

# **The interplay between dependency, self-criticism, and the basic psychological needs in adolescent adjustment: A correlational, diary-based, and experimental approach**

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*“L’homme se découvre quand il se mesure avec l’obstacle”*

— Antoine de Saint-Exupéry

## Table of contents

<b>CHAPTER 1 .....</b>	<b>1</b>
The Interplay Between Dependency, Self-Criticism, and the Basic Psychological Needs in Adolescent Adjustment: A General Introduction	
<b>CHAPTER 2 .....</b>	<b>41</b>
The Explanatory Role of Basic Psychological Need Experiences in the Relation between Dependency, Self-criticism and Psychopathology in Adolescence	
<b>CHAPTER 3 .....</b>	<b>85</b>
A Longitudinal Examination of the Interplay Between Personality Vulnerability and Need-Based Experiences in Adolescents' Depressive Symptoms	
<b>CHAPTER 4 .....</b>	<b>129</b>
Daily Ups and Downs in Adolescents' Depressive Symptoms: The Role of Daily Self-Criticism, Dependency and Basic Psychological Needs	
<b>CHAPTER 5 .....</b>	<b>167</b>
The Role of Weekly Need-Based Experiences and Self-Criticism in Predicting Weekly Academic (Mal)Adjustment	
<b>CHAPTER 6 .....</b>	<b>223</b>
Does Dependency Play a Role in Need-Based Responses to Social Exclusion?	
<b>CHAPTER 7 .....</b>	<b>263</b>
General Discussion	
<b>NEDERLANDSTALIGE SAMENVATTING .....</b>	<b>313</b>
<b>ENGLISH SUMMARY .....</b>	<b>321</b>
<b>DANKWOORD .....</b>	<b>331</b>
<b>APPENDIX .....</b>	<b>337</b>

# **CHAPTER 1**

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## **The Interplay Between Dependency, Self-Criticism, and Basic Psychological Needs in Adolescent Adjustment: A General Introduction**

Table of contents

**1 Adolescence as a Developmental Period Full of Change ..... 4**

1.1 Transformations Throughout Adolescence ..... 4

1.2 Vulnerability to Psychopathology in Adolescents ..... 5

1.3 Increases in Psychopathology over Generations ..... 6

1.4 Conclusion ..... 7

**2 Blatt’s theory: Self-Criticism and Dependency as Personality Vulnerability Factors ..... 7**

2.1 Blatt’s Two Polarities of Experience ..... 7

2.2 Personality Vulnerability to Psychopathology Associated with Self-Criticism and Dependency ..... 10

**3 Self-Determination Theory: The Role of Need-Based Experiences ..... 12**

3.1 The Basic Psychological Needs ..... 13

3.2 The Differential Role of Need Satisfaction and Need Frustration ..... 14

3.3 Associations Between Blatt’s Personality Dimensions and SDT’s Psychological Needs ..... 15

3.4 Self-Determination Theory and Blatt’s Theory: a Metatheoretical Comparison ..... 18

**4 Research Objectives and Outline of the Dissertation ..... 22**

**5 References ..... 28**

Adolescence is marked by an increased vulnerability to maladjustment (Costello, Copeland, & Angold, 2011). One influential theory to study this heightened susceptibility to maladjustment is Blatt's two-polarities model of personality development (Blatt, 2004, 2008). According to Blatt's theory, self-criticism and dependency are two important personality characteristics that confer vulnerability to psychological difficulties in adolescents. Empirical research confirmed that adolescents with high levels of dependency (involving excessive anxiety about losing other people's love) and self-criticism (involving the pursuit of very high standards and a tendency towards negative self-evaluation) are more vulnerable to maladjustment (Kuperminc, Blatt, & Leadbeater, 1997). However, less is known about the mechanisms underlying this personality vulnerability. The present dissertation aims to increase our understanding of the mechanisms behind this personality vulnerability to maladjustment by examining the intervening role of adolescents' need-based experiences, a central concept in Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017). The general introduction starts by discussing the developmental period of adolescence as an important life stage with both challenges and opportunities. Next, I discuss the theoretical background of this dissertation, thereby first reviewing the principal tenets of both Blatt's theory and SDT separately before comparatively discussing their shared and diverging meta-theoretical assumptions. The general introduction ends with an overview of the research objectives and the empirical studies conducted in this dissertation.

## **1 Adolescence as a Developmental Period Full of Change**

### **1.1 Transformations Throughout Adolescence**

Adolescence is a key developmental stage full of change in various domains of functioning. Indeed, significant biological, cognitive, and social transformations take place throughout adolescence (Soenens, Vansteenkiste, & Beyers, 2019; Steinberg & Morris, 2001). On a biological level, puberty involves physical maturation which culminates in full reproductive capacity. As a result of hormonal changes, adolescents undergo profound physical changes, with the growth spurt and the development of secondary sex characteristics as two important examples (Rosenfeld, 1982). Moreover, there is much interindividual variation in the timing of puberty (Weichold, Silbereisen, & Schmitt-Rodermund, 2003). Adolescence is also marked by changes in brain structure and function that are leading to improved executive functions and control over affect and cognition (Paus, 2005). For example, adolescents show an increased ability to think abstractly and to set goals on a longer term (Eccles, Wigfield, & Byrnes, 2003). Adolescents also develop a greater ability to reflect on their own cognitive processes (Fonagy & Target, 1997; Fontana et al., 2018).

On an emotional level, adolescents experience more frequent and more intense emotions as compared to younger and older people, while their emotion regulation skills still continue to mature during adolescence (Silk, Steinberg, & Morris, 2003). During the adolescent years, there is also significantly more emotional instability, resulting in more emotional fluctuation from day to day (Maciejewski, Van Lier, Branje, Meeus, & Koot, 2015) and from moment to moment (Larson, Brown, & Mortimer, 2002). Generally, adolescents also report more negative affect and less positive affect compared to elementary school children (Larson & Lampman-Petratis, 1989). Finally, the social world of adolescents is in transition, as they spend less time with their parents and have a stronger orientation towards their peers (e.g., Larson, Brown, & Mortimer, 2002). As a result, parent-child relationships are renegotiated (Steinberg, 2001), while acceptance by the peer group and involvement in romantic relationships gain importance. Due to all these changes, adolescents are expected to take more responsibilities and to function more independently (Steinberg, 2012).



## 1.2 Vulnerability to Psychopathology in Adolescents

Dealing with the above-mentioned transformations can be challenging for adolescents. In light of these new developmental tasks, adolescents face the challenge of acquiring plenty of new skills. For example, when adolescents spend more time with their peers without parental supervision, they have to learn how to resist peer pressure or how to solve conflicts independently (McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011). Also changes in the environment, for example the transition to secondary school, may introduce new stressors, such as increasing academic demands. Indeed, adolescents do report more daily hassles (Seidman, Allen, Aber, Mitchell, & Feinman, 1994) and stressful events (Ge, Conger, & Elder, 2001) compared to younger children.

When adolescents continue to struggle with the stressors typical of this new developmental stage, their mental health could be at risk. Indeed, adolescence is characterized by an increased vulnerability to psychopathology and to depression in particular. While depression in childhood is rather rare, risk for depressive symptoms increases after the pubertal transition (Hankin, 2015), with 18% of adolescents, or almost 1 in 6, reporting depressive symptoms (Saluja et al., 2004). Girls show the strongest increase in depressive symptoms, with the prevalence of depressive symptoms almost tripling from age 11 to 15 (Zahn–Waxler, Klimes–Dogan, & Slattery, 2000). From age 13, girls experience more depressive symptoms compared to boys (Xiaoja Ge, Lorenz, Conger, Elder, & Simons, 1994). To illustrate, a study by the World Health Organization revealed that 49% of the females and 34% of the males reported “feeling low” on a weekly basis in a sample of 15-years-olds (Scheidt et al., 2000). Also the prevalence of internalizing problems more generally (i.e., social withdrawal, anxiety) increases in adolescence (Zahn–Waxler et al., 2000). Finally, there is also evidence that adolescence confers risk to the development of externalizing problems (e.g., rule-breaking behavior, truancy, substance abuse) (Booth, Johnson, Granger, Crouter, & McHale, 2003; Deković, Buist, & Reitz, 2004).

In conclusion, adolescents have a heightened risk to develop several types of psychopathology and depressive symptoms in particular. Moreover, the development of psychopathology in adolescence can have long-lasting consequences. Approximately one-third of the adolescents with depressive symptoms continues to

experience similar psychological problems later in life (Dekker et al., 2007). Therefore, the identification of key factors explaining adolescents' risk for psychopathology is of utmost importance. In addition, as previous studies revealed that susceptibility to develop psychopathology in adolescence is not yet fully crystallized, adolescents are an important target for prevention and early detection (Hauser, Allen & Golden, 2006).

### **1.3 Increases in Psychopathology over Generations**

A commonly held belief is that the prevalence in depressive symptoms in adolescence is on the rise during the last decades. Although researchers face many methodological difficulties to test this hypothesis rigorously, there is some empirical evidence for the rise in depression over the past decade. From 2005 until 2015, the prevalence of depression in the United States increased significantly, with the most rapid rate of increase in depression observed among youth relative to the older age groups (Weinberger et al., 2018). Another study among American adolescents showed that the increasing prevalence in depressive symptoms from 2010 to 2015 is most prominent in female adolescents, and is also accompanied by raising suicide rates (Twenge, Joiner, Rogers, & Martin, 2018). Also the prevalence of major depressive episodes in adolescents has increased in recent years (Mojtabai, Olfson, & Han, 2016).

There is much debate about possible explanations for the rise in depression rates. Several aspects of modernization are associated with higher risk to develop depressive symptoms (Hidaka, 2012). For example, disease-promoting changes in daily life (e.g., physical inactivity, inadequate sunlight exposure) can be involved, as physical and psychological well-being are intertwined. Also changes at the societal level can be associated with a heightened risk for depression, such as increasing inequality, loneliness, and competition. Recent research also found associations with increased use of social media in adolescence (Twenge et al., 2018). Even though more research on this topic is needed, it is argued that changes in the society have the potential to function as stressors that negatively affect mental health (West & Sweeting, 2003). To conclude, there is a slowly growing consensus that psychological difficulties among adolescents are on the rise, although the evidence base is still

limited. Therefore, more research on antecedents of adolescents' psychopathology is highly warranted.

#### **1.4 Conclusion**

In conclusion, adolescence can be seen as a critical life stage full of change and entails both opportunities for psychosocial growth as well as risks for maladjustment. Therefore, theories that explain both adaptive and maladaptive development are important to provide insight in changes in adolescents' functioning. Moreover, adolescents' increased risk to develop depressive symptoms is not an isolated problem, as the prevalence of other kinds of psychopathology (e.g., anxiety, social withdrawal; Zahn-Waxler et al., 2000) also increases from childhood to adolescence. Hence, transdiagnostic frameworks are needed that not only explain the development of depressive symptoms in adolescents, but also internalizing problems more broadly or psychopathology on the most general level. We propose that Blatt's (2004, 2008) theory and Self-Determination Theory (Ryan & Deci, 2017) are ideally suited to shed a light on adolescents' (mal)adjustment, because these theories attend to both the bright and dark sides of human functioning and they focus on psychological processes with transdiagnostic value.

## **2 Blatt's theory: Self-Criticism and Dependency as Personality**

### **Vulnerability Factors**

#### **2.1 Blatt's Two Polarities of Experience**

According to Blatt's two polarities model (Blatt, 2004, 2008), personality development is the result of a complex dialectical transaction between two fundamental development lines, namely self-definition and relatedness. Self-definition refers to the development of a stable, realistic and essentially positive sense of self, whereas relatedness refers to the development of increasingly mature, meaningful, and reciprocal relationships (Blatt & Luyten, 2009). The two development lines are intertwined and are said to develop synergistically through the lifespan. Progress in establishing satisfying relationships goes hand in hand with progress in the development of a more integrated and differentiated identity, and the other way around (Blatt, 2008; Blatt & Blass, 1990, 1996). These complementary

development lines are crucial to understand variations in normal personality organization as well as the development of psychopathology.

A balanced integration of the development in self-definition and relatedness results in a well-functioning personality organization (Luyten & Blatt, 2011). However, each individual tends to place somewhat greater emphasis on one development line at the expense of the other, and these mild deviations determine one's personality style (Blatt, 2008). Psychopathology arises when there is an excessive focus on one developmental line that makes it difficult to achieve progress on the other developmental line. From this viewpoint, several forms of psychopathology can be seen as attempts to find a balance, however distorted, between relatedness and self-definition, resulting in a temporary or chronic emphasis on one developmental line (Luyten, 2017). Self-criticism is characterized by a stronger emphasis on the self-definition line at the expense of developing important aspects of interpersonal relatedness. Self-critical individuals set excessively high standards and engage in harsh self-scrutiny. They are preoccupied with achievement and they report a strong discrepancy between their 'ideal self' and their 'real self' (Luyten & Fonagy, 2016). Dependency, on the other hand, involves an emphasis on interpersonal relatedness at the expense of building a stable and positive self-identity. Dependent individuals are preoccupied with interpersonal relationships and are anxious about losing the love of significant others. They have excessive needs for closeness and they often adopt a claiming interpersonal style (Blatt, 2004).

Although self-criticism and dependency are conceived as important sources of individual differences between people, there is also considerable variation in self-criticism and dependency within one single individual. Previous studies provide evidence for normative (or developmental) and non-normative (event-related) changes in self-criticism and dependency within one individual. With regard to normative changes in personality vulnerability, research has revealed declines in self-criticism and dependency throughout the life span (Kopala-Sibley, Mongrain, & Zuroff, 2013). These findings suggest that people generally tend to develop a more positive sense of self and a healthier view on relations as they grow older and gain more life experience. However, self-criticism and dependency levels can also alter due to specific life events. Adverse life experiences can elicit increases in dependency

and self-criticism (Kopala-Sibley & Zuroff, 2014). Conversely, psychotherapy could help to decrease individuals' dependent orientation and harsh self-criticism (Klein, Harding, Taylor, & Dickstein, 1988). Given that these two personality dimensions consist of both stable and dynamic features, self-criticism and dependency can be seen as both a trait and as a state (Zuroff, Sadikaj, Kelly, & Leybman, 2016).

Self-criticism and dependency are even more dynamic in adolescents compared to adults, as their stabilities over time are only moderate during adolescence (Kopala-Sibley, Zuroff, Hankin, & Abela, 2015). Indeed, early adolescence seems to be a crucial period for the development of self-definition and relatedness (Blatt & Luyten, 2009). As noted by Erikson (1963), identity integration is the main developmental task in adolescence. Consequently, adolescents face the important challenge of finding a balance between self-definition and relatedness. The result of this developmental task can either be a consolidated self-identity, or different types of psychopathology that can result from failures to integrate self-definition and relatedness (Blatt & Luyten, 2009).

Notably, recent research suggests that societal changes may also affect the development of personality vulnerability. In a large-scale birth cohort study, Curran and Hill (2019) showed that recent generations of college students report more socially prescribed perfectionism as compared to older generations. This finding implies that young adults perceive their social environment nowadays as more demanding and perceive other people as judging them harshly. Socially prescribed perfectionism is highly correlated with self-criticism (Dunkley, Zuroff, & Blankstein, 2003) and with various types of psychopathology, including depressive symptoms (Blatt, D'Afflitti, & Quinlan, 1976; Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982; Blatt & Zuroff, 1992; Nietzel & Harris, 1990; Smith et al., 2018; Zuroff, Igreja, & Mongrain, 1990). Although more research is needed to draw firm conclusions, the rise in self-critical perfectionism among young people could help to explain the increasing prevalence of depression discussed earlier, a possibility further underscoring the importance of in-depth examinations of personality vulnerability to psychopathology.

## **2.2 Personality Vulnerability to Psychopathology Associated with Self-Criticism and Dependency**

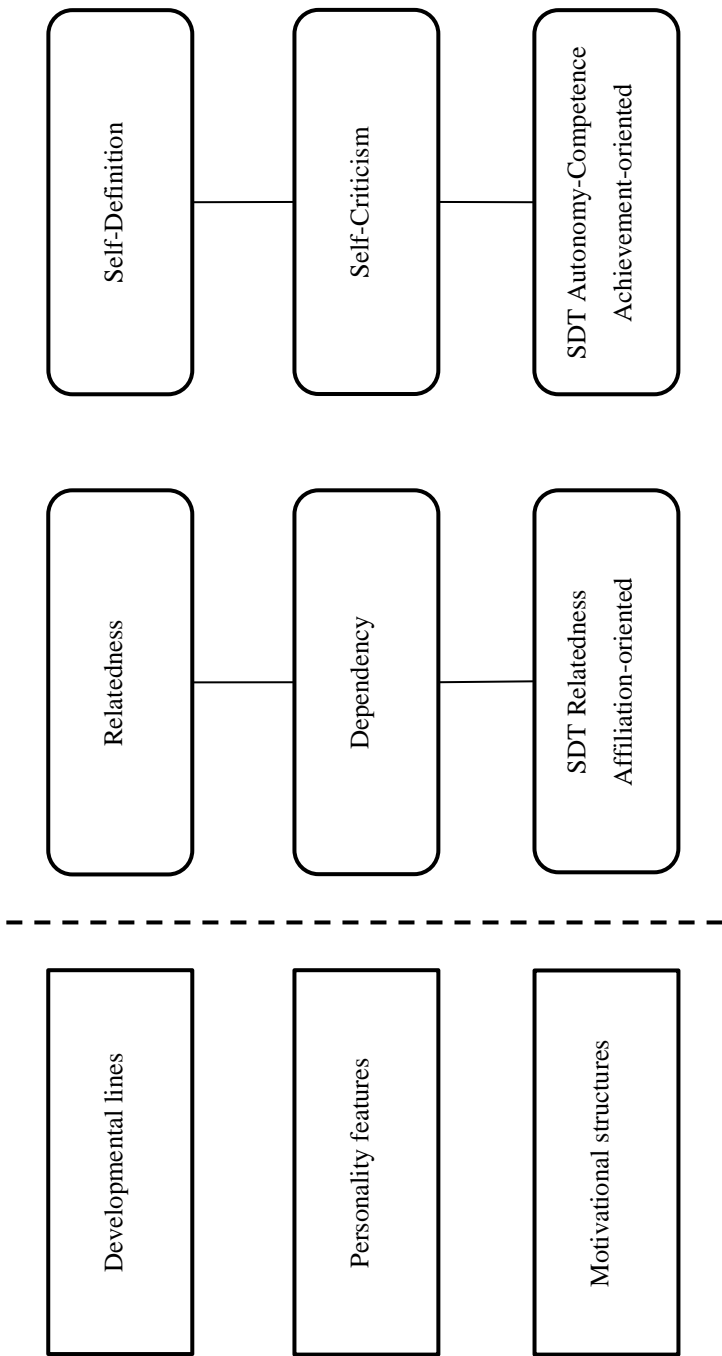
It is well-established that self-criticism and dependency confer risk to the development of depressive symptoms. Indeed, several studies confirmed this association in adolescents and in adults (Nietzel & Harris, 1990), as well as in clinical (Luyten et al., 2007) and in non-clinical samples (Zuroff & Mongrain, 1987). Although research on Blatt's theory initially focused on personality vulnerability to depressive symptoms (Blatt, 1976), more recent studies demonstrated systematic associations between the two personality dimensions and psychopathology more generally (Fazaa & Page, 2003; Iancu, Bodner, & Ben-Zion, 2015). Remarkably, dependency was associated rather uniquely with internalizing problems, whereas self-criticism was related to both internalizing and externalizing problems in adolescents (Kuperminc et al., 1997; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999).

Although the association between self-criticism, dependency and psychopathology is well-established, the underlying mechanisms remain unclear. Previous research predominantly focused on the role of objective stressors and dysfunctional interpersonal styles in personality vulnerability. More specifically, previous studies suggested that both self-criticism and dependency are associated with increased stress sensitivity for several types of objective stressors (Shahar & Priel, 2003). While dependent individuals have been shown to be particularly sensitive to interpersonal stressors (e.g., rejection, divorce), self-critical individuals are particularly sensitive to achievement-related stressors (e.g., failure, negative feedback) (Blatt & Zuroff, 1992; Chang & Rand, 2000; Priel & Shahar, 2000). On an interpersonal level, self-critical and dependent individuals both experience their own interpersonal difficulties (Luyten & Blatt, 2013). While self-critical individuals are generally colder and more distant in relationships and also receive less social support, dependent individuals tend to elicit irritation and resentment in others because of their excessive demands for care and support (Luyten, Corveleyn, & Blatt, 2005). Both the sensitivity to stressors as well as impaired social relations can reinforce self-critical and dependent individuals' vulnerability to psychopathology.

In this dissertation, I aim to address the role of a more subjective inner experience, that is, frustration and satisfaction of the basic needs as conceived in Self-

Determination Theory (Ryan & Deci, 2017). It has already been convincingly demonstrated that low satisfaction and high frustration of the psychological needs render individuals vulnerable to develop various forms of psychopathology (Vansteenkiste & Ryan, 2013). Consequently, SDT's concept of need frustration may help to provide more insight in the role of self-criticism and dependency as transdiagnostic vulnerability factors.

Conceptually, Luyten and Blatt (2016) argued that the two dimensions of personality vulnerability and the needs are hierarchically structured. The developmental lines of self-definition and relatedness and the deviations from these lines (self-criticism and dependency, respectively) reflect very fundamental processes at the level of personality organization. Thus, dependency and self-criticism are situated at a higher level of abstraction than SDT's need-based experiences, which are considered mid-level experiences that fluctuate more strongly on a short-term basis and that can explain associations between fundamental dimensions of personality vulnerability and downstream symptoms and behaviors (see Figure 1-1). Given this conceptual argument, it is important to examine the interplay between Blatt's personality dimensions and adolescents' need-based experiences in the development of depressive symptoms and (mal)adjustment more generally.



**Figure 1-1.** Hierarchical Approach to the Conceptualization of the Personality Dimensions and SDT's Needs (based on Luyten & Blatt, 2016).



### **3 Self-Determination Theory: The Role of Need-Based Experiences**

#### **3.1 The Basic Psychological Needs**

According to Self-Determination Theory, every human being has three basic psychological needs. SDT defines the needs as “innate psychological nutriments that are essential for growth, integrity and well-being” (Deci & Ryan, 2000, p. 229). First, the need for autonomy refers to the experience of volition and psychological freedom when engaging in an activity. An adolescent who can act upon personally valued interests and goals experiences a high sense of autonomy (de Charms, 1968). Second, the need for relatedness refers to feeling connected with others and having a sense of belonging (Baumeister & Leary, 1995). As an illustration, adolescents who have warm and supportive relationships with their peers and parents experience more relatedness satisfaction. Last, the need for competence involves the experience of effectiveness in dealing with challenging situations. Adolescents’ need for competence will be more fulfilled when they feel capable to handle daily tasks. When these needs are frustrated, individuals experience feelings of pressure (autonomy frustration), loneliness (relatedness frustration) and failure (competence frustration) (Vansteenkiste & Ryan, 2013). All three needs are equally important for optimal development and are strongly interrelated because they mutually reinforce one another (Deci & Ryan, 2000).

Satisfaction of the three needs is essential for an individual’s growth and thriving (Ryan & Deci, 2017; Vansteenkiste & Soenens, 2015). Indeed, previous research showed that need satisfaction is associated with more well-being and better adjustment, both at the interindividual (e.g., Chen, Van Assche, Vansteenkiste, Soenens, & Beyers, 2015) and at the intraindividual level (e.g., Ryan, Bernstein and Brown, 2010), in adolescents (e.g., Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013) and adults (e.g., Adie, Duda, & Ntoumanis, 2008), using cross-sectional (e.g., Walker & Kono, 2018), longitudinal (e.g., Campbell, Soenens, Beyers & Vansteenkiste, 2018) and diary designs (e.g., Van der Kaap-Deeder, Vansteenkiste, Soenens, & Mabbe, 2017). When adolescents’ basic needs are satisfied, they are also more resilient against negative external influences (e.g., peer pressure) (Soenens, Vansteenkiste, & Beyers, in press). Frustration of the three needs, however, is

associated with maladjustment and even psychopathology (Ryan, Deci, & Vansteenkiste, 2016; Vansteenkiste & Ryan, 2013).

### **3.2 The Differential Role of Need Satisfaction and Need Frustration**

SDT states that need frustration is not equal to a lack of need satisfaction (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumanis, 2011), implying that the two constructs do not necessarily fall along a single continuum. To illustrate, feeling a low connection with one's classmates (low relatedness satisfaction) is different from being actively rejected by one's classmates (high relatedness frustration). Because frustration involves a stronger and more direct threat to individuals' needs than the mere lack of satisfaction, need frustration is said to be particularly relevant to ill-being and maladjustment, rather than just an absence of well-being. Research indeed has begun to show that need satisfaction is particularly predictive of well-being and adaptive outcomes and that need frustration is uniquely associated with ill-being and risk for psychopathology (Bartholomew et al., 2011; Ryan et al., 2016). Consequently, need satisfaction and need frustration can be conceptualized as two separate mechanisms with differential predictors and outcomes that can explain both the "bright" and the "dark" side of people's functioning (Haerens et al., 2015; Ryan & Deci, 2017), also known under the heading of the dual pathway model (Jang, Kim, & Reeve, 2016).

Empirical studies supported this claim indicating that need frustration, and not need satisfaction, uniquely predicts maladaptive outcomes and risk for psychopathology. On the between-person level (i.e., the level of interindividual differences), need frustration yields unique associations with depressive symptoms (Chen et al., 2015), eating disorder symptoms (Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014), anxiety (Cordeiro, Paixao, Lens, Lacante, and Sheldon, 2016) and poor motivation at school (Haerens et al., 2015). At the within-person level of change, need frustration also plays a unique role in predicting general ill-being (Van der Kaap-Deeder et al., 2017) and depressive symptoms (Campbell, Boone, Vansteenkiste, & Soenens, 2018) and exhaustion (Bartholomew et al., 2011) in particular, over and above the effect of need satisfaction.

### **3.3 Associations Between Blatt's Personality Dimensions and SDT's Psychological Needs**

Given the importance of need-based experiences for individuals' psychosocial adjustment, research in SDT has examined antecedents of individual differences in need satisfaction and need frustration (Ryan & Deci, 2017). Most of this research has focused on the role of contextual sources of influence, examining for instance the role of parents (e.g., Grolnick, 2003; Joussemet, Landry, & Koestner, 2008; Soenens, Deci, & Vansteenkiste, 2017), teachers (e.g., Aelterman et al., 2018; Reeve, 2006), and coaches (e.g., De Mynck et al., 2017; Kipp & Weiss, 2013) on adolescents' need-based experiences and subsequent (mal)adjustment. Comparatively less research has addressed the potential antecedent role of personality in need-based experiences (Ryan, Soenens, & Vansteenkiste, 2019). On the basis of Luyten and Blatt's (2016) prediction that dimensions of personality vulnerability affect need-based experiences and that these experiences, in turn, relate to individuals' adjustment and risk for psychopathology, in the present dissertation, I examine the interplay between the basic psychological needs and self-criticism and dependency in the prediction of adolescents' (mal)adjustment.

The primary model guiding the examination of this interplay is a mediation model, where self-criticism and dependency are associated with more need frustration and less need satisfaction experiences that, in turn, relate to more maladjustment (i.e., depressive symptoms, internalizing and externalizing problems). This mediation model is consistent with the principle of stress generation (Luyten & Blatt, 2013; Shahar, 2015), according to which personality-based individual differences can elicit stressful experiences that, in turn, increase risk for psychopathology. Thus, the mediational sequence assumes a direct relation between personality and satisfaction and frustration of the basic needs. Indeed, it can be hypothesized that high self-criticism and high dependency are associated with more need frustration and less need satisfaction (Boone et al., 2014; Luyten & Blatt, 2016).

Several more specific underlying mechanisms can explain why self-criticism and dependency translate into higher need frustration and lower need satisfaction. According to Caspi and Roberts' (2001) model on personality development across the life span, at least three potential processes can play a role in the interplay between

personality and the needs. These processes are not mutually exclusive. First, proactive mechanisms involve that individuals with high personality vulnerability actively generate need-frustrating experiences by choosing specific contexts. For example, self-critical adolescents might choose highly competitive hobbies (resulting in competence frustration) or dependent individuals might choose dominant romantic partners who force them in a submissive position (resulting in autonomy frustration). Next, need frustrating experiences can also be generated through evocative mechanisms, involving that need frustrating experiences are elicited in the environment. For example, the ambitious and achievement-oriented focus of a self-critical adolescent may elicit corresponding high expectations from the social environment (resulting in autonomy frustration) and the demanding interpersonal style of dependent adolescent might elicit withdrawal or rejection in friendships (resulting in relatedness frustration). Third, perceptive mechanisms involve that highly self-critical and dependent individuals perceive their environment in a biased way that frustrates their needs for autonomy, relatedness and competence. For example, self-critical adolescents may perceive their classmates as opponents that they need to outperform, thereby hindering friendships (resulting in relatedness frustration) and dependent adolescents may more easily feel excluded from social events, thereby feeling isolated from others (resulting in relatedness frustration).

While the possibility of mediation is the basis for most of the hypotheses in this dissertation, I also consider the possibility of an interactive interplay between personality and the needs. Indeed, personality could also moderate the associations between need-based experiences and outcomes. In such a moderation model, high self-criticism and dependency might exacerbate the negative effects of need frustration, while desensitizing the benefits associated with need satisfaction. This possibility of moderation is consistent with the principle of diathesis-stress (Zuckermann, 1999), according to which negative and stressful experiences (such as need frustration) may awaken latent vulnerabilities and, in combination with these vulnerabilities, increase risk for psychopathology. Self-criticism and dependency might thus increase the probability that experiences of need frustration entail maladjustment. Moderation presumes a reactive process through which individuals with high personality vulnerability show heightened sensitivity to certain need-based

experiences. Personality may increase this sensitivity by affecting individuals' perception of a potential stressor. That is, personality could play a role in the relation between an actual, potentially need-thwarting event and individuals' subjective appraisal of this event in terms of need satisfaction and -frustration. This hypothesis is based on the finding that adolescents differ in the way they perceive their context and how they cope with adverse life experiences, which might affect their need-based experiences (Soenens et al., 2015). Therefore, I will also examine the moderating role of personality in the association between an actual need-thwarting event (i.e., social exclusion) and subjective need-based experiences.

In conclusion, on the basis of theory and research I assume a complex interplay between personality and the psychological needs. An examination of this interplay is important to provide more insight in the fundamental mechanisms underlying personality vulnerability to maladjustment in adolescents. Moreover, this type of research could have applied value because the basic psychological needs could be a target of change in interventions for highly self-critical and dependent individuals. Finally, the simultaneous investigation of Blatt's theory and SDT is also important in terms of the meta-theoretical rapprochement between these two frameworks. It has indeed been argued that important theories about psychological processes involved in depression and psychopathology are too often examined in isolation, resulting in a lack of theoretical integration and terminological confusion (Luyten & Blatt, 2011, 2016). As Kopala-Sibley and Zuroff (2019, p. 12) recently put it: "[...] there has been little work that attempts to integrate different conceptualizations of the self. This has arguably resulted in a "Tower of Babel" problem in which researchers and theorists with the same fundamental goal (i.e., understanding the self in relation to depression) work in parallel rather than integrating their theories into an overarching model. Although multiple theorists have noted the overlap in each of the four models reviewed here [...], little empirical work has been done." Thus, in addition to providing more fine-grained insight in the mechanisms behind personality vulnerability, this dissertation can also contribute to more conceptual convergence between major theories on human development and psychopathology. Therefore, in the next paragraph, I discuss a number of similarities and differences in the meta-theoretical assumptions behind Blatt's theory and SDT.

### **3.4 Self-Determination Theory and Blatt's Theory: a Metatheoretical Comparison**

The present dissertation aims to connect two influential theoretical frameworks on human development, namely the theory of Blatt (2004) and SDT (Ryan & Deci, 2017). These theoretical perspectives have several points of convergence and divergence that are discussed in the next paragraphs.

#### **3.4.1 Points of convergence**

Both Blatt's theory and SDT are grand theories that provide encompassing views on human development. They consist of a broad theoretical framework from which predictions in more specific life domains can be deduced. In addition to the breadth of their scope, these theories have several more specific points of convergence.

Blatt's theory and SDT also both adopt a positive view on human development. According to SDT, all human beings are inherently active organisms that have a natural tendency toward growth and integrated functioning (Ryan & Deci, 2017; Vansteenkiste & Soenens, 2015). SDT also assumes an inherent capacity to develop awareness and reflection of one's preferences, values, and goals. The deeply rooted active and social nature of humans is directed toward thriving and manifests more specifically through the engagement in intrinsically motivating activities; the gradual internalization and ownership of social norms, values, and regulations; the development of a coherent and well-integrated identity (Ryan et al., 2016; Vansteenkiste & Soenens, 2015). However, this evolution towards more integrative functioning over time does not take place automatically but requires a need-supportive environment that supports individuals in actualizing their potential

Similarly, Blatt's view on development is inspired by humanistic values (e.g., need for growth, resilience, need for balance) (Shahar & Mayes, 2017) and by Erikson's lifespan theory on psychosocial development in particular (Blatt, 2008; Blatt & Blass, 1990). According to Blatt, all humans have a strong ability to develop, grow, and actualize themselves. Thus, people have adaptive structures within themselves. In the case of psychopathology, psychotherapists should help to free these adaptive structures (Dimitrovsky, 2007). More specifically, people have a natural

tendency to strive towards a balance between relatedness and self-definition. A continuous dialectical interaction between these two developmental lines results in mature sense of self and in mutually satisfying relationships. Psychopathology needs to be seen as a failed attempt to find a balance between relatedness and self-definition (Blatt & Luyten, 2011).

Because of their positive view on human development, both theories assume that integrative functioning increases with age. SDT proposes that people find more ways to fulfill their needs as they grow older, given their inherent organismic integration process (Deci & Ryan, 1991; Sheldon, Houser-Marko, & Kasser, 2006). On the basis of Erikson's (1963) principle of epigenetic development, Blatt's two-polarities model assumes that the mutual, dialectic interaction between self-definition and relatedness strengthens and improves as people grow older. From that viewpoint, higher levels of personality development are more likely to be achieved later in life.

Given their positive view on human development, both theories are normative in nature, meaning that they provide an indication about ideal psychosocial development. Rather than simply describing development, they make assumptions about optimal human development. In Blatt's theory, the hallmark of optimal functioning consists of the establishment of increasingly mature, satisfying reciprocal relationships with other people on the one hand, and the formation of an increasingly integrated, differentiated and essentially positive sense of self on the other hand (Blatt & Luyten, 2009). Ideally, there is positive and mutually reinforcing association between these capacities for relatedness and self-definition. Consistent with Blatt's theory, SDT also assumes that all people strive towards an authentic sense of self (autonomy), towards the realization of talents and the development of skills (competence), and towards warm and meaningful relations with other people (relatedness). Accordingly, the satisfaction of the three psychological needs is the key to optimal development (Vansteenkiste & Ryan, 2013).

In defining ingredients for psychological growth and optimal development, Blatt and SDT point towards comparable themes, with Blatt's theme of self-definition resembling the needs for autonomy and competence and with the theme of relatedness evidently resembling SDT's need for relatedness.

Further, both theories stress the role of the social environment in psychological growth and, conversely, in the development of psychopathology. In SDT, psychopathology is indicative of contexts that do not support or even thwart the basic psychological needs, for example parents, teachers and peers that are controlling, rejecting or overly critical (Ryan & Deci, 2017). Blatt also underscores the role of the social context in deficits in the development of self-definition and relatedness. Self-criticism would stem from past experiences with caregivers who undermine the child's autonomy, while dependency would be associated with past experiences of overprotection, lack of care or contingent care (Blatt & Homann, 1992; Kopala-Sibley et al., 2015).

Although the meta-theoretical assumption in Blatt's theory and SDT is that people are naturally growth-oriented, both theories recognize individuals' vulnerability to psychopathology, thereby studying the dynamics of both normal and disrupted personality development (Luyten & Blatt, 2013). Both theories stress the continuity between adaptive and maladaptive development and highlight that the difference between normality and psychopathology is a matter of gradation. According to Blatt (2008), personality vulnerability represents a deviation from normal personality development. According to SDT, the psychological needs represent a unifying principle that can serve to explain both psychological growth and vulnerability, thereby bridging positive and psychopathology-oriented literatures (Ryan, Deci, & Vansteenkiste, 2016; Vansteenkiste & Ryan, 2013). Thus, the study of normal development is enriching to get more insight in the development of psychopathology and the other way around. Therefore, it is also relevant to study the development of psychopathology using community samples from the general population (as will be done in this dissertation).

To explain the development of psychopathology, both theories offer transdiagnostic explanations. Whereas Blatt noted that self-criticism and dependency are transdiagnostic vulnerability factors for psychopathology (Blatt & Luyten, 2009), SDT proposed that frustration of the basic psychological needs serves as a transdiagnostic vulnerability process, since need frustration has a direct emotional cost that can be manifested in a variety of psychopathologies (e.g. Campbell, Boone, Vansteenkiste, & Soenens, 2018; Vansteenkiste & Ryan, 2013).



### 3.4.2 Points of divergence

Although SDT and Blatt's theory both study dynamics in normal and disruptive personality development, they had a different starting point. Research in SDT was originally most focused on antecedents of human flourishing, or "the bright side" of behavior. Only more recently, the so-called "dark side" of human behavior or the study of ill-being and psychopathology received more attention within SDT-based research (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). Blatt's theory developed the other way around. Blatt's theory was originally formulated as a clinical framework, with much of the theoretical assumptions directly derived from clinical experience with patients (Shahar & Mayes, 2017). Over the years, Blatt's interests moved from psychoanalytic ego psychology to the study of interpersonal relations and attachment (Auerbach, 2017). Nowadays, there is also more research on more adaptive aspects of personality development based on Blatt's theory. For example, Blatt and his colleagues have more recently studied adaptive forms of self-definition and relatedness in adolescents (e.g., Shahar, Henrich, Blatt, Ryan, & Little, 2003; Shahar, Kalnitzki, Shulman, & Blatt, 2006).

Although the three basic psychological needs show some similarities to the two developmental lines as conceived by Blatt, there are also important differences between these concepts. In conceptual reviews, SDT's needs for autonomy and competence have been taken together as the counterparts of Blatt's self-definition developmental line (Blatt, 2008; Luyten & Blatt, 2013, 2016). Within SDT, autonomy and competence are distinguished more clearly because people do not by definition experience a sense of volition in activities they are good at. For instance, an adolescent with high levels of ability in mathematics can be pressured by parents or teachers to make a study choice involving mathematics (e.g., engineering). When this adolescent would actually prefer to make a different study choice (e.g., a choice matching better with this adolescent's interest in human development, such as psychology), a conflict arises between the adolescent's needs for competence and autonomy.

In addition to differentiating more clearly between competence and autonomy, SDT also seems to adopt a somewhat different conceptualization of autonomy than Blatt. Blatt's theorizing and writing regularly mentions the importance of finding a balance between relatedness and self-definition. This notion of a balance

implies that there is a certain tension between the two developmental lines and that the relationship between both lines needs to be considered in terms of a trade-off. The more people invest in relatedness, the more they are likely to encounter problems with self-definition, and vice versa. As a consequence, it would be better to develop intermediate and balanced levels of relatedness and self-definition. This view on the interplay between relatedness and self-definition seems to be based on a conceptualization of self-definition in terms of independence and self-reliance. Indeed, the more individuals strive for independence and are wary of other people's input and support, the less likely they are to value relatedness. Conversely, strong investment in relatedness comes at the cost of giving up independence. This view of self-definition or autonomy as independence is different from SDT's view on autonomy, which does not refer to making decisions independently and to a tendency to rely only on yourself, but which predominantly involves a sense of volition and psychological (or inner) freedom (Ryan & Deci, 2017; Soenens et al., 2018). In SDT, autonomy is not about interpersonal distance from others, it is about an intrapsychic experience of authenticity: the feeling that one's actions are self-endorsed and based on deeply rooted values and interests. With such a definition of autonomy, people can be highly autonomous within a context of relatedness, such as when they volitionally rely on others for advice or emotional support (Ryan et al., 2005; Soenens et al., 2007; Van Petegem et al., 2012). Thus, in SDT there is no tension whatsoever between autonomy and relatedness. Both needs are perfectly compatible and there is no limit to the degree to which these needs should be satisfied: the more both needs are satisfied, the better (Hodgins, Koestner, & Duncan, 1996; Vansteenkiste & Soenens, 2015).

## **4 Research Objectives and Outline of the Dissertation**

The main goal of the dissertation was to examine the interplay between psychological need-based experiences and Blatt's dimensions of self-criticism and dependency in the prediction of maladjustment in adolescents. More specifically, a first aim was to examine whether need-based experiences can explain (or mediate) personality vulnerability to maladjustment. The second aim was to explore whether self-criticism and dependency moderate associations between need-based experiences

and maladjustment. Please note that these two possibilities (mediation and moderation) are not mutually exclusive. Both types of processes could apply simultaneously. For instance, self-criticism might elicit more need frustration and subsequent depressive symptoms (indicating mediation) and, at the same time, adolescents high on self-criticism might be more sensitive to the affective consequences of need frustration. Thus, pro-active and reactive processes can occur simultaneously. These two aims were examined in five empirical studies, thereby using a variety of research methodologies, namely cross-sectional, longitudinal, diary and experimental designs (see Table 1-1 for an overview).

Table.1-1. Overview of the Empirical Studies

Chapter	Study	Aim	Design	Total N	Mean age	Gender (% female)	Personality variables	Analytical technique
Chapter 2	Study 1	1	Cross-sectional	284	14.15	58.5%	Self-criticism and dependency	Structural equation modeling
Chapter 3	Study 2	1,2	Longitudinal	149	15.20	52.0%	Self-criticism and dependency	Multilevel analysis
Chapter 4	Study 3	1,2	Diary	121	15.81	48.0%	Self-criticism and dependency	Multilevel analysis
Chapter 5	Study 4	1,2	3-week prospective	82	12.45	42.0%	Self-criticism only	Multilevel analysis
Chapter 6	Study 5	2	Experimental	86	18.94	74.0%	Dependency only	Regression
	Study 6	2	Experimental	94	18.91	88.3%		analysis

In examining these research aims, I aimed to keep two guiding principles in mind. First, I attempt to investigate the interplay between personality and the basic needs in a *dynamic fashion*. As discussed in the first part of this general introduction, adolescence is a developmental period full of change characterized by high variability in emotional functioning (Maciejewski, Lier, Branje, Meeus, and Koot, 2015). Moreover, research suggests that both Blatt's personality dimensions and the psychological needs are susceptible to change, both in the long term and in the short term. Therefore, I found it important to use research designs that allow to capture these fluctuations by testing associations in a more dynamic fashion, like longitudinal and diary designs. This dynamic approach is also important because processes of mediation and moderation are inherently dynamic in nature and thus require an examination of associations at the within-person level of change. Second, I aimed to look *beyond depressive symptoms* as an outcome in examining the interplay between personality and the basic psychological needs. Although depressive symptoms are the most central outcome in this dissertation, I also take a broader range of outcomes into account, including general psychopathology and also adaptive functioning in the academic domain. As such, I attempted to demonstrate the relevance of the hypothesized dynamics across a broader range of outcomes.

### **Objective 1: To Examine the Mediating Role of Need-Based Experiences in Personality Vulnerability to Maladjustment**

Although the association between self-criticism, dependency and adolescent maladjustment is well-established (e.g., Campos, Besser, Morgado, & Blatt, 2014), it remains unclear which precise psychological mechanisms account for these effects. Given that need satisfaction promotes well-being and need frustration elicits malfunctioning (Ryan & Vansteenkiste, 2013), I propose that the basic psychological needs may play a pivotal role in explaining why these personality dimensions are related to adolescent's maladjustment. Specifically, I hypothesized that need-based experiences, and need frustration in particular, would at least partially explain the associations between self-criticism, dependency and (mal)adjustment.

In the cross-sectional study, as described in Chapter 2, we investigated whether need-based experiences account for the associations between personality and

psychopathology. While in Chapter 2 we used a general measurement of psychopathology (i.e., internalizing and externalizing problems as assessed with the CBCL; Achenbach & Rescorla, 2001), in Chapter 3 and 4 we solely focused on depressive symptoms as outcomes. Chapter 3 and 4 also extend Chapter 2 by examining both within-person (i.e., intra-individual) and between-person (i.e., interindividual) differences. Whereas Chapter 3 examined the hypothesized mediation model across 6-month time intervals, the same mediation model was investigated on a day-to-day basis in Chapter 4. Finally, given that self-criticism is especially relevant in achievement-related settings (Santor & Zuroff, 1997), we examined the link between self-criticism and adolescents' academic functioning in greater detail in Chapter 5. Using a 3-week prospective design, we examined the interplay between self-criticism, psychological need satisfaction and need frustration, and positive and negative indicators of academic adjustment. In doing so, we examined the intervening role of need-based experiences between self-criticism on the one hand and academic adjustment on the other hand. It was hypothesized that self-criticism would be associated with more need frustration and less need satisfaction, which, in turn, would relate to poorer adjustment at school.

**Objective 2: To Examine the Moderating Role of Self-Criticism and Dependency in the Association Between Need-Based Experiences and Maladjustment**

A second key objective of this dissertation is to investigate whether the effects of need satisfaction and need frustration are equal for all adolescents, or whether individual differences in personality may amplify adolescents' susceptibility to need-based experiences. Consistent with a diathesis-stress approach (Zuckerman, 1999), highly self-critical or dependent adolescents were hypothesized to be more vulnerable to the negative consequences of need frustration and low need satisfaction.

Throughout the first four empirical chapters of the dissertation, I examine models in which self-criticism and dependency moderate the associations between need-based experiences and (mal)adjustment. In the cross-sectional study in Chapter 2, a moderation model was tested in which self-criticism and dependency moderated the associations between need-based experiences and psychopathology (i.e.,

internalizing and externalizing problems) in adolescents. Next, in Chapter 3, we examined cross-level interactions between self-criticism, dependency and the need-based experiences in the prediction of depressive symptoms, by means of a longitudinal design with 3 waves. We explored whether interindividual differences (or between-person differences) in self-criticism and dependency assessed at the onset of the study moderate associations between the needs and depressive symptoms at the intra-individual (or within-person) level. Next, in Chapter 4, we continued examining the moderating role of self-criticism and dependency in associations between the needs and depressive symptoms, this time using a daily diary design. This study design allows to study the moderating role of personality at the level of daily fluctuations (i.e., within-person level). In Chapter 5, we further examined the moderating role of self-criticism in the association between the needs and academic adjustment and maladjustment using a 3-week prospective design. More specifically, we investigated whether week-to-week associations between need-based experiences and academic (mal)adjustment depend on students' self-criticism levels, thereby testing cross-level interactions.

In addition to examining the role of dependency in the relation between subjective need-based experiences and (mal)adjustment, it is also examined whether dependency moderates need-based reactions to an objective interpersonal stressor (i.e., social exclusion) in Chapter 6. Indeed, it can be argued that highly dependent individuals have a lower threshold to experience relatedness frustration and this would lead to a higher sensitivity to signs of rejection (Blatt & Zuroff, 1992). There is also evidence for the moderating role of dependency in the association between interpersonal stressors and distress (Priel & Shahar, 2000). Building on this line of research, we explored the combined effects of dependency and experimentally induced social rejection on satisfaction and frustration for relatedness by means of a Cyberball game (Williams, Cheung, & Choi, 2000) in Chapter 6. The Cyberball game is one of the most-used paradigms to experimentally induce social exclusion. Based on Blatt's theory (2004), we hypothesized that highly dependent individuals experience more relatedness frustration and less relatedness satisfaction in reaction to social exclusion, as compared to the less dependent participants.

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## CHAPTER 2

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### **The Explanatory Role of Basic Psychological Need Experiences in the Relation between Dependency, Self-Criticism and Psychopathology in Adolescence<sup>1</sup>**

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<sup>1</sup> Vandenkerckhove, B., Brenning, K., Vansteenkiste, M., Luyten, P., & Soenens, B. (2019). The role of basic psychological need frustration in the relation between dependency, self-criticism and problem behavior in adolescence. *Journal of Psychopathology and Behavioral Assessment*. Advance online publication. <https://doi.org/10.1007/s10862-019-09719-0>.

Table of contents

**1 Introduction**..... 44

1.1 Blatt’s Theory on Personality Development and Risk for Psychopathology 44

1.2 Basic Psychological Needs as Viewed in the Self-Determination Theory .... 46

1.3 The Link Between Blatt’s Personality Dimensions and SDT’s Needs..... 48

1.4 The Present Study ..... 51

**2 Method**..... 52

2.1 Participants and Procedure ..... 52

2.2 Measures ..... 53

**3 Results** ..... 57

3.1 Correlations and Descriptive Statistics ..... 57

3.2 Primary Analyses ..... 58

3.3 Supplementary Analyses..... 60

**4 Discussion**..... 65

4.1 Personality and Psychopathology ..... 65

4.2 Psychological Needs as an Explanatory Mechanism ..... 66

4.3 Limitations and Directions for Future Research ..... 69

4.4 Prevention and Treatment Implications ..... 71

4.5 Conclusion ..... 72

**5 References**..... 73

**Appendix** ..... 84

According to Blatt's theory on personality development, adolescents with high levels of self-criticism and dependency are more vulnerable to diverse types of psychopathology. However, relatively little is known about intervening processes involved in this personality-based vulnerability. The goal of this study is to examine, on the basis of Self-Determination Theory, the explanatory role of the psychological needs for autonomy, competence, and relatedness in associations between self-criticism and dependency on the one hand and adolescents' internalizing and externalizing problems on the other hand. In this cross-sectional and multi-informant study, 284 adolescents (58,5% female; mean age = 14.15;  $SD = .93$ ) and their parents reported about the adolescent's internalizing and externalizing problems. Adolescents also completed measures assessing self-criticism, dependency, and psychological needs experiences. Data were analyzed using structural equation modeling. Self-criticism and dependency were significantly related to higher levels of both internalizing and externalizing problems, with psychological need frustration fully mediating these associations. No evidence for a mediating role of need satisfaction was found. This study suggests that psychological need frustration is an important explanatory mechanism in personality-related vulnerability for adolescent psychopathology. More generally, it provides further evidence for the integration between two major theoretical approaches in the domain of adolescent development and psychopathology.

## **1 Introduction**

It is well-established that the prevalence of both internalizing and externalizing problems increases in the transition from childhood to adolescence (e.g. Costello, Copeland, & Angold, 2011; Stouthamer-Loeber, Loeber, Wei, Farrington, & Wikström, 2002; Twenge & Nolen-Hoeksema, 2002). Research on vulnerability to psychopathology in adolescence is increasingly conducted from a biopsychosocial approach (Hill, 1980; Williams, Holmbeck, & Greenley, 2002). One influential theory in this regard is Blatt's two-polarities model of personality development (2004, 2008). According to this theory, a complex interplay of biological (e.g., genetic) and environmental influences (e.g., socialization and life stress) can give rise to personality-based vulnerability to psychopathology (Luyten & Blatt, 2013). Specifically, this theory identifies dependency and self-criticism as key personality vulnerabilities involved in depression (Blatt, D'Aflitti, & Quinlan, 1976) and in the development of psychopathology more generally (Blatt & Shichman, 1983).

Although studies have confirmed the role of these two personality dimensions in adolescents' maladjustment (Blatt, Schaffer, Bers, & Quinlan, 1992; Coyne & Whiffen, 1995; Zuroff, Igeja, & Mongrain, 1990; Zuroff & Mongrain, 1987), less is known about the explaining mechanisms involved in these associations. Recently, based on Self-Determination Theory (SDT; Ryan & Deci, 2017; Ryan, Deci, & Vansteenkiste, 2016), there is a growing interest in the role of the basic psychological needs for autonomy, competence, and relatedness in risk for psychopathology. The primary goal of this study is to examine the mediating role of these basic psychological needs in the relation between dependency, self-criticism and psychopathology in adolescence. In doing so, this study aims to contribute to a better understanding of explanatory processes involved in adolescent psychopathology, but also to furthering previous attempts at bringing together two well-established macro-theories on human development and psychopathology.

### **1.1 Blatt's Theory on Personality Development and Risk for Psychopathology**

Based on psychodynamic and cognitive developmental theory, Blatt and colleagues (Blatt, 1974; Blatt & Blass, 1996) have proposed that personality



development is the result of a complex dialectical interaction between two fundamental and complementary developmental lines (i.e., self-definition and relatedness) (Blatt & Luyten, 2009). The first developmental line, self-definition, refers to the development of an increasingly differentiated, integrated, realistic, and essentially positive identity. The second developmental line, relatedness, entails the gradual establishment of increasingly mature, meaningful, and reciprocal relationships. Both developmental lines are assumed to constantly interact with one another, such that progress in one developmental line facilitates progress in the other and vice versa. Specifically, developing a well-integrated and solid sense of self would facilitate the establishment and maintenance of mutually satisfying relationships, while the development of mature interpersonal relationships would contribute to the development of a stable and realistic sense of self. However, an excessive focus on one developmental line at the expense of the other would be associated with an increased vulnerability to maladjustment and psychopathology (Luyten & Blatt, 2011).

Most individuals are thought to put a slightly greater emphasis on one developmental line, with this relative emphasis determining an individual's personality vulnerability (Blatt, 2008). Self-criticism is seen as a personality dimension that is associated with an exaggerated focus on self-definition, at the expense of interpersonal relationships (Priel & Shahar, 2000). Self-criticism involves a tendency to set unrealistically high and rigid standards and to engage in harsh negative self-evaluation when confronted with failure. Achievement serves as an important source of self-esteem (Blatt, 2004). In contrast, dependency entails an exaggerated focus on interpersonal closeness, resulting in an anxious preoccupation with separation, strong desires to be cared for, and a claiming interpersonal style. Although mild deviations of the balance between issues of self-definition and relatedness are common, severe disruptions in the dialectical interaction may result in psychopathology (Blatt & Luyten, 2009). According to Blatt's theory, psychopathology thus reflects a failed attempt to maintain a balance between self-definition and relatedness (Luyten & Blatt, 2013).

Empirical studies on Blatt's theory initially focused on the role of dependency and self-criticism in depression (Blatt et al., 1976). More recently, self-

criticism and dependency have been conceptualized as transdiagnostic vulnerability factors (Blatt & Luyten, 2009), given that they were found to relate to several types of psychopathology (e.g., depression, anxiety, suicidality, and eating disorders) in both adults (Blatt, 2008) and adolescents (Blatt et al., 1992; Campos, Besser, Morgado, & Blatt, 2014). Research in adolescents has shown that, while self-criticism is related to both internalizing and externalizing problems, dependency is uniquely related to internalizing problems (Leadbeater, Kuperminc, Blatt, & Hertzog, 1999; Kuperminc, Blatt, & Leadbeater, 1997). Possibly, dependent individuals do not engage in outer-directed (i.e., externalizing) forms of psychopathology because they do not want to generate discomfort in others, thereby potentially harming their close interpersonal relationships (Izard, 1999).

## **1.2 Basic Psychological Needs as Viewed in the Self-Determination Theory**

SDT, a broad theory focusing on motivation and psychosocial development, identifies three inherent and universal basic psychological needs that are presumed to be essential for individuals' psychological growth and well-being (Deci & Ryan, 2000; Vansteenkiste, Niemic & Soenens, 2010). Satisfaction of the need for autonomy refers to experiences of inner psychological freedom and authenticity (e.g., adolescents choosing an educational track based on their self-endorsed interests, values, and preferences). Satisfaction of the need for relatedness involves the experience of warm and close relationships with others, and satisfaction of the need for competence concerns the experience of mastery and efficacy. Previous research has shown that need satisfaction is associated with more life satisfaction, more vitality and more positive affect in adolescents (e.g., Vansteenkiste, Lens, Soenens, & Luyckx, 2006) and adults (e.g., Reis, Sheldon, Gable, Roscoe, & Ryan, 2000).

