience), “I pay careful attention to the tasks I do” (conscientiousness), “I go out with groups of people” (extraversion), “I give positive feedback” (agreeableness), and “I react poorly to stressful situations” (neuroticism).

Results

Preliminary Analyses

Firstly, participants with non-random missing data were eliminated from the sample at the onset. Secondly, for cases with a small number of random missing data (less than 5%), values were estimated using linear interpolation. Thirdly, to handle univariate outliers, standardized scores were generated and scores above $Z = |3.29|$ were removed from the data. Mahalanobis distances were generated to identify multivariate outliers, and these cases were also removed from the data. To detect departures from the assumption of normality, kurtosis and skewness values were scrutinized. Although a few values were marginally above the conventionally acceptable interval of - 1.00 to +1.00 (see Table 1), this was not considered an issue because mean kurtosis ($M = .47$) and mean skewness values ($M = .40$) were well within acceptable parameters (Muthén & Kaplan, 1985). Lastly, for each pair of variables under study, bivariate scatterplots were generated and examined. No instance of heteroscedasticity nor curvilinearity were detected. Bivariate correlations between all variables were calculated and inspected to ascertain that no multicollinearity problems were present. No correlations above |.90| were obtained (Tabachnick & Fidell, 2019).

Main Analyses

The 70 initial items from the BETI were entered into an exploratory factor analysis, using an item reduction procedure (maximum likelihood extraction method and Oblimin rotation), with the goal of retaining six optimal items per factor. The cut-off for acceptable loadings was set at 0.30.

The final solution consisted of 30 items (see Table 2). Eigenvalues of the five final factors ranged between 1.59 and 6.98, and all factor loadings were of acceptable magnitude.

With the exception of a single cross-loading, items loaded on their target factor and the factorial solution presented a clean pattern. The variance explained by each factor ranged between 5.30% to 23.25%. The factorial solution explained a substantial amount of the total sample variance (54.57%). Internal consistency, measured using Cronbach's α was acceptable for all five factors: conscientiousness (α = .86), neuroticism (α = .74), extraversion (α = .75), agreeableness (α = .85), and openness to experience (α = .72).

Summary and Discussion

The goal of Study 1 was to operationalize the proposed conceptual framework of the behavioural manifestations of the FFM. The EFA revealed five distinct factors representing the five behavioural manifestations of the personality traits of the FFM: agreeable behaviours, openness to experience behaviours, neurotic behaviours, extraverted behaviours, and conscientious behaviours. Overall, the results of the EFA presented strong support for the five factors representing the behavioural manifestations of agreeableness, openness to experience, neuroticism, extraversion, and conscientiousness. Minor improvements were implemented to further improve the psychometric qualities of the BETI. In the hopes of eliminating the single extant cross-loading and increasing the internal consistency of the behavioural manifestations of openness to experience subscale, items for this factor were reworked and reworded. Also, two item substitutions were performed in the extraversion subscale. A redundant item ("I talk in front of groups of people"), as well as an overly general item ("I entertain other people"), were removed and replaced by more representative and discriminant items ("I seek out loud environments" and "I spend most of my time with other people"). Moreover, several minor linguistic adjustments were done to enhance item clarity and congeniality. A revised 30 item

version of the BETI was developed and tested using a Confirmatory Factor Analysis (CFA) in Study 2.

Study 2

The first goal of Study 2 was to test the structure of the final version of the BETI (see Appendix) using a confirmatory factor analysis (CFA). The second goal of Study 2 was to examine several complementary psychometric properties of the BETI, namely, construct validity, concurrent validity, and discriminant validity.

Examining the Factorial Structure of the Final Version of the BETI

Method

Participants and Procedure

Two hundred and seventy-nine undergraduate university students (230 women, 46 men, and 3 gender non-conforming individuals) were recruited through the ISPR.[3] Participants ranged in age between 17 and 50 years (M_{age} = 20.07, SD = 5.19), and 57% of participants identified as Caucasian, 17% as Asian, 6% as Black, two percent as Latinx, and 18% of participants identified with other ethnicities. The first language of the majority of participants was English (65%; French = 18%; Other = 18%). Sixty-seven percent of participants were single, 29% were in a committed relationship, and 4% were married.

In order to complete the online questionnaire, participants were provided with a link on the ISPR platform directing them to the Qualtrics website. Questionnaires were completed by all participants in English. Students were granted one percent course credit for their participation.

Measure

The online questionnaire distributed for this portion of this study consisted of the final version of the BETI.

Behavioural Expressions of Traits Inventory (BETI). The final version of the BETI, obtained as described in Study 1, was used in the current study (see Appendix). It consists of a total of 30 items, divided within five subscales that are devised to assess the behavioural manifestations of the five personality traits of the FFM. Each subscale consists of six items reflecting behavioural manifestations of openness to experience (e.g., "I do things that take me out of my comfort zone"), conscientiousness, (e.g., "I keep things clean"), extraversion (e.g., "I speak up in group conversations"), agreeableness (e.g., "I accommodate others"), and neuroticism (e.g., "I overanalyze situations"). Participants rated their agreement with items using a Likert scale ranging from *never* (1) to *frequently* (7).

Results

Preliminary Analyses

Cases with non-random missing data were deleted from the dataset. For cases with a small number of missing data (less than 5%), linear interpolation was used to estimate values. In order to address univariate outliers, cases with standardized scores above $Z = |3.29|$ were deleted. To handle multivariate outliers, Mahalanobis distances were generated and cases identified as outliers were deleted. Next, kurtosis and skewness values were examined to detect departures from the assumption of normality. All values were within the conventionally acceptable range of -1.00 to +1.00 (see Table 3). Finally, scatterplots were observed for each pair of variables under study, and no cases of heteroscedasticity nor curvilinearity were identified. In order to ascertain any multicollinearity problems, bivariate correlations between all variables were performed. No correlations above |.90| were observed (Tabachnick & Fidell, 2019).

Confirmatory Factor Analysis

The tenability of the structure of the BETI was assessed by means of a classical confirmatory factor analysis (EQS, version 6.1, Bentler, 2006). Estimated parameters included factor loadings, correlations between latent factors, and item uniqueness values. Five indices were used to assess model fit: the Satorra-Bentler chi-square (SB-χ^2; Satorra & Bentler, 2001), the Comparative Fit Index (CFI; Bentler, 1990), the Incremental Fit Index (IFI; Bollen, 1989), the Standardized Root Mean Squared Residual (SRMR; Bentler, 1995) and the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990). The internal consistency of each subscale of the BETI was evaluated using Cronbach's α.

The results of the CFA supported the hypothesized five factor structure of the BETI, comprised of five factors representing the behavioural manifestations of the FFM (i.e., openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism). Model fit was satisfactory ([SB-χ^2 (391) = 645.80, $p < 0.001$; CFI = 0.90; IFI = 0.90; SRMR = 0.07; RMSEA = 0.05; $CI_{RMSEA(90\%)}$ = {0.04, 0.05}].[4] All estimated parameters were statistically significant and of acceptable magnitude (see Figure 1). Internal consistency of each factor was assessed using Cronbach's α, and were found to be satisfactory for all five behavioural dimensions (openness to experience = .82, conscientiousness = .80, extraversion = .79, agreeableness = .81, and neuroticism = .80).

Examining the Construct, Concurrent, and Discriminant Validity of the BETI

Method

Participants and Procedure

Two hundred and ninety-seven undergraduate university students (246 women, 48 men, and 3 gender non-conforming individuals) were recruited through the ISPR.[3] Participants ranged

in age between 17 and 50 years (M_{age} = 19.99, *SD* = 4.97), and 56% of participants identified as Caucasian, 18% as Asian, 5% as Black, 3% as Latinx, 1% as Indigenous and 18% as other ethnicities. The first language of the majority of participants was English (63%; French = 19%; Other = 18%). Sixty-nine percent of participants were single, 27% were in a committed relationship, and 4% were married.

In order to complete the online questionnaire, participants were provided a link on the ISPR platform directing them to the Qualtrics website. All participants completed the questionnaire in English. Students were granted one percent credit towards an undergraduate course for their participation.

Measures

The online questionnaire distributed in this study consisted of the final version of the BETI, and eleven measures selected for the assessment of concurrent, construct, and discriminant validity. The function of these instruments was partitioned as follows: construct validity (Positive and Negative Affect Schedule [PANAS; Watson et al., 1988], Satisfaction with Life Scale [SWLS; Diener et al., 1985], Costello-Comrey Anxiety Scale [CCAS; Costello & Comrey, 1967], Brief Screen for Depression [Hakstian & McLean, 1989], Subjective Vitality Scale [Ryan & Frederick, 1997], Personal Growth Scale [Ryff, 1989; Ryff & Keyes, 1995], Prosocialness Scale for Adults [Caprara et al., 2005], Multidimensional Perfectionism Scale (Frost et al., 1990), Short Grit Scale (Grit-S): Perseverance of Effort subscale (Duckworth & Quinn, 2009), concurrent validity (Goldberg's Mini-Markers; Saucier, 1994), and social desirability (Marlowe Crowne Social Desirability Scale).

Please note that, in order to avoid participant fatigue, two versions of the questionnaire package were devised and distributed. Both versions included the BETI. Approximately half of

participants (*N* = 142) completed Version A, which included the following eight measures: the SWLS (Diener et al., 1985), PANAS (Watson et al., 1988), the Subjective Vitality Scale (Ryan & Frederick, 1997), CCAS (Costello & Comrey, 1967), and Brief Screen for Depression (Hakstian & McLean, 1989). The other half of participants (*N* = 155) completed Version B, which included the BETI and the remaining six measures: Personal Growth Scale (Ryff, 1989; Ryff & Keyes, 1995), Prosocialness Scale for Adults (Caprara et al., 2005), Multidimensional Perfectionism Scale (Frost et al., 1990), Short Grit Scale (Grit-S): Perseverance of Effort subscale (Duckworth & Quinn, 2009), and the MCSDS (Crowne & Marlowe, 1960).

Construct Validity

Positive and Negative Affect Schedule (PANAS). The PANAS (Watson et al., 1988) is a 20-item scale measuring positive affect (10 items) and negative affect (10 items). Example items include "excited" and "inspired" (positive affect), as well as "upset and "afraid" (negative affect). Items are rated on a 7-point Likert scale, ranging from *not at all* (1) to *extremely* (7). The factorial structure of this instrument was successfully tested using a confirmatory factor analysis. In the current study, the internal consistency values for the two subscales of the PANAS were shown to be .88 (positive affect) and .87 (negative affect).

The Satisfaction with Life Scale (SWLS). The SWLS (Diener et al., 1985) comprises four items. This instrument measures the global cognitive judgment of one's life satisfaction (e.g., "I am satisfied with my life"). Participants were asked to indicate to what degree they agree with the four statements on a Likert scale ranging from *not at all* (1) to *completely* (7). Construct validity was demonstrated by correlations with subjective well-being and personality variables. Test-retest reliability over a one-month interval was shown to be high, ranging from *r* = .80 to

.84 (Pavot et al., 1991; Steger et al., 2006). The SWLS showed high internal consistency in the current study (α = .87).

Costello-Comrey Anxiety Scale (CCAS). This scale contains nine items which measure anxious-affective states (Costello & Comrey, 1967). An example of one of the items in this scale is "I am a very nervous person". Participants are asked to indicate their level of agreement with each item, using a Likert scale ranging from *not at all* (1) to *completely* (7). This subscale demonstrated fair concurrent validity with the Taylor Manifest Anxiety Scales. In the present study, internal consistency for the CCAS was high (α = .87).

Brief Screen for Depression. This measure includes a reduced set of four items targeting functional behaviour and emotion regulation that are designed to optimize discrimination and sensitivity to clinical symptoms (Hakstian & McLean, 1989). An example from this scale is "how many times during the last two days have you been preoccupied by thoughts of hopelessness, helplessness, pessimism, intense worry, unhappiness, etc.?". Participants are asked to indicate how often they experienced the statement described in each item in the past two days on a Likert scale ranging from 1 (*not at* all) to 5 (*all the time*) for the first item, and from 1 to 10 for items two through four. This instrument was shown to possess high predictive validity for depression as assessed by psychiatric clinical interviews (95.8% classification efficiency), as well as high sensitivity (99%) and specificity (91.9%), by comparison to non-depressed control subjects.

The Subjective Vitality Scale. The individual difference version of the subjective vitality scale (Ryan & Frederick, 1997) consists of seven items measuring one's level of energy (i.e., feeling alive and alert and having energy available to the self; Ryan & Deci, 2001) at the trait level. Respondents were asked to indicate on a scale ranging from *strongly disagree* (1) to

strongly agree (7) their agreement with the statement. An example item from the scale is "I feel alive and vital". For the current study, the scale was adjusted to use only six items, as confirmatory factor analysis has shown the six-item version to have superior factor structure (Bostic et al., 2000). In the current study, internal consistency was high (α = .87).

Personal Growth Scale. (Ryff, 1989; Ryff & Keyes, 1995). The Personal Growth Scale consists of 14 items that measure the desire to develop one's potential, to grow, and to expand as a person. Respondents were asked to indicate on a scale ranging from *strongly disagree* (1) to *strongly agree* (7) their agreement with each statement. An example item from the scale is "I think it is important to have new experiences that challenge how you think about yourself and the world". The scale has shown good test-retest reliability over a 6-week period (r = .81; Ryff, 1989). Internal consistency in the current study was satisfactory (α = .86).

Prosocialness Scale for Adults. (Caprara et al., 2005). The Prosocialness Scale for Adults consists of 16 items assessing behaviours and feelings of prosocialness. An example item of this scale is "I am empathic with those who are in need". Participants were asked to rate their agreement with each item using a Likert scale ranging from *strongly disagree* (1) to *strongly agree* (7). Very good internal consistency has been shown for the scale (α = .92; Caprara et al., 2005). In the current study, internal consistency was very high (α = .92).

Multidimensional Perfectionism Scale. (Frost et al., 1990). The Organization (6 items) and Personal Standards (7 items) subscales of the Multidimensional Perfectionism Scale were included in the current study. Participants rated agreement with items using a Likert scale ranging from *strongly disagree* (1) to *strongly agree* (7). Example items for the Multidimensional Perfectionism Scale include "I am a neat person" (Organization), and "I set higher goals than most people" (Personal Standards). Construct validity was documented by

means of correlations with related constructs (i.e., efficacy, procrastination, and task aversion reason for procrastination). Good internal consistencies have been shown for both the Organization (α = .93 to .94) and Personal Standards (α = .81 to .83) subscales (Frost et al., 1990). In the present study, high internal consistencies were revealed for both Personal Standards (α = .87) and Organization (α = .94).

Short Grit Scale (Grit-S): Perseverance of Effort Subscale. The Perseverance of Effort subscale of the Grit-S (Duckworth & Quinn, 2009) consists of six items. Respondents were asked to indicate their level of agreement with items on a Likert scale ranging from *strongly disagree* (1) to *strongly agree* (7). The instrument has been shown to have satisfactory test-retest reliability after one year (r = .68, p < .001), and good predictive validity for relevant measures including GPA, extracurricular activities, and television watching for adolescents (Duckworth & Quinn, 2009). Internal consistency in the present study was satisfactory (α = .75).

Concurrent Validity

Goldberg's Mini-Markers. Goldberg's Mini-Marker's (Saucier, 1994) is a brief version of Goldberg's Unipolar Big-Five Markers, measuring the Five Factor Model of personality traits. This 40-item scale asks respondents to describe how they rate on various characteristics, based on how they perceive themselves in general. There are eight items per subscale, with items including "talkative" (extraversion), "imaginative' (openness), "organized" (conscientiousness), "warm" (agreeableness), and "temperamental" (neuroticism). Items were answered on a Likert scale ranging from *not at all* (1) to *totally* (7). The factorial structure of this measure is sound, as tested by principal components analysis (Saucier, 1994) and construct validity was demonstrated with the original 100-item scale (Goldberg's Unipolar Big-Five Markers, 1992). Moreover, construct validity was demonstrated for Golberg's Big Five Markers through correlations with

other measures of the FFM such as the Big Five Inventory (John & Srivastava, 1999), as well as Costa and McCrae's NEO Personality Inventory (1985; Goldberg, 1992) and NEO Five Factor Inventory (1992b; Gow et al., 2005). In the current study, internal consistency scores (Cronbach's α.) for its five subscales ranged between .74 and .82.

Discriminant Validity

Marlowe Crowne Social Desirability Scale (MCSDS). The MCSDS (Crowne & Marlowe, 1960) consists of 33 true or false items which assess an individual's level of avoidance of disapproval. The items include both desirable but uncommon behaviours (e.g., "I sometimes try to get even, rather than forgive and forget") and undesirable but common behaviours (e.g., "At times I have really insisted on having things my own way"). The scale has been shown to have good test-retest reliability, with a correlation of .88 reported after one month (Crowne & Marlowe, 1964), and a correlation of .84 reported after one week (Fisher, 1967). Concurrent validity of the measure was demonstrated as it had only low to moderate correlations with the Edwards Social Desirability Scale (Edwards, 1957) and the Self-Deceptive Enhancement (Paulhus, 1991).

Results

Construct Validity

Construct validity analyses proceeded in two steps: firstly, correlations between BETI subscales were assessed and, secondly, correlations between the BETI subscales and relevant constructs were evaluated. For the correlations among BETI subscales, absent to modest positive associations were expected between positive behavioural manifestations of traits (i.e., extraversion, conscientiousness, openness to experience, and agreeableness). Absent to modest

negative associations were expected between neuroticism and all four positive behavioural manifestations of traits. Results presented in Table 4 were in line with those expectations.

Second, correlations were performed between the dimensions of the BETI and a selection of related constructs (see Table 5). In general, positive behavioural manifestations (e.g., openness to experience, conscientiousness, agreeableness, and extraversion) were significantly and positively associated with positive constructs and negatively associated with negative constructs. Conversely, behavioural manifestations of neuroticism were negatively associated with positive constructs and positively associated with negative constructs. Moreover, as expected, the four positive behavioural manifestations (e.g., openness to experience, conscientiousness, agreeableness, and extraversion) were significantly positively correlated with positive affect, while behavioural manifestations of neuroticism were negatively correlated with positive affect and positively correlated with negative affect. Interestingly, behavioural conscientiousness was also significantly negatively correlated with negative affect. This could be explained by the nature of conscientious behaviours. Because behavioural manifestations of conscientiousness are characterized by productivity and order, it is possible that the presence of these behaviours would be associated with the absence of negative emotions. Similarly, a positive correlation was found between life satisfaction and behavioural manifestations of conscientiousness, while a negative correlation was found between life satisfaction and behavioural manifestations of neuroticism. Given that conscientious behaviours are characterized by progress and productivity, and neurotic behaviours are largely conceptualized as negative emotions, these associations with life satisfaction were anticipated. Finally, in regard to depression and anxiety, the strongest and only positive correlations were found with behavioural

manifestations of neuroticism. These associations supported the conceptualization of neurotic behaviours as managing negative emotions and apprehension.