Historically, most attention has been devoted to the growth-promoting role of basic psychological need satisfaction. However, recent work began to address more systematically the presumed “dark side” of the basic needs (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014; Vansteenkiste & Ryan, 2013). Recent theorizing and research suggest that need frustration, more so than the absence

of need satisfaction, is particularly relevant to maladjustment. In comparison to low need satisfaction, need frustration represents a stronger and more direct threat of the needs. Need frustration manifests in feelings of pressure and coercion (autonomy frustration), failure and inferiority (competence frustration), and loneliness and interpersonal alienation (relatedness frustration). Furthermore, the frustration of these psychological needs cannot be equated with the absence of need satisfaction (Bartholomew et al., 2011; Vansteenkiste & Ryan, 2013). To illustrate, although an adolescent may experience few connections with his or her peers at school (i.e., relatedness dissatisfaction), it is only when the adolescent feels actively rejected or bullied by his or her peers that he or she feels excluded and/or lonely (i.e., relatedness frustration) (Vansteenkiste & Ryan, 2013). This example shows that need frustration follows from the active thwarting of these needs, rather than from simply receiving a lack of support.

Research increasingly shows that whereas need satisfaction is particularly predictive of adjustment and well-being, need frustration is particularly predictive of maladjustment and psychopathology (Vansteenkiste & Ryan, 2013). Studies dealing with the role of need frustration in adolescent development have mainly focused on internalizing problems as an outcome, thereby showing that need frustration is indeed predictive of global indices of internalizing problems, such as depressive symptoms and anxiety (Bartholomew et al., 2011; Chen et al., 2015; Costa, Cuzzocrea, Gugliandolo, & Larcan, 2016), as well as more specific indices of internalizing problems, such as symptoms of stress (Campbell et al., 2017) and eating pathology (Campbell, Boone, Vansteenkiste, & Soenens, 2018). Few studies have investigated associations between need frustration and adolescent externalizing problems, which is unfortunate because in adolescence there is increased risk for both internalizing and externalizing problems (Costello et al., 2011). Theoretically, need frustration is assumed to elicit defensive behavior and compensatory attempts to regain control in life, which might manifest in oppositional defiant behavior and in subsequent externalizing problems (Ryan et al., 2016). In one of the few studies addressing this issue, Van Petegem, Soenens, Vansteenkiste, and Beyers (2015) indeed showed that adolescents' need frustration was related to a higher risk of externalizing problems, through an association with oppositional defiance. Along similar lines, the exposure

to a need-frustrating condition prior to engaging in a series of problem-solving and arithmetic tasks significantly increased the likelihood of cheating compared to participants placed in a control group (Kanat-Maymon, Benjamin, Stavsky, Shoshani, & Roth, 2015). Given these recent findings, the current study further addressed the effects of both need satisfaction and need frustration in adolescents' internalizing and externalizing problems, expecting that need frustration will yield more pronounced associations compared to need satisfaction. Moreover, the present study aimed to examine whether the basic psychological needs (and psychological need frustration in particular) could explain the associations between adolescents' personality-based vulnerability (i.e., dependency and self-criticism) and both internalizing and externalizing problems.

### **1.3 The Link Between Blatt's Personality Dimensions and SDT's Needs**

Several scholars have noted conceptual convergence between Blatt's theory and SDT (Blatt, 2008; Ryan & Deci, 2017) and it has been argued that dependency and self-criticism – as higher-order personality factors – affect need-based experiences, which represent experiences at a lower level of abstraction (Blatt & Luyten, 2009). While there is convergence between these two sets of constructs, they also differ in two important ways. First, Blatt's (2004) dimensions of dependency and self-criticism represent preoccupations with different developmental lines, that is, interpersonal relatedness and self-definition. Because of an exaggerated focus on one of these two developmental lines, people may become prone to experience frustration of their basic psychological needs. Thus, while the personality dimensions of dependency and self-criticism refer to the differential emphasis placed by people on interpersonal relatedness and self-definition, the basic psychological needs refer to the actual experiences that may follow from an excessive focus on one of the two developmental lines. Second, in addition to this difference in the conceptual status of Blatt's personality dimensions and the psychological needs, these concepts differ in terms of their assumed stability. While dependency and self-criticism are seen as relatively stable personality traits that result from a longer developmental history (Blatt, 1974, 2004), need-based experiences can be conceived as more dynamic and changeable states (Ryan & Deci, 2017; Vansteenkiste & Ryan, 2013) affected by trait

characteristics such as self-criticism and dependency (and their interplay with situational events).

Self-criticism is particularly likely to give rise to more feelings of need frustration and to lowered feelings of need satisfaction. As self-critical adolescents set unrealistically high standards and adopt a punitive stance towards themselves after failure (Blatt, 2004; Shahar & Priel, 2003), they are less likely to feel competent and more likely to encounter experiences of competence frustration. Furthermore, because self-critical adolescents tend to hinge their self-worth upon their achievements (Shafran, Cooper, & Fairburn, 2002), they may frequently pressure themselves into action, thereby experiencing elevated autonomy frustration and experiencing few opportunities for need satisfaction (Ryan et al., 2016; Ryan & Deci, 2017). Further, in an attempt to safeguard their strong desire for independence and to demonstrate their personal accomplishments and self-worth, self-critical individuals have been found to display a distant and avoidant (Zuroff & Fitzpatrick, 1995) or even overtly hostile style in close interpersonal relationships (Fichman, Koestner, & Zuroff, 1994; Zuroff & Duncan, 1999). Such interpersonal behavior is likely to give rise to a lack of relatedness satisfaction and even to feelings of relatedness frustration.

Similarly, dependency is also likely to affect adolescents' need-based experiences. Because dependent individuals' main concern is to maintain close and protective relationships (Blatt, 2004), dependency is likely to affect the need for relatedness. As dependent individuals have strong longings for interpersonal closeness and even excessive fears of abandonment, it is more difficult for them to reach their heightened threshold for relatedness and their need for relatedness is threatened more easily. Further, their claiming interpersonal style and excessive demands for care can have the paradoxical effect of evoking irritation in others and can even elicit rejection, resulting in the realization of their worst fears (Blatt, 2004). Furthermore, to avoid rejection and loneliness, individuals high on dependency may neglect their own personal preferences and interests, thereby experiencing dissatisfaction or even frustration of their need for autonomy (Blatt & Luyten, 2009). Finally, dependent individuals' fear to lose the love of others could also lead to frequent doubts about their capacities to establish satisfying relationships, thus leading to competence frustration.

While there are plausible reasons to predict an association between dependency and need frustration, the association with need satisfaction is less straightforward. As previous research has shown that dependency does not only confer vulnerability for psychopathology, but also contains elements of resilience (Fichman et al., 1994), a mixed pattern of associations may emerge. In addition to dependent individuals' strong fear of abandonment (which is likely to contribute to relational dissatisfaction), some studies found evidence that dependent individuals elicit more social support (Mongrain, 1998) and have more frequent and more intimate daily interactions (Zuroff, Stotland, Sweetman, Craig, & Koestner, 1995), which could lead to more need satisfaction. Thus, dependent adolescents may experience both psychological need frustration and need satisfaction, particularly when considering the need for relatedness. Because the association between dependency and need satisfaction is not straightforward, this association was addressed in a more exploratory fashion in the current study.

In spite of these conceptual accounts linking Blatt's personality dimensions to the SDT-based psychological needs, little direct evidence is available for associations between both sets of constructs. As regards self-criticism, Shahar, Henrick, Blatt, Ryan, and Little (2003) showed that adolescents' self-criticism was related to more controlled (pressured) and less autonomous motivation for behavior in different life domains (i.e., academics and social relationships), a pattern of motivation indicating the presence of autonomy need frustration (see Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015). Furthermore, two longitudinal studies also shed indirect light on associations between these theories. Specifically, self-critical perfectionism (a concept akin to self-criticism) was predictive of adolescents' increases in need frustration across time (Boone et al., 2014; Campbell et al., 2018), whereas young adults' self-criticism predicted life stress in the interpersonal and achievement domains, which could be seen as a proxy for relatedness and competence frustration (Shahar, Joiner Jr., Zuroff, & Blatt, 2004). As regards dependency, dependent individuals react with increased distress to interpersonal stressors (Priel & Shahar, 2000; Shahar et al., 2004), which provides indirect evidence that dependent individuals are more vulnerable to relatedness frustration. The role of need satisfaction was not examined in these studies. The

current study aimed to provide a more direct test of associations between Blatt's personality dimensions and adolescents' need-based experiences, thereby attending to both dynamics of need frustration and need satisfaction.

#### **1.4 The Present Study**

The present study is the first to directly examine the mediating role of basic psychological needs in associations between Blatt's dimensions of personality vulnerability and psychopathology in adolescence. Our first aim was to replicate previous findings showing that highly self-critical adolescents report, on average, more internalizing and externalizing problems (Kuperminc et al., 1997). Regarding dependency, based on previous research (e.g., Blatt, Hart, Quinlan, Leadbeater, & Auerbach, 1993), we hypothesized a significant link with internalizing, but not with externalizing, problems. Our second aim was to examine the associations between the two personality dimensions and the basic psychological needs. Based on Blatt's theory and previous research (Shahar & Priel, 2003; Shahar, 2015), we expected that self-criticism would be related positively to need frustration and negatively to need satisfaction. Given that dependency is a construct with both negative features (e.g., fear of abandonment) and potentially positive features (e.g., the capacity to seek social support), dependent adolescents were hypothesized to experience high levels of psychological need frustration, but not necessarily low (or even high) levels of need satisfaction. The third aim was to examine the mediating role of need satisfaction and need frustration in the relations between personality and psychopathology. We hypothesized that especially need frustration would relate to more externalizing and internalizing problems and that need frustration would play a more pronounced mediating role (compared to low need satisfaction) in the relationship between personality vulnerability and psychopathology.

To provide an overarching test of the general explanatory role of need frustration and need satisfaction and in light of the observation that the three needs are highly interdependent (Ryan & Deci, 2017), the central analyses relied on composite scores for need frustration and need satisfaction. In an ancillary set of analyses, we also explored the mediating role of each of the three needs separately. Another ancillary aim was to investigate the role of gender in the proposed mediation

model. This role of gender could take two different forms. First, because previous research has documented gender differences in psychopathology (with girls scoring higher on internalizing problems and with boys scoring higher on externalizing problems; Nolenhoeksema & Girgus, 1994) and in personality vulnerability (with girls scoring higher on dependency; Leadbeater et al., 1999), gender is an important covariate that needs to be taken into account when estimating the mediation model. Second, gender could also alter (i.e., moderate) associations in the mediation model. One possibility is that the pathway leading from dependency to internalizing problems via need frustration would be more relevant for girls than for boys (Leadbeater et al., 1999), resulting in more pronounced associations among girls than boys and perhaps even a pattern of moderated mediation, where need frustration only plays a mediating role in this pathway for girls (but not for boys). Alternatively, it could be the case that the associations between personality, the needs and psychopathology would be similar for boys and girls. Because there is a lack of previous research examining this issue, the moderating role of gender was addressed in an exploratory fashion.

In all analyses, we adopted a multi-informant approach to the assessment of adolescents' problems, with adolescents and both of their parents reporting on these problems. Such a multi-informant approach allows to capture (through the estimation of latent factors) the variance shared by different reporters. Especially for the assessment of psychopathology in adolescents, a multi-informant approach is recommended as different informants have access to different types of behavior in a variety of contexts, thereby providing a unique and valid perspective on the adolescent's functioning (Achenbach & Rescorla, 2001). Moreover, the reliability of the results increases by aggregating scores across different informants (Hofstee, 1994). Although this methodological approach still poses risks for response biases such as acquiescence and extreme ratings, other response biases (e.g., faking good) can be reduced.

## **2 Method**

### **2.1 Participants and Procedure**

The data collection was part of a larger research project concerning gene-environment interactions in adolescence (Bleys et al., 2016). The recruitment of all



adolescents and their parents was organized in the context of an undergraduate course in developmental psychology, in which trained students got the assignment to invite two families to participate in this study. Because of the larger research project's study aims, only intact families were recruited. The total sample consisted of 284 families (with adolescents and both of their parents participating). The adolescent sample was 58% female and the age ranged from 12 to 16 years old ( $M$  age = 14.15;  $SD$  = 0.93). The majority (70%) was engaged in studies preparing for higher education, whereas the remaining participants were preparing for technical proficiencies. Mothers' age ranged between 32 and 63 years ( $M$  = 44.85;  $SD$  = 4.06) and fathers' age ranged between 34 and 60 years ( $M$  = 46.27;  $SD$  = 4.17). As 66.9% of the mothers and 72.7% of the fathers obtained a college or university degree, the parents in this sample are relatively highly educated.

Prior to the assessment, parental informed consent was obtained for all participants. The study procedure was approved by the Ethical Committee of the Faculty of Psychology and Educational Sciences at the host university University.

## **2.2 Measures**

### **2.2.1 Personality-related vulnerability.**

The Depressive Experiences Questionnaire for adolescents (DEQ-A; Blatt, Schaffer, Bers, & Quinlan, 1992) was used to assess self-criticism and dependency. The DEQ-A is an age-appropriate, 66-item adaptation of the DEQ for adults (Blatt et al., 1976) for use with adolescents, and consists of three subscales: dependency, self-criticism and efficacy. In this study, only the scales for dependency and self-criticism were used, as these concepts are conceptually central to Blatt's theory. The scale for efficacy was investigated in a more exploratory (rather than theory-driven) fashion. Because of this reason and because the concept of efficacy does not have a central place in Blatt's theory, it is rarely used in empirical research. Items have to be rated on a scale from 1 (totally disagree) to 7 (totally agree). Much like the original DEQ, the DEQ-A is scored using weighted factor scores (Zuroff, Mongrain, & Santor, 2004). Participants' responses on the 66-items are transformed to z-scores using means and standard deviations from a large sample originally collected by Blatt et al. (1992). These z-scores are then weighted by factor coefficient scores that were also

derived from this larger sample and averaged to form scores for dependency and self-criticism. As a consequence of this scoring procedure, mean scores for dependency and self-criticism are typically around 0. As can be seen in Table 2-1, the scores on both scales in the current samples were slightly below 0, indicating that participants in the current sample scored lower on the two personality dimensions compared to participants in the original samples in which the DEQ-A were validated.

The Dutch version of the questionnaire has comparable psychometric characteristics as the original version (Luyten, Corveleyn, & Blatt, 1997). The factor structure of the DEQ-A has been replicated in several studies with adolescents (Blatt et al., 1992; Fichman et al., 1994). Further, research has demonstrated the test-retest reliability of the scales (Blatt et al., 1992) as well as their convergent validity (e.g., in terms of associations with related personality dimensions; Enns, Cox & Inayatulla, 2003) and predictive validity (e.g., in terms of associations with various indicators of psychopathology; Leadbeater et al., 1999). In the present study, Cronbach's alpha based on the weighted item z-scores was .81 for dependency and .66 for self-criticism.

*Table 2-1. Means, Standard Deviations and Correlations Between the Study Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Dependency	1	-.04	.22**	.30**	.45**	.42**	-.07	.06	-.10	-.04	.47**	.18**	.21**	.19**	.08	.04
2. Self-criticism		1	.41**	.45**	.55**	.60**	-.41**	-.49**	-.46**	-.54**	.37**	.21**	.13*	.38**	.15*	.14*
3. Autonomy frustration			1	.33**	.44**	.76**	-.31**	-.18**	-.31**	-.31**	.22**	.15**	.09	.29**	.14*	.15*
4. Relatedness frustration				1	.51**	.74**	-.25**	-.40**	-.32**	-.39**	.48**	.24**	.19**	.29**	.04	.07
5. Competence frustration					1	.85**	-.25**	-.22**	-.48**	-.37**	.50**	.33**	.32**	.32**	.15*	.18**
6. Total need frustration						1	-.34**	-.35**	-.48**	-.45**	.51**	.32**	.26**	.38**	.14*	.17**
7. Autonomy satisfaction							1	.59**	.58**	.85**	-.23**	-.25**	-.11	-.25**	-.19**	-.14*
8. Relatedness satisfaction								1	.52**	.85**	-.22**	-.23**	-.06	-.19**	-.07	.04
9. Competence satisfaction									1	.83**	-.33**	-.24**	-.15*	-.29**	-.12*	-.07
10. Total need satisfaction										1	-.31**	-.28**	-.12*	-.29**	-.15*	-.06
11. Int. problems A											1	.34**	.37**	.50**	.13*	.13*
12. Int. problems M												1	.61**	.17**	.58**	.37**
13. Int. problems F													1	.08	.37**	.56**
14. Ext. problems A														1	.36**	.30**
15. Ext. problems M															1	.67**
16. Ext. problems F																1
Mean	-.28	-.37	2.46	1.81	2.42	2.23	4.15	4.96	4.33	4.48	.38	.18	.17	.28	.13	.14
SD	.82	.83	.90	.76	1.0	.70	.91	1.0	.92	.79	.27	.19	.19	.17	.16	.16
Minimum	-3.10	-2.37	1.00	1.00	1.000	1.00	1.50	2.25	1.75	2.17	.00	.00	.00	.00	.00	.00
Maximum	1.73	2.01	5.25	6.00	6.25	5.00	7.000	7.00	7.00	7.00	1.33	1.31	1.33	.93	.93	.88

*Note.* Int. problems = internalizing problems, ext. problems = externalizing problems, A= adolescent report, M = mother report, F = father report ,  
 \*  $p < .05$ . \*\*  $p < .01$ .

### **2.2.2 Psychological need satisfaction and need frustration.**

Adolescents' psychological need satisfaction and frustration were assessed through the widely used 24- items Basic Psychological Need Satisfaction and Need Frustration Scale (BPNSNFS; Chen et al., 2015). The BPNSFS has been used successfully in previous research with adolescents (e.g., Campbell et al., 2018) and has been validated in culturally diverse samples across the world (Chen et al., 2015). It has a stable factor structure and it demonstrates high levels of reliability (Chen et al., 2015). Participants rated their degree of satisfaction and frustration of the needs for autonomy (e.g. "I feel a sense of choice and freedom in the things I undertake" and "Most of the things I do feel like I have to"), relatedness (e.g. "I feel that the people I care about also care about me" and "I feel excluded from the group I want to belong to" ), and competence (e.g. "I feel capable at what I do" and "I feel disappointed with many of my performance") on a five-point Likert scale ranging from 1 (Totally disagree) to 5 (Totally agree). Satisfaction and frustration of each need is measured with 4 items. In addition to yielding scores for satisfaction and frustration of each the three separate needs (resulting in six lower-order scores), it is also possible to compute scores for overall need satisfaction and need frustration. Cronbach's alphas for the 6 separate, lower-order scores for satisfaction and frustration of the needs ranged between .65 and .80 (mean alpha = .69). In the current sample, Cronbach's alpha for the overall need satisfaction score was .83 and for the overall need frustration score was .82.

### **2.2.3 Internalizing and externalizing problems.**

Mothers and fathers completed the Child Behavior Checklist (CBCL, Achenbach & Rescorla, 2001) to assess their adolescent's internalizing problems (31 items; factors withdrawn/depressed, withdrawn/depressed and somatic complaints) and externalizing problems (41 items; factors aggressive behavior and rule-breaking behavior). Adolescents completed the YSR (Achenbach & Rescorla, 2001), which is the self-report version of the CBCL. Previous research on the psychometric qualities of the questionnaire demonstrated excellent validity and reliability (Achenbach & Rescorla, 2001). The YSR measures both internalizing (31 items) and externalizing problems (32 items). All items (both CBCL and YSR) were rated on a 3-point scale

ranging from 0 (*not at all*) to 2 (*very much*). In the present study, Cronbach's alpha for the YSR is .88 for internalizing problems and .80 for externalizing problems. For the CBCL mother-report is Cronbach's alpha .87 for internalizing problems and .88 for externalizing problems and for the CBCL father-report .86 and .87 respectively.

### 3 Results

#### 3.1 Correlations and Descriptive Statistics

The correlations among the measures for personality vulnerability, needs experiences, and psychopathology are presented in Table 2-1. As expected, both dependency and self-criticism relate positively to internalizing problems, a finding that robustly emerged across each of the three informants. Further, while self-criticism related positively to externalizing problems across all informants, dependency related positively only to adolescent-reported externalizing problems. Next, dependency and self-criticism are positively related to the composite score of need frustration as well as to frustration of each of the three separate needs. Next, self-criticism (but not dependency) was negatively related to the composite score of need satisfaction as well as to satisfaction of each of the three separate needs. In turn, need frustration was positively associated with both internalizing and externalizing problems, with these associations being significant for each of the informants. Further, need satisfaction related negatively to both types of psychopathology, with these associations also holding mostly across informants, except for the non-significant association with father-reported externalizing problems.

Because associations between the personality dimensions and needs experiences were significant across each of the needs, in the main analyses we decided to rely on the composite scores for need satisfaction and need frustration so as to limit the number of parameters to be estimated (see also Boone et al., 2014; Chen et al., 2015). Further, because the associations of both the personality dimensions and the needs experiences with psychopathology were significant across the different informants of the psychopathology, we also computed overall scores for internalizing and externalizing problems by averaging the standardized scores of the three informants. Models with the overall scores represent the data parsimoniously and can reduce the risk of type II errors. This decision was also justified by the significant

correlations among the three informants (average  $r = .44$  for internalizing problems and average  $r = .44$  for externalizing problems). By averaging the mother, father and adolescent report, using their shared variance, we aim to give a more accurate approach of the adolescents' clinical symptoms.

To examine the effects of the background variables (i.e., adolescent gender, age, school type) on the study variables (i.e., dependency, self-criticism, need satisfaction, need frustration, externalizing, and internalizing), multivariate analyses of variance were conducted. The multivariate effect of gender was significant, Pillai's Trace = .28;  $F(30,786) = 2.73$ ,  $p < .001$ . In comparison to males, females scored on average higher on dependency (males:  $M = -0.60$ ,  $SD = 0.71$ ; females:  $M = -0.04$ ,  $SD = 0.82$ ), internalizing problems (males:  $M = .20$ ,  $SD = 0.12$ ; females:  $M = .27$ ,  $SD = .19$ ), relatedness satisfaction (males:  $M = 4.80$ ,  $SD = .88$ ; females:  $M = 5.08$ ,  $SD = 1.06$ ) and competence frustration (males:  $M = 2.21$ ,  $SD = 0.79$ ; females:  $M = 2.59$ ,  $SD = 1.10$ ). Accordingly, we decided to control for gender in the main analyses. There were no significant effects of the other background variables (i.e., adolescent age, school type) on the study variables.

### **3.2 Primary Analyses**

To estimate the structural associations between the different study variables, structural equation modeling (SEM) was conducted in Mplus Version 7.0 (Muthén & Muthén, 2012). We used structural equation modeling because this technique allows us to test a measurement model with latent variables, thereby controlling for measurement error (in contrast to separate regression analyses). Moreover, by conducting SEM, equations are fitted simultaneously as one model which allows us to test multiple predictors, mediators and outcomes at once (Chin, 1998; Rijnhart, Twisk, Chinapaw, de Boer, & Heymans, 2017). First, after examining the quality of the measurement model, we tested the direct effects of personality on psychopathology without inclusion of the psychological needs. Second, we tested a mediating model including psychological needs experiences as intervening variables in the structural relations between the personality dimensions and adolescent psychopathology. The model fit was evaluated on the basis of the Chi-square statistic ( $\chi^2$ ), the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit

Index (CFI), and the Standardized Root-Mean-square Residual (SRMR). Combined cut-off values near .90 for CFI, .08 for SRMR and .06 for RMSEA are considered as indicating a good fit (Kline, 2005).

The measurement model consisted of two manifest variables (i.e., the factor scores for dependency and self-criticism) and four latent variables (i.e. need frustration, need satisfaction, internalizing problems and externalizing problems). Similar to previous studies (e.g., Boone et al., 2014), the indicators for need frustration and need satisfaction were represented by the scores for the separate needs (i.e., autonomy, relatedness and competence). Scores on the subscales of the CBCL (Achenbach & Rescorla, 2001) were used as indicators for internalizing problems (i.e., anxious/depressed, withdrawn/depressed and somatic complaints) and externalizing problems (i.e., rule-breaking behavior and aggressive behavior). We used the mean scores across adolescents', fathers', and mothers' reports on these indicators. The measurement model included all correlations between the latent variables. The model yielded a good fit to the data [ $\chi^2(49) = 119.39$ , RMSEA = .07, CFI = .94, SRMR = .06]. Modification indices suggested to add a correlation between dependency and one specific indicator of the latent factor representing internalizing problems, that is, anxious-depressed symptoms. This association is theoretically meaningful as dependent individuals indeed are assumed to experience higher levels of anxiety - especially anxiety concerning abandonment or loss of love (e.g., Vliegen & Luyten, 2009). Therefore, we added this correlation, resulting in improved model fit [ $\chi^2(48) = 104.84$ , RMSEA = .07, CFI = .95, SRMR = .05]. All indicators had significant loadings on the latent factors, ranging from .57 to 1, all  $ps < .001$ .

### **Hypothesis 1: Associations between personality and psychopathology.**

In a first structural model, we tested whether self-criticism and dependency relate to internalizing and externalizing problems. Estimation of the model [ $\chi^2(12) = 34.09$ , RMSEA = .08, CFI = .96, SRMR = .04] showed that, as hypothesized, self-criticism was significantly related to more internalizing and externalizing problems ( $\beta = .41$  and  $\beta = .27$  respectively). Dependency was not only positively related to internalizing problems ( $\beta = .27$ ) but also to externalizing problems ( $\beta = .17$ ).

### **Hypotheses 2 & 3: Associations between personality and the basic psychological needs and a test of the mediating role of the needs in the effects of personality**

In a second structural model, we examined the associations between personality vulnerability and the needs as well as the mediating role of the needs in the personality vulnerability for psychopathology. Need satisfaction and need frustration were added simultaneously as mediating variables between the personality dimensions and the two types of adolescent psychopathology. Again, an association between dependency and the indicator anxious/depressed was added. The model showed good fit to the data ( $\chi^2(90)=123,30$ ; CFI= .95; RMSEA= .06; SRMR=.06) and is presented in Figure 2-1. While self-criticism was related positively to need frustration and negatively to need satisfaction, dependency was positively related to need frustration only. In line with expectations, need frustration related positively to both internalizing and externalizing problems, whereas need satisfaction was not significantly related to the two types of psychopathology when the variance shared between need satisfaction and need frustration was controlled for. Adding direct paths from dependency and self-criticism to psychopathology did not significantly improve model fit and none of these additional paths were significant. Tests for indirect effects indicated that associations of both dependency (bootstrapped unstandardized effect = .27, SE = .05,  $p < .001$ , 95% CI: [.18, .35]) and self-criticism (bootstrapped unstandardized effect = .35, SE = .06,  $p < .001$ , 95% CI: [0.24, 0.45]) with internalizing problems through need frustration were significant. Similarly, the indirect effects of both dependency (bootstrapped unstandardized effect = .17, SE = .05,  $p < .001$ , 95% CI: [.09, .24]) and self-criticism (bootstrapped unstandardized effect = .22, SE = .06,  $p < .001$ , 95% CI: [.22, .33]) on externalizing problems through need frustration were significant. Overall, the findings indicate full mediation of the effects of personality vulnerability through psychological need frustration.

### **3.3 Supplementary Analyses**

We conducted three sets of ancillary analyses. First, we performed multigroup analyses to examine whether adolescents' gender plays a moderating role in the final structural model. A constrained model (in which the modeled pathways were set to be invariant across boys and girls) was compared with an unconstrained

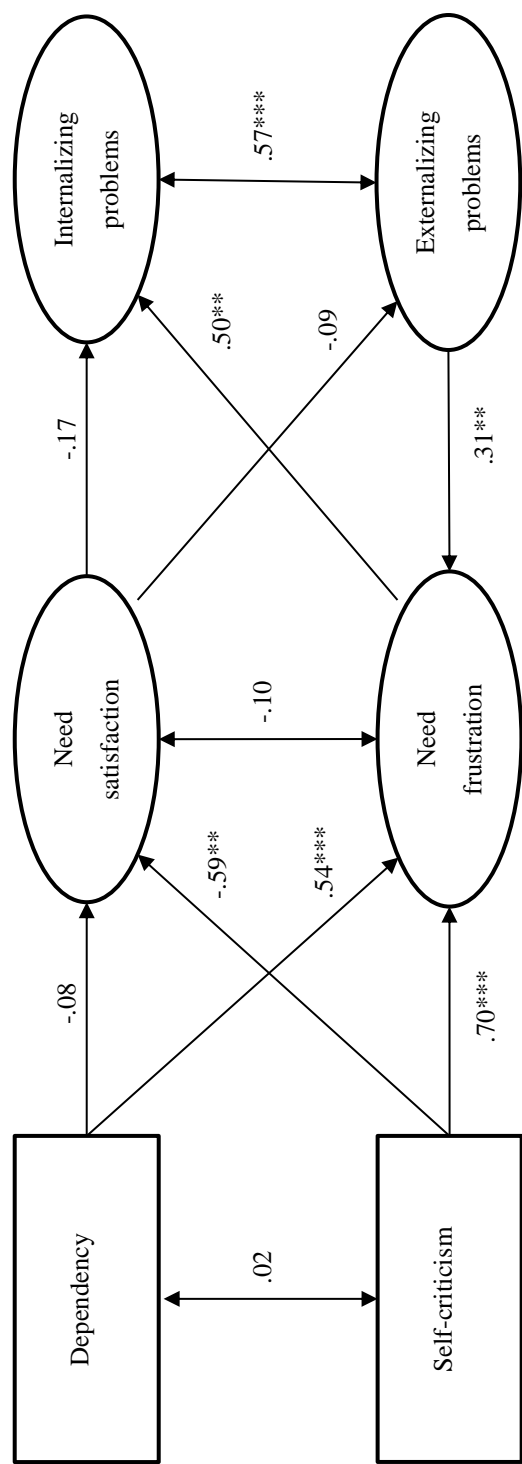


model (in which the parameters were freely estimated across boys and girls). There were no significant differences between the constrained and the unconstrained model ( $\Delta\text{CFI} < .01$ ;  $\Delta\text{TLI} < .02$ ;  $\Delta\chi^2(9) = 9.04$ ;  $p > .05$ ), which implies that gender did not moderate associations in the structural model. Overall, the findings suggest that the structural model displayed in Figure 2-1 is invariant across gender.

Second, because the association between dependency and adolescent-reported externalizing problems was somehow unexpected, we examined the correlations between dependency and subscales and individual items for externalizing problems in greater detail. Dependency was only significantly correlated with the subscale aggression and not with rule-breaking behavior. The aggression subscale consists of 17 items and only 4 of them were significantly correlated with dependency, namely ‘screams’ ( $r = .12$ ,  $p < .05$ ), ‘sudden mood changes’ ( $r = .40$ ,  $p < .001$ ), ‘suspicious’ ( $r = .23$ ,  $p < .001$ ), and ‘hot tempered’ ( $r = .14$ ,  $p < .05$ ). The correlations between the parent-reported subscales of externalizing behavior and dependency were not significant.

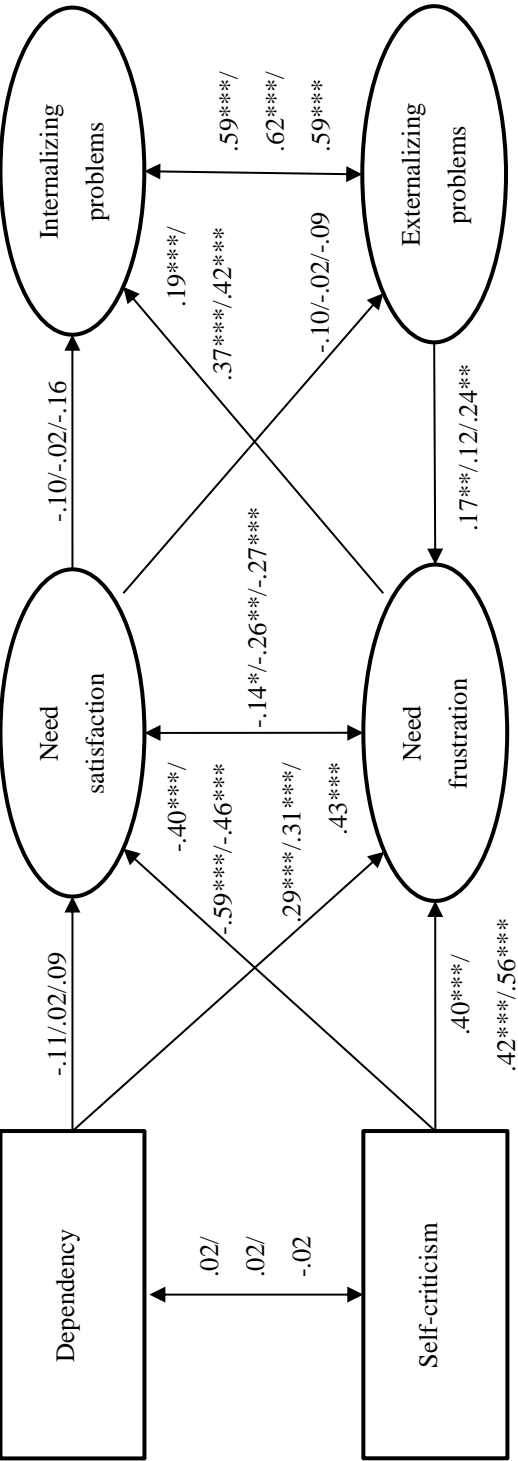
Third, we examined the mediating role of each of the three specific needs in the relation between personality and psychopathology (see Figure 2-2). In doing so, we analyzed three different mediation models with satisfaction and frustration of one specific need (autonomy, relatedness or competence) as mediators. The results were generally similar to the model in which one composite score for need satisfaction and frustration was used. However, we should be cautious to interpret the results given that the reliabilities of the separate need scales were lower. The analyses showed that dependency and self-criticism significantly predicted frustration of the needs for autonomy ( $b = .29$ ,  $p < .001$ ;  $b = .40$ ,  $p < .001$  respectively), relatedness ( $b = .31$ ,  $p < .001$ ;  $b = .42$ ,  $p < .001$  respectively) and competence ( $b = .43$ ,  $p < .001$ ;  $b = .56$ ,  $p < .001$  respectively). Only self-criticism (but not dependency) was related (negatively) to satisfaction of each the three separate needs ( $p < .001$  for all three needs). Frustration of the need for autonomy predicted more internalizing problems ( $b = .19$ ,  $p < .01$ ) and externalizing problems ( $b = .17$ ,  $p < .001$ ), and this was also the case for competence frustration ( $b = .42$ ,  $p < .001$  for internalizing problems,  $b = .24$ ,  $p < .01$  for externalizing problems). Relatedness frustration was related only to internalizing problems ( $b = .37$ ,  $p < .001$ ) but not to externalizing problems. Finally, for all three

needs, the indirect effects from dependency and self-criticism to internalizing problems through need frustration were significant. Also for autonomy frustration and competence frustration, the indirect effects from dependency and self-criticism to externalizing problems were significant. Overall, the results for the separate needs were similar to the results for the composite score of the needs, indicating that need frustration mediates the relation between personality and psychopathology. The only exception was that relatedness frustration did not mediate the relation between dependency and self-criticism on the one hand and externalizing problems on the other hand.



**Figure 2-1.** Structural Model of the Relations Between Personality, Total Need Satisfaction and Frustration, and Psychopathology.

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .01$ .



**Figure 2-2.** Structural Model of the Relations Between Personality, Satisfaction and Frustration of the three Separate Needs, and Psychopathology.

*Note.* The first value refers to the need for autonomy, the second value to the need for relatedness and the third value to the need for competence. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

## 4 Discussion

More than younger children and adults, adolescents are vulnerable for developing internalizing and externalizing problems, with symptoms of depression (e.g., Rushton, Forcier, & Schectman, 2002; Saluja et al., 2004), anxiety (e.g., Patton et al., 1996) and overt physical aggression (e.g., Liu, Lewis, & Evans, 2013) peaking in this period of life. Therefore, the identification of key factors explaining adolescents' risk for psychopathology is of utmost importance. Herein, we draw from two well-established frameworks, that is, Blatt's theory on personality development (Blatt, 1974; Blatt & Luyten, 2009) and Self-Determination Theory (Ryan & Deci, 2017) to identify psychological predictors of adolescent psychopathology. Specifically, this study aimed to examine the explanatory or mediating role of the basic psychological needs in the relationship between dimensions of personality vulnerability and adolescent psychopathology.

### 4.1 Personality and Psychopathology

Blatt (1974) proposed specific hypotheses about the association between dimensions of personality and symptoms of psychopathology. While self-criticism was expected to predict both internalizing and externalizing problems, dependent individuals would be particularly vulnerable to develop internalizing problems, such as depressive symptoms, phobias, anxiety and somatic symptoms. In contrast, the association between dependency and externalizing problems would be less strong or even absent due to the non-assertive, accommodating interpersonal style and the excessive concern about losing other people's love associated with dependency, features that would lead individuals to inhibit aggression or rule-breaking behavior. While most previous research found dependency to relate primarily with internalizing problems (Campos et al., 2014; Kuperminc et al., 1997; Leadbeater et al., 1999), in the present study, dependency related positively to both internalizing and externalizing problems. Yet, a closer inspection of the associations with the items of the externalizing subscale revealed that dependency was correlated only with the more affective items (and with sudden mood changes and paranoia in particular), but not with the items tapping into actual rule-breaking and delinquent behavior. These affective responses are consistent with the ambivalence in emotions that characterizes

dependent individuals as well as with their concerns about losing other people's love and closeness (Blatt, 2004). Moreover, it should be noted that correlations with the different informants of externalizing problems revealed that dependency correlated with adolescent-reported externalizing problems only, while being unrelated to parent reports. Thus, overall the association between dependency and externalizing problems was less robust than the association between self-criticism and externalizing problems.

Further, according to the symptom specificity hypothesis self-criticism is related not only to depressive symptoms, but also to obsessive-compulsive symptoms and symptoms centered around aggressive urges (Blatt, 2004). Consistent with this assumption and with previous research (e.g., Blatt, Hart, Quinlan, Leadbeater, & Auerbach, 1993; Leadbeater et al., 1999), we found significant associations between self-criticism and both externalizing and internalizing problems. Unlike dependency, self-criticism was also related to parental reports of externalizing problems, indicating that the rule-breaking and aggressive behaviors of adolescents high on self-criticism are not concealed and are quite visible to the family members.

#### **4.2 Psychological Needs as an Explanatory Mechanism**

Although personality vulnerability for psychopathology has been extensively studied (Blatt, 2004; Leadbeater et al., 1999), relatively little research has investigated potential mediators in this relation. Therefore, in this study, we examined the role of the basic psychological needs to yield new insights in the mechanisms behind the associations between personality and psychopathology.

Self-criticism and dependency were positively related to experiences of need frustration, a finding consistent with theoretical predictions (Luyten & Blatt, 2016) and with indirect previous evidence (Boone et al., 2014; Shahar et al., 2003). Besides its positive effect on need frustration, self-criticism was also negatively related to need satisfaction. Self-critical adolescents thus experience, on average, both more need frustration and less need satisfaction. These findings are consistent with previous research showing that self-critical individuals lack important psychosocial skills. Indeed, self-criticism is associated with the use of less adaptive coping and emotion regulation strategies (James, Verplanken, & Rimes, 2015; Rudolph, Flett, & Hewitt,

2007; van der Kaap-Deeder et al., 2016) and more negative social interactions (e.g., Mackinnon et al., 2012; Mackinnon et al., 2017). As a consequence, self-criticism seems to confer risk not only for increased ill-being but also for decreased well-being. Future research would do well to include actual measures of well-being and positive adjustment (e.g., life satisfaction, vitality, and social competence), and to examine whether the low levels of need satisfaction associated with self-criticism may account for the fact that adolescents high on self-criticism report lower well-being.

In contrast to self-criticism, dependency was not inversely related to need satisfaction in the present study. This non-significant association between dependency and need satisfaction is consistent with previous research indicating that dependency is less maladaptive in comparison to self-criticism (Kopala-Sibley, Zuroff, Hankin, & Abela, 2015). Still, the non-significant association between dependency and need satisfaction is difficult to interpret. Some scholars have portrayed dependency as a personality dimension with both negative features (e.g., excessive concerns about losing the love of important others) as well as positive features (e.g., capacity to elicit social support) (Hankin & Abela, 2005). However, if dependency would really involve such positive features, one might expect a positive association with need satisfaction (which was not the case in the current study). Possibly, the association between dependency and need satisfaction varies quite a bit on a daily or even momentary basis, with dependent adolescents being able on some days or in some circumstances to elicit social support (and experience need satisfaction) but not on other days or in other circumstances. The possibility that there is much short-term variability in the (undoubtedly complex) association between dependency and psychological need satisfaction could be addressed in future research adopting a diary design or even using experience sampling methodology.

The key finding in the present study is the mediation effect of need frustration in the relation between personality and psychopathology. Our findings suggest that highly dependent and self-critical individuals experience higher levels of need frustration which, in turn, are associated with higher levels of psychopathology. In line with previous research (e. g., Bartholomew et al., 2011; Boone et al., 2014; Vansteenkiste & Ryan, 2013), only the active obstruction of the needs (i.e., need frustration), rather than the absence of need satisfaction, was related to malfunctioning

and ill-being. This finding is consistent with several studies that have concluded that need satisfaction and need frustration should be studied as two distinct pathways (Chen et al., 2015; Haerens et al., 2015; Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013). Need frustration makes people more vulnerable to develop psychological problems in several ways. First, persistent need frustration leads to feelings of insecurity and this makes individuals prone to the pursuit of extrinsic goals (e.g., appearance or financial success) which are associated with more anxiety, more depression and less self-esteem (Kasser & Ryan, 1996). Second, people tend to respond to need frustration by engaging in compensatory behaviors, like releasing self-control, oppositional defiance and rigid behavioral patterns (Vansteenkiste & Ryan, 2013). These compensatory behaviors are typically associated with externalizing and internalizing problems in youth (Hollenstein, Granic, Stoolmiller, & Snyder, 2004; Krueger, Caspi, Moffitt, White, & Stouthamer-Loeber, 1996; Van Petegem, Soenens, Vansteenkiste, & Beyers, 2015).

Moreover, the supplementary analyses revealed that the results for the separate needs largely mirrored the findings obtained with the composite scores of need satisfaction and need frustration. Most importantly, frustration of the three separate needs appeared to play a similar role as mediator in the relation between personality and psychopathology. There was only one exception to this overall pattern of results, with relatedness frustration not being related to externalizing problems. A possible explanation could be that attachment affects adolescents' reaction to relatedness frustration. Individuals high on attachment anxiety would not display externalizing problems in reaction to relatedness frustration, as they want to ensure others' availability. Avoidant attached individuals, on the other hand, prefer more emotional distance and could be more likely to engage in externalizing problem behavior in order to create such distance. Future research examining the moderating role of attachment is needed to explore this possibility.

A strength of the present study is that we found the differential effects for need satisfaction and need frustration on the basis of a multi-informant approach. This approach allows us to conclude that the differential effects are not solely the result of shared method variance.



### 4.3 Limitations and Directions for Future Research

The main limitation of this study is the cross-sectional nature of the results, which makes it impossible to discern predictive relationships among the explored variables. A longitudinal study design is needed to assert the (bi)directionality of the described relationships. In the present study, we chose to model need frustration as a consequence of personality. However, future longitudinal studies should shed a light on the reciprocal effects between personality and need frustration. Previous studies on the role of parenting in personality vulnerability (Blatt & Homann, 1992; Kopala-Sibley, Zuroff, Hankin, & Abela, 2015; Soenens et al., 2010) provide indirect evidence for the notion that a developmental history of chronic need frustration would contribute to personality vulnerability, for example through the creation of an insecure working model. In turn, these changes in personality vulnerability could affect need frustration again. Future research could also look into the dynamic interplay between the needs and psychopathology, for example by examining the associations on a day-to-day basis. Previous diary studies have already demonstrated that self-critical perfectionism (a concept related to self-criticism; Boone et al., 2012) and need frustration (Verstuyf et al., 2013) fluctuate on a daily basis. However, no research has examined within-person level differences in dependency and the interrelations between these constructs. Further, while we did not use the DEQ scale for efficacy in the current study (to keep the focus on the personality dimensions most central in Blatt's theory), future research could explore associations between this scale, psychological needs experiences, and adolescent adjustment. It seems likely that efficacy will be primarily relevant to the need for competence and, through its association with this need may contribute to resilience and positive adjustment (Shahar et al., 2003).

Another important avenue for future research is to unravel the precise mechanisms in these associations between personality and basic psychological needs and to address the question exactly why adolescents high on dependency and self-criticism more frequently experience pressure, inferiority, and social alienation (i.e., frustration of the needs for autonomy, competence, and relatedness, respectively). Herein, we propose at least two potential mechanisms that are not mutually exclusive

and that can operate in conjunction to produce higher levels of need frustration in adolescents high on personality vulnerability.

First, adolescents high on personality vulnerability may actively generate events that give rise to more experiences of need frustration. Consistent with this mechanism, research has shown that self-criticism in particular (and dependency to a lesser extent) is related to the generation of more negative life events and to failure to generate positive events (Shahar & Priel, 2003). For example, self-critical individuals are perhaps more likely to choose demanding tasks and to select competitive environments, with such environments creating higher risks for failure and psychological need frustration. On the other hand, dependent adolescents may more often seek the company of peers or romantic partners who engage in passive or relational aggression, with such relationships eliciting doubts about social competence and concerns about the degree of care and love provided by relationship partners. While these examples refer to proactive mechanisms, adolescents high on personality vulnerability may also contribute to their own need frustration through evocative mechanisms, that is, by eliciting need thwarting responses from the environment. For example, self-critical adolescents' excessive focus on personal achievement at the expense of close interpersonal relationships might lead to social rejection. Indeed, previous research confirmed that self-critical perfectionists evoke more hostile behaviors from their partners, which inhibits their capacity for well-being (Mackinnon, Kehayes, Leonard, Fraser, & Stewart, 2017). Dependent adolescents' lack of assertiveness in close relationships might elicit a tendency in relationship partners to not take into account these adolescents' preferences and interests, thereby increasing risk for autonomy and competence frustration.

Second, in addition to the active generation of need frustrating events, personality vulnerability may also lead adolescents to perceive and interpret events in such a way that experiences of need frustration become more likely. Confronted with one and the same event (e.g., a mild failure on a test or an encounter with a partner who was somewhat less friendly than usual), adolescents low or high on personality vulnerability may be less or more likely to interpret the event as a threat to their needs. Experimental research is needed to disentangle these mechanisms. The effects of dependency could be explored through the experimental induction of social stress

(e.g., cyberball paradigm; Williams & Jarvis, 2006), while the effects of self-criticism can be better understood by inducing achievement-related stress (e.g., Trier social test; Kirschbaum, Pirke, & Hellhammer, 1993), such as the provision of negative feedback (van der Kaap-Deeder et al., 2016).

Next, the assessment of personality and psychological needs experiences in this study was based solely on self-report surveys. Clearly, there is a need to complement survey-based methods with alternative methodologies, such as biological stress measures (e.g., Kempke, Luyten, Mayes, Van Houdenhove, & Claes, 2016; Shoal, Giancola, & Kirillova, 2003; Wester, Lamberts, & van Rossum, 2014), to overcome the problems inherent to self-report assessment (e.g., reporter bias and social desirability). Empirical case based research (e.g., Stiles, 2009) is recommended too, as it would allow researchers to gain insight into more concrete manifestations of need frustration in relation to different personality dimensions.

A final important avenue for further research is to explore moderators of the association between Blatt's personality traits, psychological needs, psychopathology, and in particular moderators that attenuate the maladaptive effects of personality vulnerability and need frustration. Research on resilience processes in otherwise vulnerable individuals could provide more insight in psychological processes that might buffer against the effects of vulnerable personality and need frustration. Emotion regulation could be such a source of resilience. Studies showed that individuals high on dependency and self-criticism typically show impairments in reflective functioning and inadequate coping strategies (Blatt & Luyten, 2009). As such, these individuals might benefit the most from more constructive and adaptive ways of regulating emotions and dealing with problems and challenges in life.

#### **4.4 Prevention and Treatment Implications**

Despite the limitations of the current study, we believe that our findings have a number of potential clinical implications. First, it is important for health care professionals to take personality characteristics into account in the therapeutic process, because self-criticism and dependency are risk factors for psychopathology. It might be worthwhile to tailor treatment and clinical interventions to adolescents' personality dimensions, as these individuals with different personality profiles

respond differentially to different forms of psychotherapy (Blatt, Zuroff, Hawley, & Auerbach, 2010; Luyten & Blatt, 2011). Second, clinicians can work with their patients to increase awareness of their need frustrating experiences and of their ways of coping with such experiences (Boone et al., 2014). A training in emotion regulation skills, could then help them to deal with need frustrating experiences. Finally, especially for self-critical individuals who report on average more need frustration and less need satisfaction, it would be worthwhile to explore how they can engage more in need satisfying activities. Up to now, little research has examined the effects of interventions aiming to promote need-satisfying experiences. However, in a recent study, Weinstein et al. (2016) found evidence that a short intervention aimed at enhancing the three psychological needs can reduce symptoms of generalized stress and depression in people living in high stress conditions. Also behavior activation therapy could be a promising intervention to increase opportunities to engage in need-satisfying experiences (Lejuez, Hopko, Acierno, Daughters, & Pagoto, 2011). These types of interventions could also benefit adolescents with elevated scores on dependency and self-criticism.

#### **4.5 Conclusion**

Adolescents scoring higher on dependency and self-criticism displayed higher levels of internalizing and externalizing problems, with the association with externalizing problems being particularly pronounced for adolescents high on self-criticism. Experiences of psychological need frustration played a central mediating role in these associations. The two dimensions of personality vulnerability were associated with experiences of social alienation, pressure, and personal inadequacy, with these experiences, in turn, relating positively to adolescent engagement in psychopathology. In addition to yielding more insight in the mechanisms involved in associations between personality vulnerability and adolescent psychopathology, this study contributed further to the integration between the theory of Blatt and Self-Determination Theory, two macro-theories on personality development in social context that take an increasingly prominent role in research on adolescent psychopathology.

## 5 References

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## Appendix

In order to provide consistency over the different chapters of this doctoral dissertation, we also attempted to test the moderating role of personality in this study. Therefore, we tested two moderation models. In the first model, we examined the main effects of self-criticism, need satisfaction, and need frustration, as well as the self-criticism x need satisfaction and self-criticism x need frustration interactions on internalizing and externalizing problems. No interaction effects with self-criticism reached significance. In the second model, we tested the main effects of dependency, need satisfaction and need frustration, as well as their respective interaction effects on both types of problem behaviors. There was one significant interaction effect, with dependency and need satisfaction interacting in the prediction of externalizing problems. Further inspection of this interaction showed that the association between need satisfaction and externalizing problems was not significant among adolescents low on dependency (i.e., adolescents scoring 1SD below the mean) ( $\beta = .01, p > .05$ ) while it was significant among adolescents high on dependency (i.e., adolescents scoring 1SD above the mean) ( $\beta = -.29, p < .05$ ). Particularly among adolescents high on dependency, need satisfaction appeared to play a protective role against externalizing problems. Interpreted the other way around, high dependency was related to externalizing problems only when combined with low levels of need satisfaction. Accordingly, this interaction further demonstrates that the association between dependency and externalizing problems is limited, as it seems to be conditional upon the combined presence of (low) need satisfaction. Because only interaction (out of 8 interactions tested) reached significance, this interaction should be interpreted with much caution and should be replicated before drawing strong conclusions. Overall, a moderation model seems to fit these data less well than a mediation sequence.



## CHAPTER 3

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### **A Longitudinal Examination of the Interplay between Personality Vulnerability and Need-Based Experiences in Adolescents' Depressive Symptoms<sup>2</sup>**

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<sup>2</sup> Vandenkerckhove, B., Boncquet, M., Vansteenkiste, M., Brenning, K., Luyten, P., & Soenens, B. (2019). A longitudinal examination of the interplay between personality vulnerability and need-based experiences in adolescents' depressive symptoms. *Manuscript submitted for publication.*

Table of contents

**1 Introduction** ..... 88

1.1 Blatt’s Theory on Personality Development ..... 89

1.2 Self-Determination Theory: Basic Psychological Needs ..... 90

1.3 Blatt’s Personality Dimensions and SDT’s Need-Based Experiences ..... 92

1.4 The Present Study ..... 95

**2 Method** ..... 96

2.1 Participants and Procedure ..... 96

2.2 Measures ..... 97

**3 Results** ..... 99

3.1 Preliminary Analyses ..... 99

3.2 Primary Analyses ..... 102

**4 Discussion**..... 107

4.1 The Relation Between Self-Criticism, Dependency, and Depressive Symptoms  
..... 108

4.2 The Mediating Role of Need-Based Experiences ..... 109

4.3 Limitations and Suggestions for Future Research..... 114

4.4 Conclusion ..... 115

**5 References** ..... 116

**Appendix** ..... 126

The present study aimed to examine the interplay between the personality dimensions of self-criticism and dependency and experienced satisfaction or frustration of the basic psychological needs in relation to adolescents' depressive symptoms. In doing so, we investigated the possibility of both a mediation and a moderation model. A total of 149 adolescents (52% female,  $M_{age} = 15.20$  years at initial assessment,  $SD = 3.09$ ) participated in this three-wave longitudinal study with 6-month intervals. At each wave, adolescents reported on their personality, need-based experiences, and depressive symptoms. Multilevel analyses showed that dependency and self-criticism related to experiences of need frustration and depressive symptoms at both the between-person level (i.e., the level of interindividual differences) and the within-person level (i.e., the level of intraindividual differences). Further, need frustration partially accounted for the relations between the dimensions of personality vulnerability and adolescents' depressive symptoms at both levels of analysis. Personality did not significantly moderate the associations between needs and depressive symptoms. The results suggest that self-criticism and dependency are related to depressive symptoms in terms of both interindividual differences and within person-change because these personality dimensions go hand in hand with more experiences of need frustration.

## 1 Introduction

Adolescence is marked by an increased susceptibility to depression, which has important repercussions for adolescents' personal, social, and educational development (Costello, Copeland, & Angold, 2011). Given that vulnerability to psychological difficulties is still susceptible to change in adolescence (Hauser, Allen, & Golden, 2006), it is important to gain more insight into factors that increase the risk for depressive symptoms in this developmental period. Such insight is needed to improve prevention programs and to refine etiological models of mental health problems (Hankin, Abramson, Miller, & Haeffel, 2004; Nehmy, 2010).

One influential body of research on vulnerability to psychopathology, and to depression more specifically, is grounded in Blatt's (1974, 2004, 2008; Luyten & Blatt, 2013) two-polarities model of personality development. This research has convincingly identified dependency and self-criticism as personality dimensions that increase the risk for different types of psychopathology and depression in particular (Priel & Shahar, 2000; Zuroff et al., 2004). While this research initially focused on adults (Blatt, D'Afflitti, & Quinlan, 1976; Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982), more recent research has shown that these personality dimensions systematically relate to depressive symptoms among adolescents too (Abela, Fishman, Cohen, & Young, 2012; Cohen et al., 2013; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999). However, research on the underlying processes that can explain these associations is scarce. In the present study, we aim to examine the interplay between Blatt's personality dimensions (i.e., self-criticism and dependency) and adolescents' experiences of satisfaction and frustration of the basic psychological needs, a central concept in Self-Determination Theory (SDT; Ryan & Deci, 2017). Thereby, we address the possibility that (a) basic psychological needs account for the association between personality and depressive symptoms (with personality relating to more need frustration and subsequent depressive symptoms) and (b) personality interacts with psychological need experiences in the prediction of depressive symptoms (with personality possibly exacerbating associations between need frustration and depressive symptoms). Gaining insight into the intervening role of experiences of psychological needs in associations between personality and depression is important from a fundamental point of view because it contributes to a better understanding of

the convergence between Blatt's theory and SDT (Luyten & Blatt, 2016) and the interplay between personality and SDT-based motivational experiences more broadly (Ryan, Soenens, & Vansteenkiste, in press; Sheldon & Prentice, in press). Such insight is also important from an applied perspective because these experiences are highly dynamic and workable targets for intervention and prevention (Su & Reeve, 2011; Weinstein, Khabbaz, & Legate, 2016).

### 1.1 Blatt's Theory on Personality Development

According to Blatt's two-polarities model (Blatt & Zuroff, 1992; Blatt & Luyten, 2009), interpersonal relatedness and self-definition are two fundamental developmental processes in personality development. *Interpersonal relatedness* refers to the capacity to establish meaningful and mutually satisfying relationships with others. *Self-definition* reflects the emergence of a differentiated, realistic, and essentially positive sense of identity. Personality development results from the dialectical and synergistic interaction between these two developmental lines through the lifespan (Blatt, 2008). Specifically, satisfying and stable relationships with important others (such as parents and peers) give rise to a more coherent and positive sense of self, and this in turn contributes to the establishment of more mature and meaningful relationships.

While healthy personality development involves a balanced transaction between the two developmental processes, personality vulnerability arises when people develop an excessive focus on one developmental process at the expense of the other process (Blatt, 2008). Dependency (which entails an excessive focus on interpersonal relatedness) and self-criticism (entailing an excessive focus on self-definition) are two personality dimensions that confer vulnerability for psychopathology (Blatt & Luyten, 2009; Luyten & Blatt, 2013). Dependency is characterized by excessive longings to be loved and to be cared for. Dependent individuals are anxious about separation and they typically adopt a claiming interpersonal style to keep others close. Self-critical individuals, on the other hand, are preoccupied with concerns about failure to meet expectations and standards. Moreover, self-critical individuals set unrealistically high and rigid standards and engage in harsh and negative self-evaluation when confronted with failure.

Ample research has demonstrated associations between dependency and self-criticism and diverse forms of psychopathology, with the association with depressive symptoms being most robust (Blatt, 2004; Luyten & Blatt, 2013; Zuroff et al., 2004). These associations have been documented in cross-sectional and prospective studies, in nonclinical and clinical samples, across different cultures, and in adult and adolescent samples (Besser & Priel, 2005; Blatt & Luyten, 2009; Kopala-Sibley, Zuroff, Hankin, & Abela, 2015). For example, both dependency and self-criticism were found to predict the first onset of depressive symptoms in female adolescents (Kopala-Sibley, Klein, Perlman, & Kotov, 2017), while increases (across a 2-year interval) in self-criticism, but not dependency, related to corresponding increases in depressive symptoms among adolescents (Kopala-Sibley et al., 2015). In spite of the well-documented associations between Blatt's dimensions of personality vulnerability and depressive symptoms in adolescence, the mechanisms involved in this association have received limited attention. On the basis of both theoretical arguments and empirical research (Luyten & Blatt, 2013, 2016), we reason that the basic psychological needs as postulated in SDT may play a dynamic intervening role herein.

## **1.2 Self-Determination Theory: Basic Psychological Needs**

SDT identifies three inherent and universal basic psychological needs that are considered essential for personal growth and thriving (Ryan & Deci, 2017). The three needs are interrelated, such that each facilitates and reinforces the satisfaction of the others. The need for autonomy refers to a sense of volition and psychological freedom; the need for relatedness represents a sense of reciprocal care and closeness with significant others; and the need for competence reflects feeling capable and effective in dealing with challenging situations. Numerous studies have shown that the satisfaction of the three needs is associated with a multitude of adaptive outcomes (e.g., more positive affect, vitality, life satisfaction; Ryan & Deci, 2017; Vansteenkiste & Soenens, 2015). Research has shown that psychological need satisfaction is related to adolescents' self-reported (Veronneau, Koestner, & Abela, 2005) as well as teacher-rated (Ahmad, Vansteenkiste, & Soenens, 2013) adjustment, and to better

resolution of specific developmental tasks that are crucial during adolescence, such as identity development (Luyckx, Vansteenkiste, Goossens, & Duriez, 2009).

According to SDT, the three basic psychological needs can also be frustrated, leaving individuals at greater risk for maladjustment (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Ryan & Deci, 2017; Vansteenkiste & Ryan, 2013). Need frustration is characterized by feelings of pressure and coercion (*autonomy frustration*), loneliness and rejection (*relatedness frustration*), and failure and inferiority (*competence frustration*). Importantly, an absence of need satisfaction should not be equated with the presence of need frustration. Need frustration represents a stronger and more direct threat to the needs than low need satisfaction. Recent theorizing and empirical research (Vansteenkiste & Ryan, 2013) suggest that active frustration of the three needs plays a unique and critical role in the prediction of maladaptive developmental outcomes and risk for psychopathology (Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015). Research with adolescents has shown that need frustration is related to various indicators of behavioral and emotional maladjustment, including depressive symptoms (Costa, Cuzzocrea, Gugliandolo, & Larcan, 2016; Wenceslao, Dittmar, Vignoles, & Vansteenkiste, 2014), stress (Bartholomew, Ntoumanis, Ryan, Bosch et al., 2011; Campbell, Soenens, Beyers, & Vansteenkiste, 2018), externalizing problems (Van Petegem, Soenens, Vansteenkiste, & Beyers, 2015), and eating disorder symptoms (Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014).

Recent research has also begun to examine the role of need frustration in adolescent depressive symptoms and ill-being at the level of within-person change. A diary study with early adolescents indicated that day-to-day variation in need frustration contributes to day-to-day variation in ill-being (Van der Kaap-Deeder, Vansteenkiste, Soenens, & Mabbe, 2017). In a study with a two-wave longitudinal design, Campbell, Boone, Vansteenkiste, and Soenens (2018) showed that changes in need frustration across a 6-month period covaried with changes in depressive symptoms in adolescents, at both the level of between-person (i.e., interindividual) differences and the within-person level (i.e., the level of intra-individual change). These studies testify to the dynamic role of the psychological needs, and need frustration in particular.

### **1.3 Blatt's Personality Dimensions and SDT's Need-Based Experiences**

Although it has been repeatedly argued that the relation between Blatt's two-polarities model and SDT's notion of basic psychological needs deserves empirical attention (Luyten & Blatt, 2013), few studies to date have done so. This is unfortunate because both Blatt's personality dimensions and SDT's basic psychological needs can be seen as transdiagnostic factors and processes involved in various forms of psychopathology (Campbell, Boone, et al., 2018). Moreover, it has been argued that psychological needs experiences may play an important intervening role in associations between personality and adolescent outcomes, deepening our understanding of the dynamic processes behind Blatt's dimensions of personality vulnerability (Luyten & Blatt, 2016). Theoretically, this intervening role could take two forms, that is, a mediating role and a moderating role (Priel & Shahar, 2000).

In the logic of a mediation model, adolescents' personality would contribute to psychological needs experiences, with these experiences in turn relating to adolescents' depressive symptoms. Specifically, dependency and self-criticism would increase the likelihood that adolescents experience need frustration. Moreover, self-criticism in particular (and dependency to a lesser extent) would decrease the likelihood of experiencing psychological need satisfaction. It can be expected that self-critical individuals' strong emphasis on meeting extremely high standards increases the risk of being unable to attain these standards (i.e., low competence satisfaction) or even failure (i.e., competence frustration). Because self-critical individuals have harsh and demanding expectations for achievement (Blatt, 1974, 2004), they are unlikely to regulate their behavior on the basis of deeply valued personal interests and preferences (low autonomy need satisfaction) and even experience a stronger sense of internal conflict and pressure to meet expectations (autonomy need frustration; Shahar, Joiner, Zuroff, & Blatt, 2004). Further, self-critical individuals' strong competitive attitude may lead them to show little interest in affiliation with others (low relatedness need satisfaction; Mongrain & Zuroff, 1995) and may even come at the expense of interpersonal harmony (Zuroff et al., 2004) owing to their display of more destructive relationship responses (e.g., neglect and insensitivity; Flett, Hewitt, Shapiro, & Rayman, 2001), leading to relatedness need



frustration. Overall, self-criticism is thus expected to relate to low need satisfaction and even need frustration.

Because dependency entails aspects of both vulnerability (e.g., excessive reliance on others) and resilience (e.g., the capacity to elicit social support), it is sometimes portrayed as a two-edged sword (Casalin, Luyten, Besser, Wouters, & Vliegen, 2014). This mixture of strengths and vulnerabilities is likely to be translated into need-based experiences. Although individuals high on dependency strongly value affiliation and intimacy goals (Mongrain & Zuroff, 1995), they also experience more difficulties in close relationships (Santor, Pringle, & Israeli, 2000). Their excessive longing to be cared for make them more demanding of emotional support (Mongrain, 1998), possibly resulting in a mixed picture of both relatedness satisfaction and frustration. By idealizing others and by pleasing others to gain social support, dependent individuals also risk neglecting their own preferences, and experiencing autonomy frustration. Finally, dependency could affect the need for competence, as they tend to feel helpless and weak when important relationships are threatened (Fichman, Koestner, & Zuroff, 1996).

In the logic of a moderation model, dependency and self-criticism may not only come with different need-based experiences but may also affect the degree to which adolescents are susceptible to the effects of need-based experiences. Congruent with a diathesis-stress model (Zuckerman, 1999), individuals high on these dimensions of personality vulnerability may be more sensitive to the risks associated with need-frustrating experiences in particular. This heightened sensitivity may be caused by more ineffective ways of coping with need-frustrating experiences among adolescents scoring higher on personality vulnerability (Blatt & Zuroff, 1992). Thus, in the case of moderation, dependency and self-criticism would amplify the costs associated with need frustration, as reflected in more pronounced within-person associations between need frustration and depressive symptoms among adolescents high on these personality dimensions.

Empirical research to date has mainly provided evidence for the mediating role of psychological needs experiences in associations between personality vulnerability and psychopathology in adolescents. For instance, a longitudinal study by Boone et al. (2014) indicated that self-critical perfectionism, a concept closely

related to self-criticism (Dunkley et al., 2006), predicts an increase in need frustration, which relates to further increases in eating disorder symptoms and depressive symptoms. Only one study to date has provided direct evidence for the mediating role of psychological needs experiences in associations between Blatt's two dimensions of personality vulnerability (as measured with the Depressive Experiences Questionnaire; Blatt et al., 1976) and adolescents' depressive symptoms (Vandenkerckhove et al., 2019). This cross-sectional study showed that both self-criticism and dependency related positively to need frustration and that only self-criticism was related to lower need satisfaction. In turn, need frustration accounted for associations between the personality dimensions and adolescents' internalizing and externalizing problems.

The present study aims to extend the preliminary cross-sectional associations reported by Vandenkerckhove et al. (2019) by making use of a three-wave longitudinal instead of a cross-sectional design, by studying the dynamic interplay between psychological need experiences and personality vulnerability at the level of both between- and within-person differences, and by explicitly considering both the possibility of mediation and moderation. Analyses at the level of between-person differences deal with the question whether rank-order differences in personality are related to rank-order differences in need-based experiences and depressive symptoms. In contrast, analyses at the level of within-person change deal with the question whether an intra-individual deviation (i.e., change) from an adolescent's average personality dimension across time goes hand in hand with corresponding deviations (i.e., changes) in need-based experiences and depressive symptoms.

An examination of processes operating at the level of intra-individual change is particularly important because mediating and moderating mechanisms are assumed to be dynamic in nature and to essentially reflect processes of change (i.e., processes situated at the within-person level). In addition, the level of intra-individual change deserves attention from an applied perspective because this level is primarily targeted by intervention and prevention efforts. In spite of its theoretical and applied importance, the level of intra-individual change has not been systematically studied within Blatt's dimensions of personality vulnerability. While research has found both need-based experiences (Van der Kaap-Deeder et al., 2017) and depressive symptoms

(Garber, Keiley, & Martin, 2002; Ge, Lorenz, Conger, Elder, & Simons, 1994) to be highly variable and susceptible to change during adolescence, fewer studies (e.g., Kopala-Sibley et al., 2015; Thompson, Zuroff, & Hindi, 2012) have examined whether adolescents also display intra-individual change in dependency and self-criticism. This is surprising because Blatt (2008) reasoned that adolescence is a period of reorganization and change in the balanced development of relatedness and self-definition and because personality research more generally has shown that personality is susceptible to change during adolescence (Caspi & Roberts, 2001; Klimstra, Hale, Raaijmakers, Branje, & Meeus, 2009). Given the limited number of studies available (Kopala-Sibley & Zuroff, 2014), it was deemed important to further chart intra-individual change in adolescent dependency and self-criticism and to examine change in these personality dimensions in relation to need-based experiences and depressive symptoms.

#### **1.4 The Present Study**

The central aim of the current study was to examine the role of need-based experiences in the relation between self-criticism and dependency on the one hand, and adolescents' depressive symptoms on the other hand. Because of its longitudinal design, the current study is the first to address the possible mediating and moderating role of psychological needs experiences in associations between Blatt's dimensions of personality vulnerability and depressive symptoms simultaneously at the levels of interindividual differences and intra-individual change.

First, we examined associations between dependency and self-criticism and depressive symptoms at the level of between-person differences and the level of within-person change. We expected that these personality dimensions would relate positively to depressive symptoms at both levels of analysis. Second, we examined associations between the basic psychological needs and depressive symptoms at both levels of analysis. Consistent with the dual-pathway model in SDT (Bartholomew, Ntoumanis, Ryan, & Thogersen-Ntoumani, 2011), we expected that need frustration would yield the most pronounced associations (compared with low need satisfaction) with depressive symptoms at both levels of analysis. Third, we examined the mediating role of the needs-based experiences in the relation between Blatt's

personality dimensions and depressive symptoms, again examining this mediation model at the between-person level and at the within-person level of change simultaneously, and anticipating that need frustration in particular would play a mediating role. Fourth, we examined the moderating role of personality vulnerability in the relation between need-frustrating experiences and depressive symptoms. We specifically tested the possibility that the within-person association between need frustration and depressive symptoms would be more pronounced among adolescents scoring high on dependency and self-criticism (i.e., a cross-level interaction).

## 2 Method

### 2.1 Participants and Procedure

The sample consisted of 149 adolescents recruited from a high school in the Dutch-speaking part of Belgium. The sample was 52% female and participants had a mean age of 15.20 years (range 14–19 years,  $SD = 3.09$ ) at initial assessment. All adolescents were engaged in vocational education. Most participants came from intact families (68%) and were of Belgian origin (84.1%).

The sample participated in three subsequent measurements at 6-month intervals. A total of 117 adolescents (78.5%) participated at all three waves. The  $t$ -tests for independent samples indicated that there were no significant differences between participants who completed all three assessments and those who participated in only one or two assessments in terms of their initial levels of dependency ( $t = -1.68$ ,  $p > .05$ ), self-criticism ( $t = 0.97$ ,  $p > .05$ ), need satisfaction ( $t = 1.33$ ,  $p > .05$ ), need frustration ( $t = 0.03$ ,  $p > .05$ ), or depressive symptoms ( $t = 0.56$ ,  $p > .05$ ). Drop-out was also not dependent on participants' age ( $t = -1.04$ ,  $p > .05$ ) or gender [ $\chi^2(1) = 2.15$ ,  $p > .05$ ]. In total, there was 13.45% missing data in the dataset. As Little's (1988) Missing Completely At Random test did not reach significance [ $\chi^2(35) = 35.12$ ,  $p > .05$ ], the missing data are assumed to be completely at random and can be estimated reliably. Consequently, full information maximum likelihood was used to estimate the missing values (Little & Rubin, 2002).

One week before the first data collection, an active informed consent form for adolescents and their parents was provided together with an information letter. Only adolescents who gave active informed consent and who also received their

parents' consent participated in the study. Participation was voluntary and participants did not receive any compensation. All participants were assigned a unique code to ensure confidential treatment of the data. At each wave of data collection, the participants completed questionnaires during class hours. Completion took approximately 45 minutes. Ethical approval of the study was granted by the organizing university's institutional review board.

## **2.2 Measures**

All variables were assessed at each wave. All questionnaires had been validated and used in previous studies with Dutch-speaking adolescent populations.

### **2.2.1 Self-criticism and dependency.**

The Depressive Experiences Questionnaire for adolescents (DEQ-A; Blatt, Schaffer, Bers, & Quinlan, 1992) was used to measure self-criticism and dependency. The DEQ-A is a 66-item adaptation of the DEQ for adults (Blatt et al., 1976) for use with adolescents, and consists of three subscales: dependency, self-criticism, and efficacy. In this study, only the first two scales were used. Items are rated on a scale from 1 (totally disagree) to 7 (totally agree). The DEQ-A is scored using weighted factor scores (Zuroff et al., 2004). Participants' responses on the 66 items are transformed to z-scores using means and standard deviations from a large sample originally collected by Blatt et al. (1992). These z-scores are then weighted by factor coefficient scores that were also derived from this larger sample and averaged to form scores for dependency and self-criticism. Research has supported the internal structure and validity of the DEQ-A (Blatt et al., 1992; Fichman et al., 1994; Soenens, Vansteenkiste, & Luyten, 2010).

### **2.2.2 Need satisfaction and need frustration.**

Adolescents completed the 24-item Basic Psychological Need Satisfaction Need Frustration Scale (Chen et al., 2015). Satisfaction and frustration of each of three needs was assessed with four items: autonomy satisfaction (e.g., "I feel a sense of choice and freedom in the things I undertake") and autonomy frustration (e.g., "Most of the things I do feel like I have to"); relatedness satisfaction (e.g., "I feel connected with people who care for me, and for whom I care") and relatedness frustration (e.g.,

“I feel excluded from the group I want to belong to”); competence satisfaction (e.g., “I feel capable at what I do”) and competence frustration (e.g., “I feel insecure about my abilities”). In addition to scores for satisfaction and frustration for each of the three needs (resulting in six lower-order scores), the scale can also be used to yield scores for general need satisfaction and need frustration. Cronbach’s alpha for need satisfaction and need frustration were, respectively .75 and .80 at T1, .80 and .85 at T2, and .83 and .85 at T3.

### **2.2.3 Depressive symptoms.**

The Children’s Depression Inventory (Kovacs, 1992; Dutch translation by Timbremont & Braet, 2002) is an age-appropriate adaptation of the Beck Depression Inventory for use with children and adolescents aged between 8 and 21 years. The scale consists of 27 items that tap into adolescents’ experience of sadness, self-blame, loss of appetite, insomnia, interpersonal relationships, and school adjustment. For each item, participants choose one of three responses that best describes them (e.g., “Nobody really loves me”, “I am not sure if anybody loves me”, or “I am sure that somebody loves me”). Previous research demonstrated satisfactory reliability and validity (Timbremont & Braet, 2002). In the present study, Cronbach’s alphas were .75 at T1, .71 at T2, and .80 at T3. Elevated levels of depressive symptoms (i.e., levels exceeding the cut-off value of 19 that is recommended for non-clinical samples; Kovacs, 1992) were reported by 10.3% of the participants at T1, 9.4 % of the participants at T2, and 10.7% of the participants at T3.

### 3 Results

#### 3.1 Preliminary Analyses

##### 3.1.1 Descriptive statistics and correlations.

Table 3-1 displays the descriptive statistics over the three assessments. Repeated-measures ANOVAs were conducted to examine whether the study variables significantly changed over time. The results indicated that there were mean-level changes in dependency ( $F(2,114) = 9.70, p < .01$ ) and self-criticism ( $F(2,114) = 5.82, p < .01$ ). While dependency decreased linearly across the three waves, self-criticism increased particularly between T2 and T3. There were no mean-level changes in need-based experiences and depressive symptoms ( $p > .05$ ). However, the lack of mean-level changes in the needs and depression does not preclude the possibility of intra-individual changes from Wave 1 to Wave 3, a possibility addressed in the main analyses.

Table 3-2 shows the correlations of the study variables at both the between-person level and the within-person level of analysis. At both levels, dependency and self-criticism were related positively to need frustration. Only self-criticism was additionally related (negatively) to need satisfaction. In turn, need frustration was related positively to depressive symptoms and need satisfaction was related negatively to depressive symptoms, with the associations obtained with need frustration being more pronounced than those obtained with need satisfaction. We also examined associations with satisfaction and frustration of each the three needs (autonomy, competence, and relatedness) separately. The results of this analysis (see the Appendix) demonstrate that associations are generally similar across the three needs. Moreover, there were substantial correlations among the three needs. These substantial intercorrelations are theoretically plausible because the three needs are assumed to affect one another. For this reason, and in order to keep the number of analyses in check (thereby also reducing the chances of making Type I errors), we used the composite scores for need satisfaction and need frustration in the main analyses.

**Table 3-1.** Descriptive Statistics for the Study Variables over the Three Assessments.

	Wave 1	Wave 2	Wave 3	Effect of time	
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>F(2,114)</i>	<i>p</i>
Dependency	-.03 (1.01)	-.19(1.06)	-.26 (.95)	9.70	< .01
Self-criticism	-.09 (.86)	-.04 (.81)	.12 (.77)	5.82	< .01
Need satisfaction	3.66 (.44)	3.60 (.48)	3.64 (.52)	1.17	.31
Need frustration	2.32 (.56)	2.31 (.60)	2.38 (.62)	.93	.40
Depressive symptoms	.46 (.18)	.46 (.18)	.48 (.21)	.07	.72

*Note.* *M* = Mean; *SD*= standard deviation.



**Table 3-2.** *Correlations Between the Study Variables Aggregated over the Three Assessments at the Between-Person (below the diagonal) and Within-Person (above the diagonal) Level.*

	1	2	3	4	5
1. Self-criticism	1	-.26***	-.32***	.35***	.25***
2. Dependency	-.11	1	.09	.21***	.20***
3. Need satisfaction	-.62***	-.01	1	-.36***	-.19***
4. Need frustration	.66***	.14*	-.62***	1	.38***
5. Depressive symptoms	.57***	.76***	-.42***	.70***	1

*Note.* \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$

### 3.1.2 Background variables.

To investigate the role of background variables, a MANCOVA was conducted with gender as a fixed factor, age as a covariate, and with all study variables as dependent variables. There was an overall multivariate effect of gender [Wilk's  $\lambda = 0.67$ ,  $F(15,99) = 3.21$ ,  $p < .01$ ,  $\eta^2 = .33$ ]. Follow-up analyses revealed that girls reported less need frustration ( $M = 2.23$ ) and more need satisfaction ( $M = 3.75$ ) at Wave 3 than boys ( $M = 2.57$  for need frustration and  $M = 3.51$  for need satisfaction). Girls also scored higher than boys on dependency at each of the three waves (with means of  $-.38$  at T1,  $-.65$  at T2, and  $-.48$  at T3 for boys, and  $.31$  at T1,  $.20$  at T2, and  $-.06$  at T3 for girls). As a consequence, we controlled for gender in all subsequent analyses.

## 3.2 Primary Analyses

The main analyses were conducted using multilevel modeling with the statistical software package Mplus 7 (Muthén & Muthén, 2015). Before conducting the primary analysis, intra-class correlation coefficients (ICCs) were calculated. The ICCs reflect the percentage of variance located at the between-person level. ICC values demonstrate that, respectively, 51% and 61% of the variance in need satisfaction and need frustration was situated at the between-person level. Further, 61% of the variance of depressive symptoms was located at the between-person level, and 75% of the variance in dependency and 64% of the variance in self-criticism was situated at the between-person level. This implies that, respectively, 49%, 39%, 39%, 25% and 36% of the variance in need satisfaction, need frustration, depressive symptoms, dependency, and self-criticism reflects changes within individuals, although this part of the variance also includes error variance.

### Research question 1: Associations between dependency and self-criticism and depressive symptoms.

First, we examined the associations between personality and depressive symptoms simultaneously both at the level of between-person differences and within-person differences. Dependency and self-criticism were entered as simultaneous predictors of depressive symptoms at both levels of analysis. At the between-person

level, there was a significant association between dependency and depressive symptoms ( $b = .10$ ,  $SD = .02$ ,  $p < .01$ ) and between self-criticism and depressive symptoms ( $b = .14$ ,  $SD = .02$ ,  $p < .01$ ). Results at the within-person level were similar, with significant associations of both dependency ( $b = .07$ ,  $SD = .02$ ,  $p < .01$ ) and self-criticism ( $b = .08$ ,  $SD = .02$ ,  $p < .01$ ) and depressive symptoms.

**Research question 2: Associations between need-based experiences and depressive symptoms.**

Second, we investigated associations between need satisfaction, need frustration, and depressive symptoms both at the between-person and the within-person level of analysis. In doing so, both need satisfaction and need frustration were simultaneously added in the analysis. At the between-person level, a significant association between need frustration ( $b = .22$ ,  $SD = .03$ ,  $p < .01$ ) and depressive symptoms was found, but no such association was found between need satisfaction ( $b = -.02$ ,  $SD = .04$ ,  $p > .05$ ) and depressive symptoms. The same pattern held at the within-person level. There was a significant association between need frustration and depressive symptoms ( $b = .11$ ,  $SD = .03$ ,  $p < .01$ ), but not between need satisfaction and depressive symptoms ( $b = -.02$ ,  $SD = .02$ ,  $p > .05$ ).

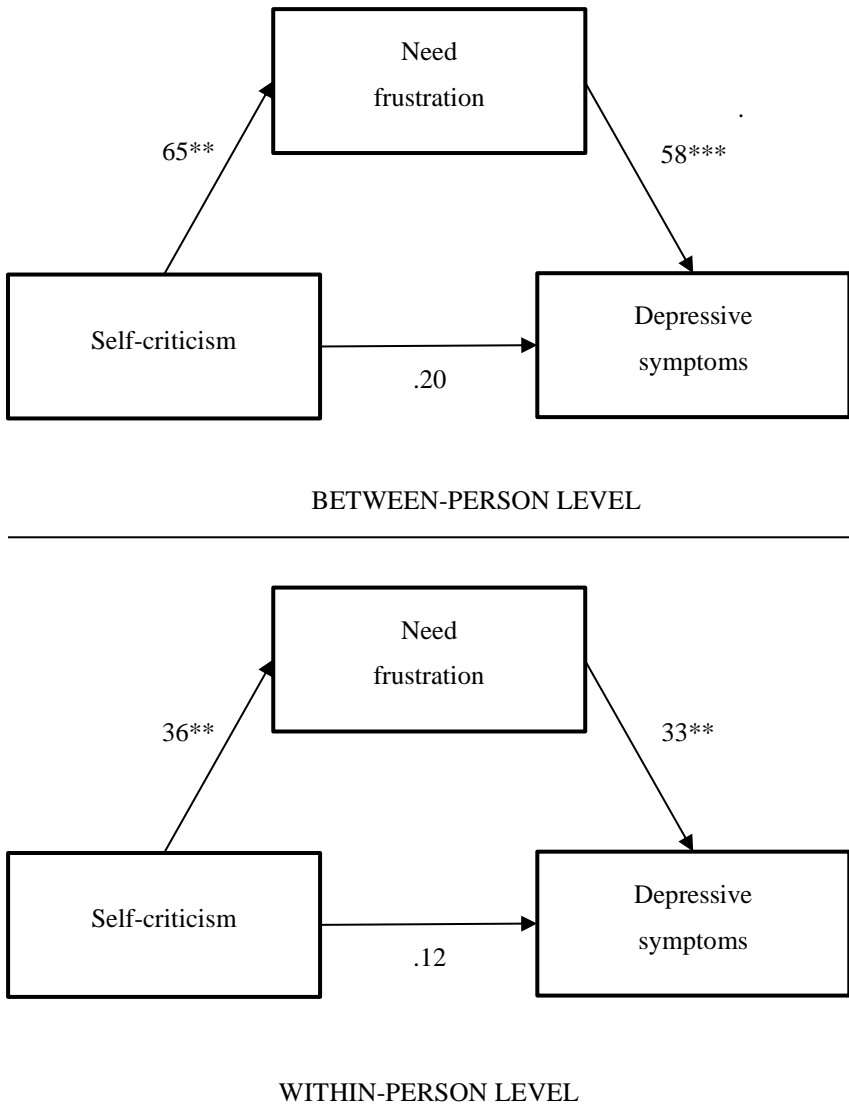
**Research question 3: The mediating role of need-based experiences.**

Next, we examined whether need frustration mediated the relation between personality and depression at both levels of analysis. Given the absence of unique associations between need satisfaction and depressive symptoms (see research question 2), the mediating role of need satisfaction was not investigated further. To reduce the number of parameter estimates, models were tested separately for dependency and self-criticism. Because all possible direct and indirect associations between personality and depressive symptoms were included, the models were fully saturated and had a perfect fit.

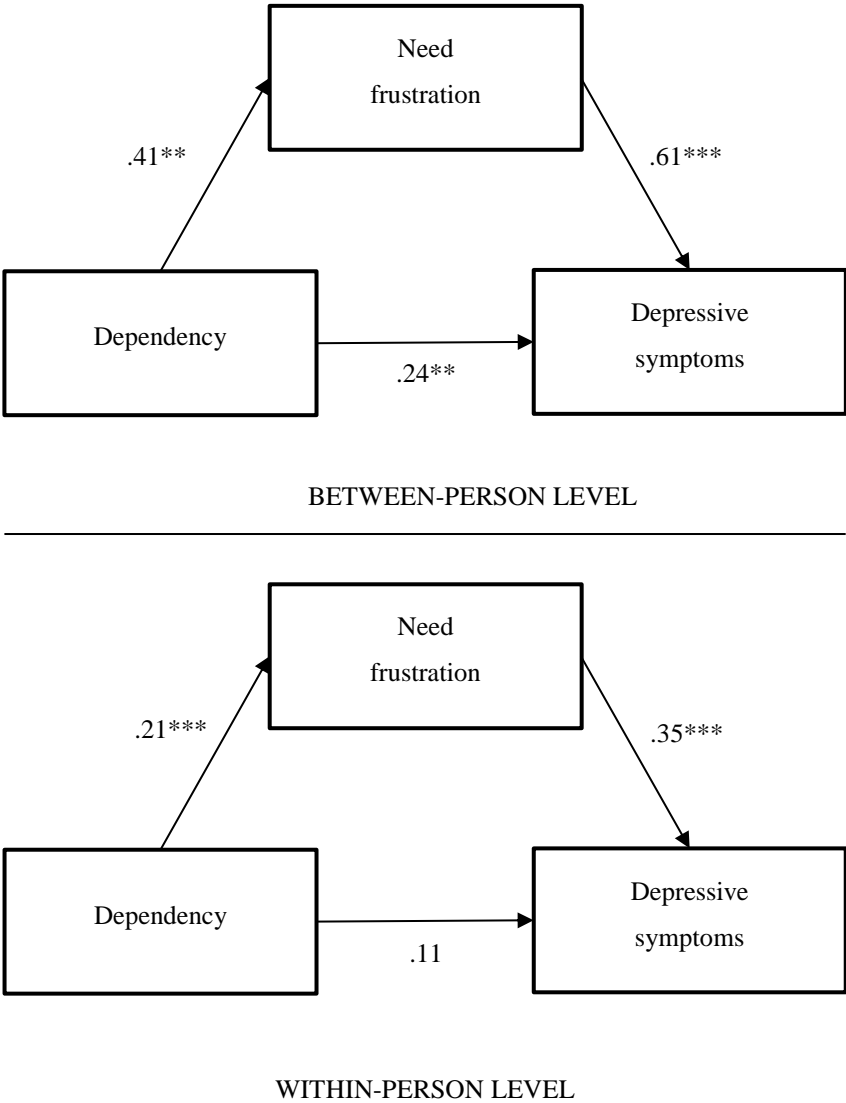
The first model (see Figure 3-1) describes the relations between self-criticism, need frustration, and depressive symptoms at the between- and within-person levels of analysis. The indirect effect from self-criticism to depressive symptoms through need frustration was significant at both the between- and within-person levels ( $b = .09$ ,  $SD = .02$ ,  $p < .05$ , and  $b = .03$ ,  $SD = .01$ ,  $p < .05$ , respectively),

while the direct effect from self-criticism to depressive symptoms was no longer significant at either level ( $b = .05$ ,  $SD = .03$ ,  $p > .05$  at the between-person level and  $b = .03$ ,  $SD = .02$ ,  $p > .05$  at the within-person level). These findings indicate that need frustration fully mediates the relation between self-criticism and depressive symptoms at the two levels of analysis.

A second model investigated the relations between dependency, need frustration, and depressive symptoms (see Figure 3-2). The indirect effect of dependency on depressive symptoms through need frustration was significant both at the between-person level ( $b = .04$ ,  $SD = .01$ ,  $p < .001$ ) and the within-person level ( $b = .02$ ,  $SD = .01$ ,  $p < .05$ ). The direct effect of dependency on depressive symptoms remained significant at the between-person level ( $b = .04$ ,  $SD = .02$ ,  $p < .01$ ), but dropped to non-significance at the within-person level ( $b = .03$ ,  $SD = .01$ ,  $p > .05$ ). These findings indicate that need frustration is a partial mediator in the relation between dependency and depressive symptoms at the between-person level and a full mediator at the within-person level.



**Figure 3-1.** Standardized Coefficients for the Role of Need Frustration in the Relation Between Self-Criticism and Depressive Symptoms at Both Levels of Analysis.



**Figure 3-2.** Standardized Coefficients for the Role of Need Frustration in the Relation Between Dependency and Depressive Symptoms at both Levels of Analysis.

**Research question 4: Cross-level interactions between personality and need-based experiences in predicting depressive symptoms.**

Finally, we examined whether personality moderates the within-person associations between need-based experiences on the one hand and depressive symptoms on the other hand. Models were tested separately for dependency and self-criticism and for need satisfaction and need frustration. As personality was assessed at each wave, the average score for self-criticism and dependency across the three waves was used. We first tested the significance of the random slope around need satisfaction and need frustration in two separate analyses, as it is commonly advised to only test interactions in case there is significant variation around the slope (Hox, 2010). A significant random slope suggests that there are interindividual differences in the strength of the within-person association between need-based experiences and depressive symptoms. We found a significant random slope for the association between need frustration and depressive symptoms ( $b = .01$ ,  $SD = .01$ ,  $p < .05$ ), but not for need satisfaction ( $b = .00$ ,  $SD = .00$ ,  $p > .05$ ). This finding demonstrates that the association between need satisfaction and depressive symptoms was equal for all adolescents in this study, and implies no room for moderation by personality. As a consequence, it was useful to conduct further moderation analyses only for the relation between need frustration and depressive symptoms. With regard to need frustration, no interactions were found for either dependency ( $b = .02$ ,  $SD = .02$ ,  $p > .05$ ) or self-criticism ( $b = .01$ ,  $SD = .03$ ,  $p > .05$ ), indicating that personality did not moderate the relation between need frustration and depressive symptoms in this sample.

## 4 Discussion

This study investigated the role of the basic psychological needs—for autonomy, relatedness, and competence—in personality vulnerability to depressive symptoms in adolescents. In doing so, we examined a mediation model (with the need-based experiences expected to explain the relation between personality and depression) and a moderation model (in which personality was examined as a potential moderator in the relation between need-based experiences and depression). Contrary to previous research that investigated the relation between personality, the needs, and psychopathology uniquely at the level of interindividual differences (e.g.,

Vandekerckhove et al., 2019), we tested the associations at the level of both between- and within-person differences. As such, we aimed to provide a more dynamic picture of underlying processes that could explain vulnerability to depressive symptoms. Results showed that need frustration mediated the relations between dependency and self-criticism on the one hand and depressive symptoms on the other hand. The study yielded no evidence for a moderation model.

#### **4.1 The Relation Between Self-Criticism, Dependency, and Depressive Symptoms**

Before testing the central hypotheses, we identified the degree of between-person variance and within-person change in each of the study variables. Intraclass correlations showed that most of the variance in personality, especially dependency, was situated at the between-person level. Still, even in these personality dimensions there was room for intraindividual change. This finding is consistent with the notion that Blatt's personality dimensions entail both trait-like (or stable) aspects and state-like fluctuations over occasions and contexts (Zuroff et.al., 2004). This finding also meshes with recent research showing that self-critical personality states can be primed experimentally (Boone, Soenens, Vansteenkiste, & Braet, 2012) and that dependency and self-criticism even fluctuate substantially on a day-to-day basis (Stader & Hokanson, 1998; Zuroff, Sadikaj, Kelly, & Leybman, 2016). More generally, our findings are consistent with contemporaneous views portraying personality in terms of both trait- and state-like features that may interact in complex ways with life events (Fleeson, 2001; Funder, 2006). Particularly in adolescence, a developmental period characterized by profound transformations in all areas of development, personality shows considerable change across time (Klimstra et al., 2009).

Similar to personality, need-based experiences also showed considerable variation at the within-person level. Previous diary studies have confirmed that psychological needs experiences are highly dynamic and vary substantially even in the short term, with these experiences having repercussions for individuals' well-being and ill-being, including daily depressive symptoms (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Ryan, Bernstein, & Brown, 2010; Van der Kaap-Deeder et al., 2017).



Having shown that dependency and self-criticism are characterized by significant within-person variability across time (in addition to between-person differences), we examined whether these personality dimensions would relate to depressive symptoms at both the between- and the within-person level. The findings indicated that higher levels of self-criticism and dependency are associated with greater numbers of depressive symptoms at both levels of analysis. While these results are in line with previous studies that found associations between self-criticism, dependency, and depressive symptoms in adolescents at the between-person level (Blatt et al., 1992; Campos, Besser, Morgado, & Blatt, 2014; Leadbeater et al., 1999), the present study is among the first to demonstrate these findings at the within-person level. Such findings indicate that when an adolescent goes through a period in which he or she displays more dependency or self-criticism than usual (i.e., a within-person change compared with the adolescent's baseline level of personality), he or she also reports a corresponding within-person deviation in depressive symptoms (compared with the adolescent's typical level of depressive symptoms). Thus, our findings suggest that Blatt's personality dimensions also play a role at the more dynamic level of within-person fluctuation. As this level of change represents the level at which contextual influences are most likely to have an impact, our findings indirectly suggest that prevention and intervention efforts targeting dependency and self-criticism in adolescents might be useful and might result in lowered intra-individual risk for depressive symptoms. Examples of such interventions include cognitive-behavioral therapy (Egan, Wade, Shafran, & Antony, 2016), compassion-focused therapy (Gilbert & Procter, 2006), and acceptance and commitment therapy (Luoma & Platt, 2015). Because such prevention and intervention efforts might be even more effective when they simultaneously target processes accounting for the role of dependency and self-criticism in depressive symptoms, we further examined the intervening role of psychological needs experiences.

#### **4.2 The Mediating Role of Need-Based Experiences**

To examine the mediating role of the need-based experiences in the effects of personality, we first examined associations between the needs-based experiences and depressive symptoms as such. As hypothesized, need frustration (and not need

satisfaction) was positively associated with depressive symptoms at the levels of both interindividual differences and within-person change. The finding that interindividual differences in need frustration were associated with interindividual differences in depressive symptoms is in line with previous studies that revealed associations between need frustration and depressive symptoms at the between-person level (e.g., Costa et al., 2016; Heisel et al., 2019; Wenceslao et al., 2014). The finding that this association also occurs at the within-person level implies that adolescents who experience ups and downs in need frustration compared with their own baseline level also report corresponding ups and downs in depressive symptoms across the 6-month time intervals in this study (i.e., at the within-person level). While such within-person associations had previously been demonstrated at the level of daily fluctuations (e.g., Van der Kaap-Deeder et al., 2017), the current study is among the first to examine these associations across a longer time interval.

The present findings also confirm the dual-pathway model in SDT stating that need satisfaction is a more robust predictor of adaptive outcomes while need frustration is primarily predictive of maladaptive outcomes (e.g., Bartholomew, Ntoumanis, Ryan, & Thogersen-Ntoumanis, 2011; Ryan, Deci, & Vansteenkiste, 2016; Vansteenkiste & Ryan, 2013). Indeed, when the two variables were added simultaneously, and thus controlled for each other, only the association between need frustration and depressive symptoms remained significant. This result indicates that the active frustration of the needs, more than dissatisfaction, contributes to depressive symptoms in adolescents, and is consistent with the notion that frustration of the psychological needs, which are considered essential for mental health, comes with an emotional cost (Ryan & Deci, 2017).

A key finding in the present study is that need frustration mediated associations of self-criticism and dependency with depressive symptoms at the two levels of analysis. At the between-person level, these findings indicate that heightened levels of self-criticism and dependency compared with other adolescents relate to heightened levels of need frustration which, in turn, relate to more depressive symptoms. At the within-person level, the findings indicate that periodic deviations from one's typical level of self-criticism and dependency go hand in hand with corresponding periodic deviations from one's typical level of need frustration, which,

in turn, relate to periodic deviations from one's typical level of depressive symptoms. These findings are consistent with a small body of research indicating that need frustration is an underlying process that accounts for a large part of the associations between self-criticism, dependency, and depressive symptoms (Campbell et al., 2018; Vandekerckhove et al., 2019). The fact that one and the same mechanism—that is, need frustration—plays an important mediating role at both the level of interindividual differences and the level of within-person change underscores its critical importance in better understanding adolescents' vulnerability to depressive symptoms.

The mediating role of need frustration in the effects of dependency and self-criticism may further inform programs and therapy aimed at reducing and preventing depression and other types of psychopathology among adolescents. In the course of both individual therapy and prevention programs, adolescents could be made aware of the impact of personality on experiences of need frustration and of the consequences of these experiences for their mental health. In doing so, it would be critical to highlight that even those low in dependency and self-criticism are not immune to periodic increases in these personality characteristics, which periodically co-vary with an increased vulnerability to need frustration and depressive symptoms. In addition to raising awareness about the consequences of need frustration, these interventions could encourage adolescents to invest in alternative, more need-satisfying, experiences. Indeed, experimental and intervention-based (Weinstein et al., 2016) research has begun to suggest that the active and deliberate pursuit of need-satisfying activities can strengthen resilience to stress and contribute to higher well-being.

Given the mediating role of need frustration in the effects of personality vulnerability at multiple levels of analysis, future research needs to examine the processes involved in the association between personality and need frustration. Based on Caspi and Roberts' (2001) theory on transactions between personality and context, we argue that self-criticism and dependency can render individuals more vulnerable to need frustration through at least three potential processes (see also Vandekerckhove et al., 2019). First, adolescents high on self-criticism and dependency may *actively generate* need-frustrating experiences by the type of activities and contexts they choose (Boone et al., 2014). For example, highly self-

critical individuals may set the bar for their own performance so high that failure (and resulting frustration of their need for competence) becomes more likely. Dependent individuals might be more likely to select a romantic partner who takes a dominant role in the relationship and who forces the dependent individual into a submissive and insecure position in the relationship (thereby contributing to autonomy and relatedness frustration). Second, *evocative mechanisms* could also explain how self-critical and dependent individuals contribute to their own need frustration. This implies that self-criticism and dependency would elicit need-frustrating reactions from their environment. For example, self-critical individuals may engage in a cold and aloof interpersonal style, thereby alienating people in their environment and contributing to their relatedness frustration. The passive-aggressive interpersonal style of dependent individuals might elicit conflicted interactions with close others and may eventually even result in rejection by these important others. Third, self-criticism and dependency might also affect individuals' *perception* of contexts and social events in a manner that frustrates their own psychological needs. Given their tendency to engage in harsh self-evaluation, self-critical individuals are likely to appraise many forms of social information (e.g., well-meant advice or mild corrective feedback about performance) in negative terms (e.g., as manipulative attempts to influence their behavior or as signals of their incompetence). Dependent individuals, on the other hand, may be more sensitive to perceived interpersonal threat. For example, highly dependent adolescents may be more likely to perceive a friend's preference to spend some time alone as a personal rejection and as a severe threat to the friendship. These three processes can all operate in conjunction to create higher levels of need frustration in highly self-critical and dependent adolescents.

While we obtained rather compelling evidence for a mediating role of need frustration, we found no evidence for moderation. That is, dependency or self-criticism did not affect the strength of within-person associations between need-based experiences and depressive symptoms. While it seemed theoretically plausible that adolescents scoring high on personality vulnerability would be more sensitive to the adverse consequences of need frustration, this turned out not to be the case. Because the current study is among the first to examine this possibility of moderation, it would be premature to conclude that Blatt's personality dimensions and need-based

experiences do not interact in the prediction of adolescents' adjustment. Future research is needed to further explore this possibility. One important goal for future research could be to examine a broader range of outcomes than only depressive symptoms. The current finding that individual differences do not play a strong role in the relation between need frustration and depressive symptoms is consistent with the notion that adolescents pay a universal emotional cost when confronted with need frustration (Ryan & Deci, 2017). However, other problematic outcomes of need frustration might be less universal, and personality may, for instance, play a moderating role in the prediction of externalizing problems. While dependent adolescents are less likely to respond to need frustration with externalizing behavior (because such behavior might cause harm to close relationships), self-critical adolescents might be more likely to do so (because such behaviors keep others at a distance and contribute to these adolescents' excessive need for independence). Thus, Blatt's personality dimensions may help to clarify the issue of multifinality in the consequences of need frustration, that is, the question why need frustration may lead to different developmental outcomes in different adolescents (Ryan et al., 2019).

Further, although the present study indicated that personality did not affect the consequences of subjectively experienced need frustration, self-criticism and dependency could still play a role in an earlier stage of processing and in the process of interpreting needs-relevant events in particular. It is possible that personality mainly affects the appraisal of the objective environment instead of the reaction to subjective need-based experiences (Soenens, Vansteenkiste, & Van Petegem, 2015). For example, the appraisal of a bad test result could be affected by a student's level of self-criticism, such that self-critical students would be more likely to interpret the result as a failure, with consequences for their self-worth, resulting in stronger feelings of shame and competence frustration. Similarly, not being invited to a birthday party could more easily be perceived as a personal rejection and thus thwart the need for relatedness in highly dependent adolescents (Shahar et al., 2004). Therefore, it would be interesting for future research to separate (e.g., through experimental manipulation or through vignette-based methodology) exposure to the objective stressor from the appraisal of the stressor, and to examine the moderating role of personality in the association between exposure to stressors and the experience of need frustration. We

would expect that highly self-critical and dependent individuals would, on average, report more need frustration after being exposed to potentially need-thwarting events than their less self-critical and dependent peers.

### **4.3 Limitations and Suggestions for Future Research**

When interpreting the results, several limitations should be kept in mind. First, the relatively small sample size could have reduced the power to detect significant moderation effects or to use more sophisticated data-analytical techniques (e.g., latent growth modeling). The findings in the present study should be replicated in larger samples. However, the low drop-out over the course of the study is a strength, as the initial sample size was not much further reduced. Next, we relied on a non-clinical sample, which limits the generalizability of our results to a clinical population of depressed adolescents.

Further, all measures relied on adolescents' self-report. Although adolescents themselves can be considered to be the most accurate reporters of their own inner experiences, common method variance could have led to an overestimation of the associations described in the present study. Future research that supplements self-report assessments with parental ratings of adolescents' depressive symptoms is recommended. Another limitation is that the analyses do not allow strong conclusions to be made about the direction of the effects. The multilevel analyses conducted in the current study revealed concurrent associations at the level of interindividual differences and correlated change at the level of within-person variation, without clearly determining the direction of effects in these associations. In the present study, we assumed that personality vulnerability precedes need frustration, but it could also be the other way around. Indeed, previous research suggests that a history of chronic need frustration could affect the personality factors dependency and self-criticism (Kopala-Sibley & Zuroff, 2014). Cross-lagged longitudinal research with larger samples could help to determine the direction of the relations between the study variables.

Examining more short-term fluctuations in the study variables could be another fruitful area of future research. As the present study provided more insight into fluctuations in personality, the needs, and depression over a relatively long period

of time (i.e., 1 year), diary methodology could help to draw an even more dynamic picture of the relations between the study variables on a day-to-day basis. Such research would be particularly innovative with respect to dependency and self-criticism because only very few studies to date have examined daily variation in these personality dimensions (see Zuroff et al., 2016 for an exception). Future research could also build on this study by examining whether increases in need frustration actually *cause* increases in depressive symptoms by using experimental designs that offer us the opportunity to make statements about the direction of effects. Experimental research is also ideally suited to induce exposure to stressors (e.g., a mild failure or peer rejection) and to test whether adolescents with higher personality vulnerability report more need frustration in reaction to the stressors (van der Kaap-Deeder et al., 2016).

#### **4.4 Conclusion**

This three-wave longitudinal study showed that dependency and self-criticism were related to adolescents' depressive symptoms not only at the level of trait-like individual differences but also at the more dynamic level of within-person change. At both levels of analysis, these associations were mediated by experiences of need frustration, suggesting that dependency and self-criticism render adolescents vulnerable to depressive symptoms because these adolescents experience more feelings of pressure, failure, and social alienation in their lives. If future large-scale longitudinal and experimental research confirms the findings of this study, therapeutic interventions and prevention programs could be enriched by attending to adolescents' psychological needs experiences.

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**Appendix**

Table 3-3 shows the correlations between self-criticism, dependency, depressive symptoms and each of the separate needs. Most correlations point in the same direction across the three needs, suggesting that the three needs tend to relate to the study variables in similar. There was only one exception to this pattern, with dependency correlating positively with relatedness satisfaction and being unrelated to relatedness frustration. This finding confirms that dependency entails some adaptive features in terms of relatedness (Hankin & Abela, 2005). Therefore, we tested the mediation model involving dependency also with a score for need frustration comprising only autonomy and competence frustration and excluding relatedness frustration. The results of the mediation model with this alternative score for need frustration were very similar to results obtained with the original score (comprising the three needs). If anything, associations between dependency and need frustration became more pronounced when removing relatedness need frustration from the scale. Moreover, the direct relation between dependency and depressive symptoms at the between-person level (which was still significant in the analyses with the total need frustration score) was not significant anymore when using the need frustration score excluding relatedness. This finding suggests that autonomy and competence frustration was an even stronger mediator this relation compared to a total need frustration score comprising also relatedness.

**Table 3-3.** *Correlations between personality, the three separate needs, and depression aggregated over the three assessment at the between-person (below the diagonal) and within-person (above the diagonal) level*

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Dependency	1	-.28	.01	.20	.01	.21	.02	.22	.18
2. Self-criticism	-.10	1	-.20	-.31	-.23	.15	.34	.31	.24
3. Autonomy satisfaction	-.04	-.48	1	.33	.45	-.20	-.13	-.26	-.10
4. Relatedness satisfaction	.17	-.54	.52	1	.40	-.14	-.33	-.20	-.14
5. Competence satisfaction	-.23	-.56	.77	.53	1	-.12	-.20	-.28	-.17
6. Autonomy frustration	.33	.49	-.42	-.25	-.51	1	.32	.31	.29
7. Relatedness frustration	.10	.59	-.35	-.65	-.36	.46	1	.37	.25
8. Competence frustration	.55	.60	-.43	-.27	-.66	.72	.53	1	.30
9. Depressive symptoms	.48	.58	-.39	-.24	-.50	.58	.45	.74	1



## **CHAPTER 4**

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### **Daily Ups and Downs in Adolescents' Depressive Symptoms: The Role of Daily Self-Criticism, Dependency and Basic Psychological Needs<sup>3</sup>**

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<sup>3</sup> Vandenkerckhove, B., Soenens, B., Luyten, P., Campbell, R., & Vansteenkiste, M. (2019). Daily ups-and-downs in adolescents' depressive symptoms: The role of daily self-criticism, dependency and basic psychological needs.

Table of contents

**1 Introduction..... 132**

1.1 The Role of Self-criticism and Dependency in Vulnerability to Depressive Symptoms ..... 133

1.2 Need-based Experiences and Adolescents’ Depressive Symptoms ..... 135

1.3 The Interplay between Personality Vulnerability, Need Frustration, and Depressive Symptoms ..... 136

1.4 The present study ..... 139

**2 Method ..... 140**

2.1 Participants and Procedure ..... 140

2.2 Measures ..... 141

2.3 Plan of analysis ..... 142

**3 Results ..... 143**

3.1 Preliminary Analyses ..... 143

3.2 Primary Analyses ..... 144

**4 Discussion..... 150**

4.1 Daily Fluctuations in Self-criticism, Dependency and Depressive symptoms ..... 150

4.2 Associations Between the Personality Dimensions, the Needs, and Depressive Symptoms at the Daily Level..... 151

4.3 Deeper Insights in the Interplay between Personality Vulnerability, Need-based Experiences and Depressive Symptoms..... 152

4.4 Limitations and Future Directions ..... 155

4.5 Conclusion ..... 157

**5 References..... 158**

**Appendix ..... 166**

Although associations between Blatt's personality dimensions of self-criticism and dependency and adolescents' depressive symptoms are well-established, only few studies have examined associations between these variables at the level of daily, within-person fluctuations. Moreover, our understanding of the mechanisms underlying this personality vulnerability to depressive symptoms is limited. Therefore, we studied (a) daily fluctuations in both personality and depressive symptoms over a 7-day period, and (b) the possible interplay between daily variations in personality vulnerability, need-based experiences (as conceptualized in Self-Determination Theory), and depressive symptoms. This interplay was examined in terms of both a mediational and a moderating role of the need-based experiences. Participants were 121 adolescents ( $M_{\text{age}} = 15.81$ ;  $SD_{\text{age}} = 1.50$ ; 52% male) who completed questionnaires tapping into daily self-criticism, dependency, need-based experiences, and depressive symptoms every evening during seven consecutive days. Multilevel analyses revealed that self-criticism and dependency fluctuated substantially on a daily basis. These daily fluctuations in personality were related to daily fluctuations in depressive symptoms, with daily variation in need-based experiences mediating these associations. We also found some evidence for interactions between personality and the need-based experiences, with self-criticism for instance exacerbating the association between low need satisfaction and daily depressive symptoms. The findings underscore the importance of considering daily fluctuations in individuals' personality vulnerability and point to the explanatory role of need-based experiences in the relation between personality and depressive symptoms on a daily basis.

## 1 Introduction

According to Blatt's theory of personality development, self-criticism and dependency reflect two personality dimensions that confer vulnerability to psychopathology in general and to depressive symptoms in particular (e.g., Blatt, Schaffer, Bers, & Quinlan, 1992; Coyne & Whiffen, 1995; Zuroff, Igeja, & Mongrain, 1990). Previous research has mainly conceptualized and assessed self-criticism and dependency as stable traits that differ between individuals (Zuroff, Mongrain, & Santor, 2004). Only recently, a handful of diary studies have begun to examine daily, within-person fluctuations in self-criticism and dependency. These studies suggested that there is considerable day-to-day variation in these personality dimensions (Boone, Soenens, Mouratidis, et al., 2012; Stader & Hokanson, 1998; Zuroff, Sadikaj, Kelly, & Leybman, 2016), with individuals reporting more depressive symptoms on days when they display more dependency or self-criticism (Zuroff et al., 2016).