Moreover, magnitudes of correlations reflected the theoretical relevance of each construct to each behavioural manifestation. For example, correlations with personal growth were strongest for behavioural openness to experience. Openness behaviours are conceptualized by unusual activities that take one outside of their comfort zone and by interactions with different types of people, thus these behaviours should support personal growth. The strongest positive correlation with vitality was found for behavioural manifestations of extraversion. Vitality is conceptualized as positive energy and alertness (Ryan & Deci, 2008), and therefore when one engages in extraverted behaviours, it is presumed that they will have high levels of vitality. Prosocialness was significantly positively correlated to the highest magnitude with agreeable behaviours, which are largely construed as interacting positively with others. Organization, perseverance, and personal standards were all significantly positively correlated most strongly with behavioural manifestations of conscientious behaviours.

Concurrent Validity

As displayed in Table 6, significant moderate to high correlations were revealed between the BETI dimensions and their respective personality trait. Each subscale of the BETI was correlated most strongly with its respective trait measure than with other traits. These correlations support the concurrent validity of the BETI with the relevant trait dimensions, and suggest that the BETI represents unique constructs from the subscales of Goldberg's Mini Markers (Saucier, 1994). Specifically, findings indicate that the presence or absence of a FFM personality trait is not always accompanied by the presence or absence of the behaviours

associated with that trait. Rather, it can be presumed that personality traits and behavioural manifestations are distinct but related constructs.

Social Desirability: Low Socially Desirable Responding

The mean score (M = 14.01; SD = 4.42) of participants on the MCSDS was lower than the cut-off score indicative of faking good identified in previous research (Lambert et al., 2016). Lambert and colleagues (2016) found that scores above 21 on the MCSDS had the optimal balance of sensitivity and specificity for identifying faking good. Crowne and Marlowe (1964) also identified a mean of 15.5 (SD = 4.4) on the MCSDS in a sample of 300 college students. The results of the current study indicate that participants' responses to the BETI did not display higher than average scores on social desirability, and were not high enough to suggest dishonest responding.

General Discussion

The central goal of this study was to conceptualize and validate a model of the behavioural manifestations of the personality traits of the FFM. The proposed conceptualization comprised five dimensions representing the behavioural manifestations of five personality traits: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. An instrument was successfully developed to operationalize this novel conceptual model: the Behavioural Manifestation of Traits Inventory (BETI). Results of exploratory and confirmatory factor analyses revealed that the items of the BETI adopted a clean five factor structure that corroborates the proposed taxonomy of behavioural manifestations of personality traits. Moreover, model fit was acceptable. Internal consistency of subscales was satisfactory. The BETI also displayed acceptable construct and concurrent validity. Furthermore, the BETI did not

present issues with social desirability. Overall, findings validated the proposed model of behavioural manifestations of personality traits.

While literature using the FFM is extensive, there is limited research on the behavioural manifestations of the FFM. The current study proposed that behavioural manifestations of personality traits can be articulated into a related, yet distinct, cogent theoretical framework. This research expands on previous literature that provided initial attempts to operationalize behaviours that are expressions of the personality traits of the FFM. That is, although some previous studies have proposed limited measures of behavioural manifestations of the FFM, none targeted the five dimensions jointly using sound methods, and this preliminary research proceeded in the absence of a conceptual framework.

For instance, Markey and colleagues (2004) adopted a Q sort technique developed by Funder and colleagues (2000) to describe behaviours associated with the Big Five traits. In addition to the impracticality of the Q sort procedure, Markey and colleagues' work was exclusively developed to describe behaviour within dyadic social interactions, and its connection to the FFM is limited to extraversion.

More recently, Tackman and colleagues (2020) utilized an electronically activated recorder which participants downloaded to their mobile devices. The application recorded their audio for two to six days. The recordings were coded into behaviours and correlated with measures of the Big Five. However, audio recordings were limited to spoken words and thus it was assumed that all behaviours could be captured by the vocal language of participants. This presents a critical limitation of Tackman and colleagues' study, as not all behavioural expressions of personality can be identified audibly. For example, an individual who is employing conscientious behaviours will be unlikely to vocalize that they are doing so. They will

simply partake in cleaning or working hard without engaging in any dialogue about the behaviours. Also, Tackman and colleagues (2020) did not develop any theoretical underpinnings nor hypotheses regarding the behavioural manifestations of each personality trait.

The theoretical framework proposed herein provides a conceptualization of behaviours that occur in everyday life, beyond social interactions and beyond those that can solely be captured by language used in one's day to day life.

In a study by Jackson and colleagues (2010), a measure was developed to examine behavioural indicators of conscientiousness. Although the factor structure and validity of the instrument was established in their study, the number of items was impractical (e.g., 185 behavioural indicators) and the measure was limited to behavioural manifestations of conscientiousness. Similarly, in a study where van Allen (2016) manipulated openness to experience states, the researcher did provide conceptual underpinnings for the indicators used to represent openness to experience. However, behavioural manifestations were not distinguished from the personality trait (i.e., behaviours were not differentiated from thoughts and feelings associated with openness to experience), and this study did not offer indicators for the other four personality traits of the FFM. The model presented in the current study advances the conceptual formalization of behavioural manifestations of traits by comprehensively and efficiently including prototypical manifestations of all five traits of the FFM, and developing and validating a practical instrument to assess the behavioural manifestations. To the best of our knowledge, this is the first time that this is achieved. It is also noteworthy that our conceptual model was rigorously backed up by the wide array of results obtained in the present studies.

The proposed framework of behavioural manifestations differentiated the specific, flexible behaviours individuals display from their consistent, stable personality traits. This study

introduced a novel approach to understanding behaviour. That is, that traits differ from behaviours, and that these behaviours can be understood as manifestations of the FFM traits. Thus, although it is undeniable that personality traits and their behavioural manifestations are related, the conceptualization of behavioural manifestations proposed herein is unique from that of personality traits, as traits are defined as enduring characteristics of the person that are abstract and stable over time, while behavioural manifestations are conceived as being concrete and specific, as well as more variable and more vulnerable to the influences of external factors. The moderate associations revealed between personality traits and their corresponding behavioural manifestations suggest that, although individuals who possess high levels of a personality trait are more likely to engage in that trait's behavioural manifestation, the presence of a trait does not necessarily indicate the presence of behaviours. For instance, an individual who is high on trait conscientiousness may not always display behavioural manifestations of conscientiousness. For example, they may not always concentrate on the task at hand, maintain order in their life, and keep things clean. Likewise, a highly extraverted individual may not always speak in groups of people or seek out social activities, and an individual high on openness to experience may not always exchange ideas with people with views radically different from theirs, engage in creative hobbies, or chase unusual experiences. It is suggested herein that a distinction is required between traits and behaviours. Results support the tenability of this notion.

Although the current study presents a novel conceptualization of behavioural manifestations and successfully validated a taxonomy to its effect, there are certain limitations to the study's design. Firstly, while there is some ethnic diversity in the samples, the majority of participants in both studies were Caucasian, and all participants were enrolled in a Canadian

university. This is notable considering literature on the FFM, as the full Big Five model has not always been consistent across different languages and cultures. Research has shown that in some cultures, only three factors (i.e., conscientiousness, agreeableness, and extraversion) are derived from factor analysis (Gurven et al., 2013; McCrae et al., 2021). Such findings suggest that the current conceptualization may be inapplicable to those cultures. Moreover, although the FFM asserts that personality traits are universal, inherent, and less susceptible to external influence, the theory proposes that expressions of traits are vulnerable to cultural influences (Costa & McCrae, 1995). Thus, in order to verify if the behavioural manifestations are universally endorsed, replication of this framework across diverse cultures is needed. Likewise, the current theoretical framework should be generalized to non-Western populations with caution, as personality psychology is largely derived from Western cultures. Given vast differences in cultural norms and practices across Western and non-Western cultures, it is likely that behavioural manifestations of the FFM would take different forms.

Finally, within a Canadian context, it is especially important to consider the dearth of knowledge surrounding Indigenous populations, as these populations have traditionally been excluded from much of research in psychology. The majority of personality research conducted on these populations adopts a strength-based approach, where the emphasis is on the resilience displayed by Indigenous peoples as a result of the colonization, discrimination, and intergenerational trauma faced by Indigenous peoples (e.g., Burack et al., 2019). This emphasis on resilience and strength has impeded the study of other aspects of Indigenous personalities, thus personality psychology does not have a sufficient understanding of the breadth and depth of psychological knowledge about Indigenous populations. In order to develop a model of

behavioural manifestations that is applicable to Indigenous peoples, exploration of this knowledge needs to be expanded.

Additionally, the current study does not address potential factors that influence behaviours beyond the Big Five personality traits. Future research could examine potential factors that impact behaviours in order to gain a more thorough understanding of the distinction between personality traits and behavioural manifestations.

Because personality is the widespread study of people's thoughts, feelings, and behaviours, the distinction made herein regarding personality traits and behaviours can contribute to the understanding of personality. If researchers study behavioural manifestations of traits and personality traits separately, they can more accurately capture the antecedents and outcomes of behaviours, rather than grouping thoughts, feelings, and behaviours together. From a fundamental viewpoint, the conceptualization and successful validation of a taxonomy of behavioural manifestations of the FFM, is an important step forward as it is liable to be very useful for researchers and clinicians that are interested in advancing knowledge of behavioural manifestations of traits. This novel theoretical framework can be helpful for researchers interested in the frequency or antecedents of behaviours that are associated with the Big Five personality traits, as the instrument developed in this study can be used to measure behavioural expressions of the FFM. The conceptualization presented can also be adopted by researchers who wish to manipulate behavioural manifestations of the FFM in experimental research. Moreover, the conceptualization endorsed in the current research proposes a discrepancy between personality traits and behavioural manifestations of those traits. Future research can examine factors that facilitate or impede behavioural manifestations, beyond personality traits.

The current findings also offer potential applied contributions. Given the fundamental role that personality holds in numerous life domains, including well-being and psychological distress (Anglim & Horwood, 2021; Boyce et al., 2013; de Vos et al., 2022; Nikčević et al., 2021; Oshio et al., 2018; Shi et al., 2015; Shokrkon & Nicoladis, 2021; Tse et al., 2021), physical health (Blanchard et al., 2022; Hampson et al., 2016; van Dijk et al., 2016; Thomas et al., 2022;), sports and exercise (Hearon & Harrison, 2021; Piepiora & Piepiora, 2021; Sutin et al., 2016), and social media use (Annisette, & Lafreniere, 2017; Choi & Shin, 2017; Kircaburun et al., 2018; Marshall et al., 2015), the behavioral manifestation of traits framework presented herein can be valuable to mental health professionals. Because certain personality traits are associated with more benefits (i.e., extraversion, conscientiousness, openness to experience, and agreeableness), while neuroticism is associated with more negative outcomes, understanding the behaviours associated with these traits can assist professionals who are interested in improving the well-being of individuals.

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Footnotes

[1] Whereas “extraverted/introverted” and “emotionally stable/neurotic” are terms that are commonly used in the literature to refer to the poles of the extraversion and neuroticism dimensions, respectively. No such labels have been created or utilized for the other three dimensions (openness to experience, conscientiousness, and agreeableness) of the Five Factor Model.

[2] The description of the sample pertains to the final participants that were retained after deletion of outliers (please refer to the Preliminary Analyses subsection below).

[3] The description of the sample pertains to the final participants that were retained after deletion of outliers (please refer to the Preliminary Analyses subsection below).

[4] Four post hoc modifications (correlations between same factor measurement error values) were performed.

Table 1

Descriptive Statistics of BETI Items (Study 1)

	M	*SD*	Skewness	Kurtosis
Agreeableness	**5.58**	**.89**	**-.43**	**-.40**
Agreeableness9	5.73	1.13	-.72	.39
Agreeableness4	5.78	1.13	-.76	.09
Agreeableness5	5.91	1.15	-1.10	1.10
Agreeableness8	5.01	1.43	-.39	-.16
Agreeableness10	5.46	1.12	-.32	-.48
Agreeableness7	5.55	1.10	-.39	-.50
Neuroticism	**4.29**	**1.10**	**.06**	**-.30**
Neuroticism13	3.50	1.56	.55	-.23
Neuroticism9	3.69	1.74	.26	-.79
Neuroticism6	4.50	1.60	-.14	-.70
Neuroticism1	4.01	1.52	.24	-.59
Neuroticism7	4.70	1.57	-.20	-.66
Neuroticism10	5.33	1.53	-.60	-.43
Conscientiousness	**5.31**	**.98**	**-.19**	**-.50**
Conscientiousness8	5.53	1.18	-.44	-.53
Conscientiousness9	5.50	1.17	-.45	-.52
Conscientiousness4	5.19	1.29	-.38	-.32
Conscientiousness12	5.44	1.22	-.48	-.30
Conscientiousness7	5.09	1.31	-.33	-.24
Conscientiousness13	5.09	1.46	-.40	-.43
Extraversion	**4.44**	**1.06**	**-.24**	**.08**
Extraversion2	4.83	1.67	-.35	-.73
Extraversion12	5.14	1.55	-.63	-.18
Extraversion3	3.78	1.84	.10	-1.02
Extraversion13	4.42	1.52	-.13	-.37
Extraversion7	4.64	1.60	-.22	-.61
Extraversion1	5.13	1.40	-.52	-.30
Openness	**5.15**	**.93**	**-.11**	**-.51**
Openness2	4.44	1.64	-.01	-.86
Openness16	5.34	1.40	-.48	-.43
Openness12	5.26	1.41	-.49	-.48
Openness6	5.99	1.19	-1.13	.57
Openness15	4.41	1.67	-.07	-.92
Openness8	5.49	1.30	-.65	-.12

Notes. Openness = openness to experience. The theoretical range of all variables is 1-7.

Table 2

Exploratory Factor Analysis of the BETI (Study 1)

Items	Factors				
	1	2	3	4	5
Agreeableness9	.78				
Agreeableness4	.73				
Agreeableness5	.66				
Agreeableness8	.61				
Agreeableness10	.61				
Agreeableness7	.36				
Neuroticism13		.67			
Neuroticism9		.66			
Neuroticism6		.65			
Neuroticism1		.61			
Neuroticism7		.57			
Neuroticism10		.52			
Conscientiousness8			-.79		
Conscientiousness9			-.78		
Conscientiousness4			-.75		
Conscientiousness12			-.73		
Conscientiousness7			-.65		
Conscientiousness13			-.55		
Extraversion2				.74	
Extraversion12				.67	
Extraversion3				.57	
Extraversion13				.53	
Extraversion7				.48	
Extraversion1				.41	
Openness2					.66
Openness16					.55
Openness12					.51
Openness6	.35				.47
Openness15					.42
Openness8					.30
Eigenvalues	6.98	3.22	2.61	1.97	1.59
% variance explained	23.25	10.74	8.70	6.58	5.30

Table 3

Descriptive Statistics of the BETI Items (Study 2)

	M	*SD*	Skewness	Kurtosis
Agreeableness	**4.84**	**.71**	**-.58**	**.25**
Agreeableness1	5.99	1.02	-.88	.35
Agreeableness2	5.88	1.06	-.82	.15
Agreeableness3	5.22	1.45	-.44	-.49
Agreeableness4	5.41	1.10	-.42	-.05
Agreeableness5	5.47	1.13	-.58	.74
Agreeableness6	5.87	1.06	-.87	1.10
Neuroticism	**3.82**	**.96**	**-.02**	**-.13**
Neuroticism1	4.80	1.72	-.30	-.87
Neuroticism2	5.76	1.45	-1.17	.78
Neuroticism3	3.61	1.60	.51	-.61
Neuroticism4	4.03	1.51	.26	-.59
Neuroticism5	3.60	1.63	.34	-.61
Neuroticism6	4.92	1.56	-.31	-.72
Conscientiousness	**4.62**	**.76**	**-.66**	**.66**
Conscientiousness1	5.25	1.35	-.90	.87
Conscientiousness2	5.56	1.14	-.80	.86
Conscientiousness3	5.47	1.41	-.77	.01
Conscientiousness4	5.67	1.10	-.72	.72
Conscientiousness5	5.19	1.25	-.60	.08
Conscientiousness6	5.24	1.23	-.65	.26
Extraversion	**3.65**	**.77**	**.22**	**.06**
Extraversion1	3.77	1.51	.19	-.42
Extraversion2	3.26	1.54	.33	-.57
Extraversion3	4.08	1.61	.21	-.79
Extraversion4	4.69	1.58	-.18	-.60
Extraversion5	5.27	1.54	-.64	-.16
Extraversion6	4.48	1.52	-.15	-.59
Openness	**3.73**	**.86**	**.23**	**-.37**
Openness1	4.14	1.51	.17	-.72
Openness2	4.00	1.39	.24	-.38
Openness3	4.40	1.35	-.12	-.21
Openness4	4.73	1.34	-.15	-.20
Openness5	4.63	1.49	-.17	-.47
Openness6	4.21	1.30	.15	.01

Notes. Openness = openness to experience. The theoretical range of all variables is 1-7.

Table 4

Correlations between the Subscales of the BETI (N = 297)

Behavioural dimension	Openness to experience	Conscientious-ness	Extraversion	Agreeableness	Neuroticism
Openness.	1.00	.10	-.43***	.25***	-.20*
Conscientiousness	.09	1.00	.11	.45***	-.33***
Extraversion	.29***	.03	1.00	.33***	.00
Agreeableness	.23***	.31***	.20***	1.00	-.09
Neuroticism	-.21***	-.23***	-.02	.10	1.00

Notes. Openness = openness to experience

*p<0.05, **p<0.01, ***p<0.001

Table 5

Correlations between the Subscales of the BETI and Relevant Constructs

Behavioural manifestation	Positive affect (*N* = 139)	Negative affect (*N* = 139)	Life satisfaction (*N* = 142)	Anxiety (*N* = 142)	Depression (*N* = 141)	Vitality (*N* = 141)	Personal growth (*N* = 152)	Prosocialness (*N* = 152)	Organization (*N* = 154)	Personal standards (*N* = 155)	Perseverance (*N* = 155)
Openness to experience	.34***	-.13	.11	-.31***	-.13	.27**	.49***	.25**	-.01	.20*	.30***
Conscientiousness	.41***	-.27**	.31***	-.20*	-.27**	.39***	.24**	.06	.63***	.45***	.61***
Extraversion	.30***	-.10	.15	.03	-.08	.33***	.11	.25**	-.01	.01	.06
Agreeableness	.27**	.02	.10	.02	-.01	.22**	.42***	.64***	.40***	.18*	.37***
Neuroticism	-.36***	.62***	-.36***	.67***	.53***	-.48***	-.17*	.16*	.08	-.08	-.33***

Note. *p<0.05, **p<0.01, ***p<0.001.

Table 6

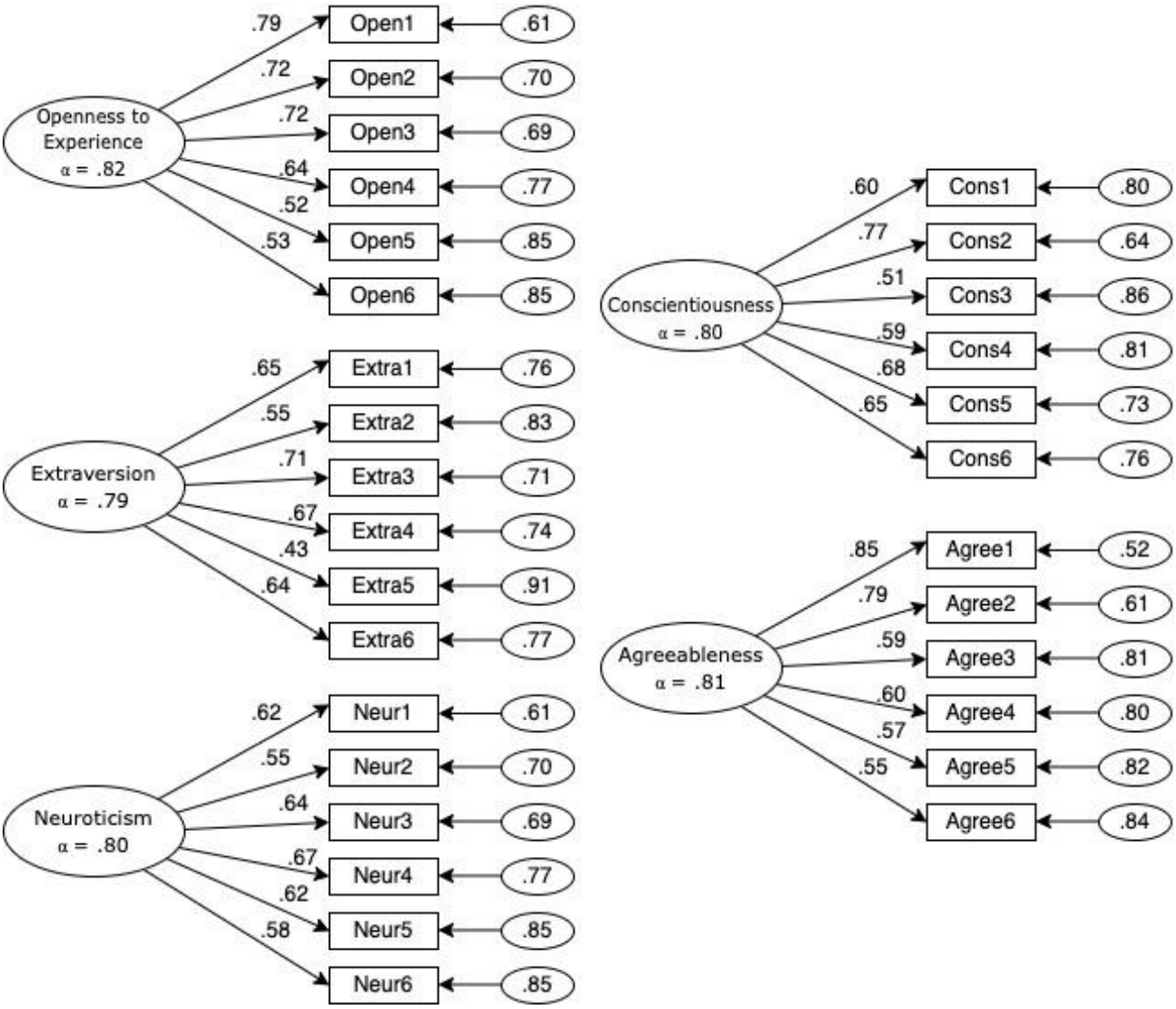
Correlations between the Subscales of the BETI and the Five Factor Model Traits (N = 142)

Behavioural dimension	Openness to experience	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Openness to experience	.53***	.04	.35***	-.04	-.25**
Conscientiousness	.12	.72***	.01	.35***	-.26**
Extraversion	.04	.01	.73***	.18*	.02
Agreeableness	.21*	.27***	.20*	.55***	-.03
Neuroticism	-.15	-.27**	-.11	-.16	.68***

Note. *p<0.05, **p<0.01, ***p<0.001

Figure 1

Confirmatory Factor Analysis



Note. All estimated parameters are significant at the $p < .001$ level.

Appendix

Behavioural Expressions of Traits Inventory (BETI)

To what extent are the following statements typical to how you behave?

		Not at all			Moderately			Very typical
1.	I do nice things for others.	1	2	3	4	5	6	7
2.	I function poorly because of my negative emotions.	1	2	3	4	5	6	7
3.	I speak up in group conversations.	1	2	3	4	5	6	7
4.	I chase unusual experiences.	1	2	3	4	5	6	7
5.	I give positive feedback.	1	2	3	4	5	6	7
6.	I make changes to spice up my life.	1	2	3	4	5	6	7
7.	I work diligently.	1	2	3	4	5	6	7
8.	I choose lively environments over quiet ones.	1	2	3	4	5	6	7
9.	I do things that take me out of my comfort zone.	1	2	3	4	5	6	7
10.	I collapse under pressure.	1	2	3	4	5	6	7
11.	I show understanding.	1	2	3	4	5	6	7
12.	I keep things clean.	1	2	3	4	5	6	7
13.	I react poorly to stressful situations.	1	2	3	4	5	6	7
14.	I help others.	1	2	3	4	5	6	7
15.	I seek out loud environments.	1	2	3	4	5	6	7
16.	I exchange ideas with people that have views that are radically different from mine.	1	2	3	4	5	6	7
17.	I put others' needs before my own.	1	2	3	4	5	6	7
18.	I concentrate on the task at hand.	1	2	3	4	5	6	7
19.	I choose to spend an evening home alone. (R)	1	2	3	4	5	6	7
20.	I maintain order in my life.	1	2	3	4	5	6	7
21.	I struggle with making decisions.	1	2	3	4	5	6	7
22.	I participate in creative hobbies.							
23.	I accommodate others.	1	2	3	4	5	6	7
24.	I spend most of my time with other people.	1	2	3	4	5	6	7
25.	I obsess about minor things.	1	2	3	4	5	6	7
26.	I go out with groups of people.	1	2	3	4	5	6	7
27.	I pay careful attention to the tasks I do.	1	2	3	4	5	6	7
28.	I do unusual activities to broaden my horizons.	1	2	3	4	5	6	7
29.	I overanalyze situations.	1	2	3	4	5	6	7
30.	I make sure I take care of details when I perform a task.	1	2	3	4	5	6	7

Notes. The item identified by (R) is reverse coded. Scoring key: Openness to experience: 4, 6, 9, 16, 22, 28; Conscientiousness: 7, 12, 18, 20, 27, 30; Extraversion: 3, 8, 15, 19, 24, 26; Agreeableness: 1, 5, 11, 14, 17, 23; Neuroticism: 2, 10, 13, 21, 25, 29

CHAPTER III

ARTICLE 2

Title: Understanding the associations between Five Factor Model personality traits and motivation: The mediating roles of trait behavioural expressions and psychological need satisfaction

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Abstract

Research has shown that the Five Factor Model (FFM) personality traits influence autonomous motivation. However, the mechanisms that explain these associations remain to be elucidated. The goal of the current study was to examine factors liable to mediate these associations: behavioural expressions of personality traits and basic psychological need (BPN) satisfaction. Structural equation modeling was performed on correlational questionnaire data (*N* = 635). Results showed that openness to experience, conscientiousness, extraversion, and agreeableness were positively, and neuroticism negatively, associated with BPN satisfaction. Behavioural expressions of personality traits mediated the associations between their respective trait and BPN satisfaction. Moreover, BPN satisfaction mediated positive associations between the beneficial behavioural expressions of traits (openness to experience, conscientiousness, extraversion, and agreeableness) and autonomous academic and friendship motivation, and mediated the negative associations between behavioural neuroticism and autonomous academic and friendship motivation. Lastly, behavioural manifestations of traits and BPN satisfaction acted as sequential mediators of the associations between FFM traits and both academic and friendship motivation. These findings expand our understanding of the relationships between personality traits and motivation by identifying two processes (behavioural manifestations of traits and psychological need satisfaction) through which it proceeds.

Keywords: Five Factor Model, personality traits, behavioural expressions of personality traits, Self-Determination Theory, psychological need satisfaction, academic motivation, friendship motivation

Understanding the associations between Five Factor Model personality traits and motivation: The mediating role of trait behavioural expressions and psychological need satisfaction

Motivation encompasses the energy and intention that people direct towards a goal (Ryan & Deci, 2000). Interest in motivation is prominent across numerous disciplines in psychology because of the importance it holds in several life domains, as well as the well-documented connections it has with outcomes such as achievement (Alamer & Alrabai, 2023) and well-being (Nunes et al., 2023). Increasing knowledge on factors that contribute to motivation is key in order to establish more effective ways to best achieve it in its most optimal forms. One antecedent that has been found to influence motivation is personality traits. However, the factors that explain this association remain unclear. Therefore, the goal of the present study was to examine two concepts liable to mediate this association: behavioural manifestations of personality traits and basic psychological need (BPN) satisfaction. The outcome of interest in the present study is motivation, and it will be examined through the lens of Self-Determination Theory (SDT).

Self-Determination Theory (SDT)

SDT (Deci & Ryan, 1985; 2002; 2013; Ryan & Deci, 2017) is a macro-level theory of human motivation that emphasizes the importance of volitional behaviour. Ryan and Deci (2017) distinguish between different motives that are situated on a self-determination continuum, where self-regulation ranges from *amotivation* to *controlled* (non self-determined extrinsic motives) to *autonomous* (self-determined extrinsic and intrinsic motives). Amotivation is conceptualized as a complete absence of intention and motivation to behave. Controlled motives, which encompass external and introjected regulation, drive behaviours that are performed out of outward (external

regulation) or internal (introjected regulation) pressures and are experienced as constraining. Autonomous motivation, which includes identified and integrated regulation (extrinsic) and intrinsic motivation, involves acting out of personal choice and offers the platform for people to express their authentic selves and values. Identified regulation involves performing an action because it is genuinely valued, while integrated regulation consists of behaviours that are in harmony with self-schemas and have been incorporated into one's self-concept. Lastly, intrinsic motivation underscores behaviours that are pleasurable, rather than instrumental, and constitutes the pinnacle of autonomous motives.

Of particular interest in this study on young adult university students, is self-determined academic and friendship motivation. These two domains were chosen due to their complementary nature and to their centrality in the lives of individuals within this population.[1]

Academic Motivation

SDT has been used in extensive research in education (Corpus et al., 2022; Deci & Ryan, 2016; Howard et al., 2021; Leenknecht et al., 2021; Litalien et al., 2017; Liu et al., 2021; Ljubin-Golub et al., 2020; Oram et al., 2022; Ryan & Deci, 2009). Studies have shown that students who hold more autonomous motivations for carrying out their academic work experience more positive outcomes than do those who pursue education with controlled motivations. For example, studies have revealed that autonomous academic motivation is associated with lower levels of intentions to drop out of school (Howard et al., 2021; Legault et al., 2006; Litalien & Guay, 2015; Litalien et al., 2017; Jeno et al., 2023; Véronneau & Trempe, 2022), higher levels of learning gains and perceived knowledge transfer (Hsu et al., 2019; Ruiz-Gallardo et al., 2013), as well as increased school satisfaction (Litalien et al., 2015, Turner, 2023). Students with high autonomous motivation and low controlled motivation towards school are also more likely to

earn higher course grades (Mouratidis et al., 2021; Richardson et al., 2012; Wu, 2019) and to experience higher academic engagement (Wu, 2019) and achievement (Hsu et al., 2019; Luginbuhl et al., 2016; Mammadov et al., 2021; Van Soom & Donche, 2014; Wu, 2019). Moreover, autonomous motivation in students has been associated with increased well-being, while conversely, controlled motivation has been shown to decrease well-being (Howard et al., 2021), measured as vitality (Litalien et al., 2019), positive emotions (Bochiş et al., 2022; Hope et al., 2019), and life satisfaction (Hope et al., 2019).

Relationship Motivation

While the bulk of research on self-determined motivation and relationships has focused on romantic relationships (Blais et al., 1990; Gaine & La Guardia, 2009; Kindelberger & Tsao, 2014; Knee et al., 2005), research on motivation in friendships is a budding area of inquiry. However, two innovative studies have documented the relevance and usefulness of SDT in this life domain.

Firstly, Richard and Schneider (2005) used the SDT continuum to measure friendship motivation in preadolescence and early adolescence. Findings revealed that friends had similar levels of motivation, self-determined friendship motivation was associated with less loneliness, and autonomously motivated individuals held less hostile and more prosocial goals in situations of conflict (Richard & Schneider, 2005).

Secondly, attachment styles, relational self-schemas, and motivation towards the friendship with a best friend were examined (Larabie, 2015). This study documented that the six types of motivation defined by SDT were present and relevant for motivation towards friendship in young adults. Moreover, results showed that secure attachment, positive relational self-schemas, and autonomous motivation towards friendship, displayed bi-directional relationships.

Basic Psychological Need Theory

Because self-determined motives are associated with beneficial outcomes, and controlled motives with detrimental ones, understanding the conditions that foster or thwart autonomous self-regulation is of central importance. Basic Psychological Need Theory (BPNT) proposes that the most fundamental antecedent of self-determined motivation is the satisfaction of three basic psychological needs (BPN): autonomy, competence, and relatedness (Deci & Ryan, 1985; 2002; 2013; Ryan & Deci, 2017). BPN theory posits that autonomous motivation, and its positive outcomes, are dependent and covary according to the degree of fulfillment of these three needs (Ryan & Deci, 2017).

First, the key to perceiving that the need for *autonomy* is satisfied is feeling ownership over one's behaviour and acting intentionally. Second, *competence* is the basic need to feel effectance and mastery. Last, *relatedness* encompasses feeling socially connected and cared for by others.

Basic Psychological Needs and Academic Motivation

A wealth of research has highlighted the importance of BPN satisfaction for the motivation of undergraduate university students (see Guay, 2022 for a review). For instance, it is well-established that autonomy supportive instructors help to increase the BPN satisfaction of students, which in turn, enhances their well-being and autonomous motivation (see Okada, 2023 for a review). Furthermore, when measured collectively, BPN satisfaction has been linked to increased pleasant affect, group satisfaction, and intrinsic motivation in groups of undergraduate students (Kelly et al., 2008). Longitudinal research has also shown that intrinsic motivation lowered in students as a result of declines in BPN satisfaction (Gnambs & Hanfstingl, 2016). In addition to the positive association BPN satisfaction has with autonomous motivation (see

Bureau, 2022 for a review), it has also been linked to a variety of positive outcomes, such as lower levels of procrastination (Oram & Rogers, 2022), higher academic engagement (Guo, 2018; Karimi & Sotoodeh, 2019), and higher campus satisfaction (Jiang & Tanaka, 2022). Moreover, studies have also shown that BPN satisfaction has a positive impact on well-being (Neufeld & Malin, 2020), as it has been associated with increased life satisfaction (Guo, 2018; Hernández et al., 2022), higher levels of positive emotions (Holzer et al., 2021), and lower levels of depression (Jiang & Tanaka, 2022).

Basic Psychological Needs and Motivation Towards Relationships

The importance of BPN satisfaction has also been explored within relationships, though this documentation is very limited (Baard et al., 2004; Milyavskaya, & Koestner, 2011; Przybylski et al., 2013; Xie et al., 2018). Moreover, the associations between BPN satisfaction and motivation towards friendships, specifically, is unknown. However, studies on romantic relationships found that one romantic partner's BPN satisfaction was associated with more relationship satisfaction and well-being for the other partner (Hadden et al., 2014; Patrick et al., 2007). Also, in one study, Deci and colleagues (2006) examined 98 American undergraduate student close-friend dyads. Results showed that BPN satisfaction for one member of the dyad correlated to that of the other friend, and that perceived autonomy support within the friendship predicted BPN satisfaction and well-being.

To summarize, psychological need satisfaction is a well-established antecedent of motivation and there is empirical support of this notion in both motivational contexts relevant here: education and relationships with friends. Academic and friendship motivation are the utmost outcomes considered in this study. At this point, it is useful to restate that the present study's main focus is processes involved in the relationship between personality traits and the

aforementioned motivational outcomes. The next building block of the conceptual rationale of this research undertaking is therefore the incipient construct of this association: Personality traits.

Five Factor Model of Personality

Personality refers to an individual's characteristic patterns of thoughts, feelings, and behaviours (Allport, 1937; Costa & McCrae, 1985; 1992; Funder, 2019). Within the field of personality, traits are defined as dispositions to occupy certain types of psychological or emotional states (Bergner, 2020). The most widely accepted conceptualization of personality traits is the Five Factor Model (FFM; Costa & McCrae, 1995; Goldberg, 1990; 1992; John, 1990) which identifies five broad factors known as the Big Five: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Openness to experience involves characteristics such as curiosity and creativity; conscientiousness comprises order, dutifulness, and self-discipline; extraversion encompasses sociability, enthusiasm, and assertiveness; agreeableness includes altruism, compliance, and trust; and neuroticism is described as the tendency to experience negative emotions, such as anxiety and self-consciousness (Costa & McCrae, 1995; Zell & Lesick, 2022). Abundant research demonstrates that these personality traits have an influence on behaviour (Malesky et al., 2022; Nguyen, 2022; Peng & Dutta, 2022).

Behavioural Expressions of the FFM

The self-as-process in complementarity to self-as-content involves dynamic features such as behavioural trends and emphasizes the awareness of experiences that are occurring in the moment (Atkins & Styles, 2015; Lewin et al., 2021). While personality traits are construed as enduring, static characteristics, behavioural expressions of personality traits can be conceptualized as central characteristics of the self-as-process that are specific, concrete, and

more variable than traits. Sullivan and Green-Demers (2023) validated a conceptual model of behaviours that represent expressions of the Big Five personality traits. Behavioural expressions of openness to experience are construed as trying new things, engaging with different types of people, and participating in creative hobbies. Conscientious behavioural expressions include cleaning, working diligently, and paying careful attention to detail when performing tasks. Behavioural manifestations of extraversion involve speaking up in conversations, putting oneself in lively situations over quiet ones, and spending time with people. Agreeable behavioural expressions encompass doing nice things for other people, showing understanding, and giving positive feedback. Behavioural manifestations of neuroticism comprise reacting and functioning poorly in stressful situations, overanalyzing situations, and struggling with decision making (Sullivan & Green-Demers, 2023).

Personality Traits, Need Satisfaction and Self-Determined Motivation

While the associations between BPN satisfaction and motivation are well-established (Iles et al., 2018), research observing the impact of other intrapersonal factors on motivation is less documented. Personality variables are promising candidates in this respect and there is an emergent documentation on this topic. For instance, some studies have revealed that people higher in grit had higher levels of BPN satisfaction, and that BPN satisfaction mediated the negative relationships grit had with depression and negative affect, and the positive associations grit had with life satisfaction and positive affect (Jiang et al., 2020; Jin & Kim, 2017).

Research has also begun to explore the relationships between the Big Five personality traits and BPN satisfaction. Studies have consistently shown positive associations between openness to experience, conscientiousness, extraversion, as well as agreeableness with BPN satisfaction, and negative associations between neuroticism and the satisfaction of all three needs

(Andreassen et al., 2010; Bratko et al., 2022; Nishimura & Suzuki, 2016; Simsek & Koydemir, 2013; Volodina et al., 2019).

Furthermore, a growing body of research has examined the relationships between the FFM personality traits and motivation. Studies have shown positive associations between openness to experience, conscientiousness, extraversion, and agreeableness with autonomous motivation, and negative associations between neuroticism and autonomous motivation (Ingledew et al., 2004; Komarraju et al., 2009; Mammadov et al., 2021). Conversely, positive associations have been found between neuroticism and controlled motivation (Audet et al., 2021).