The present study aims to add to this new generation of studies by focusing on potential psychological processes in daily associations between personality (dependency and self-criticism) and depressive symptoms. Specifically, we examine the potential interplay between the two personality dimensions and adolescents' basic psychological needs for autonomy, relatedness and competence, as conceived in Self-Determination Theory (SDT; Ryan & Deci, 2017). We focused on these need-based experiences (a) because there are compelling theoretical and empirical arguments for associations between Blatt's personality dimensions and the needs (Luyten & Blatt, 2016; Vandekerckhove, Brenning, et al., 2019), (b) because these need-based experiences are known to fluctuate substantially from day to day (Ryan, Bernstein, & Brown, 2010; Van der Kaap-Deeder, Vansteenkiste, Soenens, & Mabbe, 2017) and (c) because these experiences are implicated in individuals' vulnerability to negative affect and maladjustment more generally (Ryan, Deci, & Vansteenkiste, 2016; Vansteenkiste & Ryan, 2013). In doing so, we tested a mediation model in which satisfaction and frustration of the basic psychological needs explain the associations between personality and depressive symptoms on a daily basis. Apart from studying this mediational sequence, we also examined the interplay between these key constructs from the angle of moderation. That is, dependency and self-criticism may



enhance one's vulnerability for daily depressive symptoms on need frustrating or low need satisfying days.

These research questions are examined in an adolescent sample because adolescents, and especially girls, show a heightened risk to develop depressive symptoms (Ge, Lorenz, Conger, Elder, & Simons, 1994; Nolen-Hoeksema & Hilt, 2013). Moreover, adolescence is a developmental period characterized by profound developmental changes, as youngsters undergo important biological, psychological, and social transformations (Natsuaki, Biehl, & Ge, 2009). Indeed, adolescence is marked by greater variability in emotional ups and downs as compared to children and adults (Campbell, Boone, Vansteenkiste, & Soenens, 2018; Maciejewski, Van Lier, Branje, Meeus, & Koot, 2015). Therefore, it was deemed important to use a dynamic day-to-day approach to examine personality vulnerability to depressive symptoms in adolescents.

### **1.1 The Role of Self-criticism and Dependency in Vulnerability to Depressive Symptoms**

Blatt's theory (2004, 2008) distinguishes between two major personality dimensions that render individuals vulnerable to psychopathology in general and to depressive symptoms in particular, namely self-criticism and dependency. *Self-criticism* involves an overly strong focus on achievement, often leading to physical or mental overexertion (Luyten & Fonagy, 2016). Self-critical individuals set unrealistically high standards and engage in harsh self-scrutiny. *Dependency* refers to a preoccupation with close relations and involves excessive longings to be nurtured and cared for. Highly dependent individuals are anxious about losing the love of significant others, while highly self-critical individuals primarily fear disapproval and criticism (Luyten & Blatt, 2011).

Ample research has demonstrated associations between self-criticism, dependency and depression (Blatt, 2004; Luyten & Blatt, 2013; Zuroff, Mongrain, & Santor, 2004). The relation between Blatt's personality dimensions and depressive symptoms has been confirmed in both adolescent and adult samples (Fichman, Koestner, & Zuroff, 1994; Kopala-Sibley, Klein, Perlman, & Kotov, 2017; Shahar,

Blatt, Zuroff, Kuperminc, & Leadbeater, 2004) and in clinical and non-clinical populations (Luyten et al., 2007; Zuroff & Mongrain, 1987).

Most studies in this area have measured self-criticism and dependency as relatively stable personality features that distinguish individuals from each other (Cox & Enns, 2003; Zuroff, Igreja, & Mongrain, 1990). Indeed, most previous studies examining the associations between Blatt's personality dimensions and depressive symptoms relied on a single assessment of personality, tacitly assuming stability in these dimensions (Dunkley, Zuroff, & Blankstein, 2003; Zuroff, Koestner, & Powers, 1994). However, there is also considerable evidence for situational and short-term variation in both self-criticism and dependency. First, a limited number of diary studies found evidence for day-to-day variation in self-criticism. Moreover, the daily ups and downs in self-criticism were associated with daily ups and downs in eating disorder symptoms (Boone et al., 2012) and negative affect (Zuroff et al., 2016). To the best of our knowledge, only one study to date examined daily fluctuations in dependency. Stader and Hokanson (1998) found that daily dependency covaried with daily depressive symptoms. Second, experimental research revealed that self-critical perfectionism, a concept akin to self-criticism, can be situationally induced, with this priming of self-criticism increasing risk for psychopathology temporarily (Boone, Soenens, Vansteenkiste, & Braet, 2012; Shafran, Lee, Payne, & Fairburn, 2006). Third, psychotherapy can modify mental representations of the self in relation to others, and thereby alter the patient's self-criticism and dependency levels (Zuroff, Blatt, Sanislow, Bondi, & Pilkonis, 1999).

Findings demonstrating short-term and situational variability in Blatt's personality dimensions are consistent with contemporary views on personality (Fleeson, 2001; Fleeson, 2004; Funder, 2006; Mischel & Shoda, 1995) and, more specifically, with a conceptualization of personality development as a dynamic process in which stable, trait-like features interact with changeable contextual factors (Asendorpf & van Aken, 2003). Certainly in adolescence, when individuals undergo important and quickly evolving biological, social and cognitive transformations (Steinberg & Morris, 2001; Soenens, Vansteenkiste, & Beyers, 2019), there is evidence for short-term fluctuations in personality characteristics within one individual (Klimstra, Hale, Raaijmakers, Branje, & Meeus, 2009). According to

Fleeson (2001), personality features may get activated and manifest to different degrees over differing occasions and contexts. This within-person variability manifests against the background of more stable individual differences in the mean level of personality, which denote the individuals' set point. This view is congruent with the state-trait model of personality vulnerability (Zuroff et al., 1999) stating that the structure and content of personality vulnerability is generally stable, but the accessibility varies with mood, social, and biological factors.

In conclusion, theory and research increasingly underscore the dynamic nature of self-criticism and dependency and suggest that these personality dimensions entail both trait-like (or stable) and state-like (or changeable) features. Yet, it remains unclear whether daily variation in self-criticism and dependency relate uniquely to daily variation in adolescents' maladjustment and which mechanisms may explain these within-person associations. In the present study, we address the role of adolescents' basic psychological needs for autonomy, competence, and relatedness, because these needs are also dynamic in nature (Ryan et al., 2010) and have been shown to demonstrate theoretically plausible associations with Blatt's dimensions of personality vulnerability (Vandekerckhove, Brenning et al., 2019).

## **1.2 Need-based Experiences and Adolescents' Depressive Symptoms**

Self-Determination Theory (SDT, Ryan & Deci, 2017) states that every person has three basic psychological needs that are essential for optimal functioning and well-being. When satisfied, these needs would contribute to well-being and psychological growth. In contrast, frustration of these needs would render people vulnerable to maladjustment and psychopathology (Vansteenkiste & Ryan, 2013). The need for *autonomy* refers to a sense of inner psychological freedom and authenticity, the need for *relatedness* involves warm and close relationships with others and the need for *competence* refers to a sense of mastery. Frustration of the need for autonomy involves pressure to act, think or feel in a certain way, while relatedness frustration manifests in feelings of rejection and alienation, and competence frustration involves feelings of inferiority and being a failure.

Research has generally confirmed that satisfaction of these needs is associated with higher well-being, while need frustration is associated with ill-being

and even psychopathology (Ryan & Deci, 2017; Ryan, Deci, & Vansteenkiste, 2016). According to SDT's dual path model (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Haerens et al., 2015; Vansteenkiste & Ryan, 2013), need satisfaction (which is considered the bright side of the psychological needs) has a primary role in predicting adaptive outcomes (e.g., vitality, positive affect) while need frustration (which is considered the dark side of the psychological needs) primarily predicts maladaptive outcomes (e.g., stress, negative affect). Consequently, need frustration would yield stronger associations with depressive symptoms compared to need satisfaction, a hypothesis that received confirmation in several studies with adolescents (Bartholomew et al., 2011; Campbell et al., 2018; Chen et al., 2015).

Although between-person differences in need-based experiences historically received most attention, there is also increasing evidence for considerable variation in need satisfaction and need frustration from day to day in children (Van der Kaap-Deeder et al., 2017) and adults (Mabbe, Soenens, Vansteenkiste, van der Kaap-Deeder, & Mouratidis, 2018; Ryan et al., 2010). In adolescence, one diary study found evidence for day-to-day associations between need frustration and binge eating in a sample of female adolescents (Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013), whereas another diary study (Campbell et al., 2018) demonstrated an association between daily need frustration and poor sleep. The present study is among the first to examine daily associations in need-based experiences and depressive symptoms in adolescents. Most importantly, this study aims to examine for the first time the intervening role of daily psychological needs experiences in associations between daily dependency, self-criticism and depressive symptoms.

### **1.3 The Interplay Between Personality Vulnerability, Need Frustration, and Depressive Symptoms**

While previous research has revealed that Blatt's personality dimensions are linked to depressive symptoms (e.g., Blatt, Schaffer, Bers, & Quinlan, 1992) and that need-based experiences are related to depressive symptoms (Bartholomew et al., 2011), few studies to date have considered the interrelationship between Blatt's personality dimensions and the psychological needs. Theoretically, it can be argued that self-criticism and dependency relate to higher need frustration and, particularly

in the case of self-criticism, to lower need satisfaction (Luyten & Blatt, 2016; Vandenkerckhove, Brenning et al., 2019).

High self-criticism may render adolescents vulnerable to competence frustration because of individuals' difficulties to be satisfied with their accomplishments and because of their harsh self-scrutiny. By pressuring themselves to achieve excessively high goals (Blatt, 2004), adolescents high on self-criticism are also likely to experience frustration of the need for autonomy. Further, self-criticism could also affect the need for relatedness, as self-critical individuals typically keep others at a distance and engage in a cold, competitive, and aloof style of interaction with others.

Highly dependent individuals may sacrifice or even neglect their own preferences to please others, thereby frustrating their need for autonomy. Also, their doubts about their capacities to establish gratifying and durable relationships might frustrate their need for competence. Their strong fear of losing the love of significant others may elicit worry and rumination about the lasting character of their relations, while their accompanying claiming interpersonal style might elicit rejection, together thwarting their need for relatedness (Blatt, 2004). However, previous studies also revealed positive features of dependency in the interpersonal domain, including a tendency to seek and elicit social support (Shahar & Priel, 2003). Thus, with regard to the need for relatedness in particular dependency might be a *double edged-sword*, relating to both experiences of need satisfaction and need frustration.

A limited number of empirical studies confirmed these hypothesized associations between self-criticism, dependency, and need-based experiences. Two studies found self-critical perfectionism to predict an increase in psychological need frustration among adolescents (Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014; Campbell et al., 2018). Using a more direct measure of Blatt's personality dimensions, a cross-sectional study by Vandenkerckhove, Brenning, et al. (2019) demonstrated associations between both dependency and self-criticism and psychological need frustration. While self-criticism was additionally related to low need satisfaction, dependency was unrelated to need satisfaction. Using a longitudinal design spanning three weekly assessments of need-based experiences, Vandenkerckhove, Soenens, et al. (2019) demonstrated that self-criticism assessed at

the onset of the study forecasted more need frustration and lower need satisfaction across a 3-week period. Also, one study involving three measurement waves spaced 6 months apart examined within-person fluctuations in self-criticism, dependency, and need frustration (Vandenkerckhove, Boncquet, et al., 2019). The variation in self-criticism and dependency was related to corresponding variation in psychological need frustration. No study to date, however, examined associations between Blatt's personality dimensions and the needs at the level of daily fluctuations, thereby measuring both dependency and self-criticism as well as the needs on a daily basis.

In examining the daily, dynamic interplay between personality, the needs and depressive symptoms, we investigated both mediation and moderation models. Given that theory and research suggest that the personality dimensions elicit needs-based experiences and that needs-based experiences, in turn, affect adolescent outcomes, the mediation model assumes that daily self-criticism and dependency predict more need frustration (and, additionally, less need satisfaction in the case of self-criticism), which is, in turn, associated with more daily depressive symptoms. This possibility of mediation received support in the previously mentioned cross-sectional (Vandenkerckhove, Brenning, et al., 2019) and longitudinal (Campbell et al., 2018; Vandenkerckhove, Boncquet et al., 2019) studies. For instance, Campbell et al. (2018) found evidence for the mediating role of need frustration in the relation between self-critical perfectionism and depressive symptoms in adolescents across a 6-month period. However, it remains unclear whether these mediating processes also operate on a daily level, a question that is addressed in the present study.

In addition, we will also consider the possibility of a moderation model in which self-criticism and dependency may amplify adolescents' susceptibility to need-based experiences. Consistent with a diathesis-stress model (Zuckerman, 1999), this hypothesis implies that heightened daily self-criticism and/or dependency would exacerbate the effect of daily need frustration on daily depressive symptoms (and possibly also lead to desensitization to the positive consequences of need satisfaction). On days when adolescents display more self-criticism or dependency, they would be more sensitive to the emotional costs associated with need frustration. On those days, adolescents may display more dysfunctional responses to need frustrating events, including more negative appraisals of those events and more maladaptive ways of

coping (Blatt & Zuroff, 1992; Mongrain, Vetteese, Shuster, & Kendal, 1998; Shahar & Priel, 2003). Confronted with need frustration, adolescents whose personality vulnerability is heightened in the day would thus be less resilient against and more susceptible to the risks associated with need frustration and low need satisfaction. – While this possibility of moderation is theoretically plausible, the few studies to date that examined this possibility did not find support for it (Vandenkerckhove, Boncquet, et al., 2019; Vandenkerckhove, Soenens et al., 2019). None of these studies, however, examined the interactive interplay between Blatt’s personality dimensions and need-based experiences on a daily basis (instead focusing on stable interindividual differences or long-term change). Possibly, interactions between personality and need-based experiences operate on a short-term basis, leaving more room to observe moderation effects at the level of daily fluctuations.

#### **1.4 The present study**

The general aim of this study was to examine day-to-day associations between Blatt’s personality dimensions and depressive symptoms and the role of need-based experiences in these daily associations. The following five research goals and associated hypotheses were investigated. First, as only a handful of studies have charted daily variation in self-criticism and dependency (Boone et al., 2012; Zuroff et al., 2016) and in need-based experiences (i.e., Campbell et al., 2018) in adolescent samples, a first goal was to further examine daily fluctuations in these personality dimensions and need-based experiences. On the basis of previous studies, we expected that a substantial amount of variance in personality and need-based experiences would be situated at the within-person level (i.e., the level of daily variation; Hypothesis 1).

The second goal of this study was to investigate daily associations between self-criticism, dependency and depressive symptoms. We hypothesized that daily fluctuations in self-criticism and dependency would go hand in hand with daily fluctuations in depressive symptoms (Hypothesis 2). Third, we examined day-to-day associations between the satisfaction and frustration of the three basic psychological needs and depressive symptoms. As SDT assumes that need frustration plays a particularly strong role in predicting maladaptive outcomes (Bartholomew et al.,

2011; Vansteenkiste & Ryan, 2013), we hypothesized that daily need frustration in particular would be associated with daily depressive symptoms (Hypothesis 3).

The two final research goals concerned the interplay between personality vulnerability, need-based experiences and depressive symptoms, thereby both considering the possibility of mediation (research goal 4) and moderation (research goal 5). Specifically, in terms of mediation, we hypothesized that mainly daily need frustration would play a mediating role in the association between daily self-criticism, dependency and depressive symptoms (Hypothesis 4). In terms of moderation, we examined the possibility that higher daily levels of self-criticism and dependency could exacerbate the relation between need frustration (or lack of need satisfaction) and depressive symptoms (Hypothesis 5).

## **2 Method**

### **2.1 Participants and Procedure**

Participants were 121 adolescents from the Dutch-speaking part of Belgium (Flanders). The sample was 52% male and participants had a mean age of 15.81 years (ranging from 12 to 18 years,  $SD = 1.50$ ). All adolescents followed secondary education.

The participants were recruited as part of an undergraduate course in developmental psychology. In exchange for course credits, trained undergraduate students were asked to invite one adolescent between 12 and 18 years old (who was not a family member or close friend) to participate in this study. The training took the form of a 1-hour information session in which the first author explained how to approach potentially interested participants and how to collect the data. The students visited the participants at home and described the study requirements, including instructions to complete the booklet with daily paper-and-pencil questionnaires. They also mentioned that there were no right or wrong answers and that participants could leave an item unanswered if they were not sure. The booklet itself also included a clear set of instructions. During the home visit, participants completed the baseline assessment. Participants were instructed to fill out the diaries every evening for 7 consecutive days, starting on a Monday. They could choose to get daily reminders in the form of an e-mail or text message. Participation in the study was voluntary and



confidential treatment of the data was guaranteed. Informed consent was obtained from all participants and their parents. The study was given ethical approval by the organizing university's institutional review board.

## **2.2 Measures**

### **2.2.1 Self-Criticism and Dependency**

Participants filled out 12 items from the Depressive Experiences Questionnaire for adolescents (DEQ-A; Blatt, Schaffer, Bers, & Quinlan, 1992). Because the original 66-item DEQ is too long for use in a diary study, we selected items from a short version of the DEQ, that is, the Reconstructed Depressive Experiences Questionnaire (RecDEQ; Bagby et al., 1994), which contains the psychometrically best performing items of the DEQ. From the 19 items in the RecDEQ we selected the items that were most suitable for a daily assessment. These items were adapted to assessment diary format by adding the stem 'Today' to all items. The questionnaire consisted of 6 items tapping into daily self-criticism (e.g., "Today, I tended to be very critical of myself") and 6 items tapping into dependency (e.g., "Today, I thought about the danger of losing someone who is close to me"). All items were rated on a scale ranging from 1 (*Totally disagree*) to 7 (*Totally agree*). Both the scales for self-criticism (average  $\alpha = .84$ ; range across days = .80 -.85) and dependency (average  $\alpha = .78$ ; range across days = .69 -.80) displayed adequate reliability.

### **2.2.2 Need Satisfaction and Need Frustration**

Participants were administered the Basic Psychological Need Satisfaction and Need Frustration Scale (BPNSFS; Chen et al., 2015) to tap into need-based experiences. We employed a shortened 12-item version that has already been used in previous diary studies (Brenning, Soenens, Mabbe, & Vansteenkiste, 2018; Van der Kaap-Deeder et al., 2017). Satisfaction and frustration of each of three needs was assessed with 2 items: autonomy satisfaction (e.g. "Today I felt a sense of choice and freedom in the things I undertook") and autonomy frustration (e.g. "Most of the things I did today felt like I had to"), relatedness satisfaction (e.g. "Today I felt connected with people who care for me, and for whom I care") and relatedness frustration (e.g.

“Today I felt excluded from the group I want to belong to”), and competence satisfaction (e.g. “Today I felt capable at what I did”) and competence frustration (e.g. “Today I felt insecure about my abilities”). Items were rated on a 5-point rating scale ranging from 1 (*completely not true*) to 5 (*completely true*). The six items tapping into need satisfaction and the six items tapping into need frustration were averaged into two separate scores. Cronbach’s alpha for the composite scores of need satisfaction and need frustration was on average .76 (range across days = .67-.79) and .74 (range across days = .71-.81), respectively.

### **2.2.3 Depressive Symptoms**

Participants were administered an adapted version of the Center for Epidemiologic Studies – Depression Scale (CES-D; Radloff, 1977). A 6-item version was used in which items were adapted to the diary format (e.g., “Today I felt that everything I did was an effort”; Brenning et al., 2018). All items were rated on a scale from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). The scale had good reliability (average  $\alpha = .80$ ; range across days = .78-.82).

## **2.3 Plan of analysis**

As the data involved daily assessment during seven consecutive days (i.e., Level 1), nested within 121 adolescents (i.e., Level 2), a multilevel data-analytical approach is warranted. Mplus 7 (Muthén & Muthén, 2015) was used to test examine associations between the study variables at the within-person (daily) level, thereby controlling for interindividual differences at the between-person level. The total dataset contained 4.01% missing values. A non-significant Little’s MCAR test ( $\chi^2(380) = 391.23, p > .05$ ) suggested that the data were missing at random. Therefore, we used full information maximum likelihood (FIML) to estimate the missing values (Little & Rubin, 2002).

First, we examined day-to-day variation in all study variables (Hypothesis 1) by estimating intercepts-only models. These models yield intraclass correlations (ICC) indicating the variance at the between-person level. Next, we examined, at the level of within-person variance and controlling for between-person variance, daily associations between personality (i.e., self-criticism and dependency) and depressive symptoms (Hypothesis 2), followed by an investigation of daily associations between

need-based experiences (i.e. need satisfaction and need frustration) and depressive symptoms (Hypothesis 3). When associations at this level of within-person variance reach significance, they indicate that a daily elevation in one variable (relative to individuals' average score across days) goes hand in hand with a daily elevation in another variable.

Further, we estimated a Structural Equation Model (SEM) in which composite scores for need satisfaction and need frustration were included as mediators in the daily associations between personality and depressive symptoms (Hypothesis 4). Again, variance at the between-person level in all variables was controlled for, resulting in a mediation model tested at the level of within-person (daily) variation. To evaluate the fit of these hypothesized mediation models, we relied on the Chi-square statistic ( $\chi^2$ ), the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Standardized Root-Mean-square Residual (SRMR). An acceptable fit was indicated by CFI values of .90 or above, and RMSEA and SRMR values around .80 or below (Kline, 2005). Finally, we investigated the moderating role of personality in the relation between need-based experiences and depressive symptoms at the level of within-person (daily) variation (Hypothesis 5). Four separate moderation models were tested, with each model consisting of one dimension of personality (self-criticism or dependency) and one dimension of need-based experiences (need satisfaction or need frustration) and the corresponding interaction term.

### **3 Results**

#### **3.1 Preliminary Analyses**

##### **3.1.1 Descriptive statistics and correlations**

An overview of the descriptive statistics and within-person (i.e., day-to-day) correlations between all study variables is shown in Table 4-1. Both daily dependency and daily self-criticism were positively correlated with daily need frustration and daily depressive symptoms, while being negatively correlated with daily need satisfaction. While daily need frustration was related positively to depressive symptoms, daily need satisfaction was related negatively.

**Table 4-1.** Means, Standard Deviations, Intra-Class Correlations, and Within-Person Correlations (i.e., day-to-day) Between Personality, the Composite Score of Need Satisfaction and Need Frustration and Depressive Symptoms.

	1.	2.	3.	4.	5.
1. Dependency	1	.30**	-.31**	.39**	.38**
2. Self-criticism		1	-.41**	.56**	.41**
3. Need satisfaction			1	-.52**	-.45**
4. Need frustration				1	.55**
5. Depressive symptoms					1
Mean ( <i>SD</i> )	-.14	-.07	3.53	1.94	3.53
SD	.91	.72	.68	.67	.50
ICC	.59	.61	.50	.39	.49

Note: \* =  $p < .05$ , \*\* =  $p < .01$ .

**3.1.2 Background variables**

In order to examine the relation between the background variables (i.e., gender and age) and the study variables, all daily measures were aggregated across the 7 days. We conducted a MANCOVA with gender as a fixed factor, age as a covariate and all study variables as dependent variables. Neither gender ( $F [5, 90] = 2.04, p > .05$ ) nor age ( $F [5, 90] = 1.41, p > .05$ ) demonstrated a significant multivariate effect.

**3.2 Primary Analyses**

**Hypothesis 1: Day-to-day variability in the study variables.**

The intra-class correlations (ICC) represent the percentage of variance at the between-person level. The ICC values show that respectively 59% and 61% of the variance in dependency and self-criticism is situated at the level of between-person differences. Accordingly, 41% and 39% of the variance in dependency and self-

criticism is situated at the level of within-person differences. While a part of these within-person differences represents daily variation, it should be noted that this part of the variance also contains measurement error. Still, these findings indicate that there is substantial within-person variability in dependency and self-criticism. For need satisfaction and need frustration, 50% and 39% respectively, of the variance reflected between-person differences. Finally, for depressive symptoms, 49% of the variance was situated at the level of between-person differences. Overall, these results suggest that there is significant variance at the within-person level (i.e., fluctuations from day-to-day across 7 days) in all assessed constructs, which justifies the use of a multilevel analytical approach.

**Hypothesis 2: Associations between daily self-criticism, dependency and depressive symptoms.**

To examine within-person associations between personality and depressive symptoms, two separate models were tested, one for self-criticism and one for dependency. Both self-criticism ( $b = .24$ ,  $SE = .03$ ,  $p < .001$ ) and dependency ( $b = .25$ ,  $SE = .04$ ,  $p < .001$ ) were positively related to depressive symptoms. When entered simultaneously (thereby controlling for their shared variance), both personality dimensions displayed unique associations with depressive symptoms ( $b = .19$ ,  $SE = .03$ ,  $p < .001$  for self-criticism and  $b = .18$ ,  $SE = .04$ ,  $p < .001$  for dependency).

**Hypothesis 3: Associations between daily need-based experiences and depressive symptoms.**

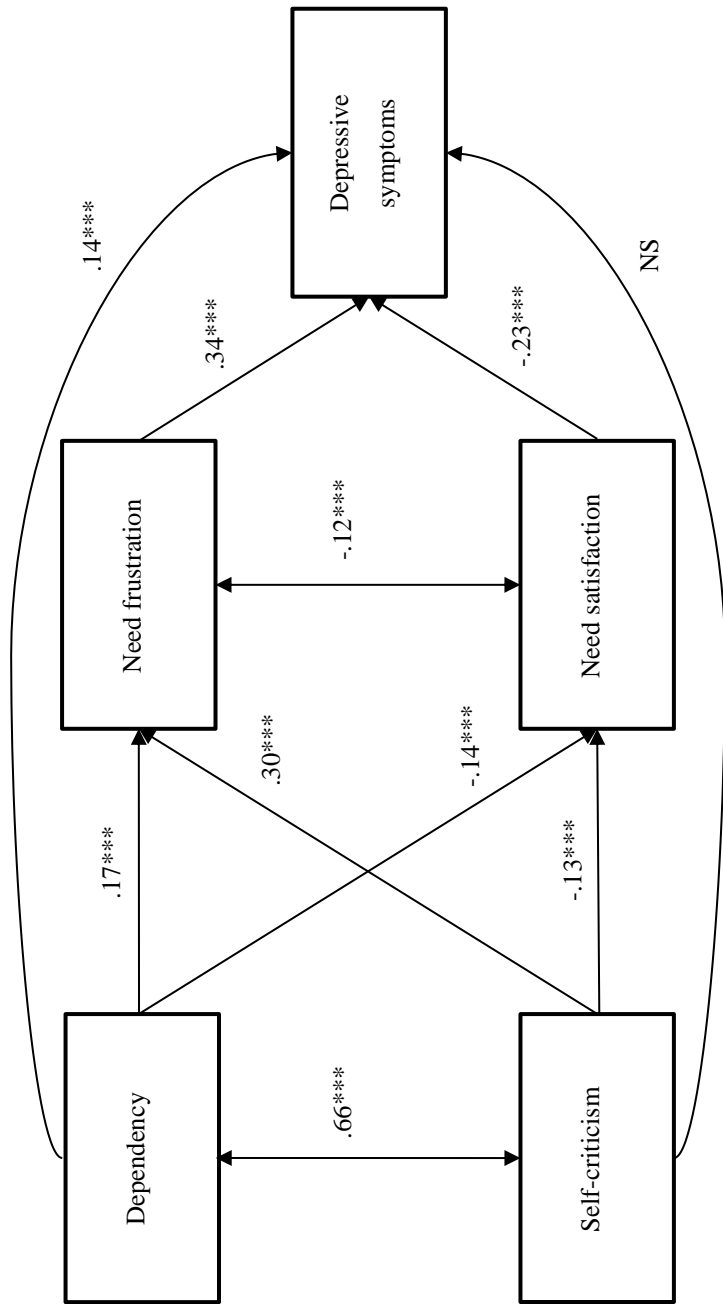
When analyzed separately, both daily need frustration ( $b = .45$ ,  $SE = .05$ ,  $p < .001$ ) and daily need satisfaction ( $b = -.40$ ,  $SE = .05$ ,  $p < .001$ ) were associated with depressive symptoms, yet, in opposite ways. When entered simultaneously (thereby controlling for the variance shared between need satisfaction and need frustration), both need satisfaction ( $b = -.20$ ,  $SE = .05$ ,  $p < .001$ ) and need frustration ( $b = .36$ ,  $SE = .05$ ,  $p < .001$ ) showed a unique association with depressive symptoms. These findings suggest that adolescents report more depressive symptoms on days when they experience less need satisfaction and more need frustration.

#### **Hypothesis 4: The mediating role of need-based experiences.**

To examine whether daily need frustration and need satisfaction mediated the within-person associations between personality and depressive symptoms, we tested a SEM model. This model included paths from dependency and self-criticism to need satisfaction and frustration, which, in turn, were allowed to predict depressive symptoms (see Figure 4-1). Correlations were allowed among the two predictor variables (i.e., self-criticism and dependency) and among the two mediators (i.e. need satisfaction and need frustration). The model fit was as follows: CFI = .96,  $\chi^2(2) = 36.45$ , RMSEA = .15 and SRMR = .05. In a next step, we added (one by one) the direct paths from self-criticism and dependency to depressive symptoms. In the case of dependency, the model fit was improved,  $\chi^2 \Delta (1) = 34.46$ ,  $p < .001$ . In contrast, adding a direct path from self-criticism to depressive symptoms did not improve model fit and this additional path was not significant. Therefore, the latter path was not retained in the final, best-fitting model. The fit of this final model was: CFI = 1.00,  $\chi^2(1) = 1.99$ , RMSEA = .04 and SRMR = .01. In the final model, both daily dependency and daily self-criticism were related positively to daily need frustration ( $b = .17$ ,  $SE = .03$ ,  $p < .001$  and  $b = .30$ ,  $SE = .02$ ,  $p < .001$  respectively) and negatively to daily need satisfaction ( $b = -.13$ ,  $SE = .04$ ,  $p < .001$  and  $b = -.14$ ,  $SE = .03$ ,  $p < .001$ , respectively). Need frustration ( $b = .34$ ,  $SE = .05$ ,  $p < .001$ ) and need satisfaction ( $b = -.23$ ,  $SE = .05$ ,  $p < .001$ ) were, in turn, uniquely associated with depressive symptoms. The indirect effects of dependency on depressive symptoms through need frustration ( $b = .06$ ,  $SE = .01$ ,  $p < .001$ ) and need satisfaction ( $b = .03$ ,  $SE = .01$ ,  $p < .001$ ) were significant. Similarly, for self-criticism, the indirect effects through need frustration ( $b = .10$ ,  $SE = .02$ ,  $p < .001$ ) and need satisfaction ( $b = .03$ ,  $SE = .01$ ,  $p < .001$ ) were significant. Notably, daily dependency continued to show a direct relation with daily depressive symptoms not accounted for by daily need-based experiences ( $b = .14$ ,  $SE = .02$ ,  $p < .001$ ), suggesting partial mediation. In contrast, need-based experiences fully mediated the relation between daily self-criticism and daily depressive symptoms.

**Hypothesis 5: Self-criticism and dependency as moderators.**

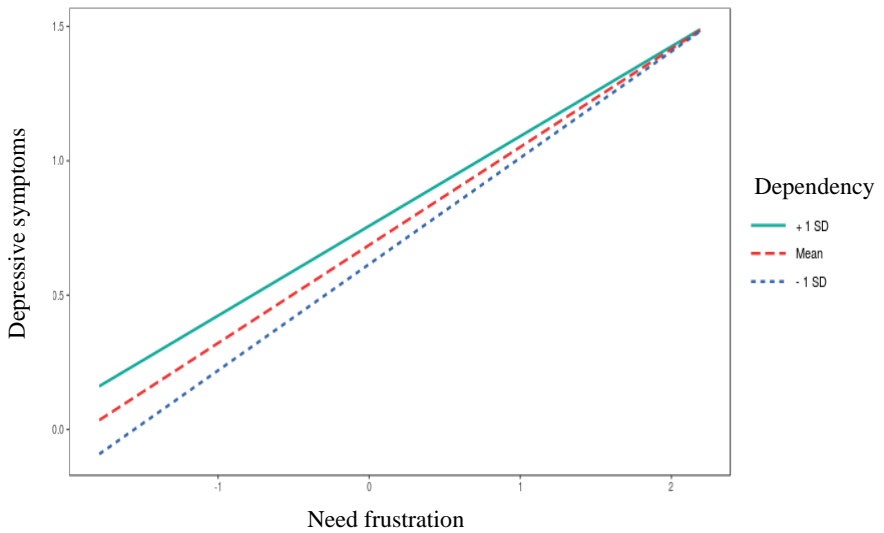
To examine whether the within-person (i.e., day-to-day) associations between need-based experiences and depressive symptoms depend on daily levels of self-criticism and dependency, interactions were tested. Two interactions (out of 4 possible interactions tested) were significant, that is, an interaction between need frustration and dependency ( $b = .01$ ,  $SE = .00$ ,  $p < .01$ ) and an interaction between need satisfaction and self-criticism ( $b = .49$ ,  $SE = .05$ ,  $p < .01$ ) in the prediction of depressive symptoms. Inspection of the interaction with dependency (see Figure 4-2) showed that adolescents were least likely to experience depressive symptoms on days where they were low in dependency and need frustration. In other words, the absence of these two risk factors was associated with the lowest probability of experiencing depressive symptoms. The interaction with self-criticism revealed a synergistic effect (see Figure 4-3) where the association between low need satisfaction and depressive symptoms was stronger on days when adolescents reported elevated self-criticism.



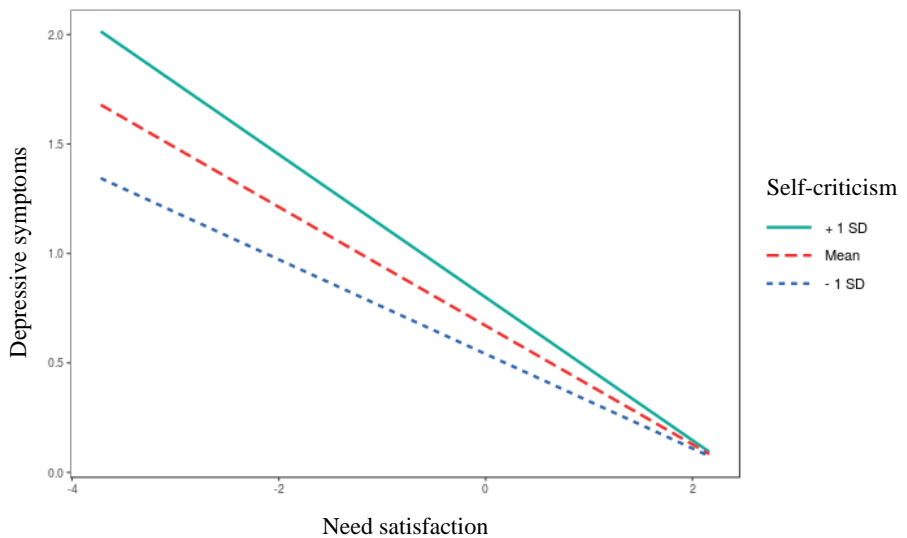
**Figure 4-1.** The Mediating Role of Need-Based Experiences in the Relation Between Dependency, Self-Criticism and Depressive symptoms.

Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , NS = not significant.





**Figure 4-2.** *The Moderating Role of Dependency in the Relation Between Need Frustration and Depressive Symptoms.*



**Figure 4-3.** *The Moderating Role of Self-Criticism in the Relation Between Need Satisfaction and Depressive Symptoms.*

## **4 Discussion**

The present study aimed to provide a dynamic picture of the associations between self-criticism, dependency, and depressive symptoms on a daily basis. Although self-criticism and dependency are often depicted as relatively stable personality characteristics that differ mainly between individuals, research increasingly shows that self-criticism and dependency also fluctuate within individuals on a daily basis (Zuroff et al., 2016). Thus, these personality dimensions would have both have trait-like and state-like features that dynamically interact with daily events (Zuroff, Mongrain, & Santor, 2004). This study aimed to build on previous work by examining the interplay between daily, within-person variation in personality and daily variation in need-based experiences in relation to adolescents' depressive symptoms. In doing so, a mediation model (in which need-based experiences explain associations between personality and depressive symptoms) and a moderation model (in which personality alters the associations between the need-based experiences and depressive symptoms) were tested.

### **4.1 Daily Fluctuations in Self-criticism, Dependency and Depressive symptoms**

A first research question was whether the study variables fluctuate substantially on a day-to-day basis. The results indicated that there is indeed considerable day-to-day variation in all study variables. Even though adolescence is a developmental stage characterized by more pronounced oscillation in emotions from day to day (Maciejewski et al., 2015), research on daily fluctuations in self-criticism and dependency in adolescent samples is very scarce. The findings are consistent with a small body of research indicating that self-criticism fluctuates from day to day in youngsters (e.g., Boone, Soenens, Mouratidis, et al., 2012) and university students (e.g., Zuroff et al., 2016). Yet, this study is among the first to demonstrate daily variation in dependency (Stader and Hokanson, 1998).

The finding that self-criticism and dependency fluctuate within individuals from day to day is in line with previous work underscoring the distinction and complex interaction between trait-like and state-like features of personality (Fleeson, 2001).

Compared to the personality dimensions, the psychological needs experiences and depressive symptoms were characterized by relatively more within-person variability. These findings are consistent with Luyten and Blatt's (2016) proposal of a hierarchy between Blatt's dimensions of dependency and self-criticism – which reflect broad personality features – and motivational experiences (such as the psychological needs) that follow from these personality dimensions and that are relatively more variable and susceptible to change. Previous diary studies similarly showed that psychological needs experiences are highly dynamic and vary substantially on a short-term (even daily) basis (e.g., Ryan et al., 2010; Verstuyf et al., 2013).

#### **4.2 Associations Between the Personality Dimensions, the Needs, and Depressive Symptoms at the Daily Level**

As expected, day-to-day fluctuations in self-criticism and dependency were significantly associated with day-to-day fluctuations in depressive symptoms. This finding implies that adolescents experience, on average, more depressive symptoms on days when they adopt a more critical attitude towards themselves (i.e., high daily self-criticism) or on days when they fear losing the love of significant others (i.e., high daily dependency). These findings are consistent with a limited number of studies providing evidence for daily associations between self-criticism and depressive symptoms (Zuroff et al., 2016) and between dependency and depressive symptoms (Stader & Hokanson, 1998).

Next, results further revealed that daily need satisfaction and need frustration relate to day-to-day fluctuations in depressive symptoms. This finding is also consistent with previous work demonstrating that need-based experiences have important repercussions for individuals' daily well-being and ill-being (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Ryan et al., 2010; Van der Kaap-Deeder et al., 2017). The present study, however, is among the first to demonstrate the role of daily variation in needs-based experiences in adolescents' depressive symptoms. Contrary to previous (mainly cross-sectional and longitudinal) work that only found evidence for a unique link between need frustration and depressive symptoms (e.g., Bartholomew et al., 2011; Chen et al., 2015; Vandenkerckhove, Boncquet et al., 2019), both daily need frustration and daily need satisfaction demonstrated unique

associations with adolescents' depressive symptoms in the present study. These findings suggest that, especially at the level of daily fluctuations, also low need satisfaction renders adolescents vulnerable to experience depressive symptoms. However, future studies should replicate and extend these findings by simultaneously testing adaptive outcomes (i.e., indicators of well-being) and depressive symptoms on a daily basis, thereby controlling also for shared variance between well-being and depressive symptoms.

Given that our findings were generally in line with Luyten and Blatt 's (2016) assumption of a hierarchy between Blatt's personality dimensions and the psychological needs (in terms of differential stability) and given that both the personality dimensions and the psychological needs experiences were related to depressive symptoms at the daily level, we proceeded by examining the interplay between personality and the need-based experiences in adolescents' depressive symptoms.

#### **4.3 Deeper Insights in the Interplay between Personality Vulnerability, Need-based Experiences and Depressive Symptoms**

The interplay between daily personality vulnerability, need-based experiences and depressive symptoms was examined in two ways. First, we investigated whether need satisfaction and need frustration would mediate the personality-depressive symptoms association at the within-person level (i.e. from day-to-day). Self-criticism and dependency were both associated positively with need frustration and negatively with need satisfaction on a daily basis. Similar associations between the personality dimensions and need frustration were reported in previous cross-sectional (Vandenkerckhove, Brenning et al., 2019) and longitudinal (Vandenkerckhove, Boncquet, et al., 2019) research among adolescents (Vandenkerckhove, Boncquet et al., 2019). However, the negative association between daily dependency and need satisfaction is rather new, as dependency was not related to need satisfaction in these previous studies. Using longitudinal assessments with 6-month intervals, Vandenkerckhove, Boncquet et al. (2019) even found positive associations between dependency and satisfaction of the need for relatedness in particular. Presumably, on days during which one's vulnerability for dependency is

awakened, one may be looking for immediate and clear signs of care and love from others, which leads one to make use of more maladaptive relational strategies (e.g., passive-aggressive communication, a claiming interpersonal style) that interfere with need satisfaction that day. Yet, in the long term, dependent individuals may possibly take more distance from their immediate responses, which allows them to more authentically rely on others for support. Indeed, it has been argued that dependency is a mixed blessing that entails both negative and positive features (Casalin, Luyten, Besser, Wouters, & Vliegen, 2014), which may manifest differently across time. Although this reasoning is speculative at this moment, our data indeed seem to suggest that the negative features of dependency manifest more strongly on a short-term (daily) basis and that the positive features may manifest only across a longer period of time. Research including explicit assessments of these positive (e.g., social support seeking) and negative (e.g., passive aggression) features and including both short and longer time frames is needed to test these speculations.

The present study found systematic evidence for the mediating role of daily need-based experiences in personality vulnerability to depressive symptoms. The finding that ups and downs in dependency and self-criticism were associated with ups and downs in depressive symptoms can be explained by the parallel daily variation in need frustration and need satisfaction on a daily basis. Although the present study is among the first to test this mediation model dynamically on a day-to-day basis, the results are in line with previous cross-sectional (Vandekerckhove, Brenning et al., 2019) and longitudinal (Vandekerckhove, Boncquet et al., 2019) work that is indicative of the mediating role of need-based experiences in the association between self-criticism, dependency and internalizing problems. Notably, these previous studies only found evidence for the mediating role of need frustration (and not need satisfaction). Yet, in the present study both daily need satisfaction and daily need frustration help to explain the association between personality and depressive symptoms. The findings also provide further evidence for the hierarchical relation between personality and the needs, as proposed by Luyten and Blatt (2016).

Second, we tested a moderation model in which personality alters the effects of need satisfaction and need frustration on depressive symptoms on a daily basis. Two of the four tested moderation models were significant, namely the interaction

between dependency and need frustration and the interaction between self-criticism and need satisfaction. The findings indicated that high self-criticism exacerbates associations between low need satisfaction and depressive symptoms on a daily basis. This interaction is largely consistent with a diathesis-stress model (Zuckerman, 1999) indicating that individuals high on personality vulnerability (i.e., high self-criticism) are more sensitive to adverse experiences (in this case low need satisfaction). On the basis of this model, one could have anticipated a similar interaction between self-criticism and high need frustration. It is unclear at this moment why this is not the case.

The second interaction, between need frustration and dependency, indicated that adolescents are least likely to report depressive symptoms on days when they are low on dependency and encounter few need frustrating experiences. Although unanticipated, this interaction is plausible because it suggests that the absence of two risk factors simultaneously decreases the probability of experiencing depressive symptoms in the day. Looking at the high end of depressive symptoms in this interaction, these results are also in line with a social push model (Shanahan & Hofer, 2005), according to which the difference between high and low personality vulnerability (i.e., dependency) manifests at low levels of stress (i.e., low need frustration) but not at high levels of stress (i.e., high need frustration). On days when need frustration is very high, differences in dependent personality matter less, possibly because the powerful (and detrimental) impact of need frustrating experiences overrides effects of personality on such days.

Whereas previous longitudinal research could not find evidence for interactions between Blatt's personality dimension and SDT's need-based experiences (Vandenkerckhove, Boncquet, et al., 2019; Vandenkerckhove, Soenens, et al., 2019), the present study found some indication for interactions at the level of daily fluctuations. Possibly, the interactions play a more important role on the level of fast daily changes, rather than predicting changes in depressive symptoms across a longer time interval. However, the evidence for moderation is still limited and less pronounced than the empirical support for the mediation sequence. Because it is unclear why self-criticism did not interact with need frustration and because the shape of the interaction with dependency was unanticipated, these results require replication.

If future research confirms these interactions, the findings would suggest that both proactive and reactive processes are involved in explaining personality vulnerability to depressive symptoms (Priel & Besser, 2000). Proactive processes mean that self-critical and dependent adolescents actively generate negative experiences that might contribute to more need frustration and depression, for example by perceiving the environment in a biased fashion or by selecting environments that create greater risk for need frustration. At the same time, reactive processes can also play a role. Highly dependent and self-critical adolescents may not only actively contribute to their own need frustration or satisfaction, but they may at the same time be more sensitive to need-based experiences on a daily basis. The finding that self-criticism exacerbates the association between low need satisfaction and depressive symptoms at the daily level is consistent with such a reactive mechanism. As such, personality, and self-criticism in particular, may contribute to risk for psychopathology through a complex combination of both pro-active and reactive processes.

#### **4.4 Limitations and Future Directions**

There are several limitations to this study. First, we were unable to address causality or direction of effects. The multilevel analyses revealed day-to-day associations between the study variables yet did not test the temporal ordering of the variables. Consequently, it remains unclear whether daily levels of self-criticism and dependency affect daily levels of depressive symptoms, or the other way around. Longitudinal studies investigating reciprocal effects over time could provide more insight in the longitudinal change involved in personality and depressive symptoms. Also experimental research is needed to establish causal pathways between the two personality dimensions and depressive symptoms. Next, all measures relied on adolescent self-report and, therefore, results can be biased due to shared method variance. Certainly for the assessment of depressive symptoms, it would be useful to obtain both self-report and parent report in future studies (Klein, Dougherty, & Olino, 2005). Next, the use of a non-clinical sample makes it difficult to generalize the findings to adolescents with clinical scores on depressive symptoms. Therefore, the present findings should be replicated in clinical samples.

Further, the present study included only one intervening variable (i.e., need-based experiences). Future research could examine the role of other potential moderating or mediating variables. For example, emotion regulation might also function as a mediator in the associations between personality and depressive symptoms. One could expect that self-critical individuals would use more deactivating emotion regulation strategies, while dependent individuals would use more hyperactivating strategies (Blatt, 2008). Deactivation and hyperactivation are both associated with a heightened risk to depressive symptoms (Brenning, Soenens, Braet, & Bosmans, 2012) and thus could play a role in explaining personality vulnerability to depressive symptoms. Objective stressors or life events (e.g., failure on a test, a conflict with a friend) could also interact with personality in the prediction of depressive symptoms in adolescents. In accordance with diathesis-stress models (Zuckerman, 1999), dependent individuals would be particularly sensitive to the negative consequences of social stressors, whereas self-critical individuals would be more sensitive to both achievement-related and social stressors (Shahar & Priel, 2003). Future studies should examine the interplay between personality and both objective stressors and subjective inner experiences (e.g. need satisfaction and frustration). Moreover, only one outcome variable was examined in the present study, namely depressive symptoms. Future work could examine the role of personality and the basic needs in the development of internalizing problems more generally and even in the development externalizing problems, two types of psychopathology with increasing prevalence during adolescence (Fergusson, Horwood, Ridder, & Beautrais, 2005; Zahn-Waxler, Klimes-Dougan, & Slaterry, 2000).

The present study was among the first to reveal day-to-day fluctuations in self-criticism and dependency in adolescents. Future diary studies could build on this work by examining the interplay between trait and state levels in self-criticism and dependency in greater detail (Fleeson, 2001). For example, future research could explore under which circumstances general trait levels of the two personality dimensions manifest in state levels of self-criticism and dependency in particular situations. As the environment directly affects state level manifestations (Boone, Soenens, Mouratidis, et al., 2012), contextual factors could play an important role in this association (Jackson & Hill, 2019). Future research could also examine



interactions between state- and trait-levels of personality, with individuals scoring high on both trait- and state-levels of personality possibly experiencing the highest levels of need frustration. Finally, it could be interesting for future research to explore whether experiences of need frustration can activate individuals' personality vulnerability. We would expect that latent trait-levels of self-criticism and dependency could be activated (and thus manifested in increases in daily state-levels of self-criticism and dependency) on days when adolescents' basic needs are frustrated. These personality vulnerabilities may get awakened to compensate for the experienced need frustration and may, paradoxically, further increase need frustration (Vansteenkiste & Ryan, 2013).

#### **4.5 Conclusion**

This study showed that both dependency and self-criticism fluctuate from day to day in adolescents. Moreover, these daily fluctuations in the two personality dimensions go hand in hand with daily fluctuations in depressive symptoms. On days that adolescents engage more in harsh self-scrutiny and are more worried about interpersonal abandonment, they also report more depressive symptoms. Findings indicated that daily need-based experiences (i.e., satisfaction and frustration of the needs for autonomy, relatedness and competence) play an explanatory role in this daily association between self-criticism, dependency and depressive symptoms. We mainly obtained evidence for the notion that daily personality vulnerability contributes to more need frustration and less need satisfaction, with these need-based experiences in turn relating to elevated depressive symptoms in the day. At the same time, there was some evidence that personality affects adolescents' sensitivity to needs-based experiences, although these findings warrant replication. Overall, these findings point towards a complex, dynamic, and perhaps self-sustaining interplay between Blatt's personality dimensions, the basic psychological needs and depressive symptoms.

## 5 References

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## **Appendix**

We also explored the correlations between each of the three specific needs and the study variables. As presented in Table 4-2, the three separate needs all showed a similar correlation pattern with the other study variables (personality and depressive symptoms). Indeed, satisfaction of the three specific needs for autonomy, relatedness and competence was negatively correlated with dependency, self-criticism and depressive symptoms. Frustration of the three specific needs was positively correlated with dependency, self-criticism and depressive symptoms. Notably, the most pronounced correlations were the correlation between dependency and relatedness frustration and between self-criticism and competence frustration. We did not report these associations in the main analyses because satisfaction or frustration of the separate needs was measured with only 2 items, resulting in lower reliability.

**Table 4-2.** *Correlations Between Personality, the Three Separate Needs and Depression at the Within-Person Level (above the diagonal).*

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Dependency	1	.30**	-.16**	-.28**	-.25**	.22**	.43**	.25**	.38**
2. Self-criticism		1	-.28**	-.26**	-.40**	.34**	.23**	.61**	.41**
3. Autonomy satisfaction			1	.17**	.35**	-.40**	-.12**	.32**	-.35**
4. Relatedness satisfaction				1	.32**	-.25**	-.47**	-.25**	-.38**
5. Competence satisfaction					1	-.25**	-.22**	-.44**	-.38**
6. Autonomy frustration						1	.25**	.34**	.33**
7. Relatedness frustration							1	.28**	.46**
8. Competence frustration								1	.40**
9. Depressive symptoms									1
Mean	-.14	-.07	23.74	15.14	27.35	12.88	23.05	15.87	3.53
SD	.91	.72	3.91	4.49	4.08	3.65	4.20	4.39	0.50

Note: \*  $p < .05$ , \*\*  $p < .01$ .



## CHAPTER 5

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### **The Role of Weekly Need-Based Experiences and Self-Criticism in Predicting Weekly Academic (Mal)Adjustment<sup>4</sup>**

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<sup>4</sup> Vandenkerckhove, B., Soenens, B., Van der Kaap-Deeder, J., Brenning, K., Luyten, P., & Vansteenkiste, M. (2019). The role of weekly need-based experiences and self-criticism in predicting weekly academic (mal)adjustment. *Learning and Individual Differences*, 69, 69-83. <https://doi.org/10.1016/j.lindif.2018.11.009>

Table of contents

**1 Introduction..... 172**

1.1 Basic Psychological Needs and Academic Adjustment ..... 173

1.2 Self-criticism, Need-Based Experiences, and Academic Adjustment..... 175

1.3 The Present Study ..... 178

**2 Method ..... 180**

2.1 Participants and Procedure ..... 180

2.2 Measures ..... 181

2.3 Plan of Analyses ..... 184

**3 Results ..... 185**

3.1 Preliminary Analyses ..... 185

3.2 Primary Analyses ..... 188

**4 Discussion..... 194**

4.1 Associations Between Need Satisfaction, Need Frustration and Academic Adjustment..... 195

4.2 The Role of Self-Criticism in the Relation Between the Needs and Academic Adjustment..... 197

4.3 Limitations and Suggestions for Future Research..... 199

4.4 Conclusion and Implications..... 201

**5 References..... 203**

**Appendix ..... 215**

The present study aims to examine the role of both adolescents' weekly experiences of psychological need satisfaction and frustration and adolescents' self-criticism in their weekly variation in academic adjustment. A sample of 82 adolescents (mean age = 12.45 years; 42% female) provided weekly assessments of the psychological needs and academic adjustment during three consecutive weeks. Multilevel analyses indicated that weekly variation in need satisfaction related positively to weekly variation in positive affect, engagement, and autonomous motivation, while weekly variation in need frustration related positively to weekly variation in negative affect, disaffection, and controlled motivation. Self-criticism was negatively related to positive affect and autonomous motivation and positively to disaffection and controlled motivation. Further, need-based experiences played a mediating role in the relation between self-criticism and academic (mal)adjustment at the level of between-person differences. Moderation analyses did not reveal any evidence for self-criticism as a potentially amplifying factor in the relation between need-based experiences and academic (mal)adjustment. These findings point to the importance of need-based experiences in explaining the impact of self-criticism on academic (mal)adjustment.

## 1 Introduction

Secondary school students differ substantially in their enthusiasm to participate in school activities and to prepare their classes. Some of them are eager to learn new skills and engage in assigned tasks with interest and even passion, while others count the minutes until the bell rings. They put minimal effort in the classroom activities and they primarily prepare their classes because they feel compelled to do so (Brooks & Magnusson, 2006). For such students with controlled motivation, school is a daunting duty rather than a place where they can actualize their full potential. Although substantial between-student differences exist in motivation and academic adjustment more generally, students also show considerable variation within their own motivation and adjustment across time. In some periods, students may feel more stressed or they may show more interest in the learning material than in other periods (Campbell, Soenens, Beyers, & Vansteenkiste, 2018).

Such short-term variations in academic adjustment may especially be observed in early adolescence, a life period marked by substantial biological and social changes, resulting in more volatile experiences (Steinberg & Morris, 2001). Consistent with the notion that early adolescents' adjustment to school is constantly in flux, studies have begun to document short-term (i.e., weekly or even daily) variability in important indicators and correlates of academic adjustment such as engagement (Bakker, Vergel, & Kuntze, 2015), motivation (Patall, Vasquez, Steingut, Trimble, & Pituch, 2016), and academic emotions (Ketonen, Dietrich, Moeller, Salmela-Aro, & Lonka, 2018). Given this substantial short-term variability in students' motivation and academic adjustment, it is important to identify its sources. To explain the within-person variation in motivation and academic adjustment, in this study we rely on Self-Determination Theory (SDT; Ryan & Deci, 2017) and, more specifically, on the concept of basic psychological needs.

Because dynamics at the level of short-term within-person variation can also be affected by differences between individuals (Fleeson, 2001), our second aim was to address the role of self-criticism as a predictor of students' psychological need-based experiences, and academic adjustment (Blatt, 1995). Self-criticism is a personality dimension characterized by the setting of excessively high standards in combination with harsh self-scrutiny (Blatt, D'Affliti, & Quinlan, 1992). Self-



criticism is a robust predictor of emotional maladjustment, including symptoms of depression, anxiety and disordered eating (Bieling, Israeli, Smith, & Antony, 2003; Dunkley, Blankstein, Zuroff, Lecce, & Hui, 2006; Stoeber & Otto, 2006). In the present study, we aimed to examine whether students high on this personality dimension would display more difficulties in academic adjustment (Shahar, Kanitzki, Shulman, & Blatt, 2006), a relation that may be accounted for by diminished weekly experiences of need satisfaction and elevated experiences of frustration of the psychological needs.

### 1.1 Basic Psychological Needs and Academic Adjustment

According to Basic Psychological Need Theory (BPNT; Ryan & Deci, 2017; Vansteenkiste, Niemiec, & Soenens, 2010), one of Self-Determination Theory's six mini-theories, every person has three basic psychological needs. Given their inherent character, these needs are said to carry universal importance for individuals' motivation and psychosocial adjustment (Ryan & Deci, 2017). First, *the need for autonomy* refers to the experience of volition and psychological freedom when engaging in an activity. If students, for example, perceive their school subjects as fitting with their interests, or their teachers do an effort to understand their perspective, or students experience a sense of choice when working on tasks, they are more likely to experience a sense of autonomy. Next, *the need for relatedness* refers to feeling connected with others and having a sense of belonging (Baumeister & Leary, 1995). Students' need for relatedness will be more fulfilled when they develop warm and supportive relationships with their classmates and teachers. Last, *the need for competence* involves the experience of effectiveness and mastery in dealing with challenging situations. Students who feel capable of succeeding in their learning goals will derive a sense of competence from doing so.

Abundant research has shown need satisfaction to relate positively to well-being in different developmental phases, including adolescence (Veronneau, Koestner, & Abela, 2005; Van der Kaap-Deeder, Vansteenkiste, Soenens, & Mabbe, 2017). Although adolescents experience different degrees of need satisfaction in various life domains, including school, home, and peer relations, especially school-related need satisfaction appeared predictive of adolescents' teacher-rated adjustment

(Ahmad, Vansteenkiste, & Soenens, 2013) and drop-out intentions (Milyavskaya et al., 2009). Studies that exclusively focus on the educational domain found need satisfaction to predict autonomous or volitional motivation (Reeve & Sickenius, 1994; Standage, Gillison, Ntoumanis, & Treasure, 2012), behavioral effort for class-related tasks (Taylor, Ntoumanis, Standage, & Spray, 2010), class-related positive affect (e.g. vitality; Mouratidis, Vansteenkiste, Sideridis, & Lens, 2011) and academic achievement (Jang, Reeve, Ryan, & Kim, 2009).

The basic psychological needs are thought to be highly dynamic in nature (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Although most research has focused on between-student differences in need satisfaction, a few studies began to consider short-term changes, with the studied time period extending from a specific class, over a single day, to a week. For instance, Mouratidis et al. (2011) found that within-class experiences of need support were related to more class-specific vitality. Van der Kaap-Deeder et al. (2017) found that daily fluctuations in perceived autonomy support related to fluctuations in need satisfaction in primary school children. Outside the educational domain, Campbell, Soenens, et al. (2018) and Verstuyf, Vansteenkiste, Soenens, Boone, and Mouratidis (2013) found evidence for within-person variations in need satisfaction in adolescents. Given the paucity of studies addressing short-term fluctuations in need satisfaction in relation to students' academic functioning, additional research is called for.

To capture the full spectrum of students' school-related experiences, research needs to attend also to students' experiences of need frustration, the so-called "dark side" of students' need-based experiences (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015). Autonomy frustration manifests through feelings of pressure and conflict; relatedness frustration entails feelings of loneliness and social alienation, and competence frustration involves a sense of failure and personal inadequacy (Vansteenkiste & Ryan, 2013). Importantly, within BPNT, the presence of need frustration is said to be distinct from the absence of need satisfaction. While experiences of low (i.e., deprived) need satisfaction arise in contexts that provide little support for the needs (e.g., teachers who provide little choice), experiences of need

frustration follow from a more direct thwarting of individuals' needs (e.g., teachers who engage in a punitive and harsh instructional style) (Ryan & Deci, 2017).

Because psychological need frustration represents a stronger and more direct threat to individuals' need-based functioning than need deprivation, it is hypothesized to be more strongly predictive of maladjustment, ill-being, and even psychopathology (Vansteenkiste & Ryan, 2013). Consistent with this notion, a rapidly growing body of research found need frustration to relate positively to diverse indicators of adolescent maladjustment, including eating pathology (Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014; Verstuyf et al., 2013), poor sleep quality (Campbell, Boone, Vansteenkiste, & Beyers, 2018), depressive symptoms (Campbell, Boone, Vansteenkiste, & Soenens, 2018), and externalizing problems (Van Petegem, Soenens, Vansteenkiste, & Beyers, 2015). Notably, in several studies among adolescent samples, need frustration yielded this unique relation to maladjustment over and above the contribution of need satisfaction (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). Need satisfaction, on the other hand, has been found to relate primarily to well-being and positive adjustment (Cordeiro, Paixão, Lens, Lacante, & Luyckx, 2016). A limited number of studies began to demonstrate similar findings in the educational domain. For instance, need frustration in high school students has been found to be predictive of poor motivation (Haerens et al., 2015) and more classroom disengagement (Jang, Kim, & Reeve, 2016). The few education-relevant studies exclusively focused on between-student differences, leaving the question unanswered whether need frustration plays a distinct and supplementary role (beyond need satisfaction) in the prediction of students' short-term variation in academic maladjustment.

## **1.2 Self-criticism, Need-Based Experiences, and Academic Adjustment**

While it is important to chart processes at the level of students' within-person functioning, these processes do not develop in isolation from characteristics at the level of between-student (i.e., interindividual) differences. Theory and research in the domain of personality psychology increasingly point out that traits (i.e., dispositional characteristics reflecting stable interindividual differences) can affect state processes (i.e., more fleeting and short-term changes) (Fleeson, 2001; Funder, 2006).

Specifically, trait characteristics (including self-criticism) can affect state dynamics (including weekly variation in, academic adjustment) by directly predicting state levels of experiences (with self-criticism for instance eliciting more need frustration and subsequent maladjustment) and/or by qualifying effects of state experiences on outcomes (with self-criticism possibly moderating associations between needs-based experiences and academic adjustment).

Herein, we focused on a trait personality dimension highly relevant to students' need-based experiences and academic outcomes, that is, self-criticism. Self-criticism is conceptualized as a personality characteristic involving very high standards, concerns about failure and harsh self-scrutiny (Blatt, 1995, 2004; Hamachek, 1978). In contradiction to personal standards perfectionism which involves the setting of high standards and goals per se, self-criticism is characterized by negative self-evaluation (Blatt, 2004). Self-critical individuals are often preoccupied with academic achievement but experience an inability to derive satisfaction from successful performance (Luyten, Blatt, Van Houdenhove, & Corveleyn, 2006). Because self-criticism predicts a wide range of psychological difficulties in adolescents, including negative affect (Harvey et al., 2015), eating problems (Boone et al., 2014), depressive symptoms (Hewitt et al., 2002), and anxiety (Essau, Leung, Conradt, Cheng, & Wong, 2008; O'Connor, Rasmussen, & Hawton, 2010), it has been suggested (Blatt & Luyten, 2009) and empirically demonstrated (Campbell, Boone et al., 2018) that self-criticism is a transdiagnostic vulnerability to maladjustment.

In the context of school, self-critical students have a tendency to set unrealistically high standards for performance and to engage in harsh, negative self-evaluations when encountering setbacks and failure (Vansteenkiste, Smeets, et al., 2010). The relation between self-criticism and affect, motivation, and engagement at school has been well-documented, although most of these studies employed a between-person design. For instance, self-criticism was found to relate to stress, depression and anxiety in secondary school (Einstein, Lovibond, & Gaston, 2000; Stoeber & Rambow, 2007) and to more negative mood both prior to and following examinations (Bieling, Israeli, Smith, & Antony, 2003; Brown et al., 1999). In terms of motivational outcomes, self-criticism is also related to less autonomous or

volitional and more controlled or pressured forms of academic motivation (Miquelon, Vallerand, Grouzet, & Cardinal, 2005; Shahar, Henrick, Blatt, Ryan, & Little, 2003; Stoeber, Damian, & Madigan, 2018), indicating that students high on self-criticism feel coerced to do well at school in general and to outperform their classmates in particular (Vansteenkiste, Smeets, et al., 2010). Although research on self-criticism and school engagement is scarcer, a cross-sectional study showed that it is negatively related to engagement in junior high school students (Shih, 2012). Yet, Damian, Stoeber, Negru-Subtirica and Băban (2017) could not confirm this relation in a longitudinal study, in which self-critical perfectionism appeared to be unrelated to school engagement over a 4- to 5- month period among high school students.

Although extant research convincingly demonstrates that self-criticism is a personality factor that confers vulnerability for poor motivational functioning and adjustment difficulties at school, few studies, if any, have examined the role of self-criticism in the prediction of state levels of student adjustment. Also, the study of the dynamic interplay between self-criticism and need-based experiences can be deepened by examining both the potential pro-active and reactive role of self-criticism in need-based experiences. In doing so, the present study considers both mediation and moderation models. Specifically, in terms of its pro-active role, a mediation model is proposed in which self-criticism may predict lower weekly need satisfaction and higher need frustration across time, with these experiences in turn relating to lower weekly adjustment and higher maladjustment. This prediction is consistent with the notion that self-critical individuals may actively generate negative experiences (Priel & Shahar, 2000) and has received initial confirmation in a handful studies (e.g., Boone et al., 2014). Specifically, as self-critical individuals set unrealistically high standards and push themselves into action, they are more likely to experience both failure (i.e., competence frustration) and pressure (i.e., autonomy frustration) in their goal pursuit. Also, the competitive attitude that often accompanies self-critical perfectionism (Habke & Flynn, 2002) may come with a more defensive interpersonal style (Dunkley et al., 2006) at the expense of building close and warm relationships with significant others. Although previous research has shown that need frustration mediates the relation between self-criticism and several types of psychopathology (Boone et al.,

2014; Campbell, Boone, et al., 2018), no research up to now explored the mediating role of the needs in the context of academic adjustment.

In terms of the potential reactive role of self-criticism, we sought to examine a moderation model in which self-criticism could affect students' susceptibility to the effects of need-based experiences. This hypothesis is informed by previous research showing that individuals scoring high on self-criticism display greater reactivity to stress (Dunkley, Zuroff, & Blankstein, 2003; Mandel, Dunkley, & Moroz, 2015) and the fact that need frustration relates to stress (Campbell et al., 2017; Campbell, Soenens et al., 2018). Self-critical individuals may suffer more from stressful events because they are less able to cope adequately with such events (Richardson & Rice, 2015). Similarly, self-criticism may both amplify students' vulnerability to the maladjustment cost associated with weekly need frustration and dampen the benefits one can reap from experienced need satisfaction. Consistent with this idea, Van der Kaap-Deeder et al. (2016) found self-critical individuals to dwell more over and cope less well with an experimentally induced thwarting of their need for competence, that is, the provision of negative feedback.

### **1.3 The Present Study**

The general aim of this study was to gain more insight in students' academic adjustment by looking at the role of both weekly variation in need-based experiences and between-student differences in self-criticism. To do so, after a baseline assessment tapping into between-student differences in self-criticism, we followed students during three consecutive weeks, asking them to report on their weekly need-based experiences as well as their weekly academic (mal)adjustment. Three main research questions guided the study, which led to the formulation of three hypotheses. First, we investigated whether week-to-week variability in need satisfaction and need frustration would relate to week-to-week variation in academic adjustment and academic maladjustment. Thereby, we expected that students' weekly need satisfaction would be mainly and positively associated with weekly adjustment, while weekly need frustration would be mainly and positively associated with weekly maladjustment (Hypothesis 1; Haerens et al., 2015; Vansteenkiste & Ryan, 2013). Second, we examined whether between-student differences in self-criticism would

relate to between-student differences in academic (mal)adjustment across the three weeks and whether these associations would be mediated by between-student differences in accumulated need-based experiences across the three-week period. Thereby, we hypothesized that highly self-critical students would experience more need frustration and less need satisfaction, which in turn would relate to more academic (mal)adjustment (Hypothesis 2; Boone et al., 2014; Campbell et al., 2018). Third, we tested the moderating role of self-criticism in the relation between both need satisfaction and need frustration on the one hand, and academic (mal)adjustment on the other hand. Based on stress-reactivity models (e.g., Hewitt & Flett, 1993), we expected that associations between need frustration and maladjustment would be amplified among adolescents high in self-criticism, while associations between weekly need satisfaction and weekly adjustment would be attenuated (Hypothesis 3).

Although previous research mostly focused on one particular aspect of academic adjustment, we adopted a broader view, including students' affect, motivation, and engagement. This choice is informed by the fact that these indicators represent three different domains of adjustment (i.e., the emotional, motivational, and behavioral domain, respectively) and, as such, provide a richer picture of students' adjustment. Further, theory and research have identified both the bright and dark sides of each of these concepts. Specifically, engagement (i.e., investment of effort into school-based tasks) can be contrasted with disaffection (i.e., passivity and giving up) (Skinner, Kindermann, & Furrer, 2009), autonomous motivation (i.e., self-endorsed and volitional reasons for activity engagement) can be contrasted with controlled motivation (i.e., pressuring reasons for school-based activities) (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009), and positive affect (i.e., emotions such as happiness, enthusiasm, and energy) can be contrasted with negative affect (i.e., experiences such as anxiety, stress, and depression) (Pekrun, Goetz, Titz, & Perry, 2002). Finally, research has shown that engagement (Fredricks, Blumenfeld, & Paris, 2004), quality of motivation (Murayama, Pekrun, Lichtenfeld, & vom Hofe, 2013), and quality of affect in the school context (Roeser, Eccles, & Sameroff, 1998) each display systematic and well-documented associations with achievement.

## 2 Method

### 2.1 Participants and Procedure

Participants were 82 early-adolescents (58% boys), aged 12-15 years old ( $M = 12.45$  years,  $SD = 0.57$ ). All participants were enrolled in an academic track and were in the 8<sup>th</sup> or 9<sup>th</sup> grade. They came from four classes ( $M_{\text{class size}} = 20.5$  students;  $SD_{\text{class size}} = 1.16$ ) in one secondary school in Flanders (Belgium). Teachers provided the students a letter with information about the study. All parents and students were asked to give their active informed consent for participation in the study. Response rate was high (98.7%), as only one parent out of 83 did not give informed consent for his or her child to participate. Each participant received two cinema vouchers in return for participation in this study. The assessment consisted of paper-and-pencil questionnaires, accompanied by a written explanation of the questionnaire, administered by the class teacher. The teacher made sure that all students were quiet and only looked at their own sheet. We asked teachers to inform us when questions arose during testing, but no questions were reported except very practical ones (e.g., How much time do we have left? What do we have to do after completing the questionnaires?). The data collection took place in February 2017. The study procedures were approved by the ethics committee of the researchers' university.

The study was conducted in the context of an evaluation of a new assessment policy in this school. Specifically, the school introduced unexpected tests during three weeks (while the use of unexpected tests was not common practice at this school before). Students reported on their need-based experiences before, during, and after this period of unexpected testing. During a three-week period, all students got unexpected tests for two main courses, namely mathematics and French or Latin. The number and type of tests was the same for all students. These particular courses were chosen because they were main courses that were taught at least four hours a week. The choice for French or Latin depended on students' major (classical languages versus modern languages). During all five assessments (one assessment before the period of unexpected, three assessments during the 3-week period of testing, and one assessment after the testing period), adolescents completed study questionnaires during a regular class hour on a Friday afternoon. For the purpose of the current study



(in which the role of unexpected tests in students' adjustment was not a research aim), we relied only on the data obtained during the 3-week period of unexpected testing. We took this approach because during this period the tests taken by students were standardized (such that differences in experiences could not be due to differences in the number and type of tests students received). Also, the full battery of measures needed to test our hypotheses were assessed only during the 3-week period of unexpected tests. The assessments before and after the 3-week period contained only the measure of need-based experiences (and not the measures of students adjustment)<sup>5</sup>.

## 2.2 Measures

### 2.2.1 Person-level Measure

**Self-criticism.** We used the self-criticism subscale of the Depressive Experiences Questionnaire for Adolescents (DEQ-A; Blatt, Schaffer, Bers, & Quinlan, 1992). Students filled out this measure prior to the weekly assessments. The DEQ-A is an adaptation of the original DEQ for adults (Blatt et al., 1976), in which the items were rephrased and simplified to make it more appropriate for adolescents. The DEQ-A is a self-report instrument that assesses self-criticism, dependency and efficacy using 66 items that were rated on a 7-point Likert scale ranging from 1 (*Totally disagree*) to 7 (*Totally agree*). An example item is: "I often find that I fall short of what I expect of myself". The dependency and efficacy scores were not used for the purpose of this study. Much like the original DEQ, the DEQ-A is scored using weighted factor scores (Zuroff, Mongrain, & Santor, 2004). Participants' item scores

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<sup>5</sup> A repeated measures ANOVA with psychological need satisfaction and need frustration as outcomes and with time (i.e., the 5 assessment points) as a within-subject predictor indicated that there was no effect of time on need frustration,  $F(4,74)=2.27$ ;  $p>.05$ ; yet, there was an effect of time on need satisfaction,  $F(4,74)=3.90$ ;  $p<.01$ ; follow-up analyses indicate that students reported a decrease in need satisfaction between the week prior to the unexpected tests ( $M=3.74$ ) and the weeks of unexpected testing ( $M=3.50$ ;  $M=3.59$ ;  $M=3.57$ ).

are transformed to z-scores using means and standard deviations from a large sample originally collected by Blatt et al. (1992). These z-scores are then weighted by factor coefficient scores that were also derived from this larger sample and averaged to form scores for self-criticism. Because of the complex scoring procedure, Cronbach's alpha cannot be computed for the present study. However, previous research showed that the DEQ has a clear and replicable internal structure and that the scales have substantial test-retest reliability in adolescents (Blatt et al., 1992). The Dutch version of the questionnaire has comparable psychometric characteristics as the original version (Luyten, Corveleyn, & Blatt, 1997).

### 2.2.2 Week-level Measures

***Need Satisfaction and Frustration.*** A shortened 12-item version of the Basic Psychological Need Satisfaction and Need Frustration (BPNSFS; Chen et al., 2015) was used to measure the satisfaction (two items per need) and frustration (two items per need) of each of the three basic psychological needs. The BPNSFS consists of six subscales, namely autonomy satisfaction, autonomy frustration, relatedness satisfaction, relatedness frustration, competence satisfaction and competence frustration. The scale was slightly adapted to the academic context such that the items focused on adolescents' need-based experiences in school rather than in their life in general. Specifically, we added the stem "Last week at school..." to each item and we changed the relatedness items as to make them refer to the relationship with the teacher and classmates (e.g., "I experienced a warm feeling with the people I spent time with." was changed into "I experienced a warm feeling with the fellow students and teachers I spent time with."). Items were rated on a 5-point Likert scale, ranging from 1 (*Totally disagree*) to 5 (*Totally agree*).

For the present study, the six items tapping into need satisfaction were averaged and the six items tapping into need frustration were averaged to create general scores for need satisfaction and need frustration. Over the three measurements, the Cronbach's alpha for need satisfaction ranged between .53 and .67, and for need frustration between .63 and .75. An overview of all items and Cronbach's alphas can be found below in Table 5-3 in the Appendix.

**Motivation.** Students' motivation was assessed by means of 6 items adapted from the Self-Regulation Questionnaire Academic (SRQ-A; Ryan & Connell, 1989; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). The SRQ-A has been found to be both valid and reliable, with the items falling apart into an autonomous and controlled motivation factor in factor analyses (Vansteenkiste et al., 2009), with the scales yielding adequate internal consistency and with the scales being related in theoretically predicted ways to a host of learning outcomes and self-regulation indicators (De Bilde, Vansteenkiste, & Lens, 2011; Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012; Vansteenkiste et al., 2012). Students rated their motivation toward last week's mathematics and French or Latin courses separately. We used the stem "Last week I put effort in my mathematics/French/Latin class because ..." followed by items tapping into autonomous motivation (3 items; e.g., "... I thought it was interesting") and controlled motivation (3 items; e.g., "... others pressured me to do so"). As students' motivation for mathematics and French or Latin was moderately correlated ( $r = .51$ ), we combined (i.e., averaged) the motivation scores for the different courses in one variable that we used in the analyses. This combined score reflects students more global motivation for school during the week. Supplementary analyses showed that associations between motivation and the other study variables were similar across the two school subjects. Detailed information about these supplementary analyses can be found in the Appendix. Items were scored on a 5-point Likert scale, ranging from 1 (*Not at all*) to 5 (*Very much*). Over the three measurements, the Cronbach's alpha for autonomous motivation ranged between .82 and .85, and for controlled motivation between .56 and .65.

**Positive and Negative Affect.** To measure positive and negative affect, respondents completed a shortened version of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). This questionnaire consists of four positive (i.e., enthusiastic, interested, happy, energetic) and four negative (i.e., anxious, irritated, nervous, tired) mood states. Participants had to indicate on a 5-point rating scale, ranging from 1 (*Not at all*) to 5 (*Very strong*), how often they had experienced these emotions in the past week at school. Cronbach's alpha ranged between .72 and .82 for positive affect and .72 and .77 for negative affect.

***Behavioral Engagement and Disaffection.*** Participants filled out the behavioral engagement subscale of the Engagement vs. Disaffection with Learning - Student Report (Skinner et al., 2009). We used three items that tapped into students' positive engagement (e.g., "In class, I work as hard as I can."). Three other items measured an absence (i.e., disaffection) of effort, attention, and persistence while initiating and participating in learning activities (e.g., "When I'm in class, my mind wanders."). Behavioral engagement and disaffection were measured for the two school subjects separately. We averaged the motivation scores for the different courses in one variable that we used in the analyses, because students' engagement ( $r = .50$ ) and disaffection ( $r = .56$ ) for the two courses was moderately correlated. More information about the aggregation of these scores across subjects can again be found in the Appendix. Each item was rated on a scale ranging from 1 (*Totally disagree*) to 4 (*Totally agree*). Cronbach's alpha ranged between .82 and .83 for positive engagement and between .77 and .83 for disaffection.

### **2.3 Plan of Analyses**

We used multilevel analyses to test our main models, as the data were hierarchically structured with 3 measurement times (i.e., Level 1) being nested within 82 adolescents (i.e., Level 2). The analyses were conducted with the statistical software package Mplus 7. All predictor variables at level 1 (i.e., need satisfaction and need frustration) were group-mean centered (i.e., centered around the person's mean) and the predictor variable at level 2 (i.e., self-criticism) was centered around the grand mean to facilitate convergence and interpretation.

There were 6.24% missing values in the total dataset. Little's MCAR test was not significant [ $\chi^2(186) = 193.23, p > .05$ ], suggesting that the data were missing at random. As a consequence, we used full information maximum likelihood (FIML) to handle missing data in the structural equation models (Little & Rubin, 1987). To evaluate model fit, the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR) and the Root Mean Squared Error of Approximation (RMSEA) were used. Combined cut-off values of .90 for CFI, .08 for SRMR and .06 for RMSEA are considered as a good fit (Kline, 2005).

### 3 Results

#### 3.1 Preliminary Analyses

##### 3.1.1 Descriptive statistics and correlations

In Table 5-1, the descriptive statistics and the correlation coefficients (computed on measures aggregated over the three weeks) can be found. As expected, self-criticism was correlated positively with need frustration, negative affect and controlled motivation and negatively with need satisfaction, positive affect, and autonomous motivation. According to Cohen's (1988) conventions to interpret the strength of correlation coefficients, correlation coefficients in the order of .10 are considered as small, correlation coefficients in the order of .30 are medium and those of .50 or more are large in terms of effect size. Considered against these criteria, the correlations between self-criticism and the other variables mostly reflect medium associations. Further, need frustration is significantly correlated with all outcome variables, displaying large positive associations with academic maladjustment and medium negative associations with academic adjustment. An opposite pattern was found for need satisfaction (large associations with positive affect, negative affect, engagement and autonomous motivation and medium associations with disaffection), with the exception that it was unrelated to controlled motivation.

Table 5-2 presents an overview of the group means over the three assessments. For descriptive purposes, repeated measures ANOVAs were conducted to examine whether all study variables display a significant change from week to week. Only one of them was significant ( $p < .05$ ), with negative affect decreasing over the three-week period. Such findings, pointing to high mean-level stability, do not preclude the possibility that students differ at the within-person level in their week-to-week variability, an issue that will be addressed in the main analyses using multilevel modeling.

Table 5-1. Descriptives and Correlations Between the Study Variables (aggregated over the three weeks).

	1	2	3	4	5	6	7	8	9
1. Self-criticism	1								
2. Need satisfaction	-.34**	1							
3. Need frustration	.33**	-.60***	1						
4. Positive affect	-.33**	.48***	-.35**	1					
5. Negative affect	.21	-.47***	.64***	-.29**	1				
6. Engagement	-.12	.52***	-.34**	.34*	-.28*	1			
7. Disaffection	.22	-.36***	.52***	-.25*	.34**	-.52***	1		
8. Autonomus motivation	-.29*	.47***	-.37**	.55***	-.29*	.50***	-.43***	1	
9. Controlled motivation	.28*	-.11	.49***	-.06	.36**	.38**	.38**	-.02	1
Mean	-.38	3.55	2.44	3.51	2.64	3.05	1.92	3.05	3.00
(Standard deviation)	(.74)	(.43)	(.59)	(.69)	(.77)	(.49)	(.54)	(.78)	(.73)
Intra-Class Correlation	-	.44	.36	.32	.35	.27	.25	.25	.31

Note. \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ .

**Table 5-2.** Descriptives for the Study Variables over the three Assessments

	Week 1	Week 2	Week 3	Effect of time	
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>F(X,X)</i>	<i>p</i>
Need satisfaction	3.48 (.55)	3.58 (.49)	3.56 (.55)	1.66	> .05
Need frustration	2.44 (.71)	2.36 (.59)	2.46 (.70)	2.25	> .05
Positive affect	3.51 (.83)	3.52 (.71)	3.50 (.79)	.13	> .05
Negative affect	2.54 (.71)	2.44 (.70)	2.47 (.65)	2.18	> .05
Positive engagement	3.07 (.53)	3.06 (.55)	3.03 (.54)	.32	> .05
Disaffection	1.88 (.55)	1.92 (.62)	1.94 (.59)	.94	> .05
Autonomous motivation	3.11 (.89)	3.00 (.88)	2.99 (.81)	1.25	> .05
Controlled motivation	3.03 (.73)	2.99 (.83)	2.97 (.85)	.21	> .05

Note. *M* = mean; *SD* = standard deviation.

### 3.1.2 Background variables

A MANCOVA was performed to examine the effects of age and gender on the study variables. The effect of both age ( $F(10, 62) = 1.17, p > .05$ ) and gender ( $F(10, 62) = 1.54, p > .05$ ) was not significant. Finally, we assessed the relation between class and the study variables using a MANOVA, with class as a predictor and all study variables as dependent variables. Results showed that class had no significant multivariate main effect,  $F(27, 189) = 1.05, p > .05$ , indicating that there were no differences in academic adjustment, need-based experiences and self-criticism between classes. As a result, we did not include age, gender and class as background variables in the main analyses.

### 3.1.3 Intra-class correlations (ICC)

Intra-class correlations represent the percentage of variance in a variable at a specific level. The ICCs with respect to the within-person level of all study variables that were measured multiple times (i.e., all variables except self-criticism) can be

found in. The results indicate that there is substantial variance at the within-person level, ranging between 25% and 44%. In other words, students displayed substantial intra-individual variation in study variables from week to week. Given the significant within-person level variation in all study variables, a multilevel approach is warranted.

### 3.2 Primary Analyses

#### **Hypothesis 1: Weekly variation in Need-based Experiences and Weekly Variation in Academic (Mal)adjustment**

To investigate the unique relations between week-to-week variation in need-based experiences and the week-to-week variation in academic (mal)adjustment, we tested a model including paths from need satisfaction and need frustration to each of the six indicators. This model was tested at Level 1, that is, the level intra-individual (weekly) variation. We also added correlations between all dependent variables and between need satisfaction and need frustration. Because all possible paths were included and all dependent variables were allowed to correlate, the model was fully saturated and, by definition, had a perfect fit ( $\chi^2(0) = 0.00, p > .05$ ; CFI = 1.00; SRMR = .00; RMSEA = .00). Results of this model, as displayed in Figure 5-1, indicated that weekly need satisfaction was positively related to weekly positive affect, engagement, autonomous motivation but also controlled motivation, while it related negatively to weekly negative affect. In contrast, weekly need frustration was positively related to weekly negative affect, disaffection, and controlled motivation, while being unrelated to any of the positive indicators. When non-significant pathways were deleted, model fit was good ( $\chi^2(4) = 4.13, p > .05$ ; CFI = 1; SRMR = .04; RMSEA = .01). The results of this model suggest that, when students experience an increase in need satisfaction during a particular week (compared to their overall need satisfaction), they also display a corresponding increase in academic adjustment during that particular week, as well as a decrease in negative affect and an increase in controlled motivation. Conversely, a weekly increase in need frustration goes hand in hand with a weekly increase in academic maladjustment.



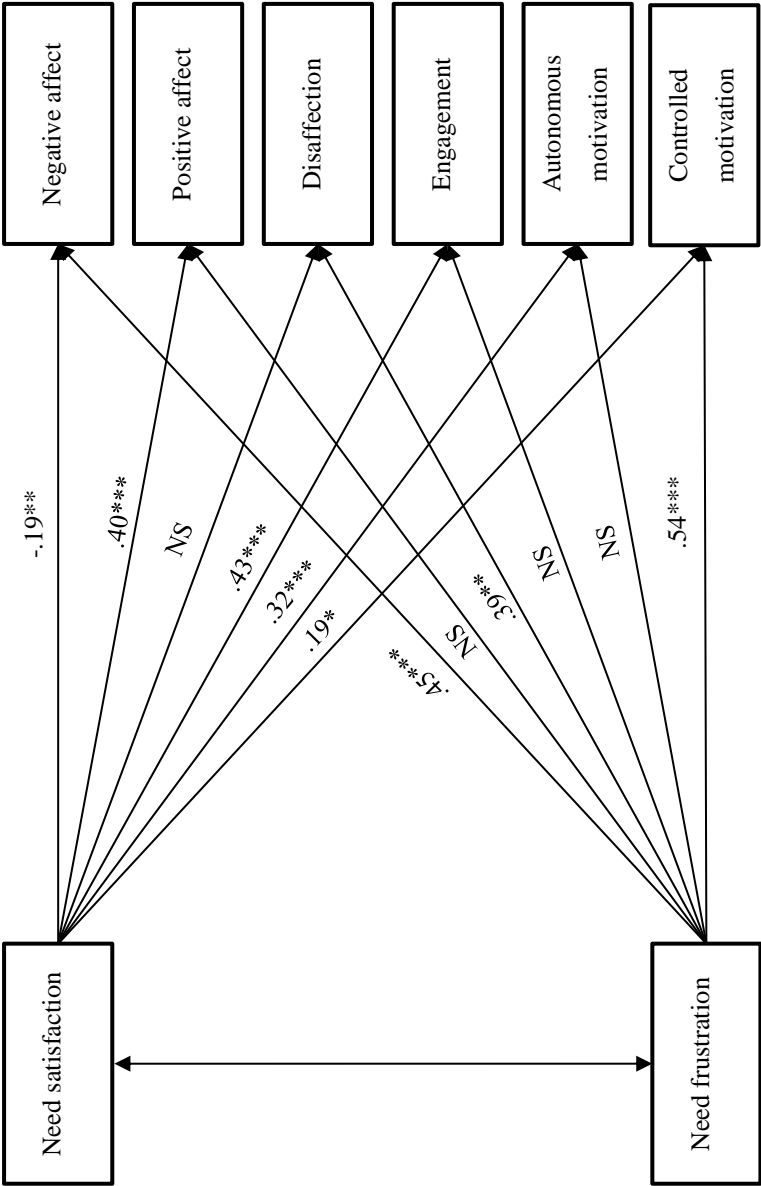


Figure 5-1. Need Satisfaction and Need Frustration as Predictors of School Adjustment.

Note. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , NS = not significant

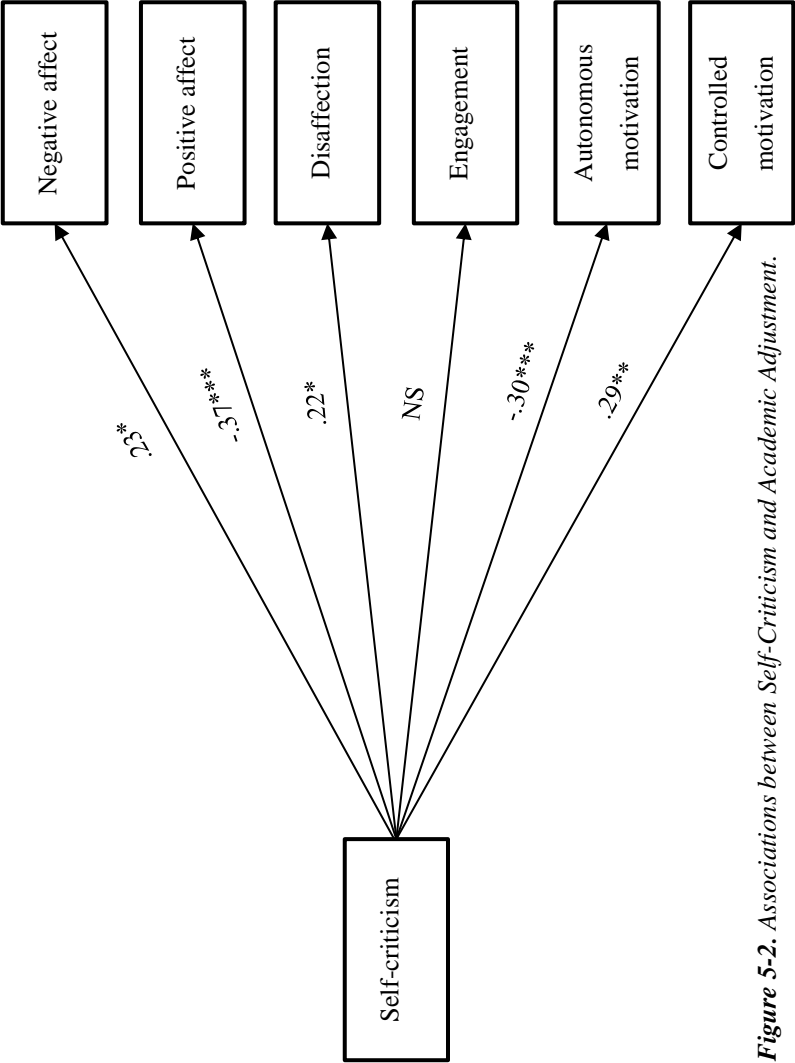
## Hypothesis 2: Mediating Role of Need-based Experiences

Prior to investigating the mediating role of the psychological needs experiences in associations between self-criticism and the outcomes, we ran a model including associations between self-criticism and the outcomes. As self-criticism was measured only once, this model is tested at Level 2, that is, the between-person level of interindividual differences. Estimation of this model (see Figure 5-2), which again had a perfect fit by definition, showed that self-criticism was related positively to negative affect, disaffection and controlled motivation, and negatively to positive affect and autonomous motivation. When non-significant pathways were deleted, model fit was  $\chi^2(1) = 1.57$   $p > .05$ ; CFI = 1.00; SRMR = .00; RMSEA = .05. These results indicate that students with higher scores on self-criticism than other students report relatively more academic maladjustment and less academic adjustment compared to students scoring lower on self-criticism.

Next, we examined whether need experiences play a mediating role in the relation between self-criticism, as assessed at the onset of the study, and academic (mal)adjustment. To address this question, we specified a SEM model (see Figure 5-3) in which we added paths at the between-person level from self-criticism to need satisfaction and need frustration, and from the two need-based experiences to each of the academic adjustment outcomes. Similar to the first model, all dependent variables were allowed to correlate. This model was again estimated at Level 2 (i.e., the level of between-person, interindividual differences). Specifically, we tested and compared two nested models, that is, a (full mediation) model in which associations between self-criticism and the academic outcomes were fully mediated (i.e., a model including only indirect associations through the need-based experiences) and a (partial mediation) model that included both indirect paths between self-criticism and the outcomes through the needs as well as direct paths from self-criticism to all outcomes. A comparison of these nested models showed that the fit of the partial mediation model was significantly better than the fit of the full mediation model ( $\Delta\chi^2(6) = 12.74$ ,  $p < .05$ ). Inspection of the partial mediation model showed that only the direct path between self-criticism and controlled motivation reached significance. Accordingly, the other five direct paths were dropped from the model. This final model ( $\chi^2(5) = 6.81$ ,  $p > .05$ , CFI = .99, SRMR = .00 and RMSEA = .04) indicated that self-criticism

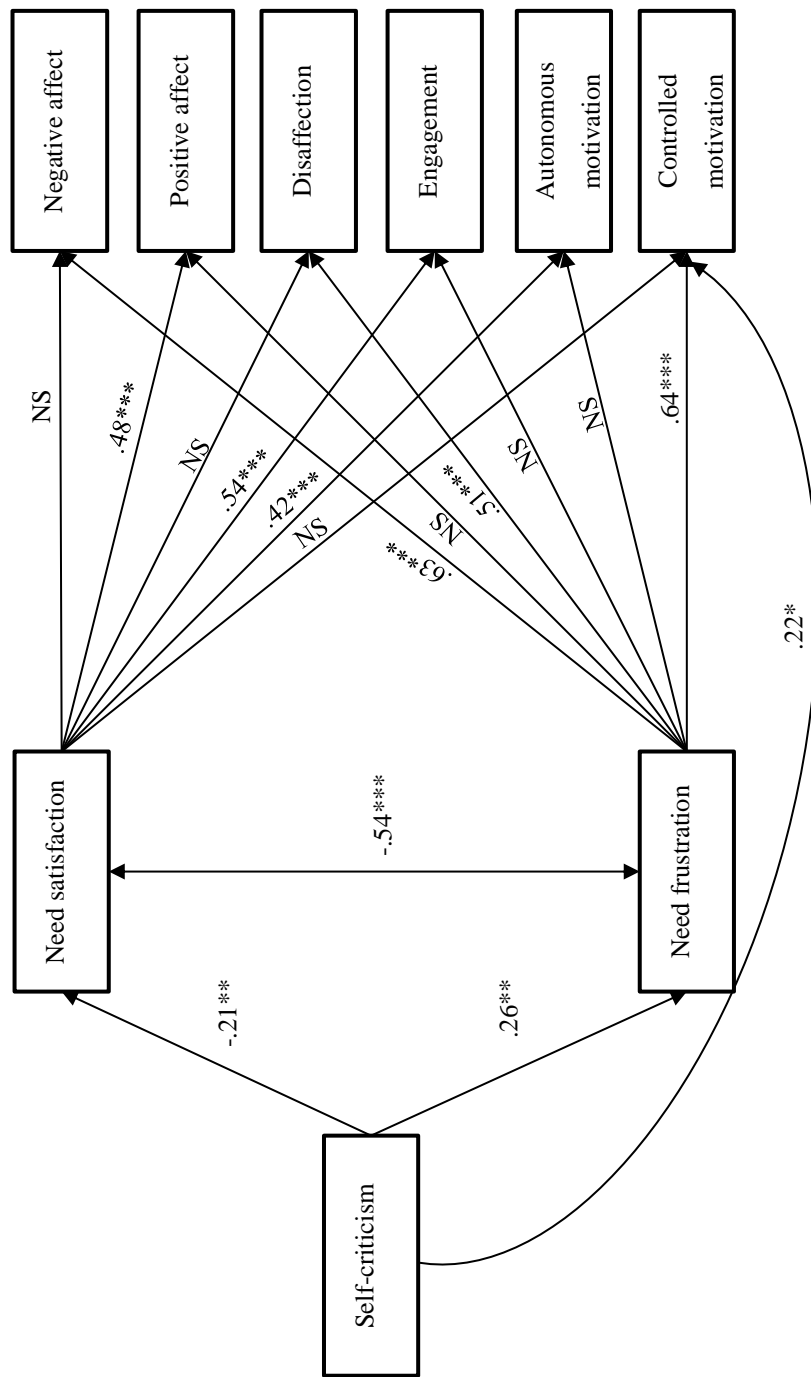
was related to lower need satisfaction and more need frustration. In turn, need satisfaction was related positively to each of the adaptive outcomes (positive affect, engagement, and autonomous motivation) and need frustration was related positively to each of the negative outcomes (negative affect, disaffection, and controlled motivation). In addition to these indirect associations through the need-based experiences, self-criticism was related positively to controlled motivation.

In this final model, self-criticism yielded an indirect relation with negative affect ( $b = .07, p < .05$ ), disaffection ( $b = .05, p < .05$ ), and controlled motivation ( $b = .09, p < .05$ ) via need frustration, while self-criticism yielded an indirect association with negative affect ( $b = .07, p < .05$ ), positive affect ( $b = -.09, p < .01$ ), engagement ( $b = -.05, p < .01$ ), and autonomous motivation ( $b = -.05, p = .05$ ) via need satisfaction. Hence, while need satisfaction could primarily account for the link between self-criticism and positive indicators, need frustration could mainly account for the link between self-criticism and negative indicators. Overall, most of the associations between self-criticism and the outcomes (except for controlled motivation) were fully mediated by the psychological needs experiences. The model explained 49% of the variance in negative affect, 35% of the variance in controlled motivation, 33% of the variance in disaffection, 31% of the variance in positive engagement, 29% of the variance in autonomous motivation and 27% of the variance in positive affect.



**Figure 5-2.** Associations between Self-Criticism and Academic Adjustment.

Note. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , NS = not significant



**Figure 5-3.** The Mediating Role of Need Satisfaction and Need Frustration in the Relation between Self-Criticism and Academic Adjustment.

Note. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ,  $NS$  = not significant  
Correlations between outcome variables were estimated but are not shown because of reasons of parsimony.

### **Hypothesis 3: The Moderating Role of Self-criticism.**

Finally, we examined whether week-to-week associations between need-based experiences and (mal)adjustment depend on students' self-criticism levels, thereby testing cross-level interactions (with self-criticism representing a Level 2 moderator of associations between the needs and outcomes at Level 1). This moderating role of self-criticism was considered only in case there was significant variation around the slopes of the explanatory variables (i.e., need satisfaction and frustration) (Hox, 2010). There was only significant variation around one slope, that is, the slope representing the association between need satisfaction and positive affect ( $b = .32$ ,  $SE = .10$ ,  $p < .01$ ). This means that the strength of the relation between weekly need satisfaction and weekly positive affect varies between students.<sup>6</sup> However, the effect of self-criticism on the strength of this association was not significant ( $p > .05$ ), indicating that self-criticism did not moderate this association. Overall, the data suggest that a moderation model fits these data less well than a mediation sequence.

In sum, we found evidence that weekly need-based experiences are related to weekly academic (mal)adjustment. Moreover, the basic psychological needs mediate the relation between self-criticism and academic (mal)adjustment. Finally, no interaction effects between self-criticism and the psychological needs were found in the prediction of academic (mal)adjustment.

## **4 Discussion**

The goal of the present study was to examine whether week-to-week variation in academic adjustment is related to adolescents' weekly need-based

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<sup>6</sup> As the students also filled in the dependency subscale of the DEQ-A questionnaire, we conducted the same analyses with dependency (instead of self-criticism). We found a significant direct effect of dependency on need frustration ( $b=.22$ ,  $p < .05$ ), but no direct effect from dependency on need satisfaction ( $b=.06$ ,  $p > .05$ ). All indirect effects via need frustration and need satisfaction between dependency and academic adjustment were not significant ( $p > .05$ ). Further, the effect of dependency on the relation between the needs and academic adjustment was not significant. These findings indicate that self-criticism plays a more important role in predicting school (mal)adjustment than dependency.

experiences and to their self-criticism. While most studies on academic adjustment examined the role of between-person individual differences (Niemic & Ryan, 2009), we studied variations in academic adjustment on a weekly basis. Consistent with emerging research showing that students' adaptation is highly dynamic (Bakker et al., 2015; Ketonen et al., 2018; Patall et al., 2016), we found evidence for substantial week-to-week variation in students' academic (mal)adjustment. Given this observation, it was deemed important to identify antecedents of weekly motivation and (mal)adjustment, thereby attending to the role of both dynamic and more stable, personality-based predictors and their complex interplay.

#### **4.1 Associations Between Need Satisfaction, Need Frustration and Academic Adjustment**

Our first hypothesis stated that weekly variation in need satisfaction and need frustration would be meaningfully related to weekly variation in motivation and academic adjustment. According to the dual pathway model in SDT (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Jang et al., 2016; Vansteenkiste & Ryan, 2013), need satisfaction would be primarily associated with adaptive outcomes (positive affect, autonomous motivation, engagement) and need frustration would yield a unique relation with maladaptive outcomes (negative affect, controlled motivation, disaffection).

The results were largely consistent with these hypotheses: during weeks that adolescents experienced more need satisfaction, they also reported more weekly positive affect, behavioral engagement, and autonomous motivation. These findings are in line with previous studies that found associations between need satisfaction and indicators of school functioning at the between-person level (Niemic & Ryan, 2009). In accordance with SDT's claim that need satisfaction energizes behavior (Ryan & Deci, 2008), the study indicates that at times students' needs are more satisfied, they feel more comfortable at school, they work harder in class, and are more interested in the learning material. Somewhat unexpectedly, need satisfaction was also positively related to controlled motivation. Although this relation is not theoretically predicted, this association has already been found in a few previous studies (Haerens et al., 2015; Silva et al., 2010; Zhou, Ma, & Deci, 2009). It should be noted, however, that the

association between need satisfaction and autonomous motivation was much more pronounced than the association between need satisfaction and controlled motivation. Moreover, controlled motivation was predicted by both need satisfaction and need frustration. This finding is meaningful because it testifies to the ambivalence inherent to controlled motivation: students with controlled motivation seem to encounter both satisfying and frustrating experiences, with this combination of experiences heightening the quantity of their motivation but not the quality of motivation. Indeed, while controlled motivation can be a powerful source of motivation (at least in the short-term and for superficial learning outcomes), it is not a high-quality source of motivation and it fails to foster long-term commitment and deep-level learning (Niemic & Ryan, 2009; Vansteenkiste et al., 2009).

As hypothesized, weekly variation in adolescents' need frustration was associated with weekly variation in negative affect, controlled motivation and disaffection. The findings indicate that experiences of coercion, disconnection and ineffectiveness interfere with students' functioning in secondary school. During weeks students' psychological needs are more frustrated, they experience more negative affect, they feel more pressured to complete their tasks, and they are more likely to be passive and to lack initiation in class. This finding is in line with previous work (e.g., Van der Kaap-Deeder et al., 2015) indicating that need frustration contributes to controlled motivation (Haerens et al., 2015), reduces individuals' energy levels (i.e., vitality and the feeling of being alive, Ryan & Frederick, 1997) and even increases the likelihood that adolescents engage in oppositional defiance (Van Petegem et al., 2015). The behavioral disengagement displayed by students during weeks characterized by high need frustration can indeed be the result of a combination of a lack of energy and a tendency to do the opposite of what teachers expect. Overall, the present results extend previous research by revealing the distinction between a bright and a dark motivational pathway at the intra-individual level of adolescents' weekly academic adjustment. One exception to this pattern concerns the supplementary unique association between weekly variation in low need satisfaction and weekly variation in negative affect. Although high weekly need frustration related more strongly to negative affect, the presence of low need satisfaction was presumably sufficient to come with more negative feelings.



## 4.2 The Role of Self-Criticism in the Relation Between the Needs and Academic Adjustment

Several studies have shown that self-criticism predicts maladaptive school outcomes, such as higher levels of stress, anxiety and controlled motivation (Shahar et al., 2003; Stoeber & Rambow, 2007; Vansteenkiste, Smeets, et al., 2010). The current study extends these studies by showing that self-criticism is related to problems in diverse areas of students' adjustment, including poor motivational, behavioral, and affective functioning. Moreover, because students reported on their motivation, behaviors, and experiences on a short-term basis (with recall bias less likely affecting students' reports than more dispositional reports of academic functioning ; Althubaiti, 2016) and because self-criticism was assessed prior to students' weekly reports, the current study yielded some of the most conclusive evidence to date that self-criticism actually forecasts academic maladjustment. The findings illustrate how a trait (i.e., self-criticism) may be directly related to state levels of experiences (i.e., need satisfaction and need frustration) (Funder, 2006). A logical next step, then, was to examine the explanatory role of psychological needs experiences in these effects of self-criticism.

Theory (Luyten & Blatt, 2016) and previous research (Boone et al., 2014; Van der Kaap-Deeder et al., 2016) have shown that self-criticism is related to lower need satisfaction and to higher need frustration. To gain more insight in the association between self-criticism and students' motivation and (mal)adjustment, we tested a mediation model in which need frustration and satisfaction play a mediating role in this association. We found rather consistent support for the proposed mediation model, with need satisfaction and need frustration accounting for most of the associations between self-criticism and the indicators of academic (mal)adjustment. These results, in combination with previous findings (Boone et al., 2014; Campbell, Boone et al., 2018; van der Kaap-Deeder et al., 2016), underscore the role of need-based experiences as an underlying mechanism through which self-criticism translates into malfunctioning.

It still remains unclear which underlying processes could be responsible for this effect. First, self-criticism could affect *situation selection*. For example, self-critical students might actively seek more competitive and highly demanding

environments and thus be more exposed to stressful events. Second, they might *elicit* more negative reactions in their environment. Indeed, the distant or even hostile interpersonal style of self-critical students could evoke more negative reactions from the environment and hamper peer relation quality and teacher-student relationships (Boone et al., 2014; Ommundsen, Roberts, Lemyre, & Miller, 2005). Another option is that self-criticism only influences the *perception* of situation. Students with an overly self-critical perspective would be more likely to interpret an ambiguous remark of a teacher as a negative reaction, or might see an average exam result sooner as a failure (De Muynck, Vansteenkiste, Vandenkerckhove, & Soenens, 2018; Van der Kaap-Deeder et al., 2016). Each of these mechanisms, which could also operate simultaneously, suggests a proactive influence of students on the crafting and appraisal of their own environment.

In addition to the possibility that self-criticism proactively generates certain experiences (as reflected in the mediation model), we also considered the possibility that self-criticism would reactively interact with need-based experiences. Specifically, we tested the moderating role of self-criticism in associations between need-based experiences and the outcomes, thereby examining the possibility that associations between need frustration and problematic outcomes are amplified when students report high self-criticism. In contrast to previous research showing that self-critical individuals are more reactive to daily stressors than non-perfectionists (Dunkley et al., 2003; Kopala-Sibley, Klein, Perlman, & Kotov, 2017), we did not find support for a moderation model in the present study. We could even only test one moderation effect because there was only one random slope, indicating that the strength of associations between need-based experiences and the outcomes was largely equal for all participants. Previous research supporting the stress-reactivity model (e.g., Chang & Rand, 2000) differed from the present study in terms of antecedents (stressful events instead of need-based experiences) and outcomes (psychological difficulties instead of academic adjustment). We speculate that there is more room for individual differences in the reaction to stressful life events than in the reaction to need frustration (which already involves a negative appraisal of potentially stressful situations). We should also be cautious in our interpretation because our sample size ( $N=82$ ) might have been too small to detect significant interaction effects. It is

important that future studies replicate the current findings with a more extended sample. For now, our findings are more consistent with the notion that self-criticism generates more need frustrating experiences than with the notion that self-criticism reactively interacts with such experiences (Priel & Shahar, 2000).

### **4.3 Limitations and Suggestions for Future Research**

A number of limitations need to be kept in mind when interpreting the findings of the present study. First, all concepts were measured through self-report questionnaires. As need satisfaction and frustration, as well as the motivational and affective indicators of academic adjustment represent rather subjective inner experiences, students themselves are the most appropriate informants. However, relations between the needs and academic adjustment could be due to shared method variance or to response tendencies. Future studies could supplement the self-report data by teacher ratings or observational measures of academic adjustment, especially for assessing engagement and disaffection as well as students' achievement (Van den Berghe, Cardon, Tallir, Kirk, & Haerens, 2016).

Next, self-criticism was measured only once, at the onset of the study. As a consequence, we could only examine the effects of trait self-criticism on the outcomes. However, there is also evidence for variations in self-criticism within individuals on a short-term basis (Boone et al., 2012; Zuroff, Sadikaj, Kelly, & Leybman, 2016). Future studies could include state measures of self-criticism in order to test all relations at the within-person level.

Future research could also include a broader range of antecedents of need-based experiences. In the present study, we included self-criticism as a predictor of need frustration. Future research could also include positive personality features that might foster need satisfaction and buffer against need frustration. Mindfulness or self-compassion might be good candidates. As mindfulness involves a higher receptivity for present experiences, mindful students may derive more need satisfaction from everyday school experiences (Brown & Ryan, 2003). Future studies could also include a broader range of school subjects in order to look at between-subject differences in academic adjustment (see Chanal & Guay, 2015). As we only used the composite

score of need satisfaction and frustration in our analyses, future research could also examine the effects of the three separate needs.

Further, the reliability of some of the measures, and of the need satisfaction measure in particular, was modest. Because of the intensive and short-term assessment of the study variables, we had to rely on a limited number of items for each scale, which may have affected the obtained reliability. We advise that future research would use the full 24-item version of the BPNSNF scale. As Cronbach's alpha is sensitive to sample size, our small sample size might have affected the reliability. Furthermore, the items assessing relatedness were formulated rather broadly as they applied to fellow students as well as to the teacher. Future research addressing the role of the need for relatedness in particular would do well to include items tapping specifically into relatedness within student-teacher relationships and student-peer relationships. Although most of the associations were still in line with theoretical expectations and previous research, the effects of the less reliable variables should be interpreted with caution. The homogeneity of the sample (i.e., all participants were recruited from one school in the academic track) might also limit the generalizability of the results. As such, it is important to replicate and extend the current findings in larger and more heterogeneous samples of students. The relatively small sample size also did not allow us to examine gender differences in depth. While previous studies on larger samples documented gender differences in academic adjustment, with boys for instance scoring higher than girls on homework motivation and efforts for mathematics and with girls scoring higher than boys on motivation for languages (e.g., Trautwein, Ludtke, Schnyder, & Niggli, 2006), we did not find evidence for such gender differences in the current study. Research in larger samples would be ideally suited not only to examine mean-level gender differences with more statistical power but also to examine whether the associations obtained in the current study apply equally to male and female students.

Finally, the study design prevented us to draw conclusions about the direction of effects in the associations between the variables. While we modelled need satisfaction as a predictor of academic adjustment, it may also be possible that during weeks where students display elevated engagement they are better capable to have their psychological needs met (see Van den Berghe et al., 2016). Future research with

more assessment points across weeks or even within the week would allow for a better test of the undoubtedly transactional associations between the psychological needs and academic adjustment. Such research with multiple (perhaps even daily) assessments within a week could also help to determine natural variation in students' needs-based experiences and adjustment in the course of a week. While we measured students' experiences on Friday, perhaps their experiences are different in the beginning or the middle of the week, an issue that remains to be examined. Such studies could possibly also include a wider number of classes as to decompose the observed variance in need-based functioning in three different levels, that is, the class-level, the between-student level, and the within-student (weekly or daily) level.

#### **4.4 Conclusion and Implications**

This study showed that weekly fluctuations in need-based experiences are associated with weekly fluctuations in motivation and academic adjustment. When students' needs for autonomy, relatedness and competence are satisfied, students feel better at school, work harder in class, and are more autonomously motivated. Weekly need frustration, however, is associated with more negative affect, more disaffection and controlled motivational functioning. At the between-person level, we found that self-criticism is related to academic maladjustment through its associations with heightened need frustration and lowered need satisfaction. These findings point to the importance of need-based experiences in explaining the impact of self-criticism on academic maladjustment.