Conceptual Integration

As this association is theoretically natural, FFM personality traits are theorized to predict their respective behavioural expression. We propose that personality traits are antecedents of BPN satisfaction because individual differences in personality can impact individuals' perspectives regarding autonomy, competence, and relatedness. Moreover, because engaging in behaviours can alter one's experience, we suggest that behavioural expressions of personality traits are mechanisms that explain the relationship between personality traits and BPN satisfaction. For example, when an individual engages in an extraverted behaviour such as going out with groups of people, the person will be likely to have their need for relatedness satisfied because of the increased exposure to people. An individual who works diligently to get tasks done (a behavioural expression of conscientiousness) will likely feel competent due to the resulting achievements associated with the completion of those tasks. When an individual chooses to do things that take them out of their comfort zone (i.e., a behavioural expression of openness to experience), they will likely have their need for autonomy satisfied because of the

freedom they experience when engaging in such audacious actions. Whereas the previous examples underscore obvious affinities between specific behavioural trait expressions and BPN satisfaction, it can also be argued that all behavioural expressions of traits are associated with BPN satisfaction.

Behavioural expressions can be construed as expressions of the self (i.e., personality). When people successfully engage in positive behaviours that are consistent with their perceived self, we purport that this would increase their satisfaction of the needs for autonomy, competence, and relatedness, because it heightens their sense of agency, their mastery over their environment, and because these fruitful actions are likely to elicit gratifying social reactions. Thus, because of their constructive nature, we expected behavioural expressions of openness to experience, conscientiousness, extraversion, and agreeableness to be positively associated with the satisfaction of BPNs. Conversely, due to the negative characteristics of neuroticism, it was expected that engaging in behavioural expressions of this trait would be negatively associated with BPN satisfaction.

To summarize, we propose that FFM personality traits will each be associated positively with its behavioural expression. Behavioural expressions are expected, in turn, to be associated with BPN satisfaction (positively for beneficial traits and negatively for neuroticism). Moreover, because behavioural expressions of traits translate personality dispositions into concrete actions that provide opportunities for the satisfaction (for beneficial traits) or deprivation (for neuroticism) of BPN satisfaction, it is proposed here that behavioural manifestations of personality traits act as mediators of the associations between personality traits and BPN satisfaction.

Furthermore, in congruence with the plenteous empirical support for this notion (see Ryan & Deci, 2017, for a review), it is anticipated that BPN satisfaction will be positively associated with academic and friendship motivation. Lastly, taking together the individual elements of the conceptual exposition offered in this section, it is proposed that BPN satisfaction mediates the association between behavioural expressions of traits and academic and friendship motivation and, most importantly, that behavioural expressions of traits and BPN satisfaction are sequential mediators of the association between personality traits (the incipient exogenous factors) and academic and friendship motivations (the outmost endogenous outcomes of this study).

Hypotheses

In line with the conceptual considerations exposed above, the expected network of associations between the variables under study comprises the following hypotheses.

(1) Personality traits will be positively associated with their corresponding behavioural expressions;

(2) Behavioural expressions of the personality traits of openness to experience, conscientiousness, extraversion, and agreeableness will be positively associated with BPN satisfaction (autonomy, competence, and relatedness), while neuroticism will be negatively associated with BPN satisfaction;

(3) BPN satisfaction will be positively associated with (a) self-determined academic motivation and (b) self-determined friendship motivation.

Within the model composed of direct effects outlined above, the following mediating (indirect) effects are hypothesized.

(4) Behavioural expressions of personality traits will mediate the relationships between their corresponding personality traits and BPN satisfaction;

(5) BPN satisfaction will mediate the relationships between behavioural expressions of personality traits and self-determined (a) academic and (b) friendship motivation;

(6) Behavioural expressions of personality traits and BPN satisfaction will act as sequential mediators of the associations between personality traits and (a) self-determined academic motivation, as well as (b) self-determined friendship motivation.

Method

Participants and Procedure

Undergraduate university students (N = 635) were recruited through the University of Ottawa's Integrated System of Participating in Research (ISPR). The sample consisted of 522 women, 110 men, two gender non-binary participants, and one participant who was gender non-conforming.[2] Participants ranged between 17 and 41 years of age (M_{age} = 19.28, SD = 2.34). Among the participants, 51% identified as Caucasian, 22% as Asian, 10% as Black, three percent as Latinx, 0.5% as Indigenous, and 14% identified as other ethnicities. Seventy-one percent of participants were single, 28% were in a committed relationship, and one percent were married. Participants were asked to complete an online questionnaire through a link on the ISPR platform where they were directed to the Qualtrics website. All participants completed the questionnaire in English. Students were compensated with one percent course credit for their participation.

Measures

The online questionnaire distributed in this study consisted of measures of personality traits, behavioural expressions of personality traits, BPN satisfaction, academic motivation, and friendship motivation.

Goldberg's Mini-Markers. Goldberg's Mini-Markers (Saucier, 1994) is a brief version of Goldberg's Unipolar Big-Five Markers, measuring the Five Factor Model of personality traits. This 40-item scale asks respondents to describe how they rate on various characteristics, based on how they perceive themselves in general. There are eight items per subscale, with items including "talkative" (extraversion), "imaginative' (openness), "organized" (conscientiousness), "warm" (agreeableness), and "temperamental" (neuroticism). Items are answered on a Likert scale ranging from *not at all* (1) to *totally* (7). Principal components analysis revealed sound factor structure of this measure (Saucier, 1994), and construct validity was established through correlations with the original 100-item scale (Goldberg's Unipolar Big-Five Markers, 1992). Moreover, construct validity was demonstrated for Golberg's Big Five Markers through correlations with other measures of the FFM such as the Big Five Inventory (John & Srivastava, 1999), as well as Costa and McCrae's NEO Personality Inventory (1985; Goldberg, 1992) and NEO Five Factor Inventory (1992b; Gow et al., 2005). In the current study, internal consistency scores (Cronbach's α.) for its five subscales ranged between .74 and .82.

Behavioural Expressions of Traits Inventory (BETI). The BETI (Sullivan & Green-Demers, 2023) consists of 30 items (6 items/subscale) representing behavioural manifestations of the personality traits of the FFM: openness to experience (e.g., "I participate in creative hobbies"), conscientiousness ("I work diligently"), extraversion (e.g., "I spend most of my time with other people"), agreeableness (e.g., "I accommodate others"), and neuroticism (e.g., "I collapse under pressure"). Participants are asked to indicate the extent that each item was typical of how they behave using a Likert scale ranging from 1 (*not at all*) to 7 (*very typical*). This measure has excellent factorial structure. Construct validity of the BETI was established through correlations with relevant constructs. Concurrent validity was demonstrated through correlations with FFM

personality traits (Sullivan & Green-Demers, 2023). Discriminant validity with social desirability was successfully documented (Sullivan & Green-Demers, 2023). Satisfactory internal consistency values (.77 < Cronbach's α <.84) were obtained in the present study.

The Basic Psychological Need Satisfaction Scale. The satisfaction items of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSS; Chen et al., 2015) were used to examine the three needs proposed by SDT (Deci & Ryan, 1985; 2002; 2013; Ryan & Deci, 2017): autonomy, competence, and relatedness. It is a 12-item scale (4 items/subscale). There are four items indicative of satisfaction for each psychological need. Example items include "I feel that my decisions reflect what I really want" (autonomy satisfaction), "I feel confident that I can do things well" (competence satisfaction), and "I feel that the people I care about also care about me" (relatedness satisfaction). Each item is rated on a Likert scale ranging from *not true at all* (1) to *very true* (7). The construct validity of the BPNSFS was established by correlations with a wide variety of related constructs. The psychometric properties of the BPNSFS (factorial structure as demonstrated by multigroup invariance testing, construct validity, and internal consistency of subscales) was shown to hold across diverse cultural samples speaking different languages (English, Chinese, Spanish, Dutch, Italian, and Portuguese; Chen et al., 2015; Cordeiro et al., 2016; Costa et al., 2018). In the current study, internal consistency values (Cronbach's α) ranged from .78 to .87.

Academic Motivation Scale. The Academic Motivation Scale (AMS-C-24; Vallerand et al., 1992) is a 20-item measure devised to measure intrinsic motivation, extrinsic motivation (identified, introjected, and external regulation), and amotivation in college/university students. For the purposes of the present study, an integrated subscale (Green-Demers et al., 2013) was also included in order for all motivation types and subtypes of SDT (Deci & Ryan 2002; Ryan &

Deci, 2017) to be assessed. Thus, the scale used in this study consists of 24 items total (4 items/subscale). Items are presented as possible answers to this question: "Why do you go to university?" Example items include "because I experience pleasure and satisfaction while learning new things" (intrinsic motivation; IM), "because being a student is part of who I am" (integrated regulation; INTEG), "because I want to show myself that I can succeed" (introjected regulation; INTRO), "In order to have a better job later on" (external regulation; ER), and "honestly, I don't know; I really feel that I am wasting my time in school" (amotivation; AM). Respondents answered items using a Likert scale ranging from 1 (*does not correspond at all*) to 7 (*corresponds totally*). The AMS has been shown to display a clear factor structure, adequate construct validity, and satisfactory test-retest reliability over a one-month time interval (Vallerand et al., 1992). In the current study, internal consistency values (Cronbach's α) ranged between .81 and .90. Test-retest reliability of the AMS over a one-month interval was shown to be high, ranging from $r = .71$ to $r = .83$ (Vallerand et al., 1992).

Motivation Towards Friendship Scale. The Motivation towards Friendship Scale (MFS; Larabie, 2015) comprises 24 items (4 items/subscale) designed to evaluate the six forms of motivation proposed by SDT (Deci & Ryan 2002; Ryan & Deci, 2017) towards friendships. Participants are asked to rate the extent to which each of the items corresponds to their motives for being in a relationship with their best friend. Instances of items comprise "For the pleasure of sharing happy moments together" (intrinsic motivation), "Because this relationship is a key component of my life" (integrated regulation), "because I value this relationship" (identified regulation), "because I would be disappointed with myself for letting my friend down" (introjected regulation), "because I meet lots of new people through this friend" (external regulation), and "I don't know; I don't feel I get anything out of this relationship" (amotivation).

Items are answered on a Likert scale ranging from *not at all* (1) to *totally* (7). The structure of the MFS was established by means of a confirmatory factor analysis. Its construct validity revealed meaningful patterns of associations between the MFS subscales, relational self-schema, and secure attachment styles. Internal consistency values (Cronbach's α) of subscales ranged from .77 to .92 in the present study.

Results

Preliminary Analyses

Data screening. Linear interpolation was performed to replace random missing data. There were no cases with systematic missing data. Standardized scores were computed to screen for univariate outliers ($Z > |3.29|$, $p < .001$) and Mahalanobis distances were evaluated to identify multivariate outliers ($\chi^2(45) = 73.40$, $p < .001$). Participants with outlying scores were removed from the sample.

Tenability of statistical assumptions. Skewness and kurtosis values were within - 1.00 and + 1.00 for the vast majority of variables (- .64. < kurtosis < .98; -.98 < skewness < .31). One variable had a skewness value of -1.04 and two other variables had kurtosis values of 1.50 and 1.65. Although those values were slightly outside the conventionally acceptable range, it was not considered a problematic departure from the assumption of normality because mean scores for skewness (M = -.34) and skewness (M = -.03) were within -1.00 and + 1.00 (Muthén & Kaplan, 1985). Bivariate scatterplots were generated and examined for each pair of variables under study. No instance of heteroscedasticity nor curvilinearity were observed. Bivariate correlations between variables were inspected to screen for multicollinearity. No correlations above |.90| were obtained (Tabachnick & Fidell, 2019).

Descriptive statistics. Means and standard deviations were calculated for all global scores (see Table 1). The magnitude of mean values ranged from moderate to moderately high for all variables. Taking the theoretical range of the scales into account, standard deviations indicated that all scores presented an acceptable dispersion.

Correlations. Bivariate correlations were performed between global scores (see Table 2). This information is presented as complementary to the structural equations modeling analysis presented below. The pattern of observed correlations was congruent with logical expectations. Positive traits (openness to experience to experience, conscientiousness, agreeableness) were positively correlated with one another, with positive behavioural expressions of traits, with psychological need satisfaction, as well as with academic and friendship motivation. Reverse or non significant associations were observed for neuroticism. The same pattern of correlations was observed for behavioural expression of traits. Lastly, need satisfaction was positively associated with academic and friendship motivation.

Main Analyses

The proposed network of associations between variables was tested by means of a full structural equations model (EQS, version 6.1, Bentler, 2006). Model specifications included, first and foremost, the estimation of all hypothesized relationships between latent factors. Correlations between all exogeneous variables (personality traits) made substantive sense and were also evaluated. Because behavioural manifestations of traits are likely to be associated, all correlations between regression residuals were estimated for those latent factors. For the same reason, the correlation between the regression residuals for academic and friendship motivation was estimated as well. Estimated parameters for the measurement portion of the model included target factor loadings and item uniqueness (error) values. Five indices were used to assess model

fit: the Satorra-Bentler chi-square (SB-χ^2; Satorra & Bentler, 2001), the Comparative Fit Index (CFI; Bentler, 1990), the Incremental Fit Index (IFI; Bollen, 1989), the Standardized Root Mean Squared Residual (SRMR; Bentler, 1995) and the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990). The internal consistency of each subscale of the BETI was evaluated using Cronbach's α.

Computation of indicators. Trait indicators were created by averaging pairs of items within each subscale of Golberg's Mini-Markers (8 items/subscale = 4 indicators). Indicators of behavioural expressions of traits were generated using the same technique on the items of the BETI (6 items/subscale = 3 indicators). Indicators for BPN satisfaction consisted of the global score of each of the three subscales (autonomy, competence, and relatedness) of the BPNSS. As for academic motivation, because SDT's motivation types and subtypes are situated on a self-determination continuum, global autonomous motivation scores can be obtained using the following formula: [3 (IM) + 2 (INTEG) + IDEN - (INTRO) -2 (ER) - 3 (AMO) /6]. To obtain four indicators, as the AMS comprises 4 items/subscale, this formula was applied to items four times, on four different subsets of items. An identical strategy was implemented with the MFS, to obtain four self-determined friendship motivation indicators. Please note that, for all calculations described in this paragraph, the items comprised within and between indicators were balanced to optimize reliability (as indicated by item-total correlations).

Structural equations model. Results are presented in Figure 1. All hypothesized associations were substantiated. All five personality traits were positively associated with their corresponding behavioural expressions. Beneficial personality traits (openness to experience, conscientiousness, and agreeableness) were positively, and neuroticism negatively, associated

with psychological need satisfaction. Need satisfaction was positively associated with both academic and friendship motivation.

Moreover, results from Sobel's test of indirect effects supported all mediation hypotheses (see Table 3). All five behavioural expressions mediated the associations between their corresponding personality trait and BPN satisfaction. In turn, BPN satisfaction mediated the associations between all five behavioural expressions of traits, and academic and friendship motivation. Lastly, but most importantly, behavioural expressions of personality traits and BPN satisfaction were statistically significant sequential mediators of the associations between personality traits, on the one hand, and academic and friendship motivation, on the other hand. It must also be noted that three unforeseen associations materialized. Trait extraversion was positively associated with the behavioural manifestation of openness to experience. Trait agreeableness was positively associated with friendship motivation. Behavioural expressions of extraversion were negatively associated with academic motivation. As all three unforeseen relationships made conceptual sense, they were incorporated into the model.

To summarize, all estimated parameters were statistically significant. All hypotheses were supported. Three unexpected associations were found. Moreover, although it is somewhat lower than the conventional threshold of .90 for relative indices (the CFI and IFI), model fit was deemed acceptable considering the high degree of complexity of the model, as illustrated by the number of degrees of freedom of the SB- χ^2, and as demonstrated by the excellent value of the RMSEA, which is the only reported index that takes complexity and parsimony into account [SB - χ^2 (952) = 2697.65, $p < .001$, CFI = .88, IFI = .88, SRMR = .08, RMSEA = .05, $CI_{RMSEA(90\%)} = \{.05,.05\}$].[3]

Discussion

Recent research developed a conceptual model of behavioural manifestations of personality traits (Sullivan & Green-Demers, 2023). Behavioural manifestations were conceptualized as elements of the self-as-process. That is, whereas personality traits are static, enduring characteristics, behavioural expressions are malleable, specific aspects of the self, and are more susceptible to change. Moreover, in this previous research, to operationalize the behavioural expressions of the FFM personality traits, a taxonomy was validated. Thus, now that this instrument is offered, the current study was the first to apply this novel conceptualization to understand its connections with other constructs. Although prior research revealed logical associations between behavioural expressions and personality traits (Sullivan & Green-Demers, 2023), in the present study, these associations were examined using a larger sample and a more sophisticated technique: structural equations modeling.

Results supported the first hypothesis. Using structural equations modeling, personality traits were found to be positively related to their corresponding behavioural expressions. Therefore, this extends on the previous findings which revealed positive correlations between FFM traits and their respective behavioural manifestations (Sullivan & Green-Demers, 2023). Interestingly, our results also showed a significant positive association between trait extraversion and behavioural expressions of openness to experience. This finding can be explained by the common variance previously found between trait extraversion and openness to experience (DeYoung, 2006). Research has demonstrated that both traits are associated with a preference for novelty (Gocłowska et al., 2019). Thus, given the conceptualization of openness to experience as trying new things, it is conceivable that someone high in extraversion would also likely engage in behavioural expressions of openness to experience.

This study was the first to relate the novel conceptualization of behavioural expressions of personality traits to a sub-component of SDT. It was hypothesized that behavioural expressions of positive personality traits (openness to experience, conscientiousness, agreeableness, and extraversion) would be positively associated with BPN satisfaction, while behavioural expressions of neuroticism would be negatively related to BPN satisfaction. Results corroborated this hypothesis. These findings present important fundamental contributions, as it was demonstrated that behavioural expressions are antecedents of BPN satisfaction. This extends SDT research as extant studies predominantly focused on interpersonal influences (Roth et al., 2019; Costa et al., 2019; Demir et al., 2019; Dincer et al., 2019; Koçak et al., 2020; Reeve & Cheon, 2021). We found that intrapersonal factors can also be influential for need satisfaction, and that BPNs are not exclusively reliant on one's social environment.

Moreover, the associations between BPN satisfaction and autonomous motivation in two life domains were examined: academics and friendship. As expected, positive associations were revealed between BPN satisfaction and academic motivation. This finding corroborates the well-established literature citing BPN satisfaction as an antecedent to autonomous academic motivation in undergraduate students (see Bureau et al., 2022). However, regarding autonomous motivation towards friendships, the current study presents novel findings. Our results suggest that the well-established positive link between BPNs and autonomous motivation can be extended to motivation towards friendships. Emerging research has explored antecedents to BPN satisfaction within friendships (Putri & Muttaqin, 2022; van der Kaap-Deeder et al., 2017), and has shown BPN satisfaction within friendships to be positively associated with desirable outcomes such as happiness (Demir & Davidson, 2013) and life satisfaction (Putri & Muttaqin,

2022). However, to our knowledge, the current study is the first to extend the positive outcomes of BPN satisfaction to autonomous friendship motivation.

The contributions above pertain to the direct effects that were tested in our model. However, the most central fundamental contributions of the current study pertain to the mediating effects of behavioural manifestations and BPNs. Regarding these indirect effects, three hypotheses were tested.

Firstly, it was hypothesized that behavioural expressions would mediate the relationships between personality traits and BPN satisfaction. Findings corroborated this hypothesis. Each FFM personality trait had an indirect effect (adaptive traits positively, and neuroticism negatively) on BPN satisfaction through its corresponding behavioural expression. While it has been established that personality traits are related to BPN satisfaction (Bratko et al., 2022; Nishimura & Suzuki, 2016; Volodina et al., 2019), little has been exposed in regard to the reasons for these associations. Thus, the current study puts forward a conceptual explanation in this regard. Because behaviours can modify one's experience, behavioural expressions of personality traits are central mechanisms which explain the association between personality traits and BPN satisfaction. Moreover, behavioural manifestations of traits are behavioural expressions of the self. Thus, the engagement in such behaviours may lead to increased feelings of authenticity, which has been related to BPN satisfaction (Ionescu & Iacob, 2019; Ryan & Ryan, 2019).

Secondly, we expected BPN satisfaction to mediate the associations between behavioural expressions and both types of autonomous motivation. It was hypothesized that, because behavioural expressions would impact one's environment and experience, behavioural expressions of openness to experience, conscientiousness, extraversion, and agreeableness would

lead to increases, and behavioural manifestations of neuroticism decreases, in BPN satisfaction. Furthermore, given that the positive associations between need satisfaction and autonomous motivation are well-established (Alesi et al., 2019; Huhtiniemi et al., 2019; Leo et al., 2020; Wang et al., 2019), it was predicted that BPN satisfaction would mediate the associations between behavioural expressions and motivation. The results were consistent with this hypothesis. Adaptive behavioural expressions had positive indirect effects on both types of autonomous motivation through BPN satisfaction, while behavioural expressions of neuroticism had negative indirect effects on academic and friendship motivation through BPN satisfaction. Thus, the current findings suggest that BPN satisfaction is a key mechanism that explains the associations between behavioural expressions and autonomous academic and friendship motivation.

Lastly, it was hypothesized that behavioural manifestations and BPN satisfaction would sequentially mediate the associations between personality traits and autonomous academic and friendship motivation. Results corroborated this hypothesis. While previous research has shown associations between personality traits and motivation (Audet et al., 2021; Mammadov et al., 2021), the current study established two processes which, together, explain how traits influence autonomous motivation. Therefore, the most important fundamental contribution of this study is the integration of two substantial research literatures: FFM personality traits and SDT. While personality traits have been found to influence BPN satisfaction (Bratko et al., 2022; Engels et al., 2022; Scott et al., 2022; Volodina et al., 2019), and BPN satisfaction is a well-known antecedent to autonomous motivation (Amoura et al., 2013; Tang et al., 2021; Valero-Valenzuela et al., 2021; Ryan & Deci, 2017), the current study incorporated the novel construct of behavioural expressions of personality traits. Thus, this study provides insight in regard to how

these two comprehensive topics are connected. That is, personality traits are theorized to drive behaviours, and it is the behavioural expressions of desirable traits that improve (and behavioural expressions of neuroticism that harm) one's experience through enhancing feelings of agency, mastery, and connection with others. Thus, behavioural expressions influence BPN satisfaction. Moreover, because behavioural manifestations influence one's satisfaction for autonomy, competence, and relatedness, which are associated with autonomous motivation, engaging in behavioural expressions of adaptive traits increases, while expressions of neuroticism decrease, BPN satisfaction, which in turn, effects one's autonomous motivation towards education and friendship.

Applied Implications

The current findings can be helpful to professionals who are interested in improving the motivation of young adults. Educators may use these results to enhance pedagogical approaches. If students engage in behavioural expressions of openness to experience, conscientiousness, extraversion, and agreeableness, and avoid behavioural expressions of neuroticism, they can benefit from increased BPN satisfaction and autonomous motivation. Thus, educators can emphasize the capacity that students have to support their own needs. They can also integrate course activities that promote these behavioural expressions. Offering students the chance to speak up in class and spend time with other students can encourage extraverted behavioural expressions; integrating assessments where students can practice creativity and providing opportunities to engage with peers who differ from them can encourage behavioural expressions of openness; course work where students can help their peers, provide feedback to others and show kindness can promote behavioural expressions of agreeableness. Moreover, educators can make efforts to teach and provide resources to adopt effective strategies to increase conscientious

behavioural expressions such as working diligently and paying careful attention to detail, and minimize neurotic behaviours, such as struggling with decisions and overanalyzing situations.

Moreover, because it is well-known that autonomy-supportive learning climates are conducive to BPN satisfaction (see Guay, 2022 for a review), the current study highlights the import role that educators have in fostering the autonomous motivation of their students. Professors can offer autonomy support by incorporating approaches such as adopting the perspective of students, encouraging students to share their thoughts and feelings, providing meaningful rationales and feedback, and providing choice within assessments (Reeve, 2009).

Lastly, given the central role that friendships have on well-being (Demir & Davidson, 2013; Putri & Muttaqin, 2022), results of the current study can be useful to mental health professionals who are interested in helping clients improve relationships with their friends. Professionals can support individuals in carrying out the necessary behavioural expressions in order to increase their BPN satisfaction, and in turn, improve autonomous motivation within their friendships.

Limitations and Future Directions

Although the current study presents important novel findings, there are certain limitations associated with the study's design. Firstly, a cross-sectional design was used as all variables were measured at the same time point. Thus, causal associations between variables cannot be inferred. Future research should use longitudinal designs in order to examine causal relationships. Second, self-report measures were used in this study, thus the results are susceptible to the self-serving bias of participants. Particularly for measures of neuroticism, BPN satisfaction, and motivation, participants may have reported more need satisfaction and autonomous motivation, and less trait and behavioural neuroticism, in order to present themselves more positively. Future studies

would benefit from including observational measures of these variables by gathering perspectives of friends and professors or using experimental designs. Third, the sample of this study consisted of entirely undergraduate students. Although the current sample was relevant to the goals of the present study, future studies could include more diverse samples in order to generalize the other findings to broader populations. Similarly, more culturally diverse samples are needed to examine potential differences in the associations between variables as previous research has found differences in BPN satisfaction between racialized and non-racialized undergraduate students (Oram et al., 2023). Moreover, it would be interesting for future research to examine the joint impact of interpersonal and intrapersonal factors on BPN satisfaction and autonomous motivation.

Conclusion

In conclusion, the current study highlights the critical role that individuals have in supporting their own BPN satisfaction. Given the emphasis that existing SDT research has on interpersonal factors, these findings offer a novel approach to need satisfaction and autonomous motivation. Behavioural expressions of personality traits mediate the relationships between personality traits and BPN satisfaction, and in turn, BPN satisfaction mediates the relationships between behavioural expressions and autonomous academic and friendship motivation. While personality traits are established as consistent, enduring characteristics, behavioural expressions are more malleable. Thus, people have more agency to change their behaviours, which can help satisfy their needs for autonomy, competence, and relatedness. These needs are fundamental to increasing autonomous motivation in two life contexts: academics and friendships.

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Footnotes

[1] Friendship motivation was chosen over couple motivation, which is also central in that population, for the following reasons: not all students are romantically involved and couple relationships are often variable and unstable in this age group. Also, because of its manifold characteristics (e.g., gender and sexual orientations, duration), the study of couple relationships requires stringent inclusion criteria. Moreover, couple relationships is a topic of such substantive importance that it shifts the focus of research from the general population to a specific subset of participants. Considering that the present study examined the mediating role of behavioural manifestations of traits and BPN satisfaction on the relationship between personality traits and motivation for the first time, friendship motivation was selected over couple motivation as it is more prevalent and universal in young adults.

[2] The description of the sample comprises the final participants that remained following the deletion of outliers (please refer to the Preliminary Analyses subsection below).

[3] Five post hoc modifications (correlations between same factor measurement errors) were performed.

Table 1

Descriptive Statistics

	M	*SD*
Traits		
Openness	4.89	.91
Conscientiousness	5.17	.91
Extraversion	4.28	1.10
Agreeableness	5.46	.88
Neuroticism	3.51	.99
Behavioural Expressions		
Openness	4.12	1.13
Conscientiousness	5.26	.98
Extraversion	3.80	1.15
Agreeableness	5.54	.83
Neuroticism	4.27	1.18
Need Satisfaction	5.10	.94
Motivation		
Academic	1.42	1.55
Friendship	2.91	1.39

Notes. The theoretical range of academic motivation and friendship motivation is -6.00 to +6.00; the theoretical range varies between 1.00 and 7.00 for all other variables.

Table 2

Correlations between Personality Traits, Behavioural Expressions, Need Satisfaction, Academic Motivation, and Friendship Motivation.

	Trait Open	Trait Cons	Trait Extra	Trait Agree	Trait Neur	Beh Open	Beh Cons	Beh Extra	Beh Agree	Beh Neur	BPN Sat	Academic	Friend
Trait Open	1												
Trait Cons	.31***	1											
Trait Extra	.21***	.13**	1										
Trait Agree	.28***	.32***	.18***	1									
Trait Neur	-.03	-.25***	-.15***	-.20***	1								
Beh Open	.32***	.02	.40***	.10*	-.05	1							
Beh Cons	.31***	.72***	.16***	.33***	-.20***	.15***	1						
Beh Extra	.05	-.01	.64***	.09*	-.05	.44***	.10*	1					
Beh Agree	.32***	.33***	.15**	.59**	-.06	.27**	.40**	.14**	1				
Beh Neur	-.03	-.20***	-.32***	-.03	.56***	-.15***	-.19***	-.21***	.15***	1			
BPN Sat	.34***	.44***	.47***	.36***	-.32***	.34***	.51***	.37***	.38***	-.37***	1		
Academic	.31***	.38***	.13**	.32**	-.27**	.14**	.36**	-.04	.24**	-.20**	.47**	1	
Friend	.26***	.31***	.14***	.44***	-.09*	-.01	.28***	-.04	.38***	.02	.33***	.34***	1

Notes. Trait Open = Trait openness to experience; Trait Cons = Trait conscientiousness; Trait Extra = Trait extraversion, Trait Agree = Trait agreeableness; Trait Neur = Trait neuroticism; Beh Open = Behavioural openness to experience; Beh Cons = Behavioural conscientiousness; Beh Extra = behavioural extraversion; Beh Agree = Behavioural agreeableness; Beh Neur = Behavioural neuroticism; BPN Sat = Basic psychological need satisfaction; Academic = academic motivation; Friend = friendship motivation. *$p < .05$, **$p < .01$, ***$p < .001$

Table 3

Sobel's Mediation Test of Indirect Effects between Latent Factors

Relationship	Mediator(s)	Ind. Effect	Sobels' Test	
			Z	Sig.
Traits ➔ Ψ Need sat.				
Open. to exp.	Beh. expr.	$\beta_{6\text{-}1}\beta_{11\text{-}6} = .03$	2.73	$p < .001$
Conscientiousness	Beh. expr.	$\beta_{7\text{-}2}\beta_{11\text{-}7} = .33$	6.15	$p < .001$
Extraversion	Beh. expr.	$\beta_{8\text{-}3}\beta_{11\text{-}8} = .27$	6.80	$p < .001$
Agreeableness	Beh. expr.	$\beta_{9\text{-}4}\beta_{11\text{-}9} = .20$	5.00	$p < .001$
Neuroticism	Beh. expr.	$\beta_{10\text{-}5}\beta_{11\text{-}10} = -.31$	-5.17	$p < .001$
Beh. expr. ➔ Acad. mot.				
Open. to exp.	Ψ Need sat.	$\beta_{11\text{-}6}\beta_{12\text{-}11} = .09$	3.00	$p < .001$
Conscientiousness	Ψ Need sat.	$\beta_{11\text{-}7}\beta_{12\text{-}11} = .26$	7.18	$p < .001$
Extraversion	Ψ Need sat.	$\beta_{11\text{-}9}\beta_{12\text{-}11} = .18$	5.08	$p < .001$
Agreeableness	Ψ Need sat.	$\beta_{11\text{-}9}\beta_{12\text{-}11} = .18$	5.32	$p < .001$
Neuroticism	Ψ Need sat.	$\beta_{11\text{-}10}\beta_{12\text{-}11} = -.27$	-7.28	$p < .001$
Beh. expr. ➔ Friend. mot.				
Open. to exp.	Ψ Need sat.	$\beta_{11\text{-}6}\beta_{13\text{-}11} = .02$	2.66	$p < .001$
Conscientiousness	Ψ Need sat.	$\beta_{11\text{-}7}\beta_{13\text{-}11} = .06$	3.77	$p < .001$
Extraversion	Ψ Need sat.	$\beta_{11\text{-}8}\beta_{13\text{-}11} = -04$	2.85	$p < .001$
Agreeableness	Ψ Need sat.	$\beta_{11\text{-}9}\beta_{13\text{-}11} = .04$	3.61	$p < .001$
Neuroticism	Ψ Need sat.	$\beta_{11\text{-}10}\beta_{13\text{-}11} = -.06$	-4.15	$p < .001$
Traits ➔ Acad. mot.				
Open. to exp.	Beh. expr. + Ψ Need sat.	$\beta_{6\text{-}1}\beta_{11\text{-}6}\beta_{12\text{-}11} = .02$	2.70	$p < .001$
Conscientiousness	Beh. expr. + Ψ Need sat.	$\beta_{7\text{-}1}\beta_{11\text{-}7}\beta_{12\text{-}11} = .24$	6.00	$p < .001$
Extraversion	Beh. expr. + Ψ Need sat.	$\beta_{8\text{-}1}\beta_{11\text{-}8}\beta_{12\text{-}11} = -.10$	-2.66	$p < .001$
Agreeableness	Beh. expr. + Ψ Need sat.	$\beta_{9\text{-}1}\beta_{11\text{-}9}\beta_{12\text{-}11} = .15$	4.79	$p < .001$
Neuroticism	Beh. expr. + Ψ Need sat.	$\beta_{10\text{-}1}\beta_{11\text{-}10}\beta_{12\text{-}11} = -.22$	-4.92	$p < .001$

Table 3 (Cont'd)

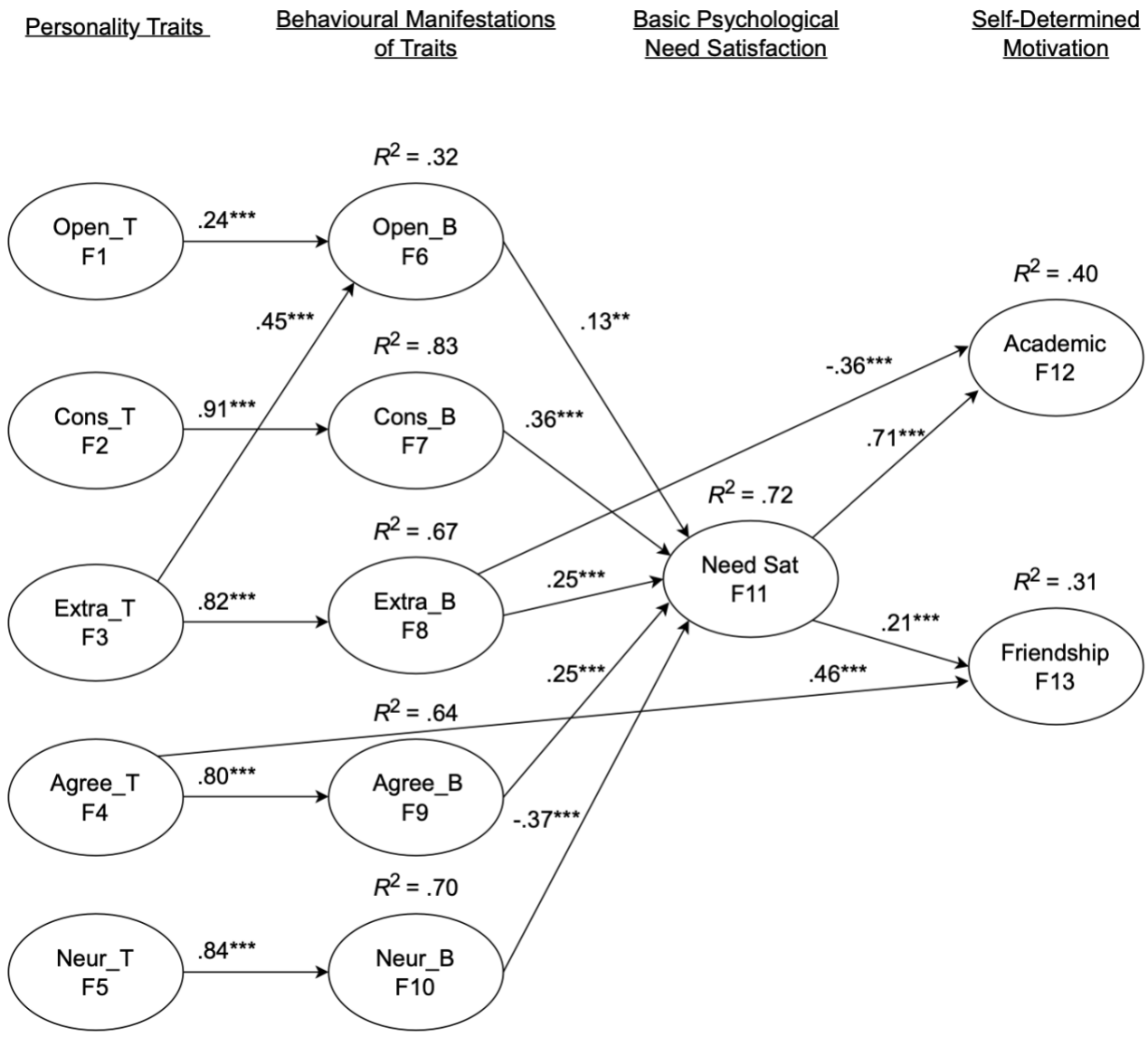
Sobel's Mediation Test of Indirect Effects between Latent Factors

Relationship	Mediator(s)	Ind. Effect	Sobels' Test	
			Z	Sig.
Traits ➔ Friend. mot.				
Open. to exp.	Beh. expr. + Ψ Need sat.	$\beta_{6\text{-}1}\beta_{11\text{-}6}\beta_{13\text{-}11} = .01$	2.41	$p < .01$
Conscientiousness	Beh. expr. + Ψ Need sat.	$\beta_{7\text{-}1}\beta_{11\text{-}7}\beta_{13\text{-}11} = .05$	3.53	$p < .001$
Extraversion	Beh. expr. + Ψ Need sat.	$\beta_{8\text{-}1}\beta_{11\text{-}8}\beta_{13\text{-}1}1 = -.02$	2.24	$p < .001$
Agreeableness	Beh. expr. + Ψ Need sat.	$\beta_{9\text{-}1}\beta_{11\text{-}9}\beta_{13\text{-}11} = .03$	3.38	$p < .001$
Neuroticism	Beh. expr. + Ψ Need sat.	$\beta_{10\text{-}1}\beta_{11\text{-}10}\beta_{13\text{-}11} = -.05$	-3.47	$p < .001$

Notes. Open. to exp. = openness to experience; Beh. Expr. = behavioural expressions; Need sat. = basic psychological need satisfaction; Acad. mot. = self-determined academic motivation; Friend. mot = self-determined friendship motivation.

Figure 1

Structural Equations Model



Notes. Open_T = trait openness to experience; Cons_T = trait conscientiousness; Extra_T = trait extraversion; Agree_T = trait agreeableness; Neur_T = trait neuroticism; Open_B = behavioural manifestations of openness to experience; Cons_ B = behavioural manifestations of conscientiousness; Extra_B = behavioural manifestations of extraversion; Agree_B = behavioural manifestations of agreeableness; Neur_B = behavioural manifestations of neuroticism; Need Sat = basic psychological need satisfaction; academic = self-determined academic motivation; Friendship = self-determined friendship motivation. ***$p < .001$, **$p < .01$.

CHAPTER IV

GENERAL DISCUSSION

The central goal of the current dissertation was to examine the processes that explain the relationship between personality traits and autonomous academic and friendship motivation. Two mediators were observed: behavioural expressions of personality traits and BPN satisfaction. Previous research has begun to examine the associations between personality traits and BPN satisfaction (Andreassen et al., 2010; Volodina et al., 2019), as well as between personality traits and academic motivation (Donche et al., 2013; Mammadov et al., 2021). However, in the existing literature, associations between personality traits and autonomous friendship motivation had not been observed. Moreover, no previous studies have explored the mediating effects of behavioural expressions of personality traits, nor had a conceptual framework of behavioural expressions been established. To address this, Studies 1 and 2 (Article 1) of this dissertation aimed to develop and validate a conceptualization of behavioural expressions of personality traits. Furthermore, a model examining the mediating roles of behavioural expressions of personality traits and BPN satisfaction on the associations between personality traits and autonomous motivations was assessed in Study 3 (Article 2).

Summary of Goals and Hypotheses

Studies 1 and 2

The overarching goal of Studies 1 and 2 was to develop and validate a theoretical model of behavioural manifestations of the personality traits of the FFM: Openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. In order to operationalize the behavioural expressions, we devised an instrument: The Behavioural Expressions of Traits Inventory (BETI). It was hypothesized that the taxonomy measured by the BETI would display a

clean factorial structure, concurrent validity between behavioural expressions and their corresponding trait, appropriate associations with relevant variables to demonstrate construct validity, and satisfactory internal consistency,

Study 3

Study 3 aimed to examine interrelations between personality traits, behavioural expressions of personality traits, BPN satisfaction, and autonomous motivation in two contexts relevant to undergraduate university students: academics and friendship. The following hypotheses were tested : (1) Personality traits were expected to be positively associated with their respective behavioural expression; (2) Behavioural expressions of adaptive personality traits (openness to experience, conscientiousness, extraversion, and agreeableness) were expected to be positively associated with BPN satisfaction, while behavioural expressions of neuroticism were expected to be negatively associated with BPN satisfaction; (3) BPN satisfaction was expected to be positively associated with (a) self-determined academic motivation and (b) self-determined friendship motivation; (4) Behavioural expressions of personality traits were expected to mediate the relationships between their corresponding trait and BPN satisfaction; (5) BPN satisfaction was expected to mediate the relationship between behavioural expressions of personality traits and (a) self-determined academic motivation and (b) self-determined friendship motivation; and (6) Behavioural expressions of personality traits and BPN satisfaction were expected to sequentially mediate the association between personality traits and (a) self-determined academic motivation, as well as (b) self-determined friendship motivation.

Summary of Key Findings

Studies 1 and 2

In Studies 1 and 2, a conceptualization of five broad factors of behavioural expressions of FFM personality traits (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) was proposed. Exploratory (Study 1) and confirmatory (Study 2) factor analyses revealed that the proposed taxonomy assessed by the BETI had a clean factorial structure. Correlations between the subscales representing behavioural expressions of traits and their corresponding trait were of moderately high magnitude, thereby indicating that behavioural expressions can be distinguished from traits (concurrent validity). Construct validity was established through logical patterns of associations between the BETI's subscales and an array of pertinent psychological and behavioural variables. The BETI presented no social desirability issues. Finally, all five behavioural expressions of traits displayed satisfactory internal consistency. Taken together, results of Studies 1 and 2 suggest that the presented conceptualization of behavioural expressions of FFM traits was valid and reliable. Moreover, Studies 1 and 2 developed the conceptual framework of behavioural expressions of traits that acted as the key element of the model tested in Study 3.

Study 3

Having conceptualized and validated a conceptual model of behavioural expressions of personality traits, Study 3 proceeded to use structural equations modeling to test the hypothesized network of associations between FFM personality traits, behavioural expressions of traits, BPN satisfaction, and academic and friendship motivation. Results supported all hypotheses.

Firstly, all direct effects were statistically significant and of acceptable magnitude. Personality traits were positively associated with their corresponding behavioural expression. Behavioural expressions of traits were positively (openness to experience, conscientiousness, extraversion, and agreeableness) and negatively (neuroticism) related to BPN satisfaction. BPN satisfaction was positively associated with both types of autonomous motivation.

Secondly, all mediating effects, as established by Sobel's test of indirect effects, were corroborated. Personality traits were positively (openness to experience, conscientiousness, extraversion, and agreeableness) and negatively (neuroticism) indirectly related to BPN satisfaction through their corresponding behavioural expression. Likewise, BPN satisfaction mediated the positive associations between desirable behavioural expressions and autonomous motivations (academic and friendship), as well as the negative associations between behavioural expressions of neuroticism and autonomous motivations (academic and friendship). Lastly, behavioural expressions of personality traits and BPN satisfaction were revealed to be sequential mediators of the relationships between personality traits and both types of autonomous motivations (academic and friendship).

Theoretical Implications

Studies 1 and 2

Behavioural Expressions of Personality Traits

There have been attempts in past research to operationalize behavioural manifestations of personality traits. The most prevalent strategy to this effect, used in experimental studies examining trait extraversion and positive affect, entails instructing participants to 'act extraverted' by showing them adjectives that characterize extraversion and asking them to behave accordingly (Davydenko et al., 2020; Sun et al., 2017; Zelenski et al., 2012; Zelenski et

al., 2013). Additionally, behavioural expressions of FFM traits have been operationalized by coding daily writings (limited to openness to experience trait; van Allen, 2016), Q-sort task describing behaviours in social interactions (Markey et al., 2004), verbal experience sampling electronic recording (Tackman et al., 2020), and self-report measures (limited to conscientiousness, 185 items, Jackson et al, 2010; dichotomous yes/no behaviour checklist, Church et al., 2008).

All of the operationalization strategies summarized above present important limitations. Most importantly, all of them were devised in the absence of a theoretical framework for behavioural expressions of personality traits. They also present specific drawbacks. The 'act extraverted' paradigm (Sun et al., 2017; Zelenski et al., 2012; Zelenski et al., 2013) leaves the interpretation and enacting of extraverted behaviours up to the participants. Codification of diary writing (van Allen, 2016) is dependent on the unflagging diligence and expressive ability of participants. Q-sort tasks are impractical and were limited to behaviours occurring in social interactions (Markey et al., 2004), which is inadequate to properly and exhaustively evaluate openness to experience, conscientiousness, and neuroticism. Verbal experience sampling (Tackman et al., 2020) is blind to private thoughts, feelings, and silent behaviours. Jackson et al.'s (2010) measure was impractically long and limited to a single trait. Dichotomous scales (Church et al., 2008) fail to evaluate gradations in ratings and severely limit item variance. Lastly, with the exception of the conscientiousness scale designed by Jackson et al. (2010), the psychometric properties of all of the other methods described in this paragraph are undocumented.

Clearly, a theoretically based strategy to evaluate behavioural manifestations with sound psychometric properties was required. The BETI developed here in Studies 1 and 2 fills this

void. It rests on the careful conceptualization of a model of behavioural expressions of personality traits. Moreover, its psychometric properties (factorial structure, concurrent and construct validity, reliability) have been documented as thoroughly as possible.

Study 3

Personality Traits and Behavioural Expressions

Proponents of personality psychology theorize that personality traits influence behaviours, and that behaviours are more susceptible to situational influence (McCrae & Sutin, 2018). However, there is a dearth of information in the existing literature linking personality traits to their behavioural manifestations. The current dissertation offers important fundamental implications in this regard. In Studies 1 and 2, all FFM personality traits were positively correlated with their corresponding behavioural expressions. In Study 3, positive associations between traits and their respective behavioural manifestations were established using a more advanced analysis, that is, structural equation modeling.

Moreover, in this dissertation, personality traits were successfully distinguished from their behavioural manifestations. Although traits and behaviours are strongly associated, results suggest that a personality trait does not necessarily define the occurrence of behavioural manifestations. Of note, the association between trait openness to experience and its behavioural expressions was lower than the four other trait-behavioural expression relationships. Thus, this finding suggests that, for openness to experience, the relationship between the trait and its behavioural manifestations may be more multifaceted. This is unsurprising given the known complexity of this trait, as there are both intellectual and experiential characteristics (Christensen et al., 2019). Moreover, it is possible that expressions of openness to experience are more susceptible to environmental influence as opportunities to express openness may be less

abundant. Thus, these results expand knowledge on the relationship between personality traits and behavioural manifestations.

Furthermore, in regard to trait-behavioural manifestation relationships, Study 3 revealed an interesting finding. Trait extraversion was positively associated with behavioural expressions of openness. Previous studies have shown that trait extraversion and openness to experience share common variance (DeYoung et al., 2002; DeYoung et al., 2005; DeYoung, 2006). For instance, both extraversion and openness to experience are conceptualized as comprising characteristic interest in novelty and exploration (DeYoung et al., 2005; Gocłowska et al., 2019). Behavioural expressions of openness to experience encompass chasing unusual experiences and making changes to spice up life. Therefore, it is logical that both traits would be connected to these behavioural expressions.

Behavioural Expressions of Personality and BPN Satisfaction

Given the novelty of the behavioural manifestations of personality traits framework developed herein, existing research had not yet connected behavioural expressions to the SDT literature. Moreover, studies observing BPN satisfaction from an SDT perspective have predominantly highlighted the influence of the environment on BPNs. For instance, there is plentiful research examining the associations between autonomy supportive environments and satisfaction of the needs for autonomy, competence, and relatedness (see Okada, 2023 for a review). Consequently, it is well-established that the people surrounding an individual have critical roles in supporting that individual's needs. However, limited research has explored the role of intrapersonal variables, such as personality traits and their behavioural expressions, on BPN satisfaction. Thus, the current dissertation provides fundamental contributions to the BPNs literature in this respect. In Study 3, results revealed positive associations between behavioural

expressions of adaptive traits (openness to experience, conscientiousness, extraversion, and agreeableness) and BPN satisfaction, and a negative association between behavioural expressions of neuroticism and BPN satisfaction. These findings offer evidence for the function of intrapersonal factors, in addition to the known interpersonal influences on BPN satisfaction. Specifically, this research underlines the actions people can take in order to better gratify their own needs.

BPN Satisfaction and Autonomous Motivation

Numerous studies have confirmed positive associations between BPN satisfaction and autonomous motivation, and this relationship is central to the SDT framework (Deci & Ryan, 2002; Ryan & Deci, 2017). Specifically, BPN theory has been applied to research on academic motivation extensively. The existing literature on this topic shows that students adopt optimal forms of motivation (i.e., autonomous) when they perceive that their needs for autonomy, competence, and relatedness are fulfilled (see Guay, 2022 for a review). Considering the connection that academic motivation has with beneficial outcomes such as higher achievement (Abdelrahman, 2020; Karlen et al., 2019) and well-being (Kotera & Ting, 2021; Rehman et al., 2022), this finding has notable implications. The current dissertation contributes to the existing literature on this topic, as we found that BPN satisfaction was positively related to autonomous academic motivation.

Furthermore, while the association between BPNs and motivation is well-established in the education domain, SDT research in the friendship domain is less prominent. In emerging research, BPN satisfaction within friendships has been linked to increases in well-being (Demir et al., 2011; Demir & Davidson, 2013; Putri & Muttaqin, 2022; Sanchez et al., 2020), however, there is an absence of knowledge surrounding the relationship between BPN satisfaction and

autonomous motivation towards friendships. Moreover, such relations are influential relationships in the lives of young adults as quality friendships are linked to increases in happiness, self-efficacy, and self-regulated learning (Demir & Özdemir, 2010; Morelli et al., 2022). Thus, identifying antecedents to self-determined motivation towards friendship is key to advancing knowledge on quality friendships, and has important implications. This dissertation provides an initial solution to satisfy this gap in the literature. In Study 3, a positive association was revealed between BPN satisfaction and autonomous motivation towards friendships. Therefore, these results suggest that having one's needs satisfied is important to developing a healthy relationship with friends as defined by autonomous motivation. Specially, BPN satisfaction is associated with autonomous reasons for pursuing and sustaining friendships.

Personality Traits, Behavioural Expressions, and BPN Satisfaction

Emerging research has revealed relationships between personality traits and BPN satisfaction (Bratko et al., 2022; Nishimura & Suzuki, 2016; Volodina et al., 2019). Studies have shown desirable personality traits (openness to experience, conscientiousness, agreeableness, and extraversion) to be positively, and neuroticism negatively, associated with need satisfaction. However, minimal research has investigated the processes through which personality traits influence BPN satisfaction. Consequently, this dissertation presented an explanation for the relationship between traits and needs. Results showed that behavioural expressions of traits were mechanisms through which its corresponding personality trait was associated with BPN satisfaction. Thus, behavioural expressions had a mediating effect on the positive associations between adaptive personality traits (openness to experience, conscientiousness, agreeableness, and extraversion) and BPN satisfaction, and on the negative association between neuroticism and

BPN satisfaction. These findings corroborated the theoretical explanations proposed in this dissertation.

Modifying Experience. Firstly, engaging in behavioural expressions can alter an individual's experience, as well as one's environment. For example, when someone chooses to go out with groups of people (a behavioural expression of extraversion), they increase the number of people that surround them, leading to a higher probability of satisfying their need for relatedness. Likewise, when an individual takes time to help others and be kind (behavioural expressions of agreeableness), they improve their chances of making meaningful connections with other people. Moreover, when an individual makes changes to their life and takes themself out of their comfort zone (behavioural expressions of openness to experience), they may increase feelings of agency over their experience. Also, by exploring different people and places, they increase the likelihood of finding appropriate environments to best support their needs. Lastly, engaging in conscientious behavioural expressions, such as maintaining order in one's life and keeping things clean, supports competence both by increasing feelings of productivity and by producing environments that will support one's needs. Conversely, behavioural expressions of neuroticism, such as obsessing over minor things and overanalyzing situations, could cause detriments to one's experience by negatively influencing one's interactions with their environment and others, as well as inducing feelings of inadequacy. Thus, behavioural expressions explain the association between personality traits and BPN satisfaction because they influence the necessary resources to fulfill one's needs.

In addition to the impact that behavioural manifestations have on an individual's experience, they also explain the trait-need relationship because they are expressions of one's self-concept. Given that personality is a fundamental aspect of the self and one's identity,

engaging in behaviours that are manifestations of one's personality can be conceived as expressions of authenticity.

Authenticity. Authenticity has been conceptualized as engaging with one's true or core self (Kernis & Goldman, 2006). Moreover, previous research has revealed positive associations between BPN satisfaction and authenticity (Ionescu & Iacob, 2019; Ryan & Ryan, 2019; Thomaes et al., 2017). Thus, the mediating effects of behavioural expressions revealed in Study 3 suggest that when individuals engage in behaviours that are consistent with their personality traits, they better satisfy their psychological needs for autonomy, competence, and relatedness. Accordingly, it is not necessarily the personality traits themselves, but is the authentic expressions of personality traits that explain the positive influences on BPN satisfaction.

Authenticity and Neuroticism. While the above is accurate for manifestations of openness to experience, conscientiousness, extraversion, and agreeableness, the opposite pattern of associations was displayed for behavioural expressions of neuroticism. The current results suggest that neuroticism is indirectly negatively related to BPN satisfaction through behavioural expressions of neuroticism. Research on self-verification and authenticity offer an explanation for this result. While individuals have a desire to present their authentic selves, they also have a desire to present their ideal selves, and these two are not mutually exclusive (Swann et al., 1989). Existing research shows mixed results surrounding whether acting authentically is more critical to one's well-being than is acting in a socially desirable manner (Bailey et al., 2020; Leikas et al., 2021). However, given the negative perceptions surrounding neuroticism (Thomson, 2016), it is plausible that presenting oneself in an unpleasant way is detrimental to one's BPNs, undermining the positive influence of expressing authenticity. The results of this dissertation suggest that behaving authentically with one's desirable characteristics is associated with

positive outcomes, whereas in regard to one's undesirable characteristics, behaving desirably is more beneficial than behaving authentically.

Additionally, from an SDT perspective, proponents of authenticity posit that humans are inherently inclined towards positive growth and adjustment (Jongman-Sereno & Leary, 2019). Moreover, neuroticism is conceptualized as a tendency to experience negative adjustment and maladaptive functioning (Hettema et al., 2006; Widiger, 2009). Thus, from this viewpoint, expressing neuroticism may, in fact, not be an authentic expression of the self, and behaving in a neurotic manner may actually impede one's ability to fully endorse their authentic self. This notion is supported by research that demonstrates neuroticism to be related to high actual-ideal self-discrepancies (Thomson, 2016). Therefore, people with high neuroticism have been found to view their current selves as inconsistent with who they would actually like to be.

Behavioural Expressions, BPNs, and Autonomous Motivation

Given that the behavioural expressions of personality traits is a novel conceptualization developed herein, little is known regarding the relationship between behavioural expressions and autonomous motivation. However, because (1) behavioural expressions were expected to influence BPN satisfaction positively (behavioural expressions of openness to experience, conscientiousness, extraversion, and agreeableness), and negatively (behavioural expressions of neuroticism), and (2) consistent with SDT, BPN satisfaction was expected to positively influence autonomous academic and friendship motivation, it was hypothesized that BPN satisfaction would be a process through which behavioural expressions would be associated with both types of autonomous motivation. Results of Study 3 supported this hypothesis. Behavioural manifestations of desirable traits were indirectly and positively related to autonomous academic and friendship motivation through BPN satisfaction. Moreover, behavioural expressions of

neuroticism were negatively indirectly related to autonomous motivations through BPN satisfaction. Thus, this finding presents fundamental contributions to knowledge on the association between behavioural expressions of personality traits and autonomous motivation in two contexts, suggesting that both types of motivation are influenced by behavioural manifestations through the process of BPN satisfaction.

Behavioural Expressions and BPN Satisfaction as Sequential Mediators

Existing research has demonstrated that personality traits are antecedents to motivation. For instance, positive associations have been revealed between desirable personality traits (openness to experience, conscientiousness, extraversion, and agreeableness) and autonomous motivation, and negative associations have been found between neuroticism and autonomous motivation (Audet et al., 2021; Ingledew et al., 2004; Komarraju et al., 2009; Mammadov et al., 2021) research exploring the processes which explain this relationship is limited. Therefore, the central contribution of this dissertation is the identification of two sequential mechanisms which explain the relationship between FFM personality traits and autonomous motivation. Emerging research has examined the associations between personality traits and BPN satisfaction (Bratko et al., 2022; Engels et al., 2022; Scott et al., 2022; Volodina et al., 2019). Moreover, extensive research in SDT demonstrates the fundamental role of the satisfaction of needs for autonomy, competence, and relatedness to enhance autonomous motivation (Amoura et al., 2013; Tang et al., 2021; Valero-Valenzuela et al., 2021; Ryan & Deci, 2017). However, the present research conceptualized and integrated the novel concept of behavioural manifestations of personality traits to connect two dominant areas of contemporary literature: SDT and FFM personality traits.

Findings of the present dissertation suggest that the sequential action of behavioural expressions of personality traits and BPN satisfaction are processes which explain the

relationship between FFM personality traits and autonomous academic and friendship motivation. Thus, an individual's stable personality traits influence their more flexible behavioural expressions. In turn, behavioural expressions affect one's experience and environment, as behaviours can alter one's feelings of agency, mastery, and connection to others in different ways. Moreover, these experiential and environmental changes introduced by one's behaviours influence an individual's levels of BPN satisfaction. Lastly, given that BPN satisfaction is a key antecedent to self-determined motivation, BPN satisfaction subsequently influences one's autonomous motivation towards education and friendship. These findings contribute to the understanding of the intricacies involved in the joint study of the FFM model of personality traits and motivation as conceived by SDT. Thus, this new direction in research is promising, as the integration of concepts from two such classic, important, and substantial documentations is liable to be fruitful.

Applied Implications

Taken together, the findings of this dissertation offer applied implications for education institutions and mental health professionals. Firstly, there is an abundance of research linking the FFM personality traits to desirable and undesirable outcomes. For instance, high conscientiousness is associated with numerous benefits such as increased job performance and ability to handle stress (Sari, 2020), better physical health (Sutin et al., 2018), lower risk of dementia (Kaup et al., 2019) and higher academic achievement (O'Connell & Marks, 2022). Similarly, high levels of extraversion have been consistently linked to increases in many indicators of well-being (Kuijpers et al., 2022; Margolis & Lyubomirsky, 2020), as well as increased peer acceptance and satisfaction with friendships and romantic relationships (Soto, 2019). Openness to experience has been related to increased knowledge attainment (von Stumm.

2018), and academic achievement (Britwum et al., 2022), while agreeableness has been associated with higher levels of well-being (Osamika et al., 2021; Strickhouser et al., 2017), and relationship satisfaction (Tov et al., 2016), and neuroticism with decreased well-being (Osamika et al., 2021). Moreover, agreeableness has also been positively related to some undesirable outcomes such as economic hardship (Matz & Galdstone, 2018). Thus, personality traits are connected to many outcomes that individuals may wish to attain or avoid. Moreover, while personalities are not easily changed, it may be more realistic to encourage individuals to modify and adopt certain behaviours. Thus, professionals who are interested in enhancing different aspects of individuals' lives can use the current framework as a guide to encouraging manifestations of personality traits in order to improve life outcomes.

Given the importance of academic motivation in facilitating academic success in university students (El-Adl & Alkharusi, 2020), results of Study 2 offer important implications for educators. Understanding the mechanisms that explain antecedents of motivation can help educators to better encourage strategies to improve BPN satisfaction, and in turn, autonomous motivation. The current SDT literature emphasizes the role of learning environments in supporting the psychological needs of students, however instructors can also communicate the influential position students can embrace to help satisfy their own needs. For instance, they can encourage and teach students effective conscientious behavioural expressions, such as keeping things clean and maintaining order in their lives to better meet their needs. Moreover, educators should be mindful of students who may engage in behavioural manifestations of neuroticism, as these can lead to determents to BPN satisfaction and autonomous motivation. Therefore, students should be provided resources and taught strategies to overcome these behavioural tendencies.

Furthermore, schoolteachers and higher education professors can facilitate certain behavioural manifestations by offering opportunities for students to express them in their courses. For instance, behavioural expressions of openness to experience such as participating in creative hobbies and engaging with others who are different than oneself can be facilitated by teachers by integrating assessments through which students can be creative, and having students engage with one another. Moreover, when applicable, educators can make efforts to integrate course material that allows students to engage with different perspectives, diverse people, and experiences. Likewise, behavioural expressions of extraversion, such as speaking in group conversations and spending time with others can be facilitated by implementing group work and course discussions. Lastly, offering chances for students to help one another, such as swapping course work and allowing them to provide feedback to one another can facilitate behavioural expressions of agreeableness.

Moreover, previous research has highlighted the benefits that friendships can have for students. For instance, friendships in university have been linked to lower dropout intentions, increased self-regulated learning, and self-efficacy (Morelli et al., 2022). Also, friendships have been connected to other positive outcomes such as enhanced well-being (Demir & Davidson, 2013; Putri & Muttaqin, 2022). Thus, both mental health professionals and educators can take advantage of this framework of behavioural expressions to help enhance the quality of relationships students have with their friends. Engaging in behavioural expressions of openness to experience, conscientiousness, extraversion, and agreeableness can help to satisfy BPNs and in turn, increase the quality of friendships by enhancing autonomous motivation towards friendships.

Limitations

Although the findings of this dissertation offer notable fundamental and applied contributions, results should be interpreted in the context of their limitations. Firstly, both studies used cross-sectional designs. Therefore, all variables were measured at the same time points, preventing the ability to make causal inferences. For instance, in Study 2, collecting data at four sequential time points would have been needed in order to effectively determine causal associations between each set of variables in the model. Secondly, because self-report measures were used, social desirability bias may have influenced the results of both studies. To avoid presenting themselves in a negative manner, participants may have reported higher levels of the positive constructs covered in this dissertation (e.g., autonomous motivations, BPN satisfaction, life satisfaction, positive affect, vitality, personal growth, prosocialness, and grit) and lower levels of negative constructs (e.g., neuroticism, depression, anxiety, and negative affect). Lastly, although the current findings offer potential implications for all students and individuals, the exclusively undergraduate university student samples recruited in this dissertation present certain limitations to the generalizability of results. The behavioural expressions and associations between variables that were identified in this research may vary for populations beyond university students.

Future Studies

Generalizing Behavioural Manifestations

It is crucial to recognize the influence of culture on behavioural expressions. The behavioural manifestations of personality traits presented here were conceptualized and operationalized on an exclusively Canadian undergraduate university sample. Furthermore, large proportions of the samples identified as white. As evoked in the first article of this dissertation,

there is conflicting research supporting the FFM across cultures (Gurven et al., 2013; McCrae et al., 2021; Schmitt et al., 2008). Additionally, Costa and McCrae (1995) suggest that behavioural expressions of personality traits are susceptible to cultural influence. Thus, although the behavioural manifestations conceptualized in Study 1 were endorsed by university students living in Canada, they may not be applicable to non-university students or individuals of other cultures. Further research recruiting more diverse samples in regard to race, country of origin, socioeconomic status, education level, and age are critical in order to generalize the current conceptual framework.

BPN Frustration

The current research highlights the importance of BPN satisfaction and deprivation for improving autonomous academic and friendship motivation. However, SDT also underscores the important role of BPN frustration, and emphasizes the value of measuring the two dimensions separately (Chen et al., 2015). BPN frustration is the active thwarting of BPNs and can lead to different outcomes than low BPN satisfaction (Chen et al., 2015). For instance, BPN frustration was found to contribute to measures of ill-being, controlled motivation, and amotivation, independent from BPN satisfaction (Stebbings et al., 2012; Teixeira et al., 2020). Thus, future research can expand on the current findings by examining the influence of personality traits and behavioural manifestations on BPN frustration, and moreover, the mediating effect of BPN frustration on the associations between behavioural expressions and autonomous academic and friendship motivation.

Autonomous Motivation in Additional Domains

Although the current research highlights that behavioural expressions and BPN satisfaction are sequential mediators of the associations between personality traits and

autonomous motivation in the domains studied, future research could expand these findings by examining motivation beyond the areas of education and friendships. For example, personality traits and BPNs have been found to be associated with motivation in the workplace (Goodboy et al., 2020; Sowunmi, 2022) and for exercise (Lautenbach et al., 2020; Sylvester et al., 2020). Thus, in order to improve the understanding of the findings revealed within these contexts, future research could conduct studies examining motivation for work and exercise, and test similar sequential mediations.

Mediators and Moderators of the Trait-Behavioural Expression Relationship

Given that personality traits influence behavioural expressions, and behavioural expressions are more susceptible to environmental influence, it is plausible that additional factors mediate and moderate the association between traits and behavioural expressions. For instance, self-awareness may explain this relationship because self-awareness increases the accessibility of one's thoughts and feelings, and in turn, increases the likelihood that those thoughts and emotions will influence behaviour (London et al., 2023). Thus, if one is more mindful of who they are, it is possible that they will be more likely to engage in behaviours that represent aspects of the self. Also, although mental health is traditionally an outcome variable, it is possible that it could be a process that explains the relationship between personality traits and behavioural expressions as well. Specifically, individuals struggling with depression or anxiety may feel impediments to their ability to engage in particular behavioural expressions, regardless of their personalities. Furthermore, research highlights the influence of social support on behaviour (Bahari et al., 2019; Hu et al., 2019). Therefore, future studies could examine social support as a potential moderator of the relationship between traits and behavioural manifestations.

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Appendix A

Study 1 Consent Form

How do you behave in various situations?

Principal Investigator:
Rebecca Sullivan
School of Psychology
University of Ottawa
Ottawa, ON

Supervisor:
Dr. Isabelle Green-Demers
Department of Psychology
University of Quebec in Outaouais
Gatineau, QC

You are invited to participate in the abovementioned research study conducted by Rebecca Sullivan, who is being supervised by Dr. Isabelle Green-Demers.

Participation: If you wish to participate in this study, please complete the survey. Your decision to complete and submit this survey will be interpreted as an indication of your consent to participate. The survey should take you approximately 45 minutes to complete. You do not have to answer any questions that you do not want to answer. Once you have completed the survey, please click submit.

Purpose of the Study: From this research, we wish to learn more about how different people feel, think, and behave in different situations.

Benefits: The current study may contribute to your knowledge of psychological research. You may also experience some increased awareness of your own thoughts, emotions, and behaviour. You will also have the opportunity to meet researchers and ask questions about how the research is conducted if you are interested to learn more.

Risks: Your participation in this study will entail that you volunteer personal information, and this may cause you to feel potential emotional or psychological discomforts. The researcher ensures that every effort will be made to minimize these risks, as you can skip any questions that cause you discomfort, and you have the option of withdrawing from the study at any time without penalty. You will also be referred to contact either the Ottawa Mental Health Crisis Line at 613-722-6914 or the Ottawa Distress Centre at 613-238-3311, should you wish to seek further assistance due to emotional or psychological discomforts as a result to this study.

Confidentiality and Anonymity: This online survey is hosted by Qualtrics, and data collected will be stored in Canada. This questionnaire does not ask for personal identifiers or any information that may be used to identify you. The security and privacy policy for the Qualtrics

company can be found at the following link: https://www.qualtrics.com/security-statement/. The information that you will share will be identified only by participant number and will be used solely by the researchers for the purposes of this research. Anonymity is guaranteed since you are not being asked to provide your name or any personal information.

Conservation of data: All data derived from this study will be stored on password-protected computers and/or password-protected external hard drives in the office of the principal investigator, Rebecca Sullivan and of the project supervisor, Dr. Isabelle Green-Demers. Both of these spaces are physically locked at all times. They will be kept for a period of 25 years, at which time they will be securely deleted.

Voluntary Participation: You are under no obligation to participate and if you choose to participate, you may refuse to answer questions that you do not want to answer. Completion and submission of the questionnaire by you implies consent. Please note that because of the anonymous nature of the survey, data cannot be withdrawn once your responses are submitted.

Information about the Study Results: The research findings will be available to you following completion of the project. Please contact Rebecca Sullivan if you wish to know the results of this study.

As was explained to you at the beginning of the semester, your participation in this study will grant you 1 point in your course. If you choose to withdraw from the study, you will still receive the full 1 point compensation.

If you have any questions or require more information about the study itself, you may contact the researcher at the email mentioned above.

If you have any questions with regards to the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, tel.: (613) 562-5387 or ethics@uottawa.ca.

Please print or save a copy of this consent page for your records.

Thank you for your time and consideration.

Appendix B

Study 1 Questionnaire

1. Do you agree to participate in this study?
   - Yes
   - No

2. Please indicate your gender identity.
   - Man
   - Woman
   - Transgender
   - Gender non-conforming
   - Other

3. Please indicate your age in years.

4. What is your university major?

5. What ethnic background do you most identify with?
   - White/Caucasian
   - Black
   - Indigenous
   - Asian
   - Latinx
   - Other

6. What is your first language?
   - English
   - French
   - Other

7. Please indicate the relationship status you best identify with.
   - Single
   - In a committed relationship
   - Married
   - Divorced

Behavioural Manifestations

To what extent are the following statements typical to how you behave (1 = never, 4 = moderately, 7 = frequently)?

1. I try new things
2. I exert willpower when necessary

3. I react poorly to stressful situations
4. I avoid disagreements
5. I engage in philosophical thinking
6. I overshare my worries with others
7. I add an artistic touch to what I do when possible
8. I invest effort required for a task to ensure a job well done
9. I set high standards for myself
10. I concentrate on the task at hand
11. I improvise my schedule
12. I welcome different points of view
13. I entertain other people
14. I enjoy deep conversations
15. I work hard on projects
16. I procrastinate despite my best interests
17. I don't do the same thing everyday
18. I follow rules
19. I am interested in meeting people that are different from me
20. I maintain order in my life
21. I make sure I take care of details when I perform a task
22. I go out with groups of people
23. I am comfortable with sensitive issues
24. I pay careful attention to the tasks I do
25. I talk in front of large groups of people
26. I do things on time
27. I welcome diversity
28. I focus.
29. I'm at ease with uninhibited conversations
30. I work diligently
31. I cause myself trouble because I avoid tasks or situations that make me anxious
32. I introduce myself to new people
33. I interact harmoniously with others
34. I use my imagination often
35. I jump into activities I am excited about
36. I keep things clean
37. I make more of problems than I should
38. I am unafraid to act in a foolish way
39. I prefer to spend an evening home alone
40. I obsess about minor things
41. I listen more than I talk in group conversations
42. I struggle with making decisions
43. I compromise
44. I take the lead in situations
45. I become uneasy seeing others succeed
46. I look at the bright side of things
47. I plan every aspect of the tasks I do
48. I am energized by new things and people

49. I go with the flow
50. I intend to visit new destinations
51. I do nice things for others
52. I show understanding
53. I enjoy talking in group conversations
54. I avoid conflict
55. I have trouble functioning because of my negative emotions
56. I have creative hobbies
57. I prefer a lively environment to a quiet one
58. I give positive feedback
59. I overanalyze situations
60. I put others' needs before my own
61. I fidget a lot
62. I help others
63. I find controversial topics interesting
64. I have difficulty managing negative emotions
65. I accommodate others
66. I collapse under pressure
67. I see the best in others
68. I act spontaneously
69. I solve interpersonal differences
70. I pay more attention to what is going on around me than to my thoughts and feelings

Appendix C

Study 2 Consent Form (Versions A and B)

Diving deep into personality: Why do you feel and behave that way?

Principal Investigator: Rebecca Sullivan
School of Psychology
University of Ottawa
Ottawa, ON

Supervisor: Dr. Isabelle Green-Demers
Department of Psychology
University of Quebec in Outaouais
Gatineau, QC

You are invited to participate in the abovementioned research study conducted by Rebecca Sullivan, in the context of a PhD thesis, who is being supervised by Dr. Isabelle Green-Demers.

Participation: If you wish to participate in this study, please complete the survey. Your decision to complete and submit this survey will be interpreted as an indication of your consent to participate. The survey should take you approximately 45 to 60 minutes to complete, and will consist of questions concerning your feelings, behaviours, and well-being. You do not have to answer any questions that you do not want to answer. Once you have completed the survey, please click submit.

Purpose of the Study: From this research, we wish to learn more about how different people feel, think, and behave in different situations.

Benefits: The current study may contribute to your knowledge of psychological research. You may also experience some increased awareness of your own thoughts, emotions, and behaviour. You will also have the opportunity to speak with researchers and ask questions about how the research is conducted if you are interested to learn more.

Risks: Your participation in this study will entail that you volunteer personal information, and this may cause you to feel potential emotional or psychological discomforts. The researcher ensures that every effort will be made to minimize these risks, as you can skip any questions that cause you discomfort, and you have the option of withdrawing from the study at any time without penalty. You will also be referred to contact either the Ottawa Mental Health Crisis Line at 613-722-6914 or the Ottawa Distress Centre at 613-238-3311, should you wish to seek further assistance due to emotional or psychological discomforts as a result to this study.

Confidentiality and Anonymity: This online survey is hosted by Qualtrics, and data collected will be stored in Canada. This questionnaire does not ask for personal identifiers or any information that may be used to identify you. The security and privacy policy for the Qualtrics company can be found at the following link: https://www.qualtrics.com/security-statement/. The

information that you will share will be identified only by participant number and will be used solely by the researchers for the purposes of this research. Anonymity is guaranteed since you are not being asked to provide your name or any personal information.

Conservation of data: All data derived from this study will be stored on password-protected computers and/or password-protected external hard drives in the office of the principal investigator, Rebecca Sullivan and of the project supervisor, Dr. Isabelle Green-Demers. Both of these spaces are physically locked at all times. They will be kept for a period of 25 years, at which time they will be securely deleted.

Voluntary Participation: You are under no obligation to participate and if you choose to participate, you may refuse to answer questions that you do not want to answer. Completion and submission of the questionnaire by you implies consent. Please note that because of the anonymous nature of the survey, data cannot be withdrawn once your responses are submitted.

Information about the Study Results: The research findings will be available to you following completion of the project. Please contact Rebecca Sullivan if you wish to know the results of this study.

As was explained to you at the beginning of the semester, your participation in this study will grant you 1 point in your course. If you choose to withdraw from the study, you will still receive the full 1 point compensation.

If you have any questions or require more information about the study itself, you may contact the researcher at the email mentioned above.

If you have any questions with regards to the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, tel.: (613) 562-5387 or ethics@uottawa.ca.

Please print or save a copy of this consent page for your records.

Thank you for your time and consideration.

Appendix D

Study 2 Questionnaire: Version A

1. Do you agree to participate in this study?
- Yes
- No

2. Please indicate your gender identity.
- Man
- Woman
- Transgender
- Gender non-conforming
- You don't have an option that applies to me
    - My gender identity is _____.

3. Please indicate your age in years.

4. What is your university major?

5. What ethnic background do you most identify with?
- White/Caucasian
- Black
- Indigenous
- Asian
- Latinx
- Other

6. What is your first language?
- English
- French
- Other

7. Please indicate the relationship status you best identify with.
- Single
- In a committed relationship
- Married
- Divorced

To what extent are the following statements typical to how you behave (1 = never, 4 = moderately, 7 = frequently)?

1. I do nice things for others.
2. I function poorly because of my negative emotions.
3. I speak up in group conversations.

4. I chase unusual experiences.
5. I give positive feedback.
6. I make changes to spice up my life.
7. I work diligently.
8. I choose lively environments over quiet ones.
9. I do things that take me out of my comfort zone.
10. I collapse under pressure.
11. I show understanding.
12. I keep things clean.
13. I react poorly to stressful situations.
14. I help others.
15. I seek out loud environments.
16. I exchange ideas with people that have views that are radically different than mine.
17. I put others' needs before my own.
18. I concentrate on the task at hand.
19. I choose to spend an evening home alone. (R)
20. I maintain order in my life.
21. I struggle with making decisions.
22. I participate in creative hobbies.
23. I accommodate others.
24. I spend most of my time with other people.
25. I obsess about minor things.
26. I go out with groups of people.
27. I pay careful attention to the tasks I do.
28. I do unusual activities to broaden my horizons.
29. I overanalyze situations.
30. I make sure I take care of details when I perform a task.

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you.

1. Before voting I thoroughly investigate the qualifications of all the candidates.
2. I never hesitate to go out of my way to help someone in trouble.
3. It is sometimes hard for me to go on with my work if I am not encouraged.
4. I have never intensely disliked anyone.
5. On occasion I have had doubts about my ability to succeed in life.
6. I sometimes feel resentful when I don't get my way.
7. I am always careful about my manner of dress.
8. My table manners at home are as good as when I eat out in a restaurant.
9. If I could get into a movie without paying and be sure I was not seen, I would probably do it.
10. On a few occasions, I have given up doing something because I thought too little of my ability.
11. I like to gossip at times.
12. There have been times when I felt like rebelling against people in authority even though I knew they were right.
13. No matter who I'm talking to, I'm always a good listener

14. I can remember “playing sick” to get out of something
15. There have been occasions when I took advantage of someone
16. I’m always willing to admit it when I make a mistake
17. I always try to practice what I preach
18. I don’t find it particularly difficult to get along with loud-mouthed, obnoxious people
19. I sometimes try to get even, rather than forgive or forget
20. When I don’t know something I don’t at all mind admitting it
21. I am always courteous, even to people who are disagreeable
22. At times I have really insisted on having things my own way
23. There have been occasions when I felt like smashing things
24. I would never think of letting someone else be punished for my wrongdoings
25. I never resent being asked to return a favour
26. I have never been irked when people expressed ideas very different from my own
27. I never make a long trip without checking the safety of my car
28. There have been times when I was quite jealous of the good fortune of others
29. I have almost never felt the urge to tell someone off
30. I am sometimes irritated by people who ask favours of me
31. I have never felt that I was punished without cause
32. I sometimes think when people have a misfortune they only got what they deserved
33. I have never deliberately said something that hurt someone’s feelings

Please respond to each of the following statements by indicating the degree to which the statement is true for you. Use the following scale: 1 = Strongly Disagree, to 7 = Strongly Agree).

1. I finish whatever I begin.
2. Setbacks don’t discourage me.
3. I am diligent.
4. I am a hard worker.
5. I have achieved a goal that took years of work.
6. I have overcome setbacks to conquer an important challenge.

Please indicate the degree to which you agree with the following statements. Use the following scale to record your answers (strongly disagree = 1 to strongly agree = 7).

1. If I do not set the highest standards for myself, I am likely to end up a second-rate person
2. It is important to me that I be thoroughly competent in everything I do
3. I set higher goals than most people
4. I am very good at focusing my efforts on attaining a goal
5. I have extremely high goals
6. Other people seem to accept lower standards from themselves than I do
7. I expect higher performance in my daily tasks than most people
8. Organization is very important to me
9. I am a neat person
10. I try to be an organized person
11. I try to be a neat person
12. Neatness is very important to me

13. I am an organized person

Please indicate the degree to which you agree with the following statements. Use the following scale to record your answers (strongly disagree = 1 to strongly agree = 7).

1. I am not interested in activities that will expand my horizons.
2. In general, I feel that I continue to learn more about myself as time goes by.
3. I am the kind of person who likes to give new things a try.
4. I don't want to try new ways of doing things--my life is fine the way it is.
5. I think it is important to have new experiences that challenge how you think about yourself and the world.
6. When I think about it, I haven't really improved much as a person over the years.
7. In my view, people of every age are able to continue growing and developing.
8. With time, I have gained a lot of insight about life that has made me a stronger, more capable person.
9. I have the sense that I have developed a lot as a person over time.
10. I do not enjoy being in new situations that require me to change my old familiar ways of doing things.
11. For me, life has been a continuous process of learning, changing, and growth.
12. I enjoy seeing how my views have changed and matured over the years.
13. I gave up trying to make big improvements or changes in my life a long time ago.
14. There is truth to the saying you can't teach an old dog new tricks.

Please indicate the degree to which you agree with the following statements. Use the following scale to record your answers (strongly disagree = 1 to strongly agree = 7).

1. I am pleased to help my friends/colleagues in their activities
2. I share the things that I have with my friends
3. I try to help others
4. I am available for volunteer activities to help those who are in need
5. I am emphatic with those who are in need
6. I help immediately those who are in need
7. I do what I can to help others avoid getting into trouble
8. I intensely feel what others feel
9. I am willing to make my knowledge and abilities available to others
10. I try to console those who are sad
11. I easily lend money or other things
12. I easily put myself in the shoes of those who are in discomfort
13. I try to be close to and take care of those who are in need
14. I easily share with friends any good opportunity that comes to me
15. I spend time with those friends who feel lonely
16. I immediately sense my friends’ discomfort even when it is not directly communicated to me

Appendix E

Study 2 Questionnaire: Version B

1. Do you agree to participate in this study?
   - Yes
   - No

2. Please indicate your gender identity.
   - Man
   - Woman
   - Transgender
   - Gender non-conforming
   - You don't have an option that applies to me
     - My gender identity is _____.

3. Please indicate your age in years.

4. What is your university major?

5. What ethnic background do you most identify with?
   - White/Caucasian
   - Black
   - Indigenous
   - Asian
   - Latinx
   - Other

6. What is your first language?
   - English
   - French
   - Other

7. Please indicate the relationship status you best identify with.
   - Single
   - In a committed relationship
   - Married
   - Divorced

To what extent are the following statements typical to how you behave (1 = never, 4 = moderately, 7 = frequently)?

1. I do nice things for others
2. I function poorly because of my negative emotions.
3. I speak up in group conversations.

4. I chase unusual experiences.
5. I give positive feedback.
6. I make changes to spice up my life
7. I work diligently.
8. I choose lively environments over quiet ones.
9. I do things that take me out of my comfort zone.
10. I collapse under pressure.
11. I show understanding.
12. I keep things clean.
13. I react poorly to stressful situations.
14. I help others.
15. I seek out loud environments.
16. I exchange ideas with people that have views that are radically different than mine.
17. I put others' needs before my own.
18. I concentrate on the task at hand.
19. I choose to spend an evening home alone. (R)
20. I maintain order in my life.
21. I struggle with making decisions.
22. I participate in creative hobbies.
23. I accommodate others.
24. I spend most of my time with other people.
25. I obsess about minor things.
26. I go out with groups of people.
27. I pay careful attention to the tasks I do.
28. I do unusual activities to broaden my horizons.
29. I overanalyze situations.
30. I make sure I take care of details when I perform a task.

Please rate these common human traits to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you wish to be in the future. Describe yourself as you are generally or typically, as compared with other persons you know.

Following each trait, please rate how accurately that trait describes you (1 = not at all, 4 = moderately, 7 = totally).

1. Bashful
2. Bold
3. Careless
4. Cold
5. Complex
6. Cooperative
7. Creative
8. Deep
9. Efficient
10. Disorganized
11. Energetic

12. Envious
13. Extraverted
14. Fretful
15. Harsh
16. Inefficient
17. Intellectual
18. Imaginative
19. Jealous
20. Kind
21. Moody
22. Organized
23. Philosophical
24. Practical
25. Quiet
26. Relaxed
27. Rude
28. Shy
29. Sloppy
30. Sympathetic
31. Systematic
32. Talkative
33. Temperamental
34. Touchy
35. Uncreative
36. Unenvious
37. Warm
38. Unsympathetic
39. Withdrawn
40. Unintellectual

Below are five statements that you may agree or disagree with. Please indicate your agreement with each item (1 = Strongly Disagree, 7 = Strongly Agree).

1. In most ways my 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.

How typical or characteristic is each item of you (1 = Not at all typical, 4 = Somewhat typical, 7 = Very typical)?

1. I get "rattled" easily.
2. When faced with excitement or unexpected situations, I become nervous and jumpy.
3. I am calm and not easily upset.
4. When things go wrong, I get nervous and upset instead of calmly thinking out a solution.

5. It makes me nervous when I have to wait.
6. I am a tense "high-strung" person.
7. I am more sensitive than most other people.
8. My hand shakes when I try to do something.
9. I am a very nervous person.

This scale consists of a number of words that describe different feelings and emotions. Indicate to what extent you felt this way over the past week (1 = very slightly or not at all to 7 = extremely).

1. Interested
2. Distressed
3. Excited
4. Upset
5. Strong
6. Guilty
7. Scared
8. Hostile
9. Enthusiastic
10. Proud
11. Irritable
12. Alert
13. Ashamed
14. Inspired
15. Nervous
16. Determined
17. Attentive
18. Jittery
19. Active
20. Afraid

Please respond to each of the following statements by indicating the degree to which the statement is true for you in general in your life. Use the following scale: 1 = Strongly Disagree, to 7 = Strongly Agree).

1. I feel alive and vital.
2. Sometimes I feel so alive I just want to burst.
3. I have energy and spirit.
4. I look forward to each new day.
5. I nearly always feel alert and awake.
6. I feel energized.

Please respond to the following questions regarding your mood and daily functioning:

1. How many times during the last two days have you been preoccupied by thoughts of hopelessness, helplessness, pessimism, intense worry, unhappiness, etc?

- Not at all
- Rarely
- Frequently
- Most of the time
- All the time

2. How relaxed have you been during the last two days, compared to how you normally are?
- 1 = Extremely tense (i.e., wringing hands, muscle tremors etc.)
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Quite calm and relaxed physically

3. To what extent have you had difficulty starting and following through an ordinary job or task to completion during the last week compared to when you feel things have been going well?
- 1 = Putting things off; starting and not finishing for a long time, if it all
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Start and finish as well as most other people

4. How satisfied are you with your ability to perform your usual domestic duties? (i.e., shopping, meals, dishes, home repair, cleaning up, child care, etc).
- 1 = Very satisfied
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Very dissatisfied

Appendix F

Study 3 Consent Form

Exploring experiences with friendship, university, and behaviours

Principal Investigator:
Rebecca Sullivan
School of Psychology
University of Ottawa
Ottawa, ON

Supervisor:
Dr. Isabelle Green-Demers
Department of Psychology
University of Quebec in Outaouais
Gatineau, QC

You are invited to participate in the abovementioned research study conducted by Rebecca Sullivan, in the context of a PhD thesis, who is being supervised by Dr. Isabelle Green-Demers.

Participation: If you wish to participate in this study, please complete the survey. Your decision to complete and submit this survey will be interpreted as an indication of your consent to participate. The survey should take you approximately 45 to 60 minutes to complete, and will consist of questions concerning your feelings, behaviours, and well-being. You do not have to answer any questions that you do not want to answer. Once you have completed the survey, please click submit.

Purpose of the Study: From this research, we wish to learn more about how different people feel, think, and behave in different situations.

Benefits: The current study may contribute to your knowledge of psychological research. You may also experience some increased awareness of your own thoughts, emotions, and behaviour. You will also have the opportunity to speak with researchers and ask questions about how the research is conducted if you are interested to learn more.

Risks: Your participation in this study will entail that you volunteer personal information, and this may cause you to feel potential emotional or psychological discomforts. The researcher ensures that every effort will be made to minimize these risks, as you can skip any questions that cause you discomfort, and you have the option of withdrawing from the study at any time without penalty. You will also be referred to contact either the Ottawa Mental Health Crisis Line at 613-722-6914 or the Ottawa Distress Centre at 613-238-3311, should you wish to seek further assistance due to emotional or psychological discomforts as a result to this study.

Confidentiality and Anonymity: This online survey is hosted by Qualtrics, and data collected will be stored in Canada. This questionnaire does not ask for personal identifiers or any

information that may be used to identify you. The security and privacy policy for the Qualtrics company can be found at the following link: https://www.qualtrics.com/security-statement/. The information that you will share will be identified only by participant number and will be used solely by the researchers for the purposes of this research. Anonymity is guaranteed since you are not being asked to provide your name or any personal information.

Conservation of data: All data derived from this study will be stored on password-protected computers and/or password-protected external hard drives in the office of the principal investigator, Rebecca Sullivan and of the project supervisor, Dr. Isabelle Green-Demers. Both of these spaces are physically locked at all times. They will be kept for a period of 25 years, at which time they will be securely deleted.

Voluntary Participation: You are under no obligation to participate and if you choose to participate, you may refuse to answer questions that you do not want to answer. Completion and submission of the questionnaire by you implies consent. Please note that because of the anonymous nature of the survey, data cannot be withdrawn once your responses are submitted.

Information about the Study Results: The research findings will be available to you following completion of the project. Please contact Rebecca Sullivan if you wish to know the results of this study.

As was explained to you at the beginning of the semester, your participation in this study will grant you 1 point in your course. If you choose to withdraw from the study, you will still receive the full 1 point compensation.

If you have any questions or require more information about the study itself, you may contact the researcher at the email mentioned above.

If you have any questions with regards to the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, tel.: (613) 562-5387 or ethics@uottawa.ca.

Please print or save a copy of this consent page for your records.

Thank you for your time and consideration.

Appendix G

Study 3 Questionnaire

1. Do you agree to participate in this study?
- Yes
- No

2. Please indicate your gender identity.
- Man
- Woman
- Transgender
- Gender non-conforming
- You don't have an option that applies to me
    - My gender identity is _____.

3. Please indicate your age in years.

4. What is your university major?

5. What ethnic background do you most identify with?
- White/Caucasian
- Black
- Indigenous
- Asian
- Latinx
- Other

6. What is your first language?
- English
- French
- Other

7. Please indicate the relationship status you best identify with.
- Single
- In a committed relationship
- Married
- Divorced

To what extent are the following statements typical to how you behave (1 = never, 4 = moderately, 7 = frequently)?

1. I do nice things for others
2. I function poorly because of my negative emotions.
3. I speak up in group conversations.

4. I chase unusual experiences.
5. I give positive feedback.
6. I make changes to spice up my life
7. I work diligently.
8. I choose lively environments over quiet ones.
9. I do things that take me out of my comfort zone.
10. I collapse under pressure.
11. I show understanding.
12. I keep things clean.
13. I react poorly to stressful situations.
14. I help others.
15. I seek out loud environments.
16. I exchange ideas with people that have views that are radically different than mine.
17. I put others' needs before my own.
18. I concentrate on the task at hand.
19. I choose to spend an evening home alone. (R)
20. I maintain order in my life.
21. I struggle with making decisions.
22. I participate in creative hobbies.
23. I accommodate others.
24. I spend most of my time with other people.
25. I obsess about minor things.
26. I go out with groups of people.
27. I pay careful attention to the tasks I do.
28. I do unusual activities to broaden my horizons.
29. I overanalyze situations.
30. I make sure I take care of details when I perform a task.

Please respond to each of the following statements by indicating the degree to which the statement is true for you 1 (*not true at all*) to 7 (*very true*).

1. I feel a sense of choice and freedom in the things I undertake
2. I feel that the people I care about also care about me
3. I feel confident that I can do things well
4. I feel that my decisions reflect what I really want
5. I feel connected with people who care for me, and for whom I care
6. I feel capable at what I do
7. I feel my choices express who I really am
8. I feel close and connected with other people who are important to me
9. I feel competent to achieve my goals
10. I feel I have been doing what really interests me
11. I experience a warm feeling with the people I spend time with
12. I feel I can successfully complete difficult tasks

Why do you go to university?

Using the scale below, please rate to what extent each of the following statements corresponds to one of the reasons why you go to university.

1 (*does not correspond at all*), 4 (*corresponds moderately*), 7 (*corresponds totally*)

1. Because I want a high paying job later on.
2. Because I enjoy learning new things.
3. Because it is a good way to prepare myself for my future career.
4. Honestly, I don't know; I feel that I am wasting my time at university.
5. To show to myself that I can succeed in my program.
6. Because studying is an important part of who I am.
7. To secure a more prestigious job later on.
8. For the pleasure I feel when I understand new information.
9. Because it will enable me to do a job that I like later on.
10. Because studying brings a lot to my life.
11. I once had good reasons for studying; however, now, I wonder whether I should continue.
12. Because succeeding in my courses make me feel important.
13. Because it will help me to become wealthy.
14. For the pleasure of expanding my understanding of topics that appeal to me.
15. Because it allows me to develop useful job skills.
16. I can't see why I go to university and, frankly, I couldn't care less.
17. To prove to myself that I am intelligent.
18. Because my studies are a central aspect of my life.
19. To have a high salary later on.
20. Because I enjoy learning interesting notions.
21. It allows me to take responsibility for training in my future career.
22. I don't know; I can't understand what I am doing in university.
23. To show myself that I can cut it in my program.
24. Because being a student is an integral part of my life.

Why are you in a relationship with your best friend?
Please respond to each of the following statements by indicating the degree to which the statement is true for you 1 (*not true at all*) to 7 (*totally*)

1. Because I value this relationship.
2. Because this relationship is important to me.
3. Because I get many perks from this relationship.
4. Because I'd be ashamed not to be there for my friend.
5. Because this relationship means a lot to me.
6. I don't know, this relationship is meaningless to me.
7. Because this relationship helps me understand who I am.
8. Because I meet other people through this relationship.
9. Because this relationship is a central part of my life.
10. I don't know anymore, I find this relationship disappointing.
11. Because I would think poorly of myself for letting down my best friend.
12. For the pleasure of sharing good and bad times together.

13. Because I'd be disappointed in myself if I didn't invest enough in this relationship.
14. I don't know, I question whether I should stay in this relationship.
15. For the pleasure of doing things together.
16. Because this relationship allows me to socialize with a group.
17. I don't know, I wonder what I get out of this relationship.
18. This relationship fosters my personal growth.
19. Because it is important to me to cultivate this relationship.
20. For the pleasure of talking together.
21. For the pleasure of relating closely to my friend.
22. Because I would feel guilty if I neglected my friend.
23. This relationship is very fulfilling to me on a personal level.
24. Because being with my friend provides me with a lot of advantages.

Please rate these common human traits to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you wish to be in the future. Describe yourself as you are generally or typically, as compared with other persons you know.

Following each trait, please rate how accurately that trait describes you (1 = not at all, 4 = moderately, 7 = totally).

1. Bashful
2. Bold
3. Careless
4. Cold
5. Complex
6. Cooperative
7. Creative
8. Deep
9. Disorganized
10. Efficient
11. Disorganized
12. Efficient
13. Energetic
14. Envious
15. Extraverted
16. Fretful
17. Harsh
18. Imaginative
19. Inefficient
20. Intellectual
21. Imaginative
22. Inefficient
23. Jealous
24. Kind
25. Moody
26. Organized

27. Philosophical
28. Practical
29. Quiet
30. Relaxed
31. Rude
32. Shy
33. Sloppy
34. Sympathetic
35. Systematic
36. Talkative
37. Temperamental
38. Touchy
39. Uncreative
40. Unenvious