There are several practical implications that can be drawn from the results of this study. First, the significant fluctuations in academic adjustment indicate that well-being at school, engagement, and motivation are dynamic concepts. Instead of only making a distinction between the better adjusted students and the poorly adjusted students in a class or school (i.e., between-person differences), teachers and counsellors should also look at ups and downs in adjustment and motivational functioning within one student (i.e., within-person differences). As there is considerable variation in academic adjustment, one week is not the same as the other. As a result, every week is a new week, with both opportunities to raise autonomous motivation and engagement and risks to become demotivated and disengaged. Also

students with generally lower academic adjustment probably do not experience every week as equally bad. For them, it could be interesting to explore their ups and downs, in order to identify what kind of triggers make them feel slightly better at school. Next, our findings underscore the importance of need satisfaction to foster students' academic adjustment. The school plays an important role in creating a need-supportive environment where students can thrive (e.g., De Meyer et al., 2016; Ryan & Deci, 2017). An autonomy-supportive teaching style, involving the teacher to adopt the students' perspective and highlight the relevance of the study tasks, has been shown to increase students' need satisfaction (Vansteenkiste, Niemiec, et al., 2010). A need-supportive teaching style does not only have an impact on affective and motivational outcomes, but it also fosters engagement at school (Reeve, Jang, Carrell, Jeon, & Barch, 2004). Teachers should not only be informed about the importance of autonomy-supportive teaching, but also about the detrimental effects of controlling (or need-thwarting) teaching and how they can refrain from these practices (De Meyer et al., 2014). Also more structural changes in the school environment can be effective, for example by developing a more need-supportive evaluation policy and by strengthening students' participation at school and reinventing school rules and regulations. Finally, we found that self-critical students experience more need frustration and, in turn, report more academic maladjustment. Therefore, teachers and school psychologists should pay attention to this vulnerable group. Self-critical students could be targeted in prevention or intervention programs, in order to foster resilience. More specifically, counsellors could help self-critical students to reduce their tendency to engage in negative self-evaluations (Boone, Soenens, Braet, & Goossens, 2010). Acceptance and Commitment Therapy (ACT; Luoma & Platt, 2015) or compassion-focused therapy (Gilbert, 2010) are promising routes to reduce self-criticism.

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## Appendix

### 1. Additional Information about the Scale Assessing Need Satisfaction and Need Frustration.

Because the present study is among the first to use a 12-item version of the BPNSNF on a weekly basis, we provide some additional information about this version of the BPNSNF. Previous research using a weekly assessment among university students (Campbell, Boone, et al., 2018) and a daily assessment among adolescents (Van der Kaap-Deeder et al., 2017) indicated that need satisfaction and need frustration yielded unique predictive validity in the prediction of individuals' weekly stress, sleep, and well-being. Whereas Chen et al. (2015) developed a 24-item version, both Van der Kaap-Deeder et al. (2017) and Mabbe, Soenens, Vansteenkiste, Van der Kaap-Deeder, and Mouratidis (2018) made use of a shortened 12-item version, which is also used in the present study. A multilevel confirmatory factor analysis which allows studying the internal structure of the scale at both the within-person and between-person level, showed that a two-factor solution separating need satisfaction from need frustration, yields a better fit compared to a single-factor solution (Mabbe et al., 2018). Table 5-3 shows all items and Cronbach's alpha values of the scales in the BPNSNF scale as used in the current study.

### 2. Confirmatory Factor Analyses for Need Satisfaction and Need Frustration.

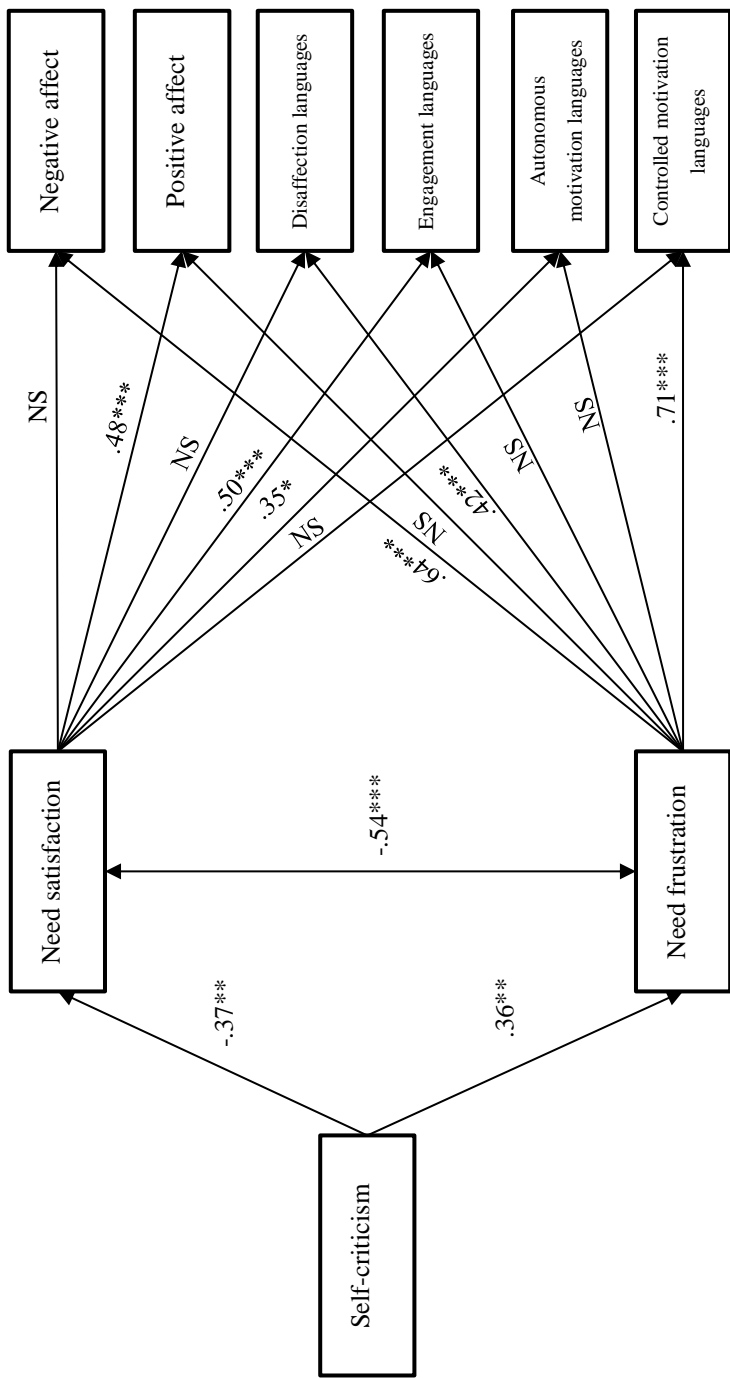
We conducted a series of Confirmatory Factor Analyses (CFAs) because such analyses allow one to formally compare the presumed 2-factor structure of the needs questionnaire to a 1-factor solution. Within each week, the fit of a 2-factor model tended to be higher than the fit of a 1-factor solution ( $\Delta \chi^2(1) = 3.15$ ,  $p = .075$  in Week 1,  $\Delta \chi^2(1) = 10.68$ ,  $p < .01$  in Week 2,  $\Delta \chi^2(1) = 3.51$ ,  $p = .061$  in Week 3), although the difference was only marginally significant in Week 1 and Week 2 (probably due to the limited sample size). The factor loadings of the 2-factor solutions can be found in Table 5-4. All items had significant loadings on their corresponding factor, except for 4 items in Week 2 (i.e., the items with loadings  $< .30$ ).

### **3. Ancillary Analyses Examining Differences Between School Subjects**

For motivation and engagement, students reported about their experiences for mathematics and French/Latin separately. Table 5-5 shows that the relations between self-criticism and the needs on the one hand and between engagement and motivation on the other hand are similar for both subjects. A z-test to formally compare the correlation coefficients (Steiger, 1980) indicated that there were no significant differences in the correlations with the needs between both subjects. Only two correlations with self-criticism (i.e., the correlations between self-criticism and engagement and between self-criticism and disaffection) differed between the two subjects. Furthermore, we also tested SEM-models for mathematics and French/Latin separately. The results (see Figure 5-4 and Figure 5-5) showed that the relations between the needs and academic adjustment were similar for the two subjects. The only difference was that the direct path from self-criticism to controlled motivation only holds for mathematics and not for languages. Therefore, we chose to collapse the scales across the two subjects.

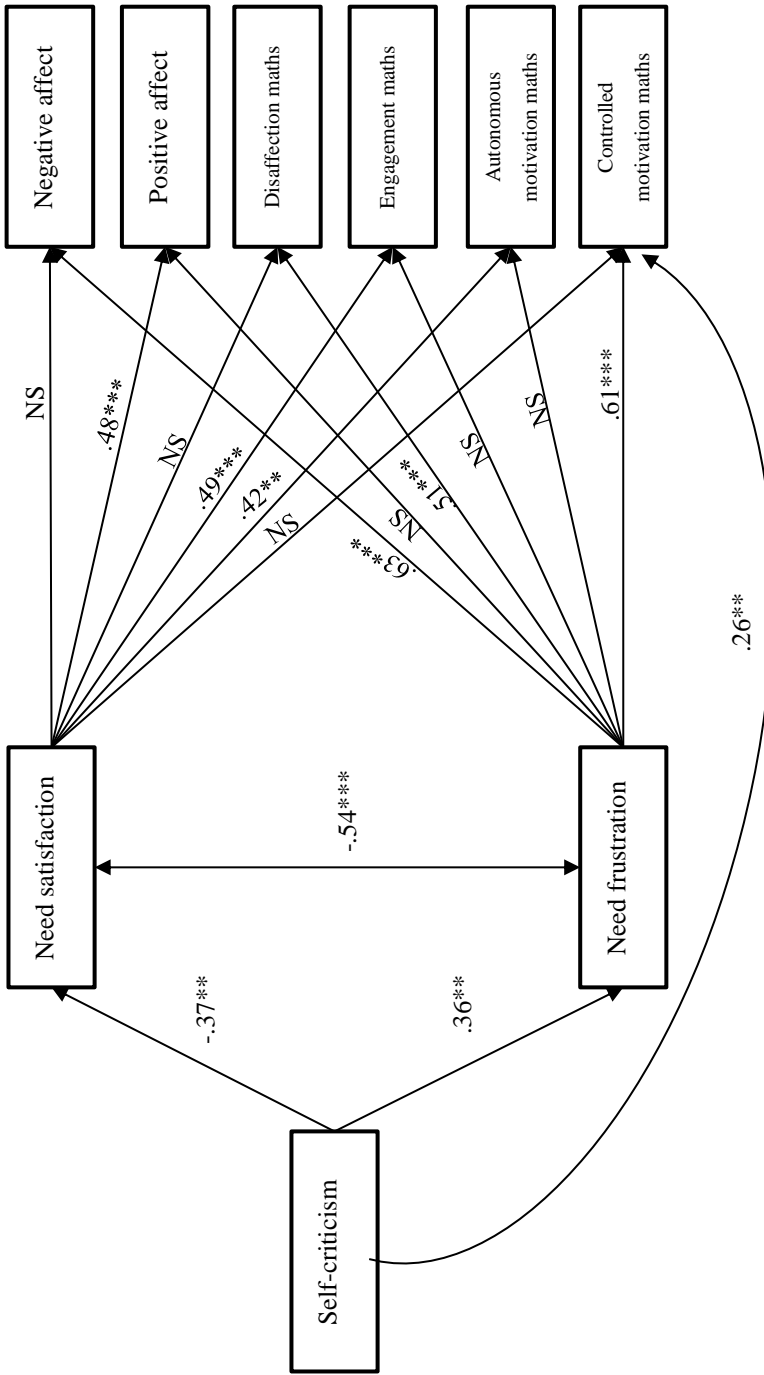
#### **Correlations between Self-Criticism, Academic Adjustment and each of the Separate Needs.**

Table 5-6 shows the correlations between self-criticism, academic adjustment and each of the separate needs. Z-tests formally comparing the correlations between each of the separate need-based experiences and academic (mal)adjustment indicated that most of the associations were consistent across the three needs. There were only a few exceptions: autonomy satisfaction and autonomy frustration were associated more strongly with some of the study variables than competence and relatedness. Also competence frustration was related more strongly to negative affect than relatedness frustration. However, all correlation coefficients point in the same direction across the three needs.



**Figure 5-4.** The Mediating Role of Need Satisfaction and Need Frustration in the Relation between Self-criticism and Academic Adjustment for Languages.

Note. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , NS = not significant



**Figure 5-5.** The Mediating Role of Need Satisfaction and Need Frustration in the Relation between Self-Criticism and Academic Adjustment for Mathematics.

Note. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , NS = not significant

**Table 5-3.** Overview of the Items and Cronbach's alphas for the BPNSNF questionnaire

	T1	T2	T3
Autonomy satisfaction	1 ... I felt a sense of choice and freedom in the things I did in class. 2... I felt that my decisions reflect what I really wanted. 3... I felt connected with my friends at school.	$\alpha =.66$	$\alpha =.67$
Relatedness satisfaction	4... I experienced a warm feeling with the fellow students and teachers I spend time with.		
Competence satisfaction	5... I felt confident that I could do things well at school. 6... I felt competent in what I did at school.		
Autonomy frustration	7 ... most of the things I did at school felt like 'I had to'.	$\alpha =.75$	$\alpha =.75$
Relatedness frustration	8... I felt forced to do many things I wouldn't choose to do in class. 9 ... I felt excluded from the group fellow students I want to belong to. 10... I felt that teachers and fellow students were cold and distant towards me.		
Competence frustration	11... I felt disappointed with my performances at school. 12... I felt insecure about my abilities.		

Table 5-4. Confirmatory Factor Analyses for Need Satisfaction and Need Frustration

	T1	T2	T3
Autonomy satisfaction			
1... I felt a sense of choice and freedom in the things I did in class.	.54	.64	.48
2... I felt that my decisions reflect what I really wanted.	.59	.24	.38
Relatedness satisfaction			
3... I felt connected with my friends at school.	.34	.20	.40
4... I experienced a warm feeling with the fellow students and teachers I spend time with.	.51	.22	.67
Competence satisfaction			
5... I felt confident that I could do things well at school.	.65	.73	.60
6... I felt competent in what I did at school.	.38	.35	.47
Autonomy frustration			
7... most of the things I did at school felt like 'I had to'.	.58	.69	.57
8... I felt forced to do many things I wouldn't choose to do in class.	.71	.75	.57
Relatedness frustration			
9... I felt excluded from the group fellow students I want to belong to.	.51	.25	.37
10... I felt that teachers and fellow students were cold and distant towards me.	.74	.41	.70
Competence frustration			
11... I felt disappointed with my performances at school.	.48	.41	.51
12... I felt insecure about my abilities.	.39	.31	.78



Table 5-5. Relations Between Self-Criticism and the Needs and Engagement and Motivation for the Two School Subjects

	Autonomous motivation			Controlled motivation			Engagement			Disaffection		
	Maths	French/ Latin	z	Maths	French/ Latin	z	Maths	French/ Latin	z	Maths	French/ Latin	z
Self-criticism	-.32**	-.19	1.42	.33**	.23*	-.94	-.20	.01	2.09*	.31**	.07	2.64**
Satisfaction												
Autonomy	.56***	.48***	1.02	-.16	-.06	-.91	.47***	.47***	.00	-.31**	-.20	-1.22
Relatedness	.28*	.30**	-.22	-.21	-.28*	.65	.12	.24*	-1.21	-.23	-.15	-.87
Competence	.33**	.25*	.88	-.03	.08	-.99	.32**	.34**	-.21	-.32**	-.25*	-.78
Frustration												
Autonomy	.44***	-.37**	-.82	.57***	.56***	.12	-.30**	-.33**	.31	.47***	.42**	.61
Relatedness	-.08	-.23*	1.60	.32**	.29*	.29	-.20	-.22	.20	.30*	.26*	.45
Competence	-.21	-.23*	.22	.30**	.22	.75	-.13	-.22	.90	.41**	.37**	.47

Note. The z-scores indicate significant differences between the correlation coefficients.  
\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

Table 5-6. Correlations Between Self-Criticism, Academic Adjustment and each of the Separate Needs

	Need satisfaction			Need frustration		
	Autonomy	Relatedness	Competence	Autonomy	Relatedness	Competence
Self-criticism	-.29**a	-.28**a	-.23**a	.37***a	.18 <sup>a</sup>	.22 <sup>†a</sup>
Positive affect	.46***a	.32***a	.32***a	-.39***a	-.21 <sup>a</sup>	-.21 <sup>a</sup>
Negative affect	-.48***a	-.23*b	-.36***ab	.48***ab	.39***a	.65***b
Engagement	.53***a	.32***a	.37***a	-.36***a	-.24 <sup>a</sup>	-.20 <sup>a</sup>
Disaffection	-.28**a	-.27**a	-.31**a	.49***a	.30*b	.43***ab
Autonomous motivation	.58***a	.19 <sup>b</sup>	.32***b	-.46***a	-.17 <sup>b</sup>	-.24*b
Controlled motivation	-.11 <sup>a</sup>	-.19 <sup>a</sup>	.03 <sup>a</sup>	.58***a	.31**b	.26***b

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$  for the significance of the correlations. Z-tests were conducted with different superscripts (a, b, c) referring to significant differences between correlations ( $p < .05$ ).

## **CHAPTER 6**

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### **Does Dependency Play a Role in Need-Based Responses to Social Exclusion?<sup>7</sup>**

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<sup>7</sup> Vandenkerckhove, B., Soenens, B., Waterschoot, J., Nasso, S., De Raedt, R., Luyten, P., & Vansteenkiste, M. (2019). Does dependency play a role in need-based responses to social exclusion?

Table of contents

**1 Introduction**..... 226

1.1 Social Exclusion..... 227

1.2 The Role of Dependency..... 228

1.3 The Present Study ..... 230

**2 Study 1** ..... 232

2.1 Method ..... 232

2.2 Results..... 234

2.3 Brief discussion..... 237

**3 Study 2** ..... 238

3.1 Method ..... 239

3.2 Results..... 241

3.3 Brief Discussion..... 246

**4 General Discussion**..... 246

4.1 Causal Impact of Social Exclusion ..... 247

4.2 The Role of dependency ..... 249

4.3 Limitations and Suggestions for Future Research..... 251

**5 References**..... 253

**Appendix** ..... 261

Although prior research convincingly demonstrated that social exclusion elicits reduced levels of belonging, fewer studies examined whether personality characteristics moderate this effect. This study is among the first to investigate the interplay between social exclusion and dependency, a personality characteristic that involves an excessive concern with maintaining the love of others. The aim of the present study was to get more insight in the effects of experimentally induced social exclusion on frustration and satisfaction of the need for relatedness and the moderating role of dependency as a vulnerability factor herein. Two experimental studies were conducted to test the immediate (Study 1 and 2) and delayed effects (Study 2) of social exclusion and the interplay with dependency. Social exclusion was experimentally induced using the well-validated Cyberball paradigm (Williams, 2007). The participants were randomly assigned to either an inclusion condition, a moderate exclusion condition, or a full exclusion condition. Questionnaires were used to tap into dependency and relatedness satisfaction and frustration. Relatedness satisfaction and frustration were assessed immediately after the induction of social exclusion (Study 1 and 2) and also one week after the experimental session (Study 2). Findings consistently demonstrate the immediate effects of social exclusion on relatedness satisfaction and frustration. No evidence for moderation by dependency was found. Yet, one week later a main effect of dependency on relatedness frustration was found. This study underscores the detrimental effects of social exclusion on the need for relatedness. Explanations for the lack of moderation by dependency are discussed.

## 1 Introduction

The need to experience a sense of belongingness (Allen & Kern, 2017) or relatedness (Ryan & Deci, 2017) is very powerful as its satisfaction is vital to individuals' psychological and physical health. Especially in adolescence and emerging adulthood, when youth spend more time with their friends than with their family, feeling connected and accepted by the peer group is essential for adjustment (Dougherty, 2008; Tanti, Stukas, Halloran, & Foddy, 2011). Adolescents and emerging adults thus face the developmental task of establishing more mature relationships, which may also be a source of worry, rumination, and stress (Luyten & Fonagy, 2016). Peer evaluations have been found to impact adolescents' feelings of personal worth, with adolescents feeling less valuable if they get rejected (Bierman, 2004). Adolescents and emerging adults are more vulnerable for the costs associated with peer rejection because they typically show a higher sensitivity to peer evaluation compared to adults (Pharo, Gross, Richardson, & Hayne, 2011). As pointed out by an adolescent: "If they don't accept you, you might feel like something's wrong with you - that you're not good enough" (O'Brien & Bierman, 1988, p. 1364). Consistent with this anecdotal quote, ample research has provided evidence for the harmful effects of social exclusion on adolescents' and emerging adults' mental health, as manifested for instance in depression and anxiety (Newman, Lohman, & Newman, 2007; Stanley & Arora, 1998). Overall, research underscores the critical role of the need for belongingness or relatedness in this developmental period.

In spite of the convincing evidence for the costs associated with social exclusion, it remains unclear whether and to what extent personality differences affect adolescents' reaction to and vulnerability for the detrimental effects of social exclusion. Research on the moderating role of several dimensions of individual differences, including the Big Five factors (McDonald, Donnellan, & Navarrete, 2012) and personality disorder traits (Wirth, Lynam, & Williams, 2010) has yielded mixed evidence. Herein we examine the moderating role of a personality factor that is theoretically highly relevant for interpersonal threat, that is, dependency (Blatt, 2008). We present the findings of two experimental studies, which sought to examine the moderating role of dependency in the association between experimentally induced social exclusion versus inclusion and adolescents' relatedness satisfaction and

frustration. The experimental induction of social exclusion is a notable strength of this study, which yields a number of advantages. Because dependency cannot affect the degree of social exclusion as such (as this was under experimental control), this design allows for a ‘pure’ test of the role of dependency as a moderator. Further, although experiences of relatedness frustration and social exclusion may be bidirectional, the use of an experimental design also allows testing the direction of effects.

### **1.1 Social Exclusion**

Several theoretical frameworks stress the importance of warm and close relationships with others as a fundamental condition for human thriving. According to Baumeister and Leary (1995), the need to belong to a group and to take part in social interactions is equally compelling as the need for food. In Self-Determination Theory (Ryan & Deci, 2017), the need for relatedness has been identified as one of the three basic psychological needs next to competence and autonomy. The need for relatedness denotes the desire to establish a sense of warmth and reciprocal care with significant others as well as the desire to be a significant member of a larger, cohesive social group. From a relational framework, attachment theory states that all people display a primary striving to form and maintain a secure bond with others, which contributes to their survival and development (Bowlby, 1969). In fact, it is very hard to find a psychological theory that denies humans’ fundamental striving for affiliation (Blackhart, Nelson, Knowles, & Baumeister, 2009).

Many studies have shown that a sense of belongingness (Baumeister, Brewer, Tice, & Twenge, 2007), relatedness (e.g., Chen et al., 2015) and the development of secure attachments (Laible, 2007) predict adolescents’ self-worth, personal well-being, and psychological growth. Conversely, the frustration of this need comes with a cost. When frustrated, adolescents feel insecure about their attachments, thereby possibly even experiencing a sense of loneliness and abandonment. Relatedness frustration is related to a large number of maladaptive outcomes, including depressive symptoms (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011), stress and poor sleep (Brissette & Cohen, 2002; Campbell et al., 2017) as well as a higher mortality rate (Holt-Lunstad, Smith, & Layton, 2010).

One contextual factor that has been found to heavily thwart individuals' need for belongingness or relatedness is social exclusion (Pharo et al., 2011). Social exclusion refers to the actual or perceived exclusion from desired relationships and to the experience of being devalued by important relationship partners or groups (MacDonald & Leary, 2005, p. 202). Several experimental paradigms have been developed to study the effects of social exclusion or ostracism, with the Cyberball method being one of the most well-validated ones (Williams, 2007; Williams & Jarvis, 2006). In the Cyberball paradigm, participants are instructed to play a ball-tossing game with two other individuals over the internet. In reality, the other players are virtual characters who are assigned a predetermined role by the experimenter. When participants are assigned to the inclusion condition, the ball is thrown towards the participant in one third of the cases. In contrast, participants assigned to the exclusion condition receive the ball only once, just at the beginning of the game. During the rest of the game, the excluded participant can only watch the two players throwing the ball to each other. According to Williams (2004, 2007), being the victim of ostracism does not only thwarts one's sense of belongingness, but also one's desire for control, one's self-esteem, and even one's meaningful existence. Indeed, adolescents report a wide range of negative outcomes after being excluded during a Cyberball game, such as reduced positive mood, lowered belongingness, poorer self-esteem and decreased feelings of meaningfulness (Ruggieri, Bendixen, Gabriel, & Alsaker, 2013; Sebastian, Viding, Williams, & Blakemore, 2010; Stillman et al., 2009). There is convincing evidence that ostracism elicits aversive feelings in victims by threatening the need to belong (Williams, Cheung, & Choi, 2000). Although social rejection is primarily associated with internalizing responses, some individuals also react to rejection with anger and aggression that can even turn into violence (Leary, Kowalski, Smith, & Phillips, 2003; Twenge, Baumeister, Tice, & Stucke, 2001).

## **1.2 The Role of Dependency**

Although the need for belongingness or relatedness is conceived as a universal human need, it is still possible that some people are more sensitive to the negative effects of social rejection than others (Moller, Deci, & Elliot, 2010; Ryan, Soenens, & Vansteenkiste, 2019). Rejection-sensitive individuals, for instance, may



more strongly anticipate social rejection and more readily perceive signs of social rejection (Downey & Feldman, 1996). Research examining personality features that could affect individuals' reaction following social exclusion has led to mixed results. Studies found little systematic evidence for moderation by personality factors such as psychopathy (Wirth, 2011), self-esteem (Zadro, Williams, & Richardson, 2004), and introversion-extraversion (Nadasi, 1992) in effects of social exclusion (as manipulated with the Cyberball task) on the victims' needs and affect (see Williams, 2007, for an overview). These findings might lead to the conclusion that ostracism is so universally aversive that there is no room for individual differences.

However, it is possible that these personality variables were not sufficiently relevant for interpersonal rejection, and thus not the ideal candidates for detecting moderation effects of personality. Indeed, moderation effects have been established with dispositional factors with a higher relevance to interpersonal functioning such as high self-consciousness (Fenigstein, 1979) and attachment insecurity (Yaakobi & Williams, 2016). More specifically, highly self-conscious individuals have heightened awareness of how one is perceived by others, and this makes them more sensitive to the negative effects of rejection (Fenigstein, 1979). However, these results were not obtained using the Cyberball paradigm. Further, attachment avoidance was in the Cyberball game associated with more distress in the inclusion condition and less distress in the exclusion condition, compared to attachment security (Yaakobi & Williams, 2016). For anxiously attached individuals, exclusion in the Cyberball game leads to hyperactivation of the attachment system and, as a consequence, higher physical pain sensitivity in the exclusion condition (Frías & Shaver, 2014).

In the present study, we examine the role of another variable that is highly relevant in the context of relatedness, that is, dependency. As defined in Blatt's theory (2004, 2008), an influential theoretical framework on personality development that received much empirical confirmation in the field of clinical psychology (Luyten & Blatt, 2011), dependent individuals display an exaggerated preoccupation with interpersonal relatedness and have excessive fears of loss and abandonment. Dependency is conceived as a risk factor for psychopathology and for depressive symptoms in particular (Blatt, 2004). The interpersonal experiences of highly dependent individuals consist of both positive and negative features (Zuroff, Santor

& Mongrain, 2005). On the one hand, they have the capacity to elicit strong social support (Hankin & Abela, 2005) and even more intimate interactions (Zuroff, Stotland, Sweetman, Craig, & Koestner, 1995). On the other hand, dependency is associated with more submissive behavior in relationships (e.g., Santor, Pringle, & Israeli, 2000). Given their strong fears to lose the love and care of significant others, they also tend to engage in demanding and clinging behavior, thereby often eliciting rejection in others (Luyten & Blatt, 2011).

Two research lines have addressed the moderating role of dependency in reaction to interpersonal threats. First, several studies examined whether dependency moderates the associations between objective interpersonal stressors and maladjustment. Evidence has accumulated that highly dependent individuals report more depressive symptoms in reaction to stressful life events in the interpersonal domain (e.g., a romantic breakup) (Priel & Shahar, 2000; Shahar, Joiner, Zuroff, & Blatt, 2004), leading to conclude that dependent individuals, on average, have a higher sensitivity to interpersonal cues (Blatt & Zuroff, 1992). Whereas these studies explored reactions to objective stressors, a second line of research has examined whether dependency moderates the association between more subjective inner experiences of need frustration (including relatedness frustration) and depressive symptoms (Vandenkerckhove, Boncquet et al., 2019; Vandenkerckhove, Brenning et al., 2019). However, no interactions between dependency and the needs have been found. The present study extends previous research by examining how dependency affects need-based reactions to an experimentally induced interpersonal stressor, that is, social rejection.

### **1.3 The Present Study**

The primary purpose of the study was to investigate the unique and interactive effects of social exclusion and dependency in the prediction of participants' satisfaction and frustration of the need for relatedness. To this end, two experimental studies were conducted, thereby randomly assigning individuals to an inclusion, moderate exclusion, and a full exclusion condition through a Cyberball paradigm (Williams & Zadro, 2005).

A first research goal was to examine whether degrees of social exclusion differentially affect participants' levels of relatedness satisfaction and frustration. We hypothesized that participants in the exclusion condition would report the most elevated relatedness frustration and the least relatedness satisfaction compared to participants in the inclusion condition, with individuals assigned to the moderate exclusion condition falling in-between. Second, we explored the main effects of dependency on relatedness satisfaction and frustration. Previous studies showed dependency to be a mixed blessing, with dependent individuals experiencing on the one hand greater bonding and mutual care because of their relational orientation (Mongrain, 1998), but also more signs of interpersonal conflict, loneliness and abandonment because of their claiming interpersonal attitude (Luyten & Blatt, 2011). The present study deviates from previous studies as participants did not interact with familiar persons but with unknown individuals throughout the Cyberball game. Therefore, it remains to be seen whether the effects observed for dependency in past work would generalize to rejection by unfamiliar people and beyond the hypothesized main effect of exclusion. Third, we examined whether dependency would moderate the relation between induced ostracism and relatedness satisfaction and frustration. As previous research demonstrated that dependent individuals show higher sensitivity to interpersonal threat (Blatt & Zuroff, 1992), we hypothesized that dependency may exacerbate the associations between social exclusion and relatedness frustration. Yet, the question is whether such moderation would occur in relation to the full or only the moderate exclusion condition. Given the already documented pervasive effects of full exclusion, the room for moderation may be limited. Yet, in the case of moderate exclusion, dependent individuals' sensitivity for interpersonal threat may manifest. In a situation of moderate exclusion, which is more ambiguous and open to interpretation than a situation of full exclusion, dependency may more easily elicit a negative appraisal of the situation. That is, the threshold for feeling excluded may be lower, such that individuals high, relative to those low, in dependency experience greater relatedness frustration in the moderate exclusion, compared to the inclusion condition.

In both Study 1 and 2, the relational outcomes are assessed immediately after playing the Cyberball task, which allows examining the immediate effects of social exclusion, dependency and their interplay. Study 2 extends Study 1 by adding a

delayed assessment of relatedness satisfaction and frustration, which enabled us to examine whether dependent individuals would have more difficulty to recover from full or partial social exclusion (Williams & Zadro, 2005).

## **2 Study 1**

### **2.1 Method**

#### **2.1.1 Participants and design**

A total of 86 undergraduate psychology students at Ghent University, Belgium (74% female, mean age= 18.94, SD= 3.21) participated in a lab experiment in exchange for course credits. The study protocol was approved by the Ethical Committee of Ghent University. All participants gave their active informed consent to participate in this study.

#### **2.1.2 Procedure**

Participants were invited in groups of three students. Upon arrival to the laboratory, they were placed in front of a computer. All students were seated in cubicles to ensure that they could not see the computer screen of their neighbors. In accordance with previous studies on using the Cyberball paradigm (e.g., Zadro et al., 2004), participants were told at the start of the experiment that they were involved in a study examining the effects of mental visualization. First, they would answer personality measures, next they would engage in a training to foster their mental visualization skills and finally they would undertake a test on mental rotation. Participants first filled out a series of online questionnaires assessing personality, relatedness satisfaction and frustration, and visualization skills. When they had completed all questionnaires, the experimenter started the online training to improve their visualization skills in the form of an online ball-toss game. Participants were instructed to visualize the ball, themselves and the other players as vividly as possible. The experimenter clarified that the participants were connected with other players on the internet, but in reality the other virtual players were experimentally manipulated to include or exclude the participants in the game.

The Cyberball game shows three ball-tossers, the middle one representing the participant. The game is animated and shows the icon throwing a ball to one of the

other two players. When the ball was tossed to the participant, he or she was instructed to click on one of the other two ball-tossers and the ball would move toward that icon. The game was set for a total of 30 throws and lasted approximately four to five minutes. Once the instructions were read, the participant clicked the “Next” link and the game started automatically. At the end of the game, the program instructed participants to inform the experimenter that they had finished, and they were then asked to fill out a post-experimental questionnaire tapping into their feelings and experiences of relatedness satisfaction and frustration during the task. Following completion of the questionnaires, participants were debriefed about the nature of the study. They were informed that they were playing with virtually manipulated characters instead of real people. Finally, they were asked if they had already heard about the Cyberball experiment or if they had been suspicious of the actual goal of the experiment.

### **2.1.3 Measures.**

#### ***Pre-experimental measures.***

*Dependency.* The Depressive Experiences Questionnaire for adolescents (DEQ-A; Blatt, Schaffer, Bers, & Quinlan, 1992) was used to assess dependency. The DEQ-A is an age-appropriate, 66-item adaptation of the DEQ for adults (Blatt et al., 1976) for use with adolescents, and consists of three subscales: dependency, self-criticism and efficacy. In this study, only the dependency scale was used. Items had to be rated on a scale from 1 (totally disagree) to 7 (totally agree). Much like the original DEQ, the DEQ-A is scored using weighted factor scores (Zuroff, Mongrain, & Santor, 2004). Participants’ responses on the 66-items are transformed to z-scores using means and standard deviations from a large sample originally collected by Blatt et al. (1992). These z-scores are then weighted by factor coefficient scores that were also derived from this larger sample and averaged to form scores for dependency. Previous research has supported the test-retest reliability (Blatt et al., 1992) and validity (Enns, Cox, & Inayatulla, 2003; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999) of the DEQ-A. Cronbach’s alpha was .79 in the current sample.

### ***Experimental measures.***

*Social exclusion.* The Cyberball paradigm (Williams, Cheung, & Choi, 2000) was used to manipulate ostracism. In accordance with previous studies (Sebastian et al., 2010), participants were told that they were involved in a study examining mental visualization ability. Participants were randomly assigned to one of three conditions that differed in the degree of ostracism. Participants in the inclusion condition received the ball 33% of the total throws. Participants in the full exclusion condition received the ball only once at the beginning of the game and never received the ball again during the rest of the game. In the moderate exclusion condition, the probability that participants would receive the ball was 20% (Williams et al., 2000).

### ***Post-experimental measures.***

*Relatedness.* The relatedness satisfaction and the relatedness frustration subscales of the Basic Psychological Need Satisfaction and Need Frustration Scale (BPNSNF; Chen et al., 2015) were used to assess relatedness satisfaction (4 items) and relatedness frustration (4 items). Items were rated on a 5-point Likert scale ranging from 1 (Completely disagree) to 5 (Completely agree). We slightly adapted the questionnaire to make it more suitable for a state assessment. Specifically, we made it clear in the stem that their experiences referred to their experiences during the tossing game (i.e., “During the ball tossing game ...”) and we referred to the ‘fellow players’ instead of ‘others’ in the actual items. An example item for relatedness satisfaction is “During the ball tossing game, I felt connected with the fellow players” and for relatedness frustration “During the ball tossing game, I felt a big distance between me and the fellow players“. Internal consistency was good with Cronbach’s  $\alpha = .81$  for relatedness satisfaction and  $\alpha = .84$  for relatedness frustration.

## **2.2 Results**

### **2.2.1 Preliminary Analyses**

*Correlations and Background Variables.* To determine whether participants’ scores on the study variables varied by background variables, a multivariate test of variance (MANOVA) was conducted with gender as a fixed factor, age as a covariate and all study variables as dependent variables. In contrast to age,  $F(3,81) = 1.34, p > .05$ , gender had a significant multivariate effect,  $F(3,81) = 2.97, p$

$< .05$ . Female participants reported, on average, more dependency ( $M_{\text{men}} = -.52$ ,  $M_{\text{women}} = -.22$ ) than male participants ( $F(1,84) = 5.09$ ,  $p < .05$ ). Dependency was unrelated to either relatedness satisfaction or relatedness frustration, with relatedness satisfaction and frustration being negatively related to one another.

**Randomization check.** First, we examined whether there were pre-existing between-condition differences in age and dependency using ANOVAs with condition as a predictor variable and age and dependency as outcome variables. Further, a chi-square test was used to examine between-condition differences in gender. As there were no significant differences between the three conditions on any of the variables assessed prior to the experimental task ( $p < .05$ ), the randomization was deemed successful.

### 2.2.2 Primary analyses

**Research Question 1: The Effect of Social Exclusion.** A MANOVA, with condition as a fixed factor and relatedness satisfaction and relatedness frustration as dependent variables, yielded a significant multivariate effect of condition ( $F(4,160) = 8.99$ ,  $p < .001$ ;  $\eta^2 = .18$ ). As represented in Table 6-1, follow-up ANOVAs indicated that the three conditions differed in terms of relatedness satisfaction ( $F(2,80) = 6.77$ ,  $p < .01$ ,  $\eta^2 = .15$ ). Participants in the full exclusion condition experienced less relatedness satisfaction than participants in the inclusion condition ( $t = -5.21$ ,  $p < .001$ , Cohen's  $d = -1.41$ ). This finding indicates that the mean of relatedness satisfaction in the full exclusion condition is 1.41 standard deviations lower than the mean in the inclusion condition. Cohen's  $d = .20$  represents a small effect, whereas  $d = .50$  and  $.80$  are considered, respectively, as a medium and a large effect (Cohen, 1988). Participants in the moderate exclusion group reported less relatedness satisfaction compared to the inclusion group ( $t = -2.36$ ,  $p < .05$ , Cohen's  $d = -.64$ ), but still more than participants in the full exclusion group ( $t = 3.48$ ,  $p < .001$ , Cohen's  $d = .90$ ). The findings for relatedness frustration paralleled those for relatedness satisfaction. The three conditions differed significantly from each other ( $F(2,80) = 22.44$ ,  $p < .001$ ,  $\eta^2 = .36$ ), with participants in the full exclusion condition reporting more relatedness frustration than those in either the inclusion ( $t = 7.83$ ,  $p < .001$ , Cohen's  $d = 2.10$ ) or the moderate exclusion condition ( $t = 3.60$ ,  $p < .001$ , Cohen's  $d = .94$ ). Participants in

the moderate exclusion condition also experienced more relatedness frustration compared to those in the inclusion group ( $t = 4.20, p < .001$ , Cohen's  $d = 1.11$ ). In sum, all three conditions significantly differed from one another on both measures of relatedness, with the moderate exclusion condition falling perfectly in between the two other conditions.

**Table 6-1.** Means and Standard Deviations for the Three Experimental Conditions together with F-Values and Effect Sizes of ANOVA-analyses (Study 1)

	Inclusion condition	Moderate exclusion condition	Full exclusion condition	Effects of condition	
	Mean (SD)	Mean (SD)	Mean (SD)	F-value	Eta- squared
Relatedness satisfaction	2.38 (.72)	1.99 (.51)	1.56 (.43)	6.77**	.15
Relatedness frustration	2.36 (.67)	3.16 (.75)	3.86 (.75)	22.44***	.36

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . SD = standard deviation.

**Research Questions 2 and 3: Main Effect and Moderating Role of Dependency.** A series of hierarchical regression analyses were conducted to examine the main effects of social exclusion and dependency as well as their interaction. For this aim, condition was recoded into two dummy variables. As for the first dummy variable, individuals in the moderate exclusion condition were assigned a value of one, while those involved in the other two conditions a value of zero. In the case of the second dummy variable, individuals in the full exclusion condition were assigned a value of one and those in the other two conditions a value of zero (Quené & van den Bergh, 2004). The simultaneous inclusion of both dummies in a series of regression analyses is required to gain insight in the effect of moderate exclusion relative to inclusion (i.e., dummy 1) and full exclusion relative to inclusion (i.e., dummy 2). Apart from these two dummies, also dependency and the interaction between both dummy variables and dependency were included in the prediction of relatedness satisfaction and relatedness frustration as dependent variables. Interaction terms were



created by multiplying z-scored predictors (Aiken & West, 1991). The results are presented in Table 6-2.

First, mirroring the ANOVA-analyses, we found significant effects of the two dummy variables on relatedness satisfaction and relatedness frustration. Specifically, participants in the two exclusion conditions experience, on average, less relatedness satisfaction and more relatedness frustration compared to the participants in the inclusion condition. Next, dependency failed to have a main effect on relatedness satisfaction and frustration. Also the interaction effects between dependency and the dummy variables representing the exclusion conditions were not significant.

**Table 6-2.** *Standardized Beta-Coefficients of Hierarchical Regression Analyses Predicting Experiences of Relatedness Based on Experimental Condition Assignment and Dependency (Study 1)*

	Relatedness satisfaction		Relatedness frustration	
	Step 1	Step 2	Step 1	Step 2
Moderate Exclusion vs. Inclusion (D1)	-.30*	-.29*	.44**	.44**
Full exclusion vs. Inclusion (D2)	-.61**	-.60**	.78**	.78**
Dependency	-.05	-.06	.15	.16
D 1 * Dependency		-.04		-.04
D 2 * Dependency		-.08		.01

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### 2.3 Brief discussion

The results from Study 1 revealed that social exclusion affects relatedness satisfaction and frustration. The degree of relatedness satisfaction and frustration depends on the condition the participant was in, namely inclusion, moderate exclusion

or full exclusion. Rather unexpectedly, there was no significant interaction between dependency and need frustration. A possible explanation might be that the Cyberball manipulation might be so powerful that it elicits a universal automatic reaction (Williams, 2009). Indeed, the immediate reaction following Cyberball is fast and quite strong, as reflected in the large effect sizes. This might leave little room for moderation by dispositional or situationally relevant factors (Van Beest, Williams, & Van Dijk, 2011; Zadro e.a., 2004). Therefore, even for participants with low levels of dependency, social exclusion in the Cyberball game threatens their need for relatedness. According to Williams' (2009) temporal need-threat model of ostracism, personality could play a more important role in the later stages of processing, when the ostracized individual is reflecting upon the experience of social exclusion. Individuals with a higher personality vulnerability would recover more slowly after exclusion (Zadro, Boland, & Richardson, 2006). However, previous studies testing this model have yielded mixed results (Hartgerink, Beest, Wicherts, & Williams, 2015) and more research is needed. Especially the personality characteristic dependency has not yet been studied in this context. Therefore, in Study 2, we sought to examine whether the effect of dependency would differ as a function of the timing of assessment of relatedness-based experiences.

### **3 Study 2**

The second study extends Study 1 by exploring both immediate and delayed need-based responses to social exclusion. Indeed, higher sensitivity to rejection could manifest immediately after the experience of exclusion, with individual differences affecting the threshold to perceive signs of rejection, or in the later stages of processing, with individual differences influencing the recovery of social exclusion (Williams & Zadro, 2005). Personality factors may fail to alter immediate reactions to social exclusion but can still affect the pace of recovery from social exclusion. For example, although social anxiety does not affect the immediate response after social exclusion, it does impact slower recovery 45 minutes after finishing the task (Zadro et al., 2006).

In Study 2, participants reported about their experiences of relatedness satisfaction and frustration immediately after the Cyberball task and also one week

later. The immediate response serves as an internal replication of the findings in Study 1. Consequently, we hypothesize that social exclusion would be associated with more relatedness frustration and less relatedness satisfaction immediately after the Cyberball task. Given the findings in Study 1, we could expect that the main effect of dependency and the interaction between dependency and social exclusion would not be significant. Yet, as in previous research (Zadro et al., 2006), the inclusion of a delayed assessment of relatedness allowed us to examine whether individuals high, compared to those low, in dependency would recall either the moderate or intense exclusion as more thwarting and less satisfying of their need for relatedness one week after the actual exposure to exclusion (i.e., delayed interaction effect).

### **3.1 Method**

#### **3.1.1 Participants and design**

Participants were 94 undergraduate students in psychology (88.3% female) who participated in a lab experiment in return for course credits. The mean age of the sample was 18.91 years ( $SD = 1.37$ , range = 17.73 – 25.11 years). All participants gave their informed consent to participate in the study. The Ethical Committee of the Faculty of Psychology and Educational Sciences of Ghent University has confirmed that the research was conducted according to the ethical rules presented in its General Ethical Protocol.

#### **3.1.2 Procedure**

Before the start of the experiment, all participants were made aware of the voluntary nature of the study and their anonymity was guaranteed. The study consisted of two parts. The first part was completely identical to the first study in which participants played the Cyberball game and answered questionnaires tapping into relatedness satisfaction and frustration immediately after completing the Cyberball game. The second part of the study was new and took place one week later. All participants were invited by mail to fill out an online short questionnaire on their memory of the experiment. In accordance with Van der Kaap-Deeder et al (2016), participants were instructed to think back of the experiment and briefly describe what had happened during the experimental session. After this short description,

participants answered a questionnaire tapping into their memories of relatedness satisfaction and frustration. Immediately after filling out the questionnaires, all participants received an online debriefing in which the goals of the study were clearly explained.

### **3.1.3 Measures**

#### ***Pre-experimental measures.***

*Dependency.* Similar as in Study 1, The Depressive Experiences Questionnaire for adolescents (DEQ-A; Blatt, Schaffer, Bers, & Quinlan, 1992) was used to assess dependency. Internal consistency for dependency was good with Cronbach's  $\alpha = .85$  in the current sample.

#### ***Experimental measures.***

*Social exclusion.* As in Study 1, the Cyberball paradigm (Williams et al., 2000) was used to manipulate ostracism. Participants were randomly assigned to one of three conditions that differed in the degree of ostracism: inclusion, moderate exclusion and exclusion (See study 1 for more detailed information).

#### ***Post-experimental measures.***

*Relatedness satisfaction and frustration.* Similar as in Study 1, two subscales of the Basic Psychological Need Satisfaction and Need Frustration Scale (BPNSNF; Chen et al., 2015) were used to assess experiences of relatedness satisfaction (4 items) and relatedness frustration (4 items) directly following the experimental manipulation. In this sample, internal consistency was good with Cronbach's  $\alpha = .83$  for relatedness satisfaction and  $\alpha = .84$  for relatedness frustration.

*Recalled relatedness satisfaction and frustration.* One week after the experiment, participants were asked to recall how they had felt during the actual experiment. Their degree of relatedness satisfaction ("During the experiment, I felt connected with my fellow players") and relatedness frustration ("During the experiment, my fellow players did not like me") were assessed with a single item, similar to previous research (e.g., Van der Kaap-Deeder et al., 2016) on memory of need-based experiences. The two items were rated on a Likert scale ranging from 1 (don't agree at all) to 5 (completely agree).

### 3.2 Results

#### 3.2.1 Preliminary Analyses

**Correlations and Background Variables.** Table 6-3 presents the correlations between the study variables. Dependency correlated positively with delayed but not with immediate relatedness frustration, while it was unrelated to any of the relatedness satisfaction measures. The corresponding immediate and delayed measures of relatedness satisfaction and frustration were positively correlated. While relatedness satisfaction immediately after the Cyberball task was negatively correlated with both the immediate and delayed measure of relatedness frustration, relatedness satisfaction and relatedness frustration one week later were unrelated.

**Table 6-3.** Descriptives and Correlations among all Study Variables (Study 2)

	1	2	3	4	M (SD)
1. Dependency					-1.14 (.48)
2. Immediate relatedness satisfaction	.02				2.00 (.76)
3. Immediate relatedness frustration	.02	-.56***			2.99 (1.03)
4. Recalled relatedness satisfaction	.20	.38***	.01		2.14 (1.01)
5. Recalled relatedness frustration	.26*	-.25*	.51***	.10	2.14 (1.23)

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . M = mean. SD = standard deviation.

The relation between the background characteristics (i.e., gender and age) and the study variables was examined by means of a MANCOVA with gender as a between-subjects variable, age as a covariate and all the study variables as dependent variables. Gender had a significant effect on the study variables,  $F(20,59) = 3.01$ ,  $p < .01$ , with females reporting less relatedness satisfaction at the delayed assessment ( $M_{\text{men}} = 3.00$ ,  $M_{\text{women}} = 2.11$ ). Age had no significant multivariate effect on the study

variables,  $F(20,59) = 3.01, p > .05$ . Therefore, we controlled for gender in the primary analyses.

**Randomization check.** To examine whether there were pre-existing between-condition differences in age and dependency, two separate ANOVAs were conducted with condition as fixed factor and age and dependency as dependent variables. Next, a chi-square test was used to examine between-condition differences in gender. The randomization procedure was successful, as we detected no significant differences between the three conditions on any of the variables assessed prior to the experimental task ( $p < .05$  for all three analyses).

### 3.2.2 Primary analyses

#### Research Question 1: The Effect of Social Exclusion.

**Immediate effects.** First, the effects of condition on relatedness satisfaction and frustration immediately after the Cyberball task were examined. A MANOVA to test the effect of social exclusion on relatedness satisfaction and frustration was significant ( $F(4,174) = 4.05, p < .01, \eta^2 = .09$ ). Next, as shown in Table 6-4, separate ANOVAs indicated that there was a significant effect of condition on relatedness satisfaction ( $F(2,88) = 4.99, p < .01, \eta^2 = .10$ ) and relatedness frustration ( $F(2,88) = 3.60, p < .05, \eta^2 = .08$ ). The differences between the conditions generally paralleled those in Study 1. Participants in the two extreme groups (i.e., inclusion and full exclusion) differed significantly in terms of both relatedness satisfaction ( $t = 4.59, p < .001$ , Cohen's  $d = 1.16$ ) and relatedness frustration ( $t = -4.25, p < .001$ , Cohen's  $d = -1.07$ ). The findings for participants in the moderate exclusion group fell in between these two extremes, although they did not differ systematically on both relatedness outcomes. Although participants in the moderate exclusion group reported more relatedness frustration compared to those in the inclusion group ( $t = -3.64, p < .01$ , Cohen's  $d = -0.92$ ), they did not differ in terms of relatedness satisfaction ( $t = 1.91, p > .05$ ). Finally, although participants in the full exclusion group significantly reported less relatedness satisfaction than those in the moderate exclusion group ( $t = -2.89, p < .01$ , Cohen's  $d = -.73$ ), they did not differ in terms of relatedness frustration was not significant ( $t = .91, p > .05$ ).

**Recalled effects.** Next, we investigated the effects of condition on relatedness satisfaction and frustration one week later after participating in the Cyberball experiment. First, we examined the delayed effects of social exclusion on relatedness satisfaction and frustration assessed one week after participation in the Cyberball experiment. A MANOVA was conducted to test the effect of social exclusion on relatedness satisfaction and frustration, which was significant ( $F(4, 156) = 2.44, p < .05, \eta^2 = .06$ ). Next, separate ANOVAs indicated that there was a significant effect of condition on relatedness frustration one week later ( $F(2, 78) = 4.51, p < .05, \eta^2 = .01$ ), but not on relatedness satisfaction ( $F(2, 78) = .93, p > .05$ ). Participants in the moderate exclusion condition reported more relatedness frustration one week after the Cyberball experiment compared to participants in the inclusion condition ( $t = -2.61, p < .05$ , Cohen's  $d = 0.69$ ). The inclusion and the full exclusion group ( $t = -1.22, p > .05$ ), and the exclusion and moderate exclusion group ( $t = -1.49, p > .05$ ) did not significantly differ in terms of relatedness frustration.

**Table 6-4:** Means and Standard Deviations for the Three Experimental Conditions together with F-values and Effect Sizes of ANOVA-analyses (Study 2).

	Inclusion condition	Moderate exclusion condition	Full exclusion condition	Effects of condition	
	Mean (SD)	Mean (SD)	Mean (SD)	F	Eta- squared
Immediate					
Relatedness satisfaction	2.40 (.80)	2.04 (.66)	1.59 (.59)	4.99**	.10
Relatedness frustration	2.39 (.75)	3.17 (.94)	3.40 (1.12)	3.60*	.08
Recalled					
Relatedness satisfaction	2.17 (.99)	2.32 (1.18)	1.97 (.87)	.93	.02
Relatedness frustration	2.39 (.75)	3.17 (.94)	3.41 (1.12)	4.51*	.10

Note. SD = standard deviation. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### **Research Questions 2 and 3: Main Effects and Moderating Role of Dependency.**

***Immediate effects.*** Next, we conducted a series of regression analyses to examine the combined effects of condition and dependency, thereby following the same procedures as in Study 1. As displayed in Table 6-5, participants in the full exclusion condition, compared to those in the inclusion condition, reported less relatedness satisfaction and more relatedness frustration. Moderate exclusion only affected participants' levels of relatedness frustration as compared to their counterparts in the inclusion condition. Similar to Study 1, no main effects were found for dependency and the interaction between dependency and social exclusion was not significant. Overall, these results indicate that social exclusion affects relatedness satisfaction and relatedness frustration in the Cyberball game, regardless of the individuals' levels of dependency.

***Delayed effects.*** Further, we examined the effects of condition and dependency on relatedness satisfaction and frustration one week after the Cyberball experiment. The regression analysis revealed a significant main effect of dependency on relatedness frustration. This finding indicated that highly dependent individuals reported more relatedness frustration one week later when they think back to the experiment, regardless of the condition they were assigned to. The interaction effects between dependency and the dummy variables were not significant.



**Table 6-5:** Standardized Beta-coefficients of Hierarchical Regression Analyses Predicting Experiences of Relatedness based on Experimental Condition Assignment and Dependency (Study 2).

	Relatedness satisfaction				Relatedness frustration			
	Immediate		Recalled		Immediate		Recalled	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step2
Moderate Exclusion vs. Inclusion (D1)	-.23*	-.14	.08	.09	.37**	.37**	.35**	.33**
Full exclusion vs. Inclusion (D2)	-.51***	-.33**	-.06	-.06	.48**	.48***	.18	.17
Dependency	-.03	-.11	.19	.20	.08	.08	.28**	.28*
D 1* Dependency		-.03		-.01		-.01		.11
D 2 * Dependency		-.02		-.11		.03		.15
R <sup>2</sup>	.20	.20	.24	.26	.19	.19	.16	.18
R <sup>2</sup> Change		.00		.01		.00		.02

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

### **3.3 Brief Discussion**

Overall, the results for the outcomes assessed directly following the experimental manipulation followed a similar pattern as the one observed in Study 1, especially for the two most extreme conditions (i.e. the inclusion and the full exclusion conditions). Results of Study 2 built on Study 1 by additionally examining delayed reactions to social exclusion. Most of the initially observed differences between the three conditions waned, with the exception that participants in the moderate exclusion condition reported more relatedness frustration when asked to recall their initial experiences during the experimental session one week later. As for the role of dependency, relatedness experiences assessed directly following the experimental manipulation were unrelated to dependency, yet, the inclusion of a delayed measure appeared fruitful. Highly dependent individuals reported greater relatedness frustration during the recall task. This effect emerged regardless of the condition individuals were assigned to as dependency did not moderate associations between social exclusion and relatedness satisfaction and frustration, neither when assessed immediately following the experimental manipulation nor in a delayed manner. Overall, the findings point to the immediate detrimental effects of social exclusion on relatedness experiences, regardless of individuals' levels of dependency.

## **4 General Discussion**

The main goal of this study was to provide more insight in the effects of social exclusion on satisfaction and frustration of the need for relatedness, and the possible moderating role of dependency in this association. Therefore, we conducted two experimental studies in which social exclusion was experimentally induced through a Cyberball paradigm (Williams & Zadro, 2005). The first study found evidence for immediate effects of social exclusion on relatedness satisfaction and frustration. However, no main effects of dependency were found, nor interactions between dependency and social exclusion. The second study replicated the first study by demonstrating comparable results for the immediate effects of social exclusion and dependency. Moreover, the second study also extended the first study by examining effects on relatedness frustration one week later, thereby revealing a main effect of

dependency on relatedness frustration and a main effect of moderate exclusion on relatedness satisfaction and frustration.

#### **4.1 Causal Impact of Social Exclusion**

Immediately following the experimental manipulation, participants in the full exclusion group reported more relatedness frustration and less relatedness satisfaction compared to their included counterparts, a finding which appeared systematically across both studies. Although the moderate exclusion group occupied a position in between these two extreme groups in both studies, the difference with them did not systematically reach significance in Study 2. The pattern was clear-cut in Study 1, with the three conditions following an A-B-C-pattern, suggesting they all differ from one another on both outcomes. The present findings provide further evidence for the validity of the Cyberball paradigm (Williams, 2007), as this online ball-tossing game was found to systematically thwart participants' basic psychological need for relatedness. The finding is in line with previous research indicating that social exclusion induced through the Cyberball game is highly threatening and comes with a cost, as indicated by reduced self-esteem, mood, and perceived meaning in life after being ostracized (Zadro et al., 2004).

Although the harmful effects of social exclusion have been experimentally studied from diverse theoretical angles (Hartgerink et al., 2015; Williams, 2007), experimental work on the effects of relatedness-thwarting environments is rather novel in SDT (but see Sheldon & Filak, 2008). Indeed, previous experimental research in SDT mainly focused on the contextual manipulation of the other two needs, that is, autonomy and competence (e.g., De Muynck et al., 2017; Houliort et al., 2002; Weinstein & Ryan, 2010). This study adds to this literature by providing evidence for the causal impact of the degree of social exclusion on the satisfaction and frustration of the need for relatedness. Indeed, the experimental manipulation of social exclusion provides insight in the direction of the effects: social exclusion, especially if more intensive in nature, caused relatedness frustration, while hampering experiences of relatedness satisfaction. Although social exclusion and relatedness may be dynamically related, with individuals high in relatedness frustration selecting themselves into situations where they get socially excluded, the present study

indicates that relatedness frustration also results from being socially excluded. Even a mild dose of exclusion was sufficient to elicit a sense of alienation and distance with others, as the moderate exclusion group systematically experienced more relatedness frustration compared to the inclusion group across both studies. Future longitudinal work is needed to examine possible bidirectional effects between social exclusion and experiences of relatedness. Alternatively, the link between relatedness and social inclusion may also be experimentally studied in future work to examine causal evidence in the opposite direction.

Results from the delayed assessment revealed that the effects of exclusion extinguished rather rapidly, with only the moderate exclusion group reporting continued relatedness frustration when reflecting back on their initial participation in the toss-ball game one week later. Interestingly, but also rather surprisingly, participants in the full exclusion condition did not report elevated relatedness frustration one week later. A possible explanation is that the manipulation in the full exclusion condition was that obvious that participants realized that the social exclusion was artificially induced by the experiment leader. In contrast, the manipulation may have been more realistic for participants in the moderate exclusion condition as the manipulation was more ambiguous, involving a more balanced combination of inclusion and exclusion. As such, this mild form of exclusion may have elicited more doubt and rumination among participants in the week following the experimental manipulation. This explanation is in line with previous research suggesting that rumination hinders recovery in targets of ostracism (Wesselmann, Ren, Swim, & Williams, 2013). For future research, it would be interesting to investigate the role of coping in reactions to events that threaten the need for relatedness. As prior research also showed that people show more avoidant coping after exposure to need-frustrating events (Van Der Kaap-Deeder et al., 2016), future studies are recommended to use a broad range of adaptive (e.g., acceptance) and maladaptive (i.e. rumination and avoidance) coping strategies to explain reactions to social exclusion.

## 4.2 The Role of dependency

A second important aim of the present study was to examine the role of dependency in reacting to social exclusion. In none of both studies, dependency related to experiences of relatedness satisfaction or frustration when assessed immediately after the Cyberball game. Yet, results from Study 2 indicated that dependency had a significant effect on relatedness frustration one week later. One possible reason for why the effect of dependency only emerges over time is that the effect of the contextual manipulation waned, creating more room for interindividual differences to play a significant role. Notably, this effect was not dependent upon the condition to which participants were assigned as dependency did not interact with condition assignment in the prediction of experiences of relatedness. Said differently, highly dependent individuals are more likely to remember the Cyberball task as an experience threatening the need for relatedness.

Although we had hypothesized that highly dependent individuals would be more sensitive to the negative consequences of social exclusion, no evidence for moderation was found. This finding is in contrast to previous studies that did report evidence for a moderating role of dependency in the association between interpersonal stressors and distress (Priel & Shahar, 2000; Shahar et al., 2004). Several explanations can be raised to better understand this lack of moderation. First, the previous studies providing evidence for moderation by dependency relied on self-report assessments of negative life events instead of using an experimental exposure to a standardized event (Priel & Shahar, 2000; Shahar et al., 2004). Consequently, the assessment of the exposure to interpersonal stressors could be biased by individuals' level of dependency as such. For example, highly dependent individuals might have a lower threshold to perceive interpersonal events as stressful or remember them for a longer period of time.

Second, dependency is often portrayed as a two-edged sword that entails both aspects of resilience (i.e. capacity to elicit social support) and maladaptive aspects (i.e., separation anxiety and claiming behavior) (Casalin, Luyten, Besser, Wouters, & Vliegen, 2014; Mongrain, 1998). As such, one could argue that these adaptive features cancel out the more maladaptive features of dependency and hinder dependency to play a clear-cut moderating role. However, follow-up analyses separating between the

adaptive and maladaptive aspects of dependency (thereby relying on the calculation of subscales within the dependency factor as outlined by Blatt, Zohar, Quinlan, Zuroff, & Mongrain, 1995) in the present sample did not reveal any interaction effects between condition and dependency either.

Third, the manipulation of social exclusion in the present study may have been too strong to detect moderation by dependency. Indeed, the Cyberball game can be considered as a strong situation, because it universally elicits discomfort in an almost reflexive fashion. Consequently, participants' immediate reactions to social exclusion might be rather automatic, with interindividual differences in sensitivity not having room to surface (Zadro et al., 2004; Williams, 2009). Said differently, the potential heightened sensitivity towards interpersonal stressors in highly dependent individuals might have been overruled by the powerful manipulation of social exclusion. The lack of interaction effect in both studies in relation to moderate exclusion and the lack of an effect on the delayed measure of relatedness frustration runs, however, counter to this explanation. Nevertheless, future studies may use more ambiguous manipulations of social exclusion to detect the more subtle effects of personality characteristics. For example, future research could use a greater mix of facets of inclusion and exclusion in order to investigate whether highly dependent individuals would direct their attention more towards cues of exclusion.

Fourth, dependent individuals' fear of abandonment is mainly centered around significant others. Indeed, dependency is characterized by intense fears of losing the love of close others and therefore their demanding and claiming interpersonal style is directed towards the significant others in their lives. Consequently, a Cyberball game with unknown co-players might not be effective to strongly activate their concerns about separation and their tendency to seek proximity. Alternatively, a Cyberball game in which the other players are significant others might have much more relevance to awaken dependent individuals' fears of abandonment and relational exclusion. A limited number of previous studies have already demonstrated differential effects of exclusion by a friend compared to exclusion by a stranger in the cyberball game (e.g., Baddam et al., 2016), but the role of dependency has not yet been studied in this context. Given dependent individuals' excessive concerns about losing the love of their significant others, it may be interesting to

explore the interaction between dependency and social exclusion by significant others (e.g., best friends or parents).

### **4.3 Limitations and Suggestions for Future Research**

The present study had several limitations. A first important weakness is that we used a single-item version of the questionnaire tapping into relatedness satisfaction and frustration at the delayed assessment, whereas the full version of the questionnaire was used at the immediate assessment (with 4 items tapping into relatedness satisfaction and 4 items into relatedness frustration). Therefore, the changes in relatedness satisfaction and frustration over time could not be formally tested. Future research should try to overcome this problem by using the full version of the questionnaire at both assessments to test recovery in the need for relatedness over time. Next, the present study did not include state-level measures of relatedness satisfaction and frustration prior to the experimental manipulation. It would be interesting for future research to explicitly test how the experimental induction of social exclusion affects changes in state-levels of relatedness experiences.

Next, the sample size in the present study might have been too small to detect significant interaction effects. Future studies are needed to replicate these findings in larger samples. As the participants in the present study were all university students, the results do not necessarily generalize to the larger population. As previous research suggested that younger adolescents are more sensitive to rejection (Pharo et al., 2011), it would be interesting to replicate this study in a sample of high school students. Conducting the manipulation of social exclusion in the school setting (instead of in the laboratory at the university) may also increase the ecological validity. In doing so, the participants might get the false instruction that they are playing the Cyberball game together with their classmates (instead of with other players on the internet).

Furthermore, the outcome variables in this study were assessed with self-report questionnaires. Future studies might attempt to find interactions between dependency and social exclusion on more implicit outcomes. For example, there is recent evidence that social exclusion also affects cognitive processes, like visual working memory (Xu et al., 2018) and attention towards social information (i.e. smiling and angry faces) (Xu et al., 2015). It would be interesting to explore whether

dependent individuals' susceptibility to interpersonal stressors would be manifested in cognitive biases.

Next, future studies could also examine the moderating role of dependency in compensating behavior after social exclusion. Hartgerink et al. (2015) argued that interpersonal outcomes (e.g., prosocial behavior, hostility) leave more room for moderation in the Cyberball paradigm. According to the social monitoring system framework (Pickett & Gardner, 2005), excluded individuals make more efforts to connect to new potential sources of affiliation, for example by expressing a greater interest in making new friends (Maner, DeWall, Baumeister, & Schaller, 2007). Based on Blatt's (2004) conceptualization of dependent individuals having an excessive need for closeness, it could be hypothesized that highly dependent individuals try harder to forge new social bonds and seek re-affiliation after exposure to ostracism as compared to less dependent people. Next to investigating other outcome variables, it could also be interesting to examine the effect of additional experimental conditions. In the present study, the inclusion condition was perceived as a rather neutral condition, given the comparable scores on relatedness satisfaction and frustration. The addition of a relatedness-supportive condition (eliciting higher relatedness satisfaction and lower relatedness frustration) might increase the chance to find a moderation effect. Finally, future studies could also identify other potential moderators in the associations between social exclusion and relatedness experiences. In particular, less is known about individual differences that mitigate the effects of social exclusion. For example, dispositional mindfulness could be a good candidate given its association with more adaptive stress appraisals (Weinstein, Brown, & Ryan, 2009).



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## Appendix

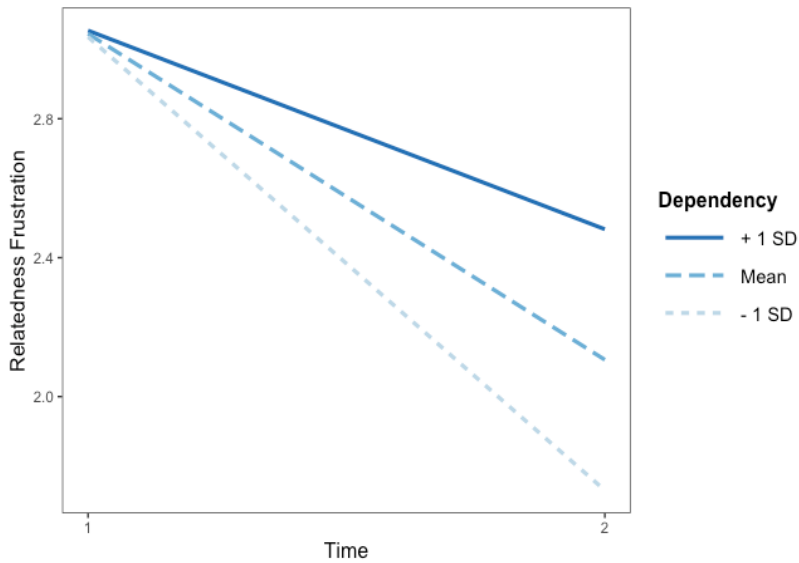
To examine how the scores on relatedness frustration changed over time after participating the Cyberball task, mixed-effects models were performed in R with the lmer package (Bates, Maechler, & Bolker, 2011, R Development Core Team, 2011). Unfortunately, the delayed assessment of relatedness frustration was not identical to the assessment immediately after the Cyberball experiment. More specifically, the immediate assessment of relatedness frustration consisted of 4 items whereas the delayed assessment consisted of 1 item that did not have exactly the same phrasing. Therefore, the response variables in the current models are scores based on the two most similar items in terms of the content (Time 1: ‘During the Cyberball task, I experienced the other players as acting cold and distant towards me’; Time 2: ‘During the Cyberball task, I experienced that other present people did not like me’.) and their correlation ( $r = .51$ ,  $p < .001$ ). Consequently, the effects over time should be interpreted with great caution.

To predict relatedness frustration, a process of stepwise regression model building with backward selection was used. The final model ( $Y_{\text{relatedness frustration}} \sim \beta_0 + \beta_{\text{dependency}} + \beta_{\text{dummy1}} + \beta_{\text{dummy2}} + \beta_{\text{time}} + \beta_{\text{dependency*time}}$ ) with ‘participant code’ as random effect did not differ significantly from the full saturated model ( $\chi^2 = 9.46$ ,  $p = .15$ ). First, the final model and its parameter estimates (see Table 6-6) indicate that the main effects of condition still remain, apart from time or level of dependency. Also, a significant two-way interaction effect was found between dependency and time, showing that individuals scoring high in dependency at baseline level score higher on relatedness frustration one week after the experiment, relative to individuals scoring on average and low on dependency (see Figure 6-1). This slower decrease in relatedness frustration over time in highly dependent individuals, thereby, could identify difficulties of recovering from interpersonal stressors. Although replication with larger samples and more comprehensive measures is necessary to draw firm conclusions, this two-way interaction holds promise for further investigation.

**Table 6-6.** Main Effects and Interactions using Linear-mixed Models (Second Study).

	Estimate	SD	df	t-value	p
Intercept	2.65	.60	133.58	4.45	< .001***
Moderate Exclusion vs. Inclusion (D1)	.70	.27	87.67	2.64	< .01**
Full exclusion vs. Inclusion (D2)	.82	.26	86.03	3.11	<.01**
Dependency	-.73	.47	127.25	-1.55	.12
Time	-.09	.35	82.60	-.25	.80
Dependency*Time	.75	.28	83.66	2.65	<.01**

*Note.* *df* = degrees of freedom. \* *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001.



**Figure 6-1.** The Interaction between Time and Dependency on Relatedness Frustration (Second Study).

*Note.* On the x-axis, Time with level 1 refers to the measurement after the Cyberball task and level 2 refers to the measurement one week after the experiment. Numbers on the lines are (unstandardized) simple slope analyses

## **CHAPTER 7**

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### **General Discussion**

**Table of contents**

**1 Introduction**..... 266

1.1 A Summary of the Main Effects of Personality on Maladjustment ..... 266

1.2 The Mediating Role of Basic Psychological Needs in the Relation Between Personality and Maladjustment (Objective 1) ..... 268

1.3 Exploring the Moderating Role of Self-criticism and Dependency in the Relation Between Need-Based Experiences and (Mal)adjustment (Aim 2)..... 273

**2 Directions for Future research**..... 278

2.1 The Mediating Role of the Basic Needs in Associations between Personality and Maladjustment (Aim 1) ..... 279

2.2 The Moderating Role of Personality in the Associations Between the Needs and (Mal)adjustment (Aim 2)..... 281

2.3 General directions for future research ..... 282

**3 Clinical Implications** ..... 290

3.1 Self-criticism and Dependency as Targets for Intervention ..... 290

3.2 The Basic Psychological Needs as Targets for Intervention ..... 292

**4 General Conclusion**..... 294

**5 References**..... 296

The key objective of this dissertation was to examine the interplay between self-criticism, dependency – dimensions of personality vulnerability central in the theory of Blatt (2004, 2008) – and the basic psychological needs as defined in Self-Determination Theory (SDT; Ryan & Deci, 2017) in adolescent (mal)adjustment. In doing so, we examined both mediation and moderation models. First, we investigated whether need-based experiences explain or mediate associations between self-criticism, dependency and (mal)adjustment (Objective 1). Second, we examined whether self-criticism and dependency alter the association between need-based experiences and (mal)adjustment (Objective 2). These objectives were pursued throughout a cumulative series of cross-sectional, longitudinal, diary, and experimental studies in adolescent samples. Several indicators of maladjustment were used through the different chapters of the dissertation, although depressive symptoms were the main focus.

This general discussion starts with an overview of the main findings of the preceding chapters. For each objective, the main study results are discussed and compared across the different chapters. Next, we reflect in greater detail on the theoretical implications and we conclude with some directions for future research and reflections about the clinical implications of the findings.

## **1 Introduction**

### **1.1 A Summary of the Main Effects of Personality on Maladjustment**

Before discussing the main objectives of this doctoral dissertation, we briefly highlight the main effects of the personality dimensions throughout the five empirical chapters. Although most of these main effects were in line with previous research, some of them were examined in methodologically innovative ways or in relation to previously unexplored outcomes.

The cross-sectional study in **Chapter 2** indicated that self-criticism and dependency were positively associated with both internalizing and externalizing problems. While quite a few studies already demonstrated that Blatt's personality dimensions are related to internalizing distress in adolescents (Blatt & Zuroff, 1992; Cohen et al., 2013; Kopala-Sibley, Zuroff, Hankin, & Abela, 2015), only a handful of studies examined associations with adolescent externalizing problems (Leadbeater, Kuperminc, Blatt, & Hertzog, 1999). Consistent with these studies, self-criticism was found to relate positively to both internalizing and externalizing problems. The latter association is congruent with Blatt's (2004) argument that highly self-critical individuals attach excessive importance to their independence. As a consequence, they are likely to perceive any type of involvement by others (advice, support, or help) as an intrusive attempt that violates their autonomy. They would then react against this perceived threat of autonomy with angry and aggressive behaviors. In line with this reasoning, research has also shown that self-criticism is related to an avoidant attachment style (Mikulincer & Doron, 2016) and to a hostile and distant interpersonal style in close relationships (Fichman, Koestner, & Zuroff, 1994). In contrast, dependency was not expected to relate to externalizing problems because individuals high on dependency would fear that anger and reactance threaten the attachment bond. As noted by Blatt and Schichman (1983): 'Anger threatens the very hand that feeds'. Thus, individuals high on dependency would suppress feelings of anger and ambivalence towards attachment figures. Our findings showed that dependency was indeed related less consistently to externalizing problems than self-criticism. There was an association only with adolescent reports, but not with parental reports, of externalizing problems, suggesting that adolescents high on dependency may feel an

inclination towards externalization yet do not display this inclination overtly. Further, dependency was related to only a few specific items reflecting the more affective symptoms in the CBCL externalizing factor. Overall, this pattern of findings largely confirmed predictions derived from Blatt's theory about the differential role of dependency and self-criticism in different types of psychopathology.

Whereas Chapter 2 used a more general assessment of internalizing and externalizing problems, **Chapters 3 and 4** focused specifically on depressive symptoms. Both studies provided a unique perspective on the role of Blatt's personality dimensions in depressive symptoms by examining this role dynamically and at the level of within-person change. The longitudinal study presented in Chapter 3 revealed positive associations between self-criticism, dependency and depressive symptoms both at the within- and at the between person-level. Ups and downs in self-criticism and dependency were not only associated with interindividual differences in depressive symptoms compared to other adolescents (i.e., between-person level), but also to intra-individual differences compared to adolescents' own baseline level of self-criticism, dependency and depressive symptoms (i.e., within-person level). Chapter 4 built on Chapter 3 by examining associations between personality and depression across a shorter time frame, namely on a daily basis. This diary study revealed that daily fluctuations in self-criticism and dependency go hand in hand with daily fluctuations in depressive symptoms. Finally, **Chapter 5** exclusively focused on self-criticism and was among the first to test the associations between self-criticism and short-term variations in academic adjustment, thereby attending to both positive and negative indicators of adjustment. Results indicated that between-person differences in self-criticism were positively associated with between-person differences in maladaptive academic outcomes and negatively associated with adaptive academic outcomes.

Overall, the present findings were consistent with previous work (e.g., Blatt, 2004; Kuperminc, Blatt, & Leadbeater, 1997) showing that both self-criticism and dependency are vulnerability factors for psychological difficulties and depressive symptoms in particular. By examining the associations both at the between- and at the within-person level, by testing daily fluctuations in self-criticism and dependency, and

by extending the breadth of outcome variables, the present dissertation contributed to previous work on this topic.

## **1.2 The Mediating Role of Basic Psychological Needs in the Relation Between Personality and Maladjustment (Objective 1)**

### **1.2.1 An overview of the findings on the mediating role of the basic psychological needs**

A main objective of this dissertation was to examine the role of the basic psychological needs as an explanatory mechanism underlying the associations between self-criticism, dependency and maladjustment. In line with previous research on the differential role of need satisfaction and need frustration (Bartholomew et al., 2011; Vansteenkiste & Ryan, 2013), we hypothesized that particularly need frustration (compared to low need satisfaction) would account for the associations between personality and maladjustment. According to this mediation hypothesis, Blatt's personality dimensions would proactively engender certain needs-based experiences that, in turn, relate to risk for psychopathology and maladjustment. As such, this mediation hypothesis is consistent with a stress-generation perspective on the interplay between personality and life experiences in psychopathology (Luyten & Blatt, 2013).

*Associations between personality and the needs.* First, we examined the associations between self-criticism and dependency and adolescents' need-based experiences. Although conceptual reviews have provided a theoretical basis for examining these associations (Luyten & Blatt, 2013, 2016), few empirical studies to date have done so. In line with a few previous studies (Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014), self-criticism was found to yield positive associations with need frustration and negative associations with need satisfaction (**Chapter 2, 4, 5**). As such, self-criticism appears to be quite detrimental for the quality of adolescents' need-based experiences. Dependency was associated with more need frustration, yet unrelated to need satisfaction in the cross-sectional and longitudinal study (**Chapter 2, 3**). These findings suggest that dependency is related to a somewhat more benign pattern of needs-based experiences than self-criticism. Consistent with other studies showing that dependency entails both elements of



vulnerability and strength (Casalin, Luyten, Besser, Wouters, & Vliegen, 2014), adolescents high on dependency would not necessarily experience low need satisfaction. However, the diary study did reveal associations between daily dependency and both low need satisfaction and high need frustration. Adolescents reported more need frustration and less need satisfaction on days when they experience higher levels of dependency. Thus, associations between dependency and need satisfaction, if any, are negative. To better understand the associations between personality and need satisfaction, the correlations between personality vulnerability and satisfaction of each of the three separate needs were inspected. While self-criticism related negatively to the satisfaction of all three needs, the associations between dependency and satisfaction of the three specific needs were less consistent. Throughout the different chapters, dependency was negatively related or unrelated to satisfaction of autonomy, competence, and relatedness, but it yielded a positive relation to relatedness satisfaction in Chapter 3. This finding is in line with the notion that dependency can entail some adaptive relatedness-features (Hankin & Abela, 2005), including the capacity to elicit and utilize social support (Mongrain, 1998) and to experience a high number of positive life events (Shahar & Priel, 2003).

*Associations between the needs and (mal)adjustment.* Theoretically, low need satisfaction and high need frustration are expected to relate to both internalizing and externalizing problems. However, the presence of need frustration was expected to relate more strongly (or even uniquely) to psychopathology than low need satisfaction, since experiences of need frustration represent a stronger and more direct threat to three basic psychological needs than a mere absence of need satisfaction, (Vansteenkiste & Ryan, 2013).

As hypothesized, need frustration was positively related to internalizing and externalizing problems in the cross-sectional study in **Chapter 2**. Need frustration also yielded positive associations with depressive symptoms, both at the between-person level as well as at the level of within-person change (**Chapter 3 and 4**). Looking beyond psychopathology, need frustration also uniquely predicted maladaptive academic outcomes in the prospective study in **Chapter 5**. As anticipated, associations between low need satisfaction and the above mentioned maladaptive outcomes were less consistent. Only in the diary study presented in

Chapter 4, a significant and unique association between need satisfaction and depressive symptoms was found. This finding indicated that adolescents report more depressive symptoms on days when they experience few need satisfaction, above and beyond the effect of daily need frustration. Yet, in the cross-sectional and longitudinal study, no unique significant associations between need satisfaction on the one hand and internalizing and externalizing problems (Chapter 2) and depressive symptoms (Chapter 3) on the other hand were found.

***The indirect effect of personality on (mal)adjustment through need-based experiences.*** Chapter 2 provided initial evidence for the mediating role of need-based experiences in personality vulnerability to internalizing and externalizing problems. The results of this cross-sectional study indicated that self-criticism and dependency were associated with higher levels of need frustration which, in turn, were associated with more internalizing and externalizing problems. As hypothesized, only need frustration (and not a lack of need satisfaction) mediated the associations between personality and psychopathology.

Chapter 3 extended this initial set of results by examining the proposed mediation model simultaneously at the level of between-person (or interindividual) and within-person (or intra-individual) differences, thereby making use of a 3-wave longitudinal design including depressive symptoms as a more specific outcome. Findings indicated that psychological need frustration mediated the associations between personality and depressive symptoms both at the between- and at the within-person level of change. At the between-person level, these results indicate that adolescents who reported heightened levels of self-criticism and dependency compared to their peers tend to report heightened levels of need frustration which, in turn, relate to greater vulnerability for more depressive symptoms. At the within-person level, the findings showed that periodical deviations from one's baseline level of self-criticism and dependency were associated with corresponding periodical deviations from one's baseline level of need frustration which, in turn, related to periodical deviations from one's baseline level of depressive symptoms. Similar to Chapter 2, the longitudinal study did not provide evidence for the mediating role of need satisfaction in the relation between personality and depressive symptoms.

Whereas the study design in Chapter 3 used three repeated assessments with a 6-month time interval, we tested the hypothesized mediation model over a shorter period of time in **Chapter 4**. A diary design with seven consecutive daily assessments allowed us to investigate the mediating role of the basic needs on a day-to-day basis. Interestingly, both self-criticism and dependency varied substantially from day to day, suggesting that these personality variables do not represent deeply ingrained and stable personality features but may be susceptible for change. Further, the results of Chapter 4 indicated that both daily need satisfaction and daily need frustration mediated the association between daily variation in personality and daily variation in depressive symptoms. In contradiction to Chapter 2 and 3, the diary study provided evidence for an explanatory role of low need satisfaction, above and beyond the effects of daily need frustration. Although replication is needed, these findings suggest that a lack of need satisfaction also has an emotional cost and is particularly important to understand personality vulnerability to depressive symptoms on the short term.

In **Chapter 5**, we examined the mediating role of the basic psychological needs in associations between personality and academic functioning. As self-criticism is considered as the most relevant personality dimension within an achievement-related context, dependency was not included in this chapter. Using a three-week prospective study with weekly assessments, the mediating role of need-based experiences in the association between self-criticism and academic adjustment was examined. In contrast to the previous chapters, both adaptive and maladaptive outcome variables were used. As expected, findings indicated that need satisfaction indeed primarily mediated associations between self-criticism and adaptive academic adjustment (positive affect, engagement, autonomous motivation) and that need frustration primarily mediated the associations between self-criticism and maladaptive academic adjustment (negative affect, disaffection, controlled motivation).

### **1.2.2 Reflections on the mediating role of the basic psychological needs**

Overall, the above mentioned studies provide evidence for the role of need-based experiences in explaining personality vulnerability to maladjustment and depressive symptoms in particular. Interestingly, need-based experiences play a

mediating role both at the between- and at the within-person level, which underscores their critical role in understanding why self-criticism and dependency confer risk to develop depressive symptoms. Whereas the relation between self-criticism and depressive symptoms was fully mediated by the need-based experiences, the direct path between dependency and depressive symptoms remained significant. Further, the mediation was significant for several indicators of maladjustment, including depressive symptoms, internalizing and externalizing symptoms and maladjustment at school.

Although the present dissertation provides evidence for the systematic associations between Blatt's personality dimensions and SDT's need-based experiences, thereby contributing to the empirical rapprochement between these two theories, the reason why both personality vulnerabilities predict need-based experiences deserves more attention. Some dynamic, yet at this point tentative, explanations for why self-criticism and dependency leave adolescents vulnerable to maladaptive need-based functioning are provided. Highly self-critical adolescents have a tendency to set unrealistically high standards and to engage in harsh self-talk when these standards are not met, thereby increasing the likelihood of failure. These self-imposed standards are often introjected, thereby causing inner conflict (Miquelon, Vallerand, Grouzet, & Cardinal, 2005; Vansteenkiste et al., 2010), and being rooted at least partially in a history of controlling parenting (Soenens et al., 2005). By demanding high achievement from themselves through the pursuit of these self-imposed standards (Blatt, 2004), self-critical adolescents are more likely to experience pressure. Further, the hostile and rather cold interpersonal style that is typical for self-critical individuals could interfere with building up satisfying relations and even thwart their need for relatedness (Fichman et al., 1994). They tend to keep others at distance and are reluctant to use social resources, since they want to achieve their goals under their own power (Zuroff, Santor, & Mongrain, 2005). High dependency, on the other hand, is characterized by strong longings to please and gratify others, thereby often neglecting their own authentic preferences and values, which this could eventually lead to autonomy frustration. Dependency might affect the need for competence as highly dependent individuals might feel insecure about their capacities to build stable and satisfying relationships. Finally, as noted above,

dependency may affect the need for relatedness in positive ways (e.g., by eliciting more social support) and in negative ways (e.g., by being too demanding) (Hankin & Abela, 2005).

In line with our expectations, need frustration mediated the associations more systematically as compared to need satisfaction. These findings were largely consistent with previous research and theorizing (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Vansteenkiste & Ryan, 2013) suggesting that especially, if not only, the active frustration of the psychological needs leaves individuals vulnerable to maladjustment and psychopathology, and not just the deprivation of its satisfaction. Internalizing problems, and depressive symptoms in particular, would represent the direct affective cost associated with frustration of the needs, which are considered vitally important nutriment for mental health (Ryan & Deci, 2017). Externalizing problems would follow from compensatory attempts to deal with high need frustration and, more specifically, from a loss of self-control resulting from such experiences (Ryan, Deci, & Vansteenkiste, 2016). Need satisfaction, in contrast, is thought and found to promote adjustment (Ryan & Deci, 2008), which is reflected in positive associations with adaptive outcomes such as positive affect, engagement and autonomous motivation at school (Chapter 5). Together, the findings in this study corroborate the distinction between a “bright” side (i.e., satisfaction) and a “dark” side (i.e., frustration) of the psychological needs, with the dark side being particularly predictive of psychopathology and maladjustment.

### **1.3 Exploring the Moderating Role of Self-criticism and Dependency in the Relation Between Need-Based Experiences and (Mal)adjustment (Aim 2)**

#### **1.3.1 An overview of the findings on the moderating role of personality**

A second aim was to examine whether self-criticism and dependency moderate the associations between need-based and maladjustment. Based on previous research (e.g., Shahar & Priel, 2003), we hypothesized that heightened levels of self-criticism and dependency would exacerbate associations between low need satisfaction or high need frustration and maladjustment. Consistent with a diathesis-stress perspective on the interplay between personality and life experiences in

psychopathology, personality could determine individuals' sensitivity to need-based experiences. Specifically, highly self-critical or dependent individuals would be more sensitive to the adverse consequences associated with low need satisfaction and need frustration. Possibly, self-criticism and dependency would also lead to desensitization to the positive consequences of need satisfaction.

In **Chapter 2**, we examined the moderating role of personality in cross-sectional associations between need-based experiences and internalizing and externalizing problems. Only 1 out of 8 interactions between personality and the needs turned out to be significant, that was the interaction between dependency and need satisfaction in the prediction of externalizing problems. Further inspection of this interaction revealed that the relation between need satisfaction and externalizing symptoms was significant among highly dependent individuals only. Need satisfaction was negatively related to externalizing problems only when combined with high levels of dependency, suggesting that high need satisfaction protects highly dependent adolescents against externalizing problems. As the interactions in Chapter 2 were situated at the between-person level, **Chapter 3** built on Chapter 2 by examining cross-level interactions between personality and the needs using a 3-wave longitudinal study design with 6-month intervals. Possibly, personality plays a more pronounced moderating role in the relation between need-based experiences and psychopathology at the level of within-person change because this level captures better dynamic and intra-individual fluctuations in sensitivity to needs-based experiences. In contrast to Chapter 2, Chapter 3 exclusively focused on depressive symptoms as an outcome variable. We found no evidence for significant cross-level interactions, indicating that between-person (i.e., interindividual) differences in self-criticism and dependency do not moderate within-person (i.e., intraindividual) associations between need-based experiences and depressive symptoms. As there was no significant variation around the slope, the association between need-based experiences and depressive symptoms was largely equal for all adolescents.

As no evidence for moderation was found across rather long time periods (i.e., 6-month intervals), we investigated whether there would be more room for moderation by personality on the short term. Therefore, we examined the interactions between self-criticism and the needs on a weekly basis in **Chapter 5**. However,

similar to the findings reported in Chapter 4, no significant cross-level interactions between self-criticism and the needs in the prediction of academic (mal)adjustment were found. In a next step, we examined the proposed moderation model across an even shorter time frame, namely at the daily level. The diary study in **Chapter 4** investigated whether daily fluctuations in self-criticism and dependency alters daily associations between need-based experiences and depressive symptoms. The findings indicated that 2 of the 4 tested interactions (i.e. the interaction between self-criticism and need satisfaction and between dependency and need frustration) were significant. The first interaction was in line with a diathesis-stress model (Zuckerman, 1999), and suggested that high self-criticism exacerbates the association between low need satisfaction and depressive symptoms on a daily basis. The second interaction was rather unexpected, yet plausible and suggested that adolescents report the least amount of depressive symptoms on days when they are low on dependency and experience few need frustrating experiences. The interaction also indicates that differences between high and low dependency manifest most strongly on days when need frustration is low.

In addition to testing the moderating role of personality on both levels of analysis and across longer and shorter time frames, we also examined whether personality moderates the reaction to an experimentally induced need-thwarting situation. As moderation by personality might be due to differences in the perception of need-relevant situations, we deem it important to examine differential reactions to such experimentally induced stressors. In Chapter 6, interactions between dependency and an experimentally induced interpersonal stressor (i.e. social exclusion) were examined using the Cyberball paradigm (Williams & Jarvis, 2006). Although we hypothesized that dependency would exacerbate the association between social exclusion and relatedness frustration (or relatedness satisfaction), no significant interaction effects were found. The findings indicate that highly dependent individuals did not report more relatedness frustration (or less relatedness satisfaction) after being exposed to social exclusion compared to less dependent individuals. In a follow-up study, we examined the interactions between dependency and social exclusion immediately after the experimental manipulation and one week later. Again, we did

not find a significant interaction between dependency and the needs at both measurement moments.

Overall, relatively few systematic interactions between personality and the needs were found. Only at the daily level, self-criticism and dependency seemed to moderate to some extent associations between need-based experiences and depressive symptoms, although replication is needed. Generally, it can be suggested that a mediation model fitted the data better than a moderation model. Said differently, our findings were more in line with the notion that personality may generate certain need-based experiences than with the possibility that personality affects individuals' sensitivity to the consequences of need-based experiences.

### **1.3.2 Reflections on the moderating role of personality**

The present findings also call for further reflections on SDT's assumption of universality of the needs. Indeed, the lack of moderation observed in this dissertation testifies to the powerful and universal character of the basic psychological needs. SDT indeed assumes that the three basic psychological needs are universal, implying that the needs have the potential to promote growth or elicit maladjustment in all individuals and across cultural contexts (Ryan & Deci, 2017). Empirical research confirmed the universality claim by providing evidence for the beneficial effects of need satisfaction and the detrimental effects of need frustration across four culturally diverse countries (Chen et al., 2015). The beneficial effects of need satisfaction have been demonstrated among very diverse samples, including adolescents reporting low desire for need satisfaction (Chen et al., 2015) and adolescents who are placed in rehabilitation centers with severe psychopathology (Savard, Joussemet, Emond Pelletier, & Mageau, 2013).

This universal viewpoint may seem quite strong and even implausible at first sight because it would leave no room whatsoever for individual or cultural differences. With such a strong universal viewpoint, an examination of the moderating interplay between personality and needs-based experiences would not be considered useful. The SDT-perspective on the needs is more nuanced, however, and recently, SDT-researchers have been more explicit about the fact that SDT actually holds a moderate universalistic viewpoint, thereby acknowledging that need-based experiences both



have universal and context-specific features (Mabbe, Soenens, Vansteenkiste, & Van Leeuwen, 2016; Ryan, Soenens, & Vansteenkiste, 2019; Soenens, Vansteenkiste, & Van Petegem, 2015). In doing so, SDT proposes that need satisfaction universally promotes well-being but it does not preclude the possibility that individual differences (1) might alter the degree to which an individual benefits from need satisfaction, (2) affect the perception of objective need-thwarting situations and (3) impact how need-based experiences manifest.

Although it is unlikely that some people would benefit from need frustration or suffer from need satisfaction, it remains possible that individual differences could *affect one's sensitivity to need-based experiences* to some degree. Few studies found indirect evidence for moderation in the association between need-based experiences and (mal)adjustment by examining the role of individual differences in associations between need-thwarting parenting and maladjustment (e.g., Mabbe et al., 2016; Zarra-Nezhad et al., 2014). Possibly, the moderating role of personality is more visible in individuals with a history of chronic need frustration, like highly self-critical and dependent individuals. In line with the sensitivity hypothesis in SDT (e.g., Moller, Deci, & Elliot, 2010; Van Petegem et al., 2017), it could be expected that the accumulated history of need frustrating experiences in self-critical and dependent individuals could affect how they interpret new situations and respond to it, resulting in higher sensitivity to new need frustrating experiences and less benefit from new need satisfying experiences. Yet, engaging in need satisfying experiences is still important in this vulnerable group. This reasoning is in line with previous research indicating that acceptance by peers predicts higher positive affect and self-esteem, even in individuals who underappreciate close relationships (Carvallo & Gabriel, 2006).

Second, it is argued that individual differences can *affect the perception of need-satisfying (or need-thwarting) events* (Soenens et al., 2015). For example, personality characteristics could affect the degree to which an absence of choice is perceived as an autonomy frustrating experience. We aimed to add to this line of research by focusing on the question whether personality affects the reaction to an actual need-thwarting event in Chapter 6. However, more research is needed to examine in greater detail how personality affects perception of need frustrating events.

Third, individual differences could *affect the manifestation of need frustration*. For example, Mabbe et al. (2018) concluded that a need thwarting parenting style has an emotional cost for all adolescents, but personality characteristics affect the type of maladjustment that manifests. Depending on one's personality characteristics, a need thwarting environment may give rise to internalizing problems in some adolescents, whereas it might result in externalizing problems in other adolescents. In the present dissertation, we used several indicators of maladjustment to explore whether personality could affect the manifestation of maladjustment. Throughout the dissertation, we only found limited evidence for moderation by personality in the prediction of internalizing problems, suggesting that self-criticism and dependency do not play an important role in altering associations between need frustration and internalizing problems. It seems like need frustration pays a cost in terms of internalizing complaints in all adolescents regardless of their personality. Unfortunately, we assessed externalizing problems only once, that was in the cross-sectional study in Chapter 2. Possibly, there is more room for moderation in the associations between need frustration and externalizing problems, as certain personality characteristics might prevent the manifestation of problem behavior. Future studies should more systematically take externalizing problems into account and study the associations with personality and the needs both at the between- and at the within-person level. Studying the role of personality in manifestations of maladjustment may provide more insight into the question of multifinality of need frustration (Nolen-Hoeksema & Watkins, 2011).

## **2     Directions for Future research**

In this section, limitations with regards to each of the two specific research questions will be provided along with avenues for future research. Next, we give some general directions for future research relating to the general aims of this research project.

## 2.1 The Mediating Role of the Basic Needs in Associations between Personality and Maladjustment (Aim 1)

Although we found compelling evidence for the mediating role of need-based experiences, it remains unclear why self-critical and dependent individuals experience more need frustration (and less need satisfaction to a lesser extent). Caspi and Roberts' (2001) theory on transactions between personality and context suggests three potential processes through which self-criticism and dependency can leave individuals more vulnerable to need frustration. We describe these three processes only briefly, because they are already thoroughly discussed in the previous chapters of the current dissertation. First, highly dependent or self-critical adolescents may *actively generate* need frustrating experiences by choosing specific contexts and activities (Boone et al., 2014). Future studies could use vignette-based research methods in which adolescents read standardized situations and indicate how they would respond to it (e.g., Chen, Soenens, Vansteenkiste, Petegem, & Beyers, 2016). Second, *evocative mechanisms* imply that self-critical and dependent adolescents would elicit more need frustrating reactions from their environment. Research on adolescents' evocative impact (or agency) on their own need-based experiences could make use of cross-lagged longitudinal research methods with repeated assessments of adolescents' personality and need-supportive and need-thwarting responses from parents, peers and/or teachers. Third, self-criticism and dependency could also lead to biased *perception* of contexts. Self-critical and dependent adolescents might have a tendency to perceive events in a way that frustrates their own psychological needs. Experimental research is needed to examine whether pre-existing differences in personality affect perception of experimentally induced stressors, and whether these perception biases explain the associations between self-criticism, dependency and need frustration.

In line with most research on personality for depression, we investigated a mediational sequence in which personality precedes depressive symptoms, the so-called *vulnerability model* (Blatt, Dafflitti, & Quinlan, 1976; Blatt & Zuroff, 1992). This model has dominated research on personality vulnerability to depression in the last decades. However, some scholars have proposed a *scar model* in which personality is considered as an outcome of depressive symptoms (Coyne & Calarco,

1995; Coyne, Gallo, Klinkman, & Calarco, 1998; Coyne & Whiffen, 1995). This model assumes that depressive symptoms have the potential to “scar” the adolescent’s personality, resulting in elevated levels of self-criticism and dependency. However, research on the scar model is scarce (Shahar, Blatt, Zuroff, Kuperminc, & Leadbeater, 2004). It is also possible that personality and depressive symptoms mutually affect each other over time in a reciprocal model (Shahar et al., 2004). To decide on the direction of effects and to explore the position of the need-based experiences in this association, cross-lagged analysis with larger samples are needed (Cole & Maxwell, 2003).

Finally, the present dissertation used a dimensional assessment of the needs in which the overlap between need satisfaction and need frustration is statistically controlled for. Although this variable-centered approach allows to test the unique effects of need satisfaction and need frustration, it does not take distinct combinations of these variables into account. For example, some adolescents in the population might experience high levels of need satisfaction and need frustration at the same time. A *person-centered approach* would allow to identify profiles characterized by distinct configurations of need satisfaction and need frustration. These profiles reflect a particular combination of need satisfaction and need frustration scores. As SDT assumes that need frustration and need satisfaction are two distinct mechanisms (Bartholomew et al., 2011; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015), the two constructs should be combinable within at least a subgroup of individuals. Therefore, we could expect to find four profiles with different configurations of need satisfaction and need frustration (i.e., high-high, high-low, low-high, low-low). It could be hypothesized that dependency is associated with a profile high in need satisfaction and high in need frustration, as the conceptualization of dependency entails both positive and negative features (Hankin & Abela, 2005). Self-criticism, in turn, might be associated with the least adaptive profile, namely high in need frustration and low in need satisfaction. Next, the mediating role of the unique combination of need satisfaction and need frustration in the relation between personality and maladjustment could be studied. In doing so, a person-centered approach could add to a better differentiation between the two personality vulnerability factors. This person-centered approach has already been successfully

used in previous research in SDT examining motivational profiles (e.g., Moran, Diefendorff, Kim, & Liu, 2012; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). Up to now, only one recent study has already examined adolescents' psychological need satisfaction profiles (Earl, Taylor, Meijen, & Passfield, 2019).

## **2.2 The Moderating Role of Personality in the Associations Between the Needs and (Mal)adjustment (Aim 2)**

The Cyberball study examined the role of differential reactions to an actual relatedness-thwarting event associated with dependency. Complementary to this study, it would be interesting to test differential reactions to *achievement-related stressors* among highly self-critical adolescents. As highly self-critical individuals typically show demanding expectations and excessive concerns about failure (Blatt, 2014), it could be hypothesized that they are more susceptible to competence frustration in reaction to experiences of failure. Previous research in SDT has already successfully induced failure experiences by giving false negative feedback (e.g., De Muynck et al., 2017; De Muynck et al., 2019; Van Der Kaap-Deeder et al., 2016). Future studies could examine whether self-critical perfectionism interacts with experimentally induced failure in predicting competence frustration and competence satisfaction.

A second recommendation for future research involves the use of *more ambiguous manipulations* of need-thwarting stressors. As we have already mentioned, it could be hypothesized that personality affects the perception of an actual need-thwarting event, thereby modifying the effect of the event on the individual's outcome (Soenens et al., 2015). For example, dependent individuals might be more likely to perceive a declined request as a personal rejection, or self-critical individuals might more easily perceive a well-meant remark as criticism. Therefore, it is important for future studies to induce ambiguous stressors that leave more room for perception and, thus, individual differences, in contrary to the Cyberball study in which the powerful manipulation of social exclusion experiment might have overruled the more subtle interaction effects with personality. Follow-up studies would better use mild signals of rejection or mild negative feedback to leave more room for individual differences in the appraisal of the situation.

Finally, another fruitful area of further research could be the use of *signal- or event-contingent sampling methods*, like Ecological Momentary Assessment (EMA; Shiffman, Stone, & Hufford, 2008). EMA involves multiple assessments of individuals' current experiences in real time in the individuals' natural environment. The significant moderation at the daily level suggests that the probability to detect moderation may be increased by using very short time intervals. As individual differences in the appraisal of stressors might be the driven force after the hypothesized moderation effects, it would be interesting to tap into the micro-processes involved in this appraisal of need-thwarting events with EMA. This research method could also identify potential sources of daily variation in personality states and the need experiences by examining associations between personality, the needs and their interactions with life events during the day. Moreover, EMA could help to reduce recall bias associated with retrospective self-report measures and maximize ecological validity.

## **2.3 General directions for future research**

In addition to the suggestions for further research that are mentioned for each specific research aim, we give some general directions for future research relating to the general aims of this research project.

### **2.3.1 Methodological directions**

Except for the Cyberball study in Chapter 6, the research methodologies used in the present dissertation do not allow for strong conclusions on the direction of effects. Indeed, the structural models in the cross-sectional study in Chapter 2 and the multilevel analyses used in Chapters 3, 4 and 5 revealed associations between the study variables, yet they do not clearly determine the direction of the effects. Future studies could overcome this limitation by using *experimental designs* to manipulate self-criticism and dependency. For example, Boone, Soenens, Vansteenkiste and Braet (2012) demonstrated causal associations between experimentally induced self-critical perfectionism and eating disorder symptoms. Future studies could use similar designs to examine causal relations between experimentally induced self-criticism and dependency on the one hand, and need frustration and depressive symptoms on the other hand.

A second methodological issue to be mentioned is that only one study in this dissertation used a *multi-informant assessment* of psychopathology (i.e., Chapter 2). Consequently, in the other studies, the association between the need-based experiences and the indicators of (mal)adjustment could be due to shared method variance and response tendencies. For example, participants may have a tendency to endorse extreme response categories on a rating scale or to agree rather than disagree with items, regardless of the content (Van Herk, Poortinga, & Verhallen, 2004). Therefore, in order to examine the unique role of need frustration and satisfaction in the associations between personality and maladjustment more accurately, future studies should use a multi-informant approach by complementing the self-report data with external measures of the outcome variables (e.g., peer / parent / teacher ratings, observations). Another limitation is that the studies all rely on questionnaire data. Future research could complement the questionnaire data by using *biological stress measures* (Kempke, Luyten, Mayes, Van Houdenhove, & Claes, 2016; Wester, Lamberts, & van Rossum, 2014). The moderating role of personality may arise more clearly with physiological measures as they overcome some of the limitations typical for questionnaire data, like social desirability and response bias due to personality. Especially in the context of experimental research, it could be interesting to assess biological stress levels after induction of interpersonal or achievement-related stressors (e.g., Cyberball paradigm, Williams et al., 2000; Trier Social Stress Test, Kirschbaum, Pirke, & Hellhammer, 1993) in order to examine interactions between personality and the experimental manipulation in the prediction of stress. Moreover, research using biological measures of stress could increase our understanding of the mediational sequences between need frustration and psychopathology. Possibly, the relations between need frustration and psychopathology are mediated by stress generation. In line with this reasoning, previous research has already indicated that stress generation partially explains the relation between self-criticism, dependency and depressive symptoms (Luyten & Blatt, 2013).

Also *qualitative research* may be an interesting area for future research, as interviews with highly self-critical and dependent adolescents may shed a light on the ‘lived experiences’ and concrete manifestations of need satisfaction and need frustration in the population. This type of research may also increase our

understanding of the specific ways in which personality affects need-based experiences in the daily life of adolescents. By complementing nomothetic research with case-based research, the transferability of group-based findings to individual adolescents can be tested (McLeod, 2013).

Finally, the samples in the PhD-project consisted of community samples, which limits extrapolation of our findings to clinical samples. The same research objectives can be pursued in *clinical samples* to investigate whether the current findings generalize to adolescents with heightened levels of internalizing and externalizing problems. We expect that the mean scores for self-criticism, dependency, need frustration and psychopathology would be higher in clinical samples. However, the structural relations between personality, the needs and maladjustment are expected to be equal, as Blatt's theory and SDT highlight the continuity between adaptive and maladaptive development and assume that the difference between normality and psychopathology is a matter of gradation.

### **2.3.2 Theory-specific directions**

The present dissertation adopted a dynamic approach on personality assessment by examining trait-levels of self-criticism and dependency in some studies and state-levels of these personality variables in other studies. Although this approach is in line with previous conceptualizations of personality development as a dynamic process in which stable, trait-like features continuously interact with changeable environmental factors (Asendorpf & van Aken, 2003; Fleeson, 2001; Fleeson, 2004; Funder, 2006; Mischel & Shoda, 1995), we deem it important for future studies *to examine the trait- and state-levels of personality simultaneously*. This type of research would allow to explore whether need frustrating experiences could activate trait levels of self-criticism or dependency in a certain situation, which is manifested in higher state-levels of these personality characteristics. As such, experiences of need frustration could activate latent trait-levels of personality vulnerability (indicated by increased state-levels of self-criticism and dependency), thereby increasing risk for psychopathology.

Next, this dissertation found convincing evidence for associations between personality and need frustration, but it remains unclear how adolescents deal with



these need frustrating experiences. Possibly, personality affects adolescents' reactions to need frustration. Therefore, *individual differences in need regulation* could be an avenue for future research. This research could be inspired by previous work on emotion regulation in SDT that proposes three emotion regulation strategies that differ in terms of the quality and the depth of processing: dysregulation, suppression and emotional integration (Roth, Assor, Niemiec, Ryan, & Deci, 2009). Previous research found associations between dysregulation and attachment anxiety (Brenning, Soenens, Braet, & Bosmans, 2011), an attachment dimension that shows some conceptual overlap with dependency. Therefore, it could be hypothesized that highly dependent individuals, on average, also use more emotional dysregulating strategies, like rumination or excessive complaining. Like attachment anxiety, dependency is characterized by strong fears of abandonment and this may give rise to the use of emotion regulation strategies that elicit the proximity of other people. Self-criticism, in contrast, would rather be associated with suppression of emotions (e.g., avoidance or minimization of emotional experiences). Self-criticism has previously been associated with attachment avoidance (Murphy & Bates, 1997; Zuroff & Fitzpatrick, 1995), an attachment dimension that is also characterized by the use of deactivating or suppressing emotion regulation strategies (Shaver & Mikulincer, 2002). Dysregulation and suppression confer risk to the generation of further need frustration and the development of depressive symptoms, because need frustrating experiences are not experienced in full awareness nor processed in a thorough and unbiased way (Brenning, Soenens, Braet, & Bosmans, 2012; Brenning, Soenens, Van Petegem, & Vansteenkiste, 2015). Future research could further address the role of personality and need-based experiences in associations between emotion regulation and psychopathology.

A final note concerns the direction of effects. All models in this dissertation tested whether self-criticism and dependency affect need frustration and need satisfaction. However, a *reversed model* with need-based experiences affecting personality should also be explored. Indeed, it is recently argued that need-based experiences can also affect trait development and trait manifestation (Ryan, Soenens, & Vansteenkiste, 2018). More specifically, chronic exposure to need frustration could give rise to the development of dysfunctional personality traits, like self-critical

perfectionism or borderline personality disorder (Csathó & Birkás, 2018). In line with this reasoning, previous research on developmental pathways of self-criticism and dependency point to the role of a history psychological controlling parenting (Kopala-Sibley & Zuroff, 2014; Soenens, Vansteenkiste, & Luyten, 2010). Growing up in a psychologically controlling context might chronically undermine children's and adolescents' basic needs, which, in turn, could give rise to the development of defensive compensatory coping strategies that could become part of the individuals' personality in the long run. Possibly, a self-reinforcing cycle results from the bidirectional effects between need frustrating experiences and dysfunctional personality traits. Therefore, it would be interesting for future research to examine the effects of chronic need frustration on the development of self-criticism and dependency over time in adolescents, and vice versa.

### **2.3.3 Cross-theoretical directions**

Future studies might attempt to examine the interplay between personality and the needs *across the life span*. Whereas the present dissertation examined associations between personality, the needs and maladjustment on the short term, future research could address its developmental origins and its malleability over a longer period of time. Previous studies on developmental antecedents of personality vulnerability pointed to the detrimental role of intrusive parenting behavior and negative peer relations (for a review, see Kopala-Sibley & Zuroff, 2014). For example, parental psychological control is associated with the development of self-criticism and dependency in children (e. g., Soenens, Vansteenkiste, & Luyten, 2010). Future studies examining the interplay between personality and need-based experiences could take developmental history of parenting into account, thereby exploring how a history of psychological control affects personality vulnerability over time, and how this personality vulnerability translates into maladjustment through need frustration. Only few studies have examined the early roots of self-criticism and dependency across a longer time period. For example, Koestner, Zuroff and Powers (1991) demonstrated in a longitudinal study that children whose mothers had been rated as rejecting when the children were 5 years old were also more likely to report higher levels of self-criticism at age 12. More research on the role of need support

versus need thwarting by socialization figures (i.e., parents or teachers) is recommended. This type of research is important, because previous studies in SDT indicated that early need satisfying experiences already have important effects on developmental outcomes at young age (i.e., attachment, executive functioning) (e.g., attachment: Bernier, Carlson, & Whipple, 2010; Bernier, Matte-Gagné, Bélanger, & Whipple, 2014; Matte-Gagné & Bernier, 2011; Whipple, Bernier, & Mageau, 2011). Using a life span perspective, it would also be worthwhile to explore how important life experiences (e.g., starting a new job, getting children) affect personality development. Whereas previous studies have indicated that adverse life experiences can contribute to increases in self-criticism and dependency (see Kopala-Sibley & Zuroff, 2014), future studies could also explore how positive life experiences can affect personality maturation, resulting in lower levels of self-criticism and dependency.

This dissertation also aimed to further previous attempts at *bringing together Blatt's theory and SDT*. As we previously discussed in the general introduction, Blatt's theory and SDT are both grand theories with a positive view on human development. Although most research within Blatt's tradition has focused on maladaptive aspects of personality, future research could further investigate the adaptive aspects of dependency (i.e., connectedness) from an SDT-perspective. Similarly, research could include self-compassion (i.e., an orientation characterized by kindness toward oneself; Neff, 2003) as a positive alternative to self-criticism and examine whether the mental health benefits of self-compassion are mediated by experiences of psychological need satisfaction.

Both theories also assume that integrative functioning increases with age. Whereas the present dissertation examined the interplay between personality and the needs in adolescents, it would be interesting to study the same dynamics in older populations or to examine age-related changes in both personality and needs-based experiences across the lifespan. Consistent with Blatt's (2008) prediction that personality maturity increases with age, research has shown that levels of dependency and self-criticism decrease as people grow older (Kopala-Sibley et al., 2013). Similarly, it has been argued within SDT that people develop better skills to have their needs met and to cope with need frustration as they grow older (Ryan & Deci, 2017).

Particularly with regard to the need for autonomy, there is evidence that people indeed regulate their behavior more on the basis of self-endorsed motives within increasing age, and that these age-related changes in autonomy account at least partly for age-related changes in mental health (Sheldon, Houser-Marko, & Kasser, 2006; Sheldon, Kasser, Houser-Marko, Jones, & Turban, 2005). By combining insights from Blatt's theory and SDT, future research may provide a fuller understanding of age-related increases in mental health. Such research could examine the possibility that older people experience more well-being because they have developed a more mature personality which, in turn, contributes to more need satisfying experiences in life.

A next similarity is that both theories stress the importance of the social environment in the development of psychopathology. Since we focused on intraindividual processes in the present dissertation, the social context of the adolescents did not receive much attention. As already noted, future work could overcome this limitation by examining how controlling social environments contribute to need frustration and maladaptive personality development (e.g., Soenens, Vansteenkiste, & Luyten, 2010). This future work would do well to focus on both the role of early adversity and current need-thwarting contextual influences (as well as their interplay) and to examine these contextual influences in the long run (Luyten, Vliegen, Van Houdenhove, & Blatt, 2008).

Next, Blatt's theory and SDT both offer transdiagnostic explanations. Therefore, we used several indicators of maladjustment to test the mediation and moderation models in the present dissertation. Future research could explore the transdiagnostic role of personality and the basic needs with regard to other types of maladjustment that are common in adolescents, like eating disorders, self-harm or game addiction. In doing so, it would be interesting to test this transdiagnostic role more formally, for example by examining whether the relation between several types of maladjustment decreases after introducing personality and need frustration as transdiagnostic factors (see Campbell, Boone, Vansteenkiste, & Soenens, 2018). A final similarity involves that both theories point to comparable themes, with Blatt's theme of self-definition resembling the needs for autonomy and competence and with the theme of relatedness evidently resembling SDT's need for relatedness. The present dissertation revealed that self-criticism was associated with frustration of all three

needs, whereas dependency was mainly associated with autonomy and competence frustration. These findings suggest that all needs are important to fully understand personality vulnerability to maladjustment. As already noted in the general introduction, SDT and Blatt's theory use a slightly different conceptualization of the term 'autonomy'. Whereas SDT conceptualizes autonomy as volitional functioning, Blatt's theory refers to autonomy as independence or self-reliance. Based on SDT, it could be hypothesized that the difficulties that highly dependent and self-critical individuals experience are not due to a lack of independence (for dependency) or an excess of independence (for self-criticism) *an sich*, but rather due to the controlled motives that result from their frustrated need for autonomy (in the sense of volitional functioning). This hypothesis could be examined in future research using more explicit measures of volitional functioning (see Van Petegem, Beyers, Vansteenkiste, & Soenens, 2012) in order to map the effects of Blatt's personality dimension and the differential conceptualizations of autonomy in more detail.

Our main contribution to the rapprochement of Blatt's theory and SDT involves the finding that personality engenders need frustrating experiences, with need frustration mediating the association between personality and maladjustment. We also provided explanations why self-criticism and dependency translates in higher levels of need frustration. Highly self-critical individuals might actively generate need frustrating experiences by selecting specific contexts (e.g., choosing highly competitive environments or dominant partners), they might elicit more need frustration from the environment (e.g., self-critical adolescents' hostile interpersonal style might elicit rejection, whereas dependent individuals' lack of assertiveness might elicit a tendency in partners to not take into account these adolescents' preferences and interests), and they might perceive their environment in a biased way (e.g., hypersensitivity to signals of failure and interpersonal threat in self-critical and dependent individuals respectively). Although the first steps have been taken, more research on these underlying mechanisms. could result in a better understanding of how adaptive and maladaptive development arises (Shahar et al., 2003).

### 3 Clinical Implications

Based on the findings of the present dissertation, a number of suggestions for improving clinical work with adolescents are offered. As our work points to the importance of personality and need-based experiences in the development of psychopathology, our recommendations are centered around these two constructs.

#### 3.1 Self-criticism and Dependency as Targets for Intervention

The present dissertation confirmed the role of self-criticism and dependency as risk factors to develop psychopathology and depressive symptoms in particular (Chapter 2-4) (see Blatt, 2004; Blatt & Luyten, 2009). Moreover, results in Chapter 3 and 4 indicated that self-criticism and dependency significantly varies within individuals, suggesting that these personality dimensions are susceptible to change. Based on the findings of the current dissertation, we could argue that clinical work may focus on reducing the probability that self-criticism and dependency get awakened in adolescents, thereby decreasing their personality vulnerability to psychopathology. The importance of reducing self-criticism and dependency in both prevention and intervention programs is discussed.

Adolescence seems to be an important life period to focus on *prevention* of psychological difficulties. Although adolescents show a heightened vulnerability to psychopathology (e.g., Hankin, 2015; Saluja et al., 2004; Zahn-Waxler, Klimes-Dougan, & Slattery, 2000), at the same time they also develop important psychosocial skills and demonstrate increased agency (Steinberg & Morris, 2001; Zimmermann & Iwanski, 2014). Given that adolescent development is highly dynamic in nature, prevention programs could react to this potential for change by strengthening resilience (Nehmy, 2010). Previous prevention programs have been successful in reducing self-critical perfectionism in a group of high-risk adolescents (Wilksch, Durbridge, & Wade, 2008), as well as in community samples of adolescents (Nehmy & Wade, 2015). Prevention programs in highly dependent adolescents are less common. However, the present dissertation also revealed associations between dependency and several types of maladjustment. Therefore, highly dependent individuals could be targeted as at risk-youth in prevention programs in order to increase their resilience.

We suggest that clinical interventions should also take their clients' personality style into account, especially for adolescents with internalizing problems. Indeed, research indicated that the perfectionism levels predict change in depressive symptoms throughout therapy (Hawley, Ho, Zuroff, & Blatt, 2006). Psychodynamic interventions are demonstrated to be successful in decreasing self-criticism and dependency levels (e.g., Blatt, 2004). Interventions aimed at reducing dependency should focus on altering problematic cognitions (e.g. 'If someone is angry, he or she will leave me'), facilitating autonomous functioning and promoting healthy interdependence in social relations (Bornstein & Bowen, 1995). Highly dependent patients also make more therapeutic progress (i.e., symptom reduction) when treated by a supportive therapist who is aware of their strong desires to remain in treatment (e.g., Eames & Roth, 2000; Hardy et al., 1999). Self-criticism can be reduced in long-term psychoanalytical treatment that involves overcoming interpersonal and emotional detachment (Blatt & Ford, 1994; Eames & Roth, 2000). A strong therapeutic alliance is recommended to identify and restructure self-critical beliefs (Hawley et al., 2006). Recent research also suggests that self-criticism can be successfully reduced with cognitive-behavioral therapy (CBT) by identifying unhelpful thoughts and changing inaccurate beliefs (e.g., Glover et al., 2007; Riley, Lee, Cooper, Fairburn, & Shafran, 2007; Shafran, Coughtrey, & Kothari, 2016) or by compassion-based therapy (Gilbert & Procter, 2006) by increasing clients' ability to be self-soothing and to focus on feelings of warmth and reassurance for the self. A meta-analysis provided initial evidence that CBT-interventions targeting self-criticism are effective in reducing symptoms of depression and anxiety, even when there was no focus on symptoms of depression and anxiety in the intervention (Lloyd, Schmidt, Khondoker, & Tchanturia, 2015). Although interventions aimed at reducing personality vulnerability (and self-criticism in particular) seem promising, most studies only examined short follow-up treatment effects (Egan, Wade, Shafran, & Antony, 2014). Indeed, interventions can still be improved in order to maintain the effects on symptoms of psychopathology (Campbell, Boone, Vansteenkiste, & Soenens, 2018). Interventions that simultaneously focus on reducing personality vulnerability and engaging in more need-satisfying activities could be a valuable approach.

### 3.2 The Basic Psychological Needs as Targets for Intervention

The present findings suggest that need-based experiences play a central role in adolescents' adjustment and psychopathology. As indicated in Chapter 3 and 4, need satisfaction and need frustration are dynamic processes that significantly fluctuate over short time frames and even from day to day. As they are highly susceptible to change, they can function as a target for both prevention and intervention programs. Because SDT assumes that adolescents are able to actively contribute to their own need-based functioning (Soenens et al., 2015), prevention and intervention programs could teach adolescents how to effectively manage their need-based experiences. We propose four ways to optimize adolescents' need-based functioning.

First, clinicians could help adolescents *to increase awareness* of need frustrating experiences and their ways of coping with such experiences. Clinicians should notice when their clients ignore or avoid a particular need and find a way to address it (Ryan & Deci, 2008).

Second, once need frustrating experiences are acknowledged, it could be explored how clients can avoid future need frustration. That is, through a process of *need crafting*, which involves pro-actively seeking out contexts, activities, and relational partners that are more need-conducive, clients can build in more opportunities for need satisfaction in their daily life or even take decisions, with more far stretching consequences, like changing majors at school or extricating from unhealthy friendships. Clinicians can invite adolescents to search for opportunities to engage in more need satisfying activities, thereby stimulating the inherent growth tendency of their patients. This suggestion is in line with a plethora of studies indicating that need satisfaction is a critical resource for well-being and adjustment (Chen et al., 2015; Ryan, Bernstein, & Brown, 2010; Vansteenkiste, Niemic, & Soenens, 2010; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). For example, clinicians could help adolescents to identify activities matching their personal interests and values (autonomy satisfaction). Especially for highly self-critical or dependent adolescents, it could be challenging to distinguish between what the clients want themselves and what their environment wants them to do. Relatedness satisfaction can be increased by reflecting on how they can establish more genuine,



caring and meaningful close connections with other people. Highly dependent individuals might find it difficult to engage in more equal and mutual relations, since they have a tendency to put others in a domineering position (Luyten, Corveleyn, & Blatt, 2005). Finally, competence satisfaction can be raised by engaging more in activities which the adolescents may be good at and give them a sense of mastery. Given that self-critical adolescents have intense concerns about failure and try to cope with these feelings by working very hard (Shafran, Cooper, & Fairburn, 2002), it is deemed important to discuss and restructure the meaning of failure (Campbell et al., 2018). An important aspect in reducing adolescents' tendency to engage in negative self-evaluations after failure is to acknowledge the positive aspects of failure (e.g., failure as a valuable experience and precursor to learn). In line with these suggestions, there is initial evidence that an intervention aimed at identifying and engaging in daily need satisfying activities is effective in reducing stress and need frustration among Syrian refugees (Sheldon et al., 2010; Weinstein, Khabbaz, & Legate, 2016). Future research could explore whether a training in need crafting might foster resilience in highly self-critical and dependent adolescents.

Although people can be stimulated to engage in need satisfying activities, every person will also be confronted with need frustrating experiences from time to time. Therefore, it is also interesting to teach adolescents how to take better care of themselves when exposed to need frustration. Within SDT, it is recommended to be fully aware of the need frustrating experience and explore it in an open, interested and unbiased way. As noted above, this strategy is also referred to as *integrative need-regulation* and is based on SDT's concept of integrative emotion regulation, an emotion regulation strategy characterized by taking interest in one's inner emotional world, receptivity and acceptance of emotions, and integrating them with other aspects of the self (Roth et al., 2009, 2017). Integrative need regulation enables adolescents to use need frustrating experiences as a signal to take action and guide subsequent behavior. Although integrative need-regulation is a rather new concept that calls for further empirical investigation, a growing body of research has already demonstrated positive associations between integrative emotion regulation and adjustment in adolescents (e.g., Benita, Levkovitz, & Roth, 2017; Brenning, Soenens, Van Petegem, & Vansteenkiste, 2015; Roth & Assor, 2012; see Roth, Vansteenkiste, & Ryan, 2019

for an overview). As highly self-critical and dependent adolescents experience, on average, higher levels of need frustration, integrative need regulation could be a promising strategy to reduce personality vulnerability to maladjustment. Future studies could explore whether integrative need regulation could protect adolescents with a higher personality vulnerability to the detrimental effects of need frustration.

Finally, it is also important for clinicians to *support their clients' basic needs within the therapeutic relationship*. According to SDT, clients' need satisfaction is a crucial mechanism underlying the process of personal endorsement for change, a type of motivation that has beneficial effects for lasting therapeutical change (Deci & Ryan, 2000; Van der Kaap-Deeder et al., 2014). The need for relatedness can be fostered when clients experience a sense of trust, warmth and genuine care from their therapist. By providing structure and ensuring that home assignments are manageable, the need for competence is supported. Clinicians can foster clients' need for autonomy by taking the client's perspective, supporting the client to clarify own goals, being responsive to the client's thoughts and feelings, and stimulate initiative or ownership (Ryan & Deci, 2008). An autonomy-supportive style can be integrated within other evidence based treatments like CBT. Whereas CBT focuses on specific outcomes, SDT mainly informs how changes occur and how existing treatment can be optimized (e.g., by offering the techniques in an autonomy-supportive style).

#### 4 General Conclusion

The present dissertation aimed to examine the interplay between self-criticism, dependency and the basic psychological needs in adolescent (mal)adjustment. Throughout the different chapters, consistent support was found for the mediating role of need-based experiences in the relation between self-criticism, dependency and maladjustment. These findings suggest that dependency and self-criticism render adolescents vulnerable to develop psychopathology because these adolescents experience more feelings of pressure, failure, and social alienation in their lives. We also examined the moderating role of personality in the associations between need-based experiences and maladjustment. However, relatively few systematic interactions were found. Overall, a mediation model fitted the data better than a moderation model, suggesting that adolescents with a more vulnerable

personality generate more need frustration and with need frustration, in turn, increasing risk for psychopathology and for depressive symptoms in particular. Although more research is needed and directions for future research are discussed, the present findings suggest that therapeutic interventions and prevention programs could be enriched by attending to adolescents' personality style and psychological needs experiences.

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# **NEDERLANDSTALIGE SAMENVATTING**

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**Het Samenspel Tussen Afhankelijkheid, Zelfkritiek en  
de Psychologische Basisnaden bij Aanpassing van  
Adolescenten:  
Een Correlationele, Dagboek- en Experimentele  
Benadering**

## Introductie

Jongeren ondergaan tijdens de adolescentie belangrijke biologische, cognitieve en sociale transformaties. Daarom wordt de adolescentie beschouwd als een cruciale levensfase vol verandering in verschillende levensdomeinen (Steinberg & Morris, 2001). Omgaan met deze veelheid aan veranderingen kan uitdagend zijn voor adolescenten. Wanneer ze blijven worstelen met de stressoren die typisch zijn voor deze leeftijdsfase, kan hun geestelijke gezondheid in gevaar komen. Adolescenten blijken inderdaad een verhoogd risico te hebben op het ontwikkelen van verschillende vormen van psychopathologie in het algemeen en van depressieve symptomen in het bijzonder (Costello, Copeland, & Angold, 2011). Daarnaast kan de ontwikkeling van psychopathologie tijdens de adolescentie ook verstrekkende gevolgen hebben op de langere termijn. Aangezien kwetsbaarheid voor psychische problemen in deze levensfase nog geen onomkeerbare en onveranderbare eigenschap is (Hauser, Allen, & Golden, 2006), is het belangrijk om meer inzicht te verwerven in de factoren die het risico op psychopathologie verhogen in deze leeftijdsgroep. Hiervoor baseert het huidige proefschrift zich op twee gevestigde theorieën die de ontwikkeling van mensen binnen hun context bestuderen, namelijk de theorie van Blatt (2004, 2008) en de Zelf-Determinatietheorie (ZDT, Deci & Ryan, 2000; Ryan & Deci, 2017).

De theorie van Blatt onderscheidt twee persoonlijkheidsdimensies die adolescenten kwetsbaar maken voor het ontwikkelen van psychopathologie, namelijk zelfkritiek en afhankelijkheid. Zelfkritiek verwijst naar het stellen van zeer hoge standaarden en een neiging tot destructieve zelfevaluatie na falen. Afhankelijkheid wordt daarentegen gekenmerkt door een overdreven nadruk op interpersoonlijke relaties en een sterke angst om de liefde en nabijheid van anderen te verliezen (Blatt, 2004). Zelfkritiek en afhankelijkheid werden oorspronkelijk beschouwd als kwetsbaarheidsfactoren voor het ontwikkelen van depressieve klachten (Blatt, D’Affliti, & Quinlan, 1976), maar al snel werd duidelijk dat ze ook betrokken waren bij de ontwikkeling van een breder scala aan psychische moeilijkheden (Blatt & Schichman, 1983; Campos, Besser, Morgado, & Blatt, 2014). Omdat eerdere onderzoeken meermaals hebben aangetoond dat zelfkritische en afhankelijke adolescenten extra kwetsbaar zijn voor het ontwikkelen van verschillende soorten

psychopathologie, werden zelfkritiek en afhankelijkheid geconceptualiseerd als transdiagnostische kwetsbaarheidsfactoren (Blatt & Luyten, 2009). Het verband tussen Blatts persoonlijkheidsdimensies en de ontwikkeling van psychopathologie kreeg reeds sterke empirische ondersteuning, maar desondanks is er toch weinig geweten over de mechanismen die aan de basis liggen van deze persoonlijkheidskwetsbaarheid. Dergelijke kennis is echter van groot belang, zowel vanuit fundamenteel wetenschappelijk perspectief alsook met het oog op de ontwikkeling van interventies. In dit proefschrift stellen we voor dat de psychologische basisnoden, een centraal concept binnen ZDT, een centrale rol spelen in het verklaren waarom zelfkritiek en afhankelijkheid geassocieerd zijn met psychopathologie.

Volgens ZDT zijn er drie universele basisnoden die essentieel zijn voor groei en welbevinden, namelijk de behoefte aan autonomie (d.i. het ervaren van psychologische vrijheid en keuze), competentie (d.i. het ervaren van bekwaamheid) en relationele verbondenheid (d.i. het ervaren van een warme en hechte band met anderen) (Ryan & Deci, 2017). Satisfactie van elk van de drie behoeftes hangt samen met een betere aanpassing, terwijl frustratie van de behoeftes aanpassingsproblemen en zelfs psychopathologie voorspelt (Vansteenkiste & Ryan, 2013). Verschillende studies toonden immers aan dat behoeftefrustratie een nefaste invloed heeft op de ontwikkeling van een breed spectrum van psychische problemen, waaronder internaliserende problemen (Bartholomew et al., 2011; Chen et al., 2015), externaliserende problemen en eetstoornissen (Boone et al., 2014). Daarom kan behoeftefrustratie ook beschouwd worden als een transdiagnostische risicofactor voor de ontwikkeling van psychopathologie (Campbell, Boone, Vansteenkiste, & Soenens, 2008).

Hoewel verschillende theoretici de conceptuele overlap tussen de theorie van Blatt en ZDT al hebben beschreven (bv. Blatt & Luyten, 2007), hebben weinig studies de link tussen beide theorieën empirisch onderzocht (Kopala-Sibley & Zuroff, 2019). Dit proefschrift probeert bij te dragen aan de conceptuele convergentie tussen beide theorieën. Het **hoofddoel** van dit proefschrift was om het samenspel tussen de psychologische basisbehoeftes en zelfkritiek en afhankelijkheid te onderzoeken bij adolescenten. Hierbij onderzochten we eerst een mediatiemodel waarbij

behoeftegerelateerde ervaringen (d.i. behoeftesatisfactie en -frustratie) het verband tussen persoonlijkheid en aanpassingsproblemen verklaren (**doel 1**). We verwachtten dat ervaringen van behoeftefrustratie, en in mindere mate ook een gebrek aan behoeftesatisfactie, zouden verklaren waarom zelfkritische en afhankelijke jongeren meer psychische problemen rapporteren. Ten tweede onderzochten we ook een moderatiemodel waarin persoonlijkheid interageert met behoeftegerelateerde ervaringen in het voorspellen van aanpassing (**doel 2**). We verwachtten dat zelfkritische en afhankelijke jongeren meer gevoelig zouden zijn voor de negatieve gevolgen van hoge behoeftefrustratie en lage behoeftesatisfactie.

Deze doelen werden nagestreefd in een reeks van cross-sectionele, longitudinale, dagboek- en experimentele studies. We achtten het belangrijk om het verband tussen persoonlijkheid, de behoeftes en aanpassing op een dynamische manier te bestuderen omdat mediatie en moderatie ook inherent dynamische en intra-individuele processen zijn. Bovendien hebben we doorheen dit proefschrift verschillende indicatoren van aanpassingsproblemen gemeten, alhoewel depressieve klachten de hoofdfocus waren. Zo wilden we de relevantie van de veronderstelde dynamieken aantonen met betrekking tot een brede waaier aan uitkomstmaten.

## **Resultaten en discussie**

### **De mediërende rol van behoeftegerelateerde ervaringen in persoonlijkheidskwetsbaarheid voor aanpassingsproblemen**

Vier studies werden uitgevoerd om de verklarende rol van behoeftegerelateerde ervaringen te testen in het verband tussen persoonlijkheid en verschillende indicatoren van aanpassingsproblemen. De bevindingen in **hoofdstuk 2** (een cross-sectionele studie van 284 adolescenten en hun ouders) tonen aan dat zelfkritiek en afhankelijkheid geassocieerd zijn met hogere niveaus van behoeftefrustratie, hetgeen op zijn beurt geassocieerd is met meer internaliserende en externaliserende problemen. We vonden echter geen evidentie voor de mediërende rol van behoeftesatisfactie.

**Hoofdstuk 3** beschrijft de resultaten van een longitudinale studie ( $N = 149$ ) en heeft als doel verder te bouwen op de bevindingen in hoofdstuk 2 door de mediërende rol van behoeftegerelateerde ervaringen in de relatie tussen



persoonlijkheid en depressieve symptomen te bestuderen op het inter- en intra-individuele niveau. De mediatie op het interindividuele niveau toont aan dat hogere niveaus van behoeftefrustratie verklaren waarom zelfkritische en afhankelijke jongeren meer depressieve symptomen rapporteren in vergelijking met andere jongeren. Op het intra-individuele niveau tonen de resultaten aan dat veranderingen in zelfkritiek en afhankelijkheid (in vergelijking met het eigen referentieniveau) geassocieerd zijn met veranderingen in depressieve klachten (eveneens ten opzichte van het eigen referentieniveau) en dat dit verband verklaard kan worden door overeenkomstige veranderingen in behoeftefrustratie. Net als in hoofdstuk 2 was de mediërende rol van behoeftesatisfactie niet significant in deze studie.

Terwijl het onderzoeksopzet in hoofdstuk 3 bestond uit 3 herhaalde metingen met een tijdsinterval van 6 maanden, hebben we in hoofdstukken 4 en 5 het voorgestelde mediatiemodel over een kortere tijdperiode getoetst. De studie in **hoofdstuk 4** (een dagboekstudie met 121 adolescenten) onderzocht het verband tussen persoonlijkheid, behoeftegerelateerde ervaringen en depressieve symptomen op dagelijkse basis. Uit de resultaten bleek dat zelfkritiek en afhankelijkheid significant fluctueren van dag tot dag en dat deze schommelingen hand in hand gaan met dagelijkse schommelingen in depressieve klachten. Bovendien verklaarden de dagelijkse schommelingen in behoeftefrustratie ook het dagelijkse verband tussen persoonlijkheid en depressieve klachten. In tegenstelling tot de bevindingen in hoofdstukken 2 en 3, toonde de dagboekstudie aan dat ook een gebrek aan behoeftesatisfactie het verband tussen persoonlijkheid en depressieve symptomen kan verklaren. Deze bevinding suggereert dat zowel behoeftefrustratie als een gebrek aan behoeftesatisfactie belangrijk zijn om persoonlijkheidskwetsbaarheid voor depressie op dagelijkse basis te begrijpen.

Tot slot werden in **hoofdstuk 5** de bevindingen van een prospectieve studie besproken ( $N = 82$ ), waarbij de verbanden tussen zelfkritiek en zowel positieve als negatieve indicatoren van schoolse aanpassing aan de hand van wekelijkse metingen werden onderzocht. Behoeftesatisfactie verklaarde het verband tussen zelfkritiek en negatieve schoolse aanpassing (negatief affect, negatieve betrokkenheid en gecontroleerde motivatie) op het intra-individueel niveau. Bovendien verklaarde een gebrek aan behoeftesatisfactie ook het negatieve verband tussen zelfkritiek en

positieve schoolse aanpassing (positief affect, positieve betrokkenheid en autonome motivatie). Deze bevindingen zijn in lijn met de notie dat behoeftefrustratie voornamelijk geassocieerd is met indicatoren van aanpassingsproblemen, terwijl behoeftesatisfactie vooral welzijn en een gezonde psychologische ontwikkeling voorspelt.

Samengevat vond het huidige proefschrift sterke evidentie voor de verklarende rol van behoeftefrustratie in het verband tussen zelfkritiek, afhankelijkheid en aanpassingsproblemen. Deze bevinding suggereert dat bepaalde persoonlijkheidskenmerken meer behoeftefrustrerende ervaringen genereren. Deze ervaringen van behoeftefrustratie dragen vervolgens bij tot de verhoogde kwetsbaarheid voor psychopathologie. In lijn met de verwachtingen bleek behoeftefrustratie dit verband meer systematisch te verklaren dan behoeftesatisfactie. Dit resultaat werd zowel op het interindividueel niveau als op het intra-individueel niveau bevestigd.

### **De modererende rol van zelfkritiek en afhankelijkheid in het verband tussen behoeftegerelateerde ervaringen en aanpassingsproblemen**

De modererende rol van zelfkritiek en afhankelijkheid in het verband tussen behoeftegerelateerde ervaringen en aanpassingsproblemen werd getoetst aan de hand van vier studies. In de cross-sectionele studie in **hoofdstuk 2** werden interacties tussen persoonlijkheid en behoeftegerelateerde ervaringen getoetst in de voorspelling van internaliserende en externaliserende problemen. Slechts 1 van 8 interacties was significant, namelijk de interactie tussen afhankelijkheid en behoeftesatisfactie. Deze bevinding toont aan dat afhankelijkheid enkel geassocieerd was met externaliserende problemen in combinatie met weinig behoeftesatisfactie.

**Hoofdstuk 3** bouwde verder op dit werk door cross-level interacties tussen persoonlijkheid en behoeftegerelateerde ervaringen te onderzoeken aan de hand van een longitudinaal onderzoeksopzet. We vonden geen significante cross-level interacties. Dit wijst erop dat interindividuele verschillen in zelfkritiek en afhankelijkheid de intra-individuele verbanden tussen behoeftegerelateerde ervaringen en depressieve klachten niet modereren.

Mogelijks is er meer ruimte voor moderatie binnen een kortere tijdsperiode. Daarom hebben we hetzelfde moderatiemodel ook onderzocht aan de hand van studies met dagelijkse (zie hoofdstuk 4) en wekelijkse metingen (zie hoofdstuk 5). De studie met wekelijkse metingen in **hoofdstuk 5** onderzocht de modererende rol van zelfkritiek in het verband tussen de noden en academische aanpassing. Er werd echter geen significant moderatie-effect gevonden. De dagboekstudie in **hoofdstuk 4** vond daarentegen wel evidentie voor de modererende rol van persoonlijkheid, waarbij zelfkritiek bijvoorbeeld het effect van een lage behoeftesatisfactie op depressieve klachten versterkt. Aangezien 2 van de 4 interacties significant waren, wijzen de resultaten erop dat zelfkritiek en afhankelijkheid allebei het potentieel hebben om de sterkte van het verband tussen de behoeften en depressieve klachten in zekere mate te beïnvloeden.

Terwijl de correlationele studies zich richtten op de modererende rol van persoonlijkheid in het verband tussen subjectieve ervaringen van behoeftesatisfactie, behoeftefrustratie en aanpassingsproblemen, onderzocht de experimentele studie in **hoofdstuk 6** de vraag of afhankelijkheid iemands reactie op een objectieve behoeftefrustrerende situatie modereert. Hierbij werd er sociale exclusie experimenteel geïnduceerd in een steekproef van 180 adolescenten. Hoewel we verwachtten dat afhankelijkheid het verband tussen sociale exclusie en de frustratie van verbondenheid zou versterken, vonden we toch geen significant interactie-effect.

Samengevat biedt dit proefschrift slechts beperkte evidentie voor de modererende rol van zelfkritiek en afhankelijkheid. Dit wijst erop dat de data beter aansluiten bij een mediatiemodel dan bij een moderatiemodel.

### **Klinische implicaties**

Op basis van de resultaten van dit proefschrift kunnen een aantal suggesties aangereikt worden om het klinisch werk met adolescenten te versterken. Ten eerste wijzen de resultaten uit de voorgaande studies erop dat het belangrijk is om klinische interventies te richten op het verminderen van de neiging tot zelfkritiek en afhankelijkheid, zeker bij jongeren met een verhoogd risico op internaliserende problemen. Preventieprogramma's met als doel de veerkracht te versterken kunnen

zich ook specifiek richten op jongeren met verhoogde scores op zelfkritiek en afhankelijkheid.

Ten tweede geven de bevindingen in het huidige onderzoek aan dat behoeftegerelateerde ervaringen een centrale rol spelen bij aanpassingsproblemen en psychopathologie. Gezien de nefaste invloed van behoeftefrustratie, kunnen hulpverleners jongeren helpen om zich meer bewust te worden van behoeftefrustrerende ervaringen en hun manier van omgaan met deze ervaringen verbeteren. Men kan jongeren ook uitdagen om op zoek gaan naar manieren om meer behoeftebevredigende ervaringen op te doen en zo zelf actief bij te dragen aan meer behoeftebevrediging in het dagelijkse leven.

### **Algemene conclusie**

Tallose studies hebben aangetoond dat zelfkritische en afhankelijke jongeren meer vatbaar zijn voor het ontwikkelen van psychische problemen. Tot nu toe werd echter weinig onderzocht welke onderliggende processen deze persoonlijkheidskwetsbaarheid voor psychopathologie kunnen verklaren. In het huidige proefschrift bestudeerden we daarom in welke mate de psychologische behoeften aan autonomie, verbondenheid en competentie kunnen verklaren waarom zelfkritische en afhankelijke jongeren meer psychische problemen rapporteren. In een reeks van vier studies toonden we aan dat de psychologische basisbehoeften een belangrijke verklarende rol spelen in het verband tussen persoonlijkheid en verschillende types van psychopathologie. De verklarende rol van de basisbehoeften werd bevestigd aan de hand van cross-sectionele, longitudinale en dagboekgebaseerde onderzoeksmethodes. Deze resultaten suggereren dat zelfkritische en afhankelijke jongeren meer noodfrustrerende ervaringen genereren en dat dit vervolgens bijdraagt aan de toenemende kwetsbaarheid voor psychopathologie. Daarnaast onderzochten we ook of persoonlijkheid het verband tussen de basisbehoeften en psychopathologie modereert. Zelfkritische en afhankelijke jongeren zouden bijvoorbeeld meer gevoelig kunnen zijn voor de negatieve gevolgen van noodfrustratie. Op basis van vijf studies vonden we echter weinig systematische evidentie voor een dergelijk moderatiemodel. Deze bevinding wijst erop dat noodfrustratie een emotionele kost zou hebben bij alle adolescenten, ongeacht hoe zelfkritisch of afhankelijk ze zijn.

## **ENGLISH SUMMARY**

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**The Interplay Between Dependency, Self-Criticism, and  
the Basic Psychological Needs in Adolescent  
Adjustment:  
A Correlational, Diary-Based, and Experimental  
Approach**

## Introduction

Adolescents undergo significant biological, cognitive and social transformations. Therefore, adolescence is considered a critical life stage full of change in various domains of functioning (Steinberg & Morris, 2001). Dealing with this multitude of transformations can be challenging for adolescents. When they continue to struggle with the stressors typical of this new developmental stage, their mental health can be at risk. Indeed, adolescents have a heightened risk to develop several types of psychopathology in general and depressive symptoms in particular (Costello, Copeland, & Angold, 2011). Furthermore, the development of psychopathology in adolescence can have long-lasting consequences. Given that vulnerability to psychological difficulties is still susceptible to change in adolescence (Hauser, Allen, & Golden, 2006), it is important to gain more insight in factors that increase the risk for psychopathology in this developmental period. To provide more fine-grained insight into these factors, the present dissertation draws upon two well-established theoretical frameworks about human development in context, namely Blatt's (2004, 2008) theory and Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017).

According to Blatt's theory, self-criticism and dependency are two main personality dimensions that confer vulnerability to psychopathology in adolescents. Whereas self-criticism involves a tendency to set unrealistically high and rigid standards and to engage in negative self-evaluation after failure, dependency entails an exaggerated focus on interpersonal closeness and strong concerns about losing other people's love, (Blatt, 2004). Although dependency and self-criticism were originally identified as key personality vulnerabilities involved in depression (Blatt, Dafflitti, & Quinlan, 1976), it soon became clear that they were involved in the development of psychopathology more generally (Blatt, 1983; Campos, Besser, Morgado, & Blatt, 2014). As plenty of studies demonstrated that adolescents with high levels of self-criticism and dependency are more vulnerable to several types of psychopathology, self-criticism and dependency have been conceptualized as transdiagnostic vulnerability factors (Blatt & Luyten, 2009). Although the link between Blatt's personality dimensions and the development of psychopathology received much empirical confirmation, less is known about the mechanisms

underlying this personality vulnerability. Such knowledge, however, is crucial from both a basic science as well as intervention perspective. In the present dissertation, we propose that the basic psychological needs, a central concept in SDT, may play a pivotal role in explaining why self-criticism and dependency are related to psychopathology.

According to SDT, people have three basic and universal psychological needs that are essential for individuals' well-being and psychological growth, that is, the needs for autonomy (i.e., experiencing a sense of volition and ownership), competence (i.e. experiencing a sense of efficacy), and relatedness (i.e., experiencing a sense of connection and reciprocity in interpersonal relationships) (Ryan & Deci, 2017). Satisfaction of the three needs predicts adjustment and well-being, whereas frustration of the needs is a predictor of maladjustment and even psychopathology (Vansteenkiste & Ryan, 2013). Indeed, several studies provide evidence for the detrimental role of need frustration in the development of a wide range of psychopathological phenomena, including internalizing problems (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Chen et al., 2015), externalizing problems and eating disorders (Boone, Vansteenkiste, Soenens, Van der Kaap-Deeder, & Verstuyf, 2014). Therefore, need frustration can also be considered as a transdiagnostic risk factor for psychopathology (Campbell, Boone, Vansteenkiste, & Soenens, 2018).

Although several theorists have noted conceptual overlap between Blatt's theory and SDT (e.g., Blatt & Luyten, 2009), empirical confirmation is still lacking (Kopala-Sibley & Zuroff, 2019). This dissertation attempted to contribute to further conceptual convergence between both theories. Specifically, the **main aim** of the present dissertation was to examine the interplay between psychological need-based experiences and self-criticism and dependency in the prediction of (mal)adjustment in adolescents. In doing so, we first considered the possibility of a mediation model, in which need-based experiences account for the associations between personality and maladjustment (**aim 1**). Specifically, we hypothesized that need frustration, and a lack of need satisfaction to a lesser extent, explains why highly self-critical and dependent adolescents report more psychological difficulties. Second, we additionally investigated a moderation model, according to which personality interacts with need-

based experiences in the prediction of (mal)adjustment (**aim 2**). We hypothesized that adolescents high on self-criticism and dependency would be more sensitive to the negative consequences of need frustration and low need satisfaction.

These objectives were pursued throughout a series of cross-sectional, longitudinal, diary and experimental studies in adolescent samples. We deemed it important to investigate the associations between personality, the needs and adolescents' (mal)adjustment in a dynamic fashion, as mediation and moderation processes are inherently dynamic and intra-individual processes. Moreover, we used several indicators of maladjustment throughout the different chapters of the dissertation, although depressive symptoms were the main focus. As such, we attempted to demonstrate the relevance of the hypothesized dynamics across a broad range of outcomes.

## **Results and Discussion**

### **The mediating role of need-based experiences in personality vulnerability to maladjustment**

Four studies were conducted to test the explanatory role of the need-based experiences in associations between personality and several indicators of maladjustment. Findings from **Chapter 2** (a cross-sectional study with 284 adolescents and their parents) indicated that self-criticism and dependency were associated with higher levels of need frustration which, in turn, were related to more internalizing and externalizing problems. No evidence was found for the mediating role of need satisfaction in these associations.

**Chapter 3** presented findings from a longitudinal study ( $N = 149$ ) and aimed to build on the findings in Chapter 2 by examining the mediating role of needs experiences in the relation between personality and depressive symptoms both at the within- and at the between-person level of change. The mediation at the between-person level indicated that higher levels of need frustration explain why highly self-critical and dependent individuals report more depressive symptoms, as compared to other adolescents. At the within-person level, the results suggested that fluctuations in need frustration (compared to adolescents' own baseline level) also explain associations between changes in personality and depressive symptoms in comparison



to adolescents' own baseline levels. Similar to Chapter 2, the explanatory role of need satisfaction was not significant in this study.

Whereas the study design in Chapter 3 consisted of repeated measurements with a 6-month time interval, we tested the hypothesized mediation model over a shorter period of time in Chapters 4 and 5. The study in **Chapter 4** (a diary study,  $N = 121$ ) examined daily associations between personality, the need-based experiences and depressive symptoms. Results indicated that self-criticism and dependency vary significantly from day to day, and that these daily fluctuations in personality go hand in hand with daily fluctuations in depressive symptoms. Moreover, daily fluctuations in need frustration explained the daily associations between personality and depression. In contrast to the findings in Chapters 2 and 3, we also found evidence for the mediating role of low need satisfaction in the relation between personality and depression in this study. This finding suggests that both need frustration and a lack of need satisfaction are important to understand personality vulnerability on a daily basis.

Finally, **Chapter 5** reports on findings from a three-week prospective study ( $N = 82$ ), thereby focusing on short-term associations between self-criticism and positive and negative indicators of adolescents' academic functioning using weekly assessments. Need frustration explained the associations between self-criticism and negative academic functioning (i.e., negative affect, disaffection and controlled motivation) at the within-person level. Moreover, low need satisfaction accounted for the negative associations between self-criticism and positive academic adjustment (i.e., positive affect, positive engagement and autonomous motivation). These findings are consistent with the notion that need frustration is primarily associated with indicators of maladjustment, whereas need satisfaction primarily predicts well-being and healthy psychological development.

In conclusion, the present dissertation found convincing support for the explanatory role of need frustration in the association between self-criticism and dependency and maladjustment, suggesting that personality generates certain need frustrating experiences. Consistent with our expectations, need frustration mediated the associations more systematically as compared to need satisfaction. This result was

found both at the between-person level (i.e., the level of interindividual differences) and at the within-person level (i.e., the level of intra-individual change).

### **The moderating role of self-criticism and dependency in the association between need-based experiences and maladjustment**

The moderating role of personality in the association between the needs experiences and maladjustment was tested in four studies. In the cross-sectional study in **Chapter 2**, interactions between personality and the needs-based experiences were tested in the prediction of internalizing and externalizing problems. Only 1 out of 8 interactions was significant, namely the interaction between dependency and need satisfaction. This finding indicates that dependency was related to externalizing problems only when combined with low levels of need satisfaction.

**Chapter 3** built on this work by investigating cross-level interactions between personality and the need-based experiences using a longitudinal design. We found no evidence for significant cross-level interactions, indicating that between-person (i.e., interindividual) differences in self-criticism and dependency do not moderate within-person (i.e., intraindividual) associations between need-based experiences and depressive symptoms.

Possibly, there could be more room for moderation across a shorter time period. Therefore, the possibility of moderation was examined also in the studies with daily (Chapter 4) and weekly (Chapter 5) assessments. The study with weekly assessments in **Chapter 5** investigated moderation by self-criticism in associations between the needs and academic adjustment, but showed no evidence for moderation. However, the diary study in **Chapter 4** provided some evidence for the moderating role of personality, with self-criticism for instance amplifying the effect of low need satisfaction on depressive symptoms. As 2 out of 4 interactions were significant, the findings suggest that self-criticism and dependency have the potential to alter the relation between need-based experiences and depressive symptoms to some extent.

Whereas the correlational studies focused on the moderating role of personality in the relation between subjectively experienced needs and maladjustment, the experimental study in **Chapter 6** investigated whether dependency moderates individuals' reaction to an objective need-thwarting situation.

In this study, social rejection was experimentally induced in a sample of 180 adolescents. Although we hypothesized that dependency would exacerbate the association between social exclusion and relatedness frustration, no significant interaction effects were found.

In conclusion, limited evidence for the moderating role of self-criticism and dependency was found, suggesting that the data fitted a mediation model better than a moderation model.

### **Clinical Implications**

The findings of the present dissertation may offer suggestions for improving clinical work with adolescents. First, the results of this dissertation point to the importance of reducing self-criticism and dependency in clinical interventions, especially among adolescents at risk for internalizing problems. Highly dependent and self-critical adolescents may also be targeted as at-risk youth for prevention programs in order to increase resilience.

Second, the present findings suggest that need-based experiences play a central role in adolescents' adjustment and psychopathology. Given the detrimental role of need frustration, clinicians could help adolescents to increase awareness of need frustrating experiences and improve their ways of coping with such experiences. It is also recommended to invite adolescents to search for opportunities to engage in more need satisfying activities and to actively craft more need satisfying experiences in their daily life.

### **General conclusion**

Plenty of studies have demonstrated that self-criticism and dependency confer risk to psychopathology in adolescents. However, less is known about the processes underlying this personality vulnerability to psychopathology. In the present dissertation, we examine whether the basic psychological needs for autonomy, relatedness and competence can explain why self-critical and dependent adolescents report more psychological difficulties. Throughout four different studies, we showed that adolescents' psychological needs experiences play an important explanatory role in the associations between personality and several types of maladjustment. Evidence

for this mediating role emerged in cross-sectional, longitudinal and diary research designs. These results suggest that self-critical and dependent adolescents generate more need frustrating experiences which, in turn, are associated with increased risk for psychopathology. Next, we also examined the moderating role of personality in the associations between needs-based experiences and maladjustment. Based on five studies, we only found few systematic evidence for moderation. This finding suggests that need frustration has an emotional cost in all adolescents, regardless of their self-criticism and dependency levels.

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— David Steindl – Rast

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Een speciaal woordje van dank wil ik nog richten aan mijn bureaugenootjes van het eerste uur, Rachel en Lisa. Vanaf dag 1 voelde ik me helemaal welkom bij jullie. Ons bureau vormde dan ook het decor van tal van verjaardagsfeesten, spelletjes en andere vormen van entertainment. Daarnaast konden we ook echt lief en leed met elkaar delen. Dit betekende heel veel voor mij. Rachel, sinds jij België verruild hebt voor Australië heb ik al heel vaak gedacht ‘Hoe zou Rachel dit toch aanpakken?’. Je hebt me enorm goed geholpen om m’n eerste stappen als onderzoeker te zetten. Lisa, ik vond het heel fijn dat we de voorbije 4 jaar samen konden afleggen. In deze periode heb je me ontelbare keren geholpen. Bovendien bleek je ook een superleuke reisbuddy te zijn! Nooit gedacht dat dit doctoraat ook zou leiden tot het spotten van beren, orka’s, krokodillen, kangoeroes en koala’s. Gert-Jan, wij zijn ongeveer gelijktijdig gestart, dus we konden vaak samen onze weg zoeken in de wetenschappelijke wereld. Bedankt voor de vele leuke babbels en alle steun, zeker tijdens de eindsprint van mijn doctoraat. Het jonge Belgisch tennistalent kan zich echt geen betere coach wensen dan jij. Jochen en Sara, ook al hebben jullie de universiteit vorig jaar al verlaten, jullie waren steeds mijn maatjes! Onze roadtrip door Canada was dan ook een absoluut hoogtepunt.

Ook bedankt aan de collega’s van Centrum Kind en Adolescent om me onder te dompelen in de klinische praktijk en mij zo te laten groeien als therapeut. Dit vormde een aangename en interessante afwisseling met het onderzoekswerk. Bedankt

aan Barbara om de treinritten van en naar Brugge op te fleuren. Tot slot dankjewel aan Katrien en Steven voor alle ondersteuning op vlak van administratie en ICT.

Verder wil ik graag mijn dichtste vriendinnen bedanken. Evelien, Valentine, Isabelle, Astrid, Emily, Iris, Nele. De meesten onder jullie ken ik al sinds het middelbaar, of zelfs al sinds de kleuterklas. Bedankt voor de trouwe vriendschap waarbij we zo veel met elkaar kunnen delen! Ik vond het heel attent dat jullie zo vaak vroegen hoe het ging met dit doctoraat, maar toch wil ik jullie vooral ook bedanken voor alle superleuke momenten die we de voorbije jaren samen beleefd hebben. Bedankt ook aan de lieve vrienden en vriendinnen die ik heb leren kennen tijdens mijn studententijd in Gent. Chloë, Sarah, Lies, Séline, Daphné, Shana, Veerle, Wout en Deinhart. Ook al zijn we intussen al 6 jaar afgestudeerd, toch vormen we nog steeds een zeer hechte groep. Bedankt dat jullie altijd voor me klaar staan. Jullie maken het leven zo veel leuker! Chloë, jij zat in hetzelfde schuitje als ik. Samen konden we uren babbelen over onze doctoraatsavonturen, en dan nog het liefst over alle grappige dingen die dagelijks op ons pad kwamen. Bedankt voor je luisterend oor, je goeie raad, en de vele leuke sms'jes vanuit Abu Dhabi waarmee je mee steeds een hart onder de riem stak.

Mamie en oma, ook jullie geloven heel erg in mij en staan altijd voor me klaar. Jullie zijn heel trots op mij en op m'n zus, maar ik ben ook heel trots op twee zo'n sterke oma's! Papie, je bent één van de meest wijze en minzame personen die ik ooit gekend heb. Door dit doctoraat te schrijven hoop ik toch een beetje in jouw voetsporen te treden.

Mama en papa, jullie zijn steeds mijn grootste supporters geweest! Bedankt voor het liefdevolle nest waarin ik mocht opgroeien en nog steeds met evenveel plezier naartoe terugkeer. Bedankt om steeds voor mij klaar te staan op alle mogelijke manieren. Jullie leerden me hard te werken om iets te bereiken, maar ook om goed zorg te dragen voor mezelf. Wat er ook gebeurt, jullie zijn er altijd voor me. Ik weet dat jullie heel trots zijn op mij, maar jullie zouden zeker even trots geweest zijn moest ik een heel andere weg ingeslaan zijn. Ann-Sophie, jij bent een schat van een zus! Zo zorgzaam en attent. Wij hebben een heel hechte band die ik altijd wil blijven koesteren.

Mijn laatste woord van dank gaat uit naar de man die ik tijdens m'n doctoraat heb ontmoet en sindsdien niet meer van mijn zijde is geweken. Nico, bedankt om er altijd voor mij te zijn. Ook al stonden de laatste maanden vooral in het teken van dit doctoraat, bij jou kon ik steeds weer tot rust komen. Telkens weer doe je me lachen, zet je me aan het denken, laat je me in mezelf geloven en doe je mij dromen van ons verdere leven samen.

Hartelijk dank allemaal!

Beatrijs, maart 2019



# **APPENDIX**

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## **Data Storage Fact Sheets**

% Data Storage Fact Sheet (versie 7 maart 2014)

% Name/identifier study: DSFS Beatrijs Vandenkerckhove\_Chapter2

% Author: Beatrijs Vandenkerckhove

% Date:26/11/2018

1. Contact details

=====

1a. Main researcher

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  - e-mail: beatrijs.vandenkerckhove@ugent.be

1b. Responsible Staff Member (ZAP)

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- name: Bart Soenens
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If a response is not received when using the above contact details, please send an email to data-ppw@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

=====

*\* Reference of the publication in which the datasets are reported: Vandenkerckhove, B., Brenning, K., Vansteenkiste, M., Luyten, P., & Soenens, B. (2019). The explanatory role of basic psychological need experiences in the relation between dependency, self-criticism, and psychopathology in adolescence. Journal of Psychopathology and Behavioral Assessment. Advance online publication. <https://doi.org/10.1002/jab.1000> **Table 0-1: Means, Standard Deviations and Correlations Between the Study Variables***

7/s10862-019-09719-0.

\* Which datasets in that publication does this sheet apply to?: The sheet applies to all the data used in the publication

3. Information about the files that have been stored

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3a. Raw data

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\* Have the raw data been stored by the main researcher? ☒ YES / ☐ NO

If NO, please justify:

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- ☒ researcher PC
- ☒ research group file server
- ☐ other (specify): ...

\* Who has direct access to the raw data (i.e., without intervention of another person)?

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- ☒ responsible ZAP
- ☒ all members of the research group
- ☐ all members of UGent
- ☐ other (specify): ...

3b. Other files

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- ☒ file(s) containing processed data. Specify: .dat file for mplus data
- ☒ file(s) containing analyses. Specify: syntax for analysis conducted in Mplus
- ☐ file(s) containing information about informed consent. Specify: ...
- ☐ a file specifying legal and ethical provisions. Specify: ...
- ☐ file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- ☐ other files. Specify: ...

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- ☐ other: ...

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% Data Storage Fact Sheet (versie 7 maart 2014)

% Name/identifier study: DSFS Beatrijs Vandenkerckhove\_Chapter3

% Author: Beatrijs Vandenkerckhove

% Date:04/03/2019

1. Contact details

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1a. Main researcher

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2. Information about the datasets to which this sheet applies

===== \* Reference of  
the publication in which the datasets are reported: Vandenkerckhove, B., Michiel, B.,  
Vansteenkiste, M., Brenning, K., Luyten, P., & Soenens, B. (2019). *A longitudinal  
examination of the interplay between  
personality vulnerability and need-based experiences in adolescents' depressive  
symptoms*. Manuscript submitted for publication.

\* Which datasets in that publication does this sheet apply to?: The sheet applies to all  
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\* Who has direct access to the raw data (i.e., without intervention of another person)?

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- ☒ responsible ZAP
- ☒ all members of the research group
- ☐ all members of UGent
- ☐ other (specify): ...

### 3b. Other files

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- ☒ file(s) containing processed data. Specify: .dat file for mplus data
- ☒ file(s) containing analyses. Specify: syntax for analysis in Mplus
- ☐ file(s) containing information about informed consent. Specify: ...
- ☐ a file specifying legal and ethical provisions. Specify: ...
- ☐ file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- ☐ other files. Specify: ...

\* On which platform are these other files stored?

- ☒ individual PC
- ☒ research group file server
- ☐ other: ...

\* Who has direct access to these other files (i.e., without intervention of another person)?

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% Data Storage Fact Sheet (versie 7 maart 2014)

% Name/identifier study: DSFS Beatrijs Vandenkerckhove\_Chapter4

% Author: Beatrijs Vandenkerckhove

% Date:04/03/2019

1. Contact details

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1a. Main researcher

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If a response is not received when using the above contact details, please send an email to [data-ppw@ugent.be](mailto:data-ppw@ugent.be) or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

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\* Reference of the publication in which the datasets are reported: Vandekerckhove, B., Soenens, B., Luyten, P., Campbell, R., & Soenens, B. (2019). Daily ups-and-downs in adolescents' depressive symptoms: The role of daily self-criticism, dependency and basic psychological needs. *Manuscript in preparation*.

\* Which datasets in that publication does this sheet apply to?: The sheet applies to all the data used in this publication.

3. Information about the files that have been stored

=====

3a. Raw data

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\* Have the raw data been stored by the main researcher? ☒ YES / ☐ NO

If NO, please justify:

\* On which platform are the raw data stored?

- ☒ researcher PC
- ☒ research group file server
- ☐ other (specify): ...

\* Who has direct access to the raw data (i.e., without intervention of another person)?

- ☒ main researcher
- ☒ responsible ZAP
- ☒ all members of the research group
- ☐ all members of UGent
- ☐ other (specify): ...

3b. Other files

-----

\* Which other files have been stored?

- ☒ file(s) describing the transition from raw data to reported results. Specify: SPSS syntax file for transition raw data in used variables

- ☒ file(s) containing processed data. Specify: .dat file for analysis in MPlus

- ☐ file(s) containing analyses. Specify: syntax for analyses conducted in MPlus

- ☐ file(s) containing information about informed consent. Specify: ...

- ☐ a file specifying legal and ethical provisions. Specify: ...

- ☐ file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...

- ☐ other files. Specify: ...

\* On which platform are these other files stored?

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- ☐ other: ...

\* Who has direct access to these other files (i.e., without intervention of another person)?

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% Data Storage Fact Sheet (versie 7 maart 2014)

% Name/identifier study: DSFS Beatrijs Vandenkerckhove\_Chapter5

% Author: Beatrijs Vandenkerckhove

% Date:26/11/2018

1. Contact details

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1a. Main researcher

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  - e-mail: beatrijs.vandenkerckhove@ugent.be

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## 2. Information about the datasets to which this sheet applies

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\* Reference of the publication in which the datasets are reported: Vandenkerckhove, B., Soenens, B., Van der Kaap-Deeder, J., Brenning, K., Luyten, P., & Vansteenkiste, M. (in press). *The role of weekly need-based experiences and self-criticism in predicting weekly academic (mal)adjustment. Learning And Individual Differences.*

\* Which datasets in that publication does this sheet apply to?: The sheet applies to all the data used in this publication.

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### 3a. Raw data

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\* Have the raw data been stored by the main researcher? ☒ YES / ☐ NO

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\* On which platform are the raw data stored?

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- [X] research group file server
- [ ] other (specify): ...

\* Who has direct access to the raw data (i.e., without intervention of another person)?

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- [X] responsible ZAP
- [X] all members of the research group
- [ ] all members of UGent
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3b. Other files

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\* Which other files have been stored?

- ☒ file(s) describing the transition from raw data to reported results. Specify: SPSS syntax file for transition raw data in used variables
- ☒ file(s) containing processed data. Specify: .dat file for mplus data
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- ☐ other: ...

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% Data Storage Fact Sheet (versie 7 maart 2014)

% Name/identifier study: DSFS Beatrijs Vandenkerckhove\_Chapter6

% Author: Beatrijs Vandenkerckhove

% Date:26/11/2018

1. Contact details

=====

1a. Main researcher

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\* Reference of the publication in which the datasets are reported: Vandenkerckhove, B., Soenens, B., Waterschoot, J., Nasso, S., De Raedt, R., Luyten, P., & Vansteenkiste, M. (2019). Does dependency play a role in need-based responses to social exclusion? *Manuscript in preparation.*

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- ☐ all members of UGent
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-----

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- ☒ file(s) containing analyses. Specify: syntax for analysis in Mplus (.sps), R scripts
